know, and I'll move it up for you when you get to it.
A Go down. The downloading interface permitting downloading of enabling data related to at least one corresponding vehicle device for use by said multiple vehicle compatible controller. At this point, the information that's being returned from the remote server is just information for this vehicle.
Q Are data codes downloaded in Oxnard, California?
A Device codes, do you mean?
Q Yes, sir.
A No, they're not.
Q What's downloaded?
A It's really just pointers identifying what parameters the LMU should be looking at.
Q Would that include any information concerning the bus that we talked about, the hi, how are you, please respond?
A We've identified the bus, and then you get the VIN. And from the VIN, you get the informa-- you send it off remotely to get the information that is of interest.
Q That's not a downloading? Well, what is --
A I'm commenting on the multiple vehicle part of it.
Q Okay.
A Which is a different argument than we say before about unplugging and plugging it. It's the information

that's available for that -- that is of interest for that vehicle.
Q Because it goes through the discovery bus protocol, you would agree that it can discover multiple different bus types?
A Yes.
Q Is there anything else?
A Not on that one.
Q Number 18.
A And the same arguments are applying on this as we go, so I don't have to repeat those; is that correct?
Q No. I'm looking for new argument, something the jury hasn't already heard you and I go back and forth.
A Okay, yeah. Sorry. We're in agreement.
Go down, please. The temporary connection on the bottom is one.
Q That's something new?
A Yes, it is.
Q All right. When the units are provisioned in Oxnard, California, are they connected to the board?
A Yes, they are.
Q With a temporary connection?
A That's how I understand it, yes.
Q Okay. So that would be found?
A The way I read this is beyond the vehicle at the

time.
Q Beyond the vehicle at the time?
A Yes.
Q What does that mean?
A Well, this was programming and -- this was -- described what's going on in the vehicle in terms of the information available on the bus, the communication to get information to send it out wirelessly and then said downloading interface comprised of a wireless receiver temporarily connected to a downloading device.
Q Well, the wireless refer would be temporarily connected, right? It's not always on.
A Okay. Yes, you're right.
Q Anything else?
A No.
Q And that's all the independent claim of the '278?
A Yes.
Q Now, why is the '278 invalid?
A 'Cause of what I just described -- oh, invalid, I'm sorry.
Q Yes, sir.
A Based on the references that I looked at and analyzed, I saw the claim, a good description of the Flick patents.
Q And which references did you throw at the '278?

A '278 was Spaur and Bambini.
Q Bambini, we've talked about. That's that turn-by-turn direction patent, right?
A Yes.
Q Okay. And that's missing the multi-vehicle compatible element?
A Correct.
Q And you have to import that from the J1978 standards?
A Correct.
Q And can you point to anything in Bambini that helps the jury understand why you would do so?
A Beyond the time frame of this patent versus what was available, no, there's nothing described in this patent.
Q Any objective evidence the jury can rely upon to make sure that they wouldn't be using improper hindsight analysis?
A No.
Q And then, you combined Spaur. That's the '074 patent?
A Yes.
Q With again, the J1978?
A Yes.
Q So that would indicate Spaur, likewise, failed to have that multi-vehicle capability?

A Correct.
Q So you had to pull into Spaur this bus protocol that you've described?
A Correct.
Q And can you point anywhere in Spaur that there is evidence that someone of ordinary skill in the art at the time of the invention would have looked to the scan tool bus discovery process of J1978 to solve the problem identified by Mr. Flick?
A No.
Q Did you also look at the '727?
A Yes, I did.
Q And I know engineers and patent lawyers hate for me to do it, but generally for the shorthand version of it, this is the speed notification patent, right?
A Yes.
Q And I understand, you have to use all the terms of the claim, but just for shorthand.
A No problem.
Q And did the prosecution of the '272 follow along the similar lines that we've seen on the other three patents?
A Yes, it did.
Q Claims were rejected?
A Yes.
Q And then, the argument was made that I don't find

anything in what you're asserting that has multi-vehicle compatible controllers, right?
A Correct.
Q And then, the examiner reluctantly shook his head and said, all right, you got me, I'm going to allow it; fair enough?
A Fair enough.
Q And during that process, they relied upon all the various patents that we've talked about in the file histories, in the whole history of the Flick conglomeration of patents?
A Yes.
Q And they looked at various references?
A Yes.
Q And Other Publications?
A Yes.
Q Including Omega's GPS 2000?
A Yes.
Q And this one's got quite a laundry list, correct?
A Yes.
Q And I assume you did not review each and every one of these cited references?
A Correct.
Q But you were still comfortable enough making a determination that the references you relied upon were

more relevant than what the examiners had in front of them?
A Yes.
Q They would not have been merely cumulative?
A Correct.
Q How did you make that determination without actually reviewing what the examiner had?
A I was assuming that the patent was valid, is still valid, and just looking at the claims and comparing it with the patents that I had found.
Q All right. I'm not asking the question well, then.
A I'm sorry.
Q Would you agree with me that the law says that if it's merely cumulative of what the examiner had in front of him, the art you're referring to, it would be a much higher burden to prove invalidity?
A Correct.
Q Okay. So my question is, as part of your analysis, did you make that determination that what you relied upon was more relevant than any of this?
A No.
Q All right, sir. I'm going to turn your attention to the claims of the '727. Can you identify for the jury what elements you found missing from the '727?
A The third one, a controller to be coupled to the

vehicle data communications bus for reading the data related to the vehicle speed from the vehicle data communication bus.
Q All right. I think the jury has heard us debate the controller enough.
A Yes.
Q Okay.
A This one, the -- while the vehicle speed is available on the bus, it's my understanding that the LMU is using GPS speed.
Q Are all of them using GPS speed?
A Yes. To my knowledge, they are.
Q Would it surprise you if the engineers that the jury listened to said about five percent or more use the speed from the bus?
A To do this determination?
Q Yes, sir.
A Okay. That's news.
Q Okay. So you didn't consider that testimony when you arrived at your non-infringement position?
MR. KAUTH: Objection. Misstates prior testimony.
THE COURT: Overruled.
A Ask the question again, I'm sorry.
BY MR. GILCHRIST:

Q You didn't rely upon any such testimony when you made your determination that the LMU-3000, 3030, were non-infringing?
A Correct.
Q And if the jury were to believe or determine that there were LMU devices programmed to read speed off the bus, would you agree that the LMU infringed?
A Well, not necessarily. Because just reading speed, there's the second part of this about, you know, then comparing it against the threshold.
Q Right. And do you have any reason to believe that when they read the bus speed that they don't compare them?
A Well, it depends on what that information's used for. If the program in the LMU is not set up for an overspeed condition, then no.
Q All right. So if it's not doing it, it doesn't infringe. I get that argument.
A Okay.
Q But would you agree with me that many of them set up are set up to do it?
A You said five percent?
Q Well, I didn't say it, but, sure, five percent?
A And the question was would I be surprised or --
Q Right.

A Yes. Based on what I understand, the capability of the LMU software using the GPS speed.
Q And would you -- well, would you agree with me that the speed data that's being sent to the remote -- sent remotely -- doesn't have to be the same speed?
A As the GPS?
Q Right.
A Correct.
Q And can it be the GPS speed that's sent?
A Yes.
Q Anything else?
A The second part of that, determining the speed exceedance. So if it's using the vehicle speed I guess it could, you know, in this five percent that you describe. But as I understand it and the way I read it in the PEG programming guide that there's very good capability using the GPS speed to make that determination.
Q Is the LMU capable of infringing if it's programmed to read the data bus speed?
A And make the determination based on that, then, as I would read this, yes.
Q And you know it had to be capability to make that determination. Your dispute is whether it's using GPS or data bus speed, right?

A Correct. I guess the question becomes if you had the capability of an LMU, you know, why would you re-invent the wheel to re-program it to -- but, I mean, that's up to the customer.
Q Correct. Anything else?
A No.
Q And you have also determined that '727 is invalid?
A Yes.
Q What did you rely upon to make the determination of invalidity?
A Two patents of Bambini and Spaur.
Q What did you look at for Spaur?
A The claims.
Q And you found that it was not multi-vehicle compatible?
A Correct.
Q And, therefore, you had to go back to the SAE standard, right?
A Yes.
Q But this time you went to a different standard, didn't you?
A Yes, I did.
Q So this person of ordinary skill in the art at about the time of the invention would have known to bypass the scan tool SAE reference and go to get another one?

A Correct.
Q And the reason that they had to go to another one is because your J1978 doesn't have anything in it about the speed, does it?
A Correct.
Q Because that's a scan tool?
A Yeah, that's about asking which bus. It's called bus determination.
Q For a scan tool?
A For any device that needs to talk to multiple vehicle -- multiple --
Q Doesn't the SAE reference scan tool?
A Yes, that's the title.
Q And scan tool, at or about the time, was a device that you went on to look at your emissions control and make sure that your warning items on the emission control were all in compliance?
A It had a little more capability than that, but yes.
Q And so, one of ordinary skill at or about the time of the invention, if they looked to that scan tool SAE document, they still wouldn't come up with the '727 patent, in your opinion, right?
A Well, 72 -- excuse me -- 1978 in the description refers to 1979. 1978 is that query of information to find the right bus. And 1979 describes the information

that's available that would come back from the various devices. So they go together.
Q All right. So you're saying that one of -- well, for purpose of invalidity, you have to combine Spaur 1978 and 1979?
A No, you don't.
Q Okay. So we jump from Spaur to 1979?
A Correct.
Q Okay. Because 1978 doesn't have anything to do with speed?
A Correct.
Q And can you tell the jury or point to anything in Spaur that would suggest combining an SAE reference to Spaur would solve a problem?
A Just that vehicle speed was available on the bus as a standard feature.
Q All right. That's it?
A Yes.
Q And what else did you combine or what other combination did you make?
A Just those two.
Q No other? I don't want to fool you. I could have sworn that you told the jury that Mobile-Trak --
A Oh, I'm sorry. I thought you were still on the patent, not the --

Q I am still on the patent, sir.
A No, I just -- okay, sorry. You flashed up the first patent.
Q Mobile-Trak, that doesn't have multi-vehicle compatibility, correct?
A Actually, Mobile-Trak describes three different data buses.
Q Does it describe how you can work with all three or would you have to have separate programming?
A I don't think it describes that. In the features it just said the three were capable.
Q In fact, isn't that exactly the argument that the examiner, Mr. Pham, made when he was trying to reject the '885 that he told the patent attorneys that, I can simply reprogram the Dery product to make it multi-vehicle compatible?
A It was capable of three different communication protocols on three different wires, I believe.
Q Now, you're talking about Mobile-Trak?
A Yes, I am.
Q Okay. I was asking about the argument that the examiner made.
A Oh, single bus means no multi-vehicle?
Q Right.
A Correct.

Q Because being able to reprogram them isn't what the examiner ultimately found was patentable?
A Correct.
Q Is that the same thing we've got with Mobile-Trak?
A No, because I don't believe it required reprogramming to talk with multiple buses.
Q It required three different connections?
A I believe so.
Q Okay. And each of those connections would have had a different identifier?
A Different identifier?
Q If I plugged it into one --
A Each one has two wires, yeah. So part of the connector would go, you know, if you had that on your bus you'd wire up to these two wires. If it was this on your bus -- so it will all depend on what you were using it for and what bus the vehicle had.
Q It didn't go through that bus discovery protocol?
A No, it didn't.
Q And than you have to combine that Mobile-Trak with the J1979, right?
A Correct.
Q Because Mobile-Trak didn't talk at all about the speed notification?
A Correct.

Q And is there anything in Mobile-Trak that you can point to this jury as evidence, objective evidence, that one of ordinary skill in the art would have combined the two?
A No.
Q They simply have to rely upon what you're telling them?
A Correct.
Q And we started a way back on this idea of secondary considerations, and on the questioning of your lawyer you said, well, I considered it commercial success. Do you remember that?
A Yes.
Q Did you consider it in the sense that it was listed on your report? Or did you actually go out and see whether Mr. Flick's inventions generated commercial success?
A No, I didn't.
Q And that was a terrible question 'cause I asked you two questions. Did you investigate whether Mr. Flick's patents generated commercial success?
A I did look on the Internet. I didn't find anything that when using Mr. Flick as a key word and automotive and whatnot, I didn't find any products that jumped out at me.

Q Did you find the DEI line of products?
A I don't think that -- no, I did not.
Q All right. Are you familiar with DEI, Directed Electronics?
A I have heard the company name.
Q Very large company, right?
A I don't know.
Q Okay. Have you heard of the company AudioVox?
A Yes, I have.
Q Now known as Voxx?
A Yes.
Q Very large company?
A Okay.
Q Would you agree that if they had products licensed under the patent that were successful, that would be an indication of commercial success?
A To avoid litigation or to -- you know, there's a valid -- possibly, yes.
Q And you're not suggesting to this jury that Voxx was involved in litigation with Mr. Flick, are you?
A No, I'm not.
Q And you did not investigate whether there had been copying of Mr. Flick's invention by others, correct?
A Correct.
Q And if I were to tell you that DEI was found to be

a willful infringer, would that surprise you?
A No.
Q Would that alter your opinion that the secondary considerations that this jury is required to consider would lean towards the patents being valid?
A Are these the same patents that are in question that they're copying?
Q One of them was; the '885, sir.
A Okay. No.
Q It wouldn't change your opinion?
A Oh, I'm sorry. It could. I'd have to look at it in more detail. It wasn't part of my analysis to look at that product.

MR. GILCHRIST: Your Honor, that's all I have.

THE COURT: All right, thank you.

Why don't we take the lunch break now. It's 12:25. We'll come back at 1:25. We'll have redirect examination. And we should be -- we're moving along well, ladies and gentlemen, but I think it's obvious we are not moving quite as quickly as we had hoped, and that's all right. That happens in these matters. We'll talk about the schedule as we go through the day, but I think there is no doubt that the evidence will be to you today.

The question I'll have is if it's so late in

the day, my preference is to have you be willing to come back fresh for closing arguments, because I think there's only so much the human brain can take at one time. And so, perhaps we'll discuss that later about coming back in the morning if it's mid-afternoon or something like that. That might make more sense rather than at 5:00 me asking you to go back and start talking. I think that's a lot to ask of anyone. So enjoy your lunch. We'll see you at 1:25.

(Jury exits.)

Thank you. The jury has withdrawn.

For scheduling purposes, redirect examination, Mr. Kauth, roughly, I'm not going to hold you to it. I'm just getting a sense.

MR. KAUTH: Twenty minutes.

THE COURT: All right. Is this your last witness in the case?

MR. KAUTH: Yes, it is.

THE COURT: And then, rebuttal case I think you indicated was an hour?

MR. GILCHRIST: Yes, I think an hour.

THE COURT: Is this the same measuring stick for an hour used in your cross examination or a different one?

MR. GILCHRIST: I'm not sure I referenced that

in my cross examination.

THE COURT: Just giving you a hard time.

MR. GILCHRIST: And if you weren't the judge, I would object.

[Light laughter.]

I believe an hour should include most of the cross as well. I don't -- Mr. Santurri's going to do it. He's kind of slow, but I don't think he's that slow.

THE COURT: Because what I'm thinking, folks, is that by the time we conclude evidence, it's probably getting close to three. And if you're closing's going to take several hours, you know, whatever it is, two, two and a half, whatever the number of hours is, we're not going to get to the charge, and I don't want to split closings up. So in that case, we'll come back in the morning. And I'll be asking if they can come back at 8:30 just so that they have time to really get to work. I don't want to start them too late. So we'll kind of go in that regard.

MR. GILCHRIST: I understood you had sentencings all day tomorrow.

THE COURT: I do. But I just told Nancy we're going to move some of those.

MR. GILCHRIST: Okay.

THE COURT: They're not going anywhere.
All right, thank you.
(Lunch recess from 12:28 p.m. to 1:32 p.m.)
COURT SECURITY OFFICER: Court is back in session. Please be seated.
THE COURT: The record should reflect the jury is absent. There was a question from one of the jurors which is what caused my delay in getting back out here. Let me just read it to you. We'll mark it as a court's exhibit. But the question is -- from juror number 4, Ms. Gibson -- my boss has asked if there is any way to know whether this case will conclude Thursday or Friday. She is trying to determine coverage for my patient care load.
Here is the response I would like to give to juror number 4: The evidence presented by the parties will conclude today by mid-afternoon. We will have closing arguments first thing in the morning. I expect the case to be with you before noon tomorrow. It is not possible to predict how long you may deliberate. You are entitled to deliberate for as long as you deem necessarily. Accordingly, whether your work will conclude Thursday or Friday is not within the control of the Court, signed by me.
All right? I don't want to suggest a deadline

to anybody. All right. I got nods all around, so I am going to make the question the next court's exhibit and the answer the one following that, and we'll send the answer back.
DEPUTY CLERK: And this will be number 10.
THE COURT: Number 10. Thank you, Nancy.
DEPUTY CLERK: Should I not have a copy?
THE COURT: Pardon me?
DEPUTY CLERK: I need a copy.
THE COURT: Yes, you do, and I forgot to bring you one.
DEPUTY CLERK: May I make it?
THE COURT: Yes, you may.
MR. GILCHRIST: While we are at a lull, just for my benefit, does the Court generally allow me to have a rebuttal to the opening? [sic]
THE COURT: Of course.
MR. GILCHRIST: Okay.
THE COURT: Yeah. So you will tell me how much time you need for rebuttal, and we'll do timekeeper and tell you. And any exhibit that's in evidence, feel free to use in a power point type of format, or however you want to educate the jury, is fine by me.
MR. SANTURRI: Your Honor, with the verdict forms, we got the -- we were asked to review these and

confirm. I think we are good with everything. The only suggestion we had, and I think the defendants are okay with it, the '278 patent, Claim 12, which is on page 6, page 6 of the verdict form.
THE COURT: Okay.
Mr. SANTURRI: During the presentation of evidence, Omega did not assert Claim 12 of the '278 patent against the VPOD or VPOD2.
THE COURT: Okay.
MR. SANTURRI: Rather than have check boxes, since the jury is not being asked to determine those, we suggest just emptying those two boxes.
THE COURT: Absolutely. The last two boxes were for Claim 12?
MR. SANTURRI: Correct.
THE COURT: All right.
Can you make that change?
LAW CLERK: Yes.
THE COURT: We will do that.
The jury instructions, you will have obviously before you leave today and then you can look at them and we'll get together before the jury comes in case there are any last-minute changes to be made.
Mr. Andrews, when we do this next section, try to stay close to the microphone. Sometimes it's hard

for me to hear you.
THE WITNESS: Sorry.
THE COURT: It's not you. It's just I'm getting old.
THE WITNESS: Okay. Aren't we all.
(Pause in proceedings.)
THE COURT: Oh, I'm sorry.
DEPUTY CLERK: It already went in.
THE COURT: The note went back?
DEPUTY CLERK: The note went back.
THE COURT: I thought you were still getting it ready.
DEPUTY CLERK: Oh, no.
THE COURT: We're ready.
(Jury present.)
The record should reflect the jury has returned, the parties are present, and we are at redirect examination. When you're ready, you may proceed.
MR. KAUTH: Thank you, Your Honor.

REDIRECT EXAMINATION

BY MR. KAUTH:
Q Mr. Andrews, how long have you been an engineer?
A Since 1983.
Q And how long have you been working on the vehicle

data bus?
A Twenty-two years.
Q And are you a lawyer?
A I am not.
Q There was some discussion earlier about your opinions. Could you please turn to Exhibit 38 to your expert report regarding invalidity?
A Yes.
Q Does that report contain all your opinions on why you believe the Omega patents are invalid?
A Yes, it does.
Q Could you turn to Exhibit 47, please. I'm sorry, Court Exhibit 47, not the exhibit in your report.
A Yes.
Q And is that your expert report regarding non-infringement?
A Yes, it is.
Q And does that report contain all your opinions why you believe the CalAmp products do not infringe any of the Omega patents?
A Correct.
Q You were discussing some appeal process on the '885 patent with Mr. Gilchrist earlier. Do you recall that?
A Yes, I do.
Q Could you turn to page 22 in your report?

MR. GILCHRIST: Counsel, which report?
MR. KAUTH: I'm sorry. Exhibit 47, the non-infringement report.
A I'm there.
BY MR. KAUTH:
Q And on -- were you on page 21 of your report or before the page number in your report there is also an exhibit number.
A Okay.
Q So, I'd like you to go to the page number that says Defendant's Exhibit 47, page 22.
A Okay.
Q And is that a discussion of the prosecution history of the '885 patent and the appeal you were discussing earlier?
A Yes, it is.
Q And if you continue down two more pages to the page marked Defendant's Exhibit 47, page 24.
A Yes.
Q Is that a decision of the actual -- I'm sorry -- is that a discussion of the actual decision of the Board of Patent Appeals and Interferences?
A Yes, it is.
Q In that very last paragraph that begins with the word, "Turning --"

A Yes.
Q -- could you read that paragraph, please?
A Turning next to the appellant's challenge to the examiner's finding inherency to the controller 20 in Dery, we agree with the appellant's argument. Although the controller may be multiple compatible, it can only store codes for one vehicle at a given time. Thus, the anticipation rejection of claims 1 through 8, 11, 16 through 26, 32 through 38 and 40 through 44 is revised[sic] because the mere fact that Dery is software driven, and can be reprogrammed by the owner of the vehicle to provide multi-vehicle compatible does not necessarily lead to the conclusion that the controller stores "a set of device codes for a plurality of different vehicles as claimed." [sic]
Q Is it your understanding that the '885 patent was allowed because Dery did not disclose that last sentence you read?
A Correct.
Q And the second sentence of that paragraph said, "Although the controller may be multi-vehicle compatible, it can only store codes for one vehicle at a given time," correct?
A Correct.
Q Does that make you reconsider your agreement with

Mr. Gilchrist that multi-vehicle had been shut down by the Board of Patent Appeals?
A Yes, it does.
Q When you were going through your opinion with Mr. Gilchrist, he was asking you about the '876 patent. Could you turn back to page 11 of your report for your discussion of the '876 patent in your same report, Defendant's Exhibit 47?
A Yes.
Q And am I on the right page for your discussion of the '876 patent?
A Claim 1, yes.
Q And I believe when you spoke with counsel earlier, you said that one reason Claim 1 would not infringe is because it didn't have a controller?
A Correct.
Q I'm sorry. One reason the CalAmp device would not infringe Claim 1?
A Yes.
Q And I believe you didn't give any other reasons?
A Correct.
Q Looking at your opinion, did your opinion provide any other reasons why the CalAmp devices would not infringe Claim 1?
A Being a multi-vehicle controller, yes, as well, too.

Q And what about do the CalAmp devices provide working and non-working command signals?
A Correct, they do not.
Q So if you omitted that earlier, was that a mistake?
A Yes, it was.
Q And your opinion is that the CalAmp devices do not provide working and non-working command signals?
A Correct.
Q Let's turn now to your discussion of the '278 patent in your report. Actually, let's just put the '278 patent up on the screen. If you could put up Joint Exhibit 5, I believe, and if you could turn to Claim 1 of Joint Exhibit 5, and the top of the second column, please. Would you take a look at that fourth paragraph there. It says, said multi-vehicle compatible controller to be coupled.
A Yes.
Q And did you provide an opinion whether the CalAmp devices satisfied that limitation?
A Yes, I did.
Q And what was your opinion on that?
A That it did -- that CalAmp did not provide vehicle device information onto the bus. Vehicle device information as described by the Court is coming from a vehicle device.

Q And about halfway through that section, it says, at least one vehicle device using at least one corresponding vehicle device code?
A Correct.
Q What interpretation were you using for the word device code?
A As defined by the Court, it's a signal from a vehicle device.
Q And do the CalAmp devices store or use at least one corresponding vehicle device code from among a plurality thereof for different vehicles?
A No, it does not.
Q Earlier in your discussion, you were also talking about the '727 patent. And in one or your statements regarding GPS speed, I wasn't sure if you were talking about what the '727 patent says or what the CalAmp devices do. So to clarify, could you tell me do you believe that the CalAmp devices use bus speed for measuring a speed threshold and determining if a speed exceeds a speed threshold?
A No, they do not.
Q And what do you think they use to determine speed for that purpose?
A On-board GPS receiver.
Q If you could turn now to Defendant's Exhibit 17.

That's the Spaur patent. And specifically, Figure 2 of that patent. We just read some testimony from the Board of Patent Appeals and Interference decision regarding the '885 patent about multi-vehicle. Can you refresh my memory? What's the Court's definition of multi-vehicle compatible controller?
A Multi-vehicle compatible controller is defined as electronic circuitry that performs one or more control functions and can operate with more than one vehicle.
Q And I know you had a discussion earlier about the CAN bus. Did you previously identify that the Spaur patent utilized a CAN bus?
A Yes, it does.
Q And when was the Spaur patent filed?
A I think '97 -- January '96.
Q Do you know in January of 1996 how many different CAN bus types there were for automobiles?
A Six. Oh, CAN bus, two, excuse me. There was -- yes, two.
Q What were those two?
A It was 11 and 29 bit. Essentially, one is an extension of the other.
Q If you're on a CAN bus, do you have to do a bus determination to determine if it's an 11 bit or a 29 bit bus?

A No, you don't.
Q I believe you also testified about Spaur obtaining data from the bus and you combined it with J1979 for speed parameters?
A Correct.
Q Does Spaur discuss obtaining any type of data from the bus?
A Yes, it does. Different -- the vehicle device information described in the patent.
Q Back in 1996, when the Spaur patent was filed, how would a person of ordinary skill in the art determine what data was available on a vehicle bus?
A Actually, the information coming back from J1979 would tell you all the parameters that could be available.
Q Could you turn your attention to Defendant's Exhibit 24, please. Earlier, I believe you testified that your obviousness combination for the '727 patent, one of those combinations included this Mobile-Trak 2 reference with J1979; is that correct?
A That's correct.
Q Does the Mobile-Trak reference itself disclose setting speed alerts?
A Yes, it does.
Q And can you point me to where it discloses that?

A On page 3, it's got a PC Windows display of how to set it up.
Q So if the Mobile-Trak 2 reference already disclosed speed, why did you combine it with J1979?
A Actually, I didn't need to 'cause it was already defined in this document. Well, that it was -- well, it was part of this document, so I knew that it did have speed.
Q And in this case is J1979 for the same purpose as before, just to show that speed is an available bus parameter?
A Correct.
Q You answered some questions before -- I think you were asked whether you would be surprised if a CalAmp engineer, Mr. Hergesheimer, had said certain things. Do you recall those?
A Yes, I do.
Q Would it surprise you if I told you that in response to a question whether querying a bus and receiving response constituted a control function, that Mr. Hergesheimer said he didn't consider it a control function, it's a query process?
A I believe that.
Q You were also asked about some factors that you set out in your report regarding obviousness, and you were

asked if anyone had copied I believe it was the '885 patent. Do you recall that?
A Yes, I do.
Q Do you have any understanding with regard to those obviousness factors whether copying has to include copying an actual product or can it include copying a patent?
A I was assuming it was copying a patent in this example.
Q Would it surprise you if I told you the law said it had to be copying a product?
MR. GILCHRIST: Objection, Your Honor.
THE COURT: Sustained.
BY MR. KAUTH:
Q You were also asked about, I think, your knowledge of a DEI lawsuit and a couple hypothetical questions and asked if they would surprise you. I believe you were asked if you knew whether DEI was found to be a willful infringer of the '885 patent in a previous patent case. Do you recall that?
A I remember that.
Q Were you aware that that judgment was later vacated?
A I didn't know that.
Q Are you aware if any of the Omega patents had claims invalidated in the DEI litigation?

A No, I didn't.
Q Would it surprise you if I told you claims were invalidated in that DEI litigation --
MR. GILCHRIST: Your Honor --
BY MR. KAUTH:
Q -- and that judgment was later vacated as well?
THE COURT: Pardon me. There's an objection.
MR. GILCHRIST: He's getting into facts that we've heard nothing about.
THE COURT: Sustained.
MR. GILCHRIST: He's suggesting to the witness --
THE COURT: Sustained.
MR. KAUTH: Your Honor, I'd move for admission of Defendant's Exhibit 38 under Rule 703 to aid the jury with determination of the patent analysis.
THE COURT: 38 is the expert report?
MR. KAUTH: Correct.
THE COURT: Any objection?
MR. GILCHRIST: Well, it is hearsay, but I think it's fair. We've got our expert report in as well.
THE COURT: Thank you for that concession. I was going to ask that --
MR. KAUTH: And I'd likewise move for

admission of Exhibit 47.
THE COURT: Any objection? It's the rebuttal report.
MR. GILCHRIST: No, sir.
MR. KAUTH: No further questions, Your Honor.
THE COURT: All right, thank you.
There were a few new matters brought up in cross examination. Is there any desire to inquire on limited recross?
MR. GILCHRIST: No, Your Honor.
THE COURT: All right. Thank you very much.
Sir, you are excused. Thank you very much.
THE WITNESS: Thank you.
THE COURT: All right. Your next witness, please.
MR. KAUTH: Your Honor, we had one housekeeping matter. I don't know if we want to do this here or at a sidebar.
THE COURT: We can go to the sidebar if it's going to be fairly quick.
[Sidebar.]
THE COURT: Since I have a cold, I'm going to try and stay away from you guys.
MR. KAUTH: Okay.
THE COURT: All right.

MR. KAUTH: It was regarding our move to admit the opinion letters. I didn't know if we needed to make a formal proffer to get those on the record.

THE COURT: We can -- if you'd like, it can be a court's exhibit so it's there for review by the Federal Circuit.

MR. KAUTH: Perfect, Your Honor.

THE COURT: Rather than a proffer.

My concern was -- just so the record is clear -- that there's a number of legal statements that invades the province of --

MR. KAUTH: Understood.

THE COURT: -- me giving instructions to the jury, as well as the fact that to my knowledge the attorney is not disclosed as an expert to render an opinion. But that's my --

MR. KAUTH: I just wanted to make sure that as an unadmitted exhibit it would still be part of the record.

THE COURT: Yes. I can make those a court's exhibit.

MR. KAUTH: Thank you.

THE COURT: Do you intend to renew your motion for judgment as a matter of law so you can preserve it?

MR. KAUTH: We do.

MR. GILCHRIST: We have some motions as well.

THE COURT: Okay. Let's give the jury a break. I hate to do this, because we just brought them back in, but I don't want to rush you.

MR. KAUTH: And we have no further witnesses, Your Honor.

THE COURT: All right. Thank you.

[End sidebar.]

Ladies and gentlemen, I do apologize. We just brought you in, but we have one housekeeping matter. And rather than have you listen to that static for the next ten minutes, I'll give you a very brief break, and then we'll push through and finish the evidence for the day and get out of here a little bit earlier. I just don't want to have you listen to that static for ten minutes while we whisper over here.

(Jury exits at 1:55 p.m.)

All right. The jury has withdrawn.

Any motions to be made at this time, gentlemen?

MR. SANTURRI: Yes, Your Honor. The plaintiff has some motions, if the Court wants to hear them now.

THE COURT: Yes.

MR. SANTURRI: Omega's going to move for judgment as a matter of law with respect to obviousness

for each of the patents. There are a couple of grounds for this. First at least -- they did rest, correct, Your Honor?

THE COURT: Yes, they did, correct.

MR. SANTURRI: There were at least two of the references that they rely upon for --

THE COURT: Would you do me a favor and please go to the microphone? I just can't hear you very well. It's probably because I have a cold, and I'm not hearing very well.

MR. SANTURRI: No problem, Your Honor.

THE COURT: Thank you.

MR. SANTURRI: So two of the references that were relied upon in every one of the combinations, the J1978 and the J1979, are not in evidence for those purposes. I will say that the J1978 came in. The Court allowed it in for a limited purpose. But it was only, I believe, with respect to Mr. Chen's belief or how B&B told him that their technology worked.

And so, it's Omega's position that without those documents the jury couldn't possibly reach a determination on obviousness, because they can't go on oral testimony alone. There has to be documentary corroboration with respect to each of those. So that's going to be the first basis.

Alternatively -- and I don't have to go through it now, but if the Court is not -- depending on how that ruling goes, if the Court's going to defer ruling on that, then we'd move for the Court striking testimony related to those exhibits and not permitting those exhibits to go back with the jury or at least a limitation -- well, a limitation with respect to the 1978, that they can't consider it for purposes of invalidity.

Additionally, Mr. Andrews testified he had no -- he offered no reason to combine. I think the Federal Circuit and the case law requires that the defendants must articulate a reason to combine the references.

Additionally, there was no reference or reliance on or explanation or analysis of secondary considerations by the only expert that offered invalidity opinions. And the Federal Circuit has said that one must consider the evidence of secondary considerations in order to determine obviousness. I think that covers it with respect to the obviousness issue.

THE COURT: All right. Let me take these down in bullet format.

MR. SANTURRI: So I guess, as a result of all that discussion, they haven't met their burden of clear

and convincing evidence as to the issue of obviousness.

THE COURT: All right. So just so I make sure I understand -- I'm sorry, before you walk away -- your contention as to obviousness, first and foremost, that the SAE standards, J1978 and 79, which are referenced in combination with patents has not been offered through the expert. He has made some reference to why he consulted them, but not offered the document. And your position is that absent -- well, to state it more clearly, that oral testimony is insufficient for purposes of obviousness.

MR. SANTURRI: Yes, sir.

THE COURT: Do I understand that correctly?

MR. SANTURRI: Yes, Your Honor. And we can provide some case law, but I think there are a number of cases that say that the jury can't rely upon evidence that hasn't been admitted for purposes of invalidity.

THE COURT: All right. And then, secondly, you were referring to -- I just lost my train of thought.

MR. SANTURRI: Well, I think that basically they haven't met their burden because they haven't -- number one, they haven't offered any basis -- articulated a reason to combine the references.

THE COURT: You're talking about the

motivation?

MR. SANTURRI: Yes, Your Honor.

And additionally, there was no analysis of the secondary considerations, which was required.

THE COURT: All right. Thank you very much.

All right. Let's hear a response to that.

And my concern is this: There was an objection to the introduction of J1978 -- I believe it was, it may have been 1979 -- when Mr. Chen testified. The reason I sustained the objection is that he was a lay witness -- testifying as a lay witness and was not the proper party to authenticate J1978 or 79. And a lay witness cannot rely upon hearsay as an expert can. 1978 and 1979 were not re-offered through the expert who can rely upon hearsay if it's within the wheelhouse of matters they typically rely upon. So --

MR. KAUTH: They were a part of his expert report, though, Your Honor, and are part of the exhibit over here.

THE COURT: Are they attached to his report?

MR. KAUTH: They were. And they're in separate folders here, not in bulk, but they are all part of respective Exhibits 38 and 47.

THE COURT: Mr. Santurri, how does that -- how do you respond to that? 38 and 47 were just

admitted without objection. If J1978 and 79 are included, aren't they before the jury?

MR. SANTURRI: Your Honor, I think that those documents still haven't been authenticated properly in order for the jury to consider them.

THE COURT: But if it's been admitted, that horse has left the barn.

MR. SANTURRI: There are voluminous attachments there, including pleadings, other depositions, those sorts of things. I don't know that simply allowing those reports in somehow authenticates and properly provides every attachment for the jury's consideration of those.

THE COURT: In the plaintiff's reports that have been previously admitted, is that the report itself or is that the report and attachments?

MR. SANTURRI: Well, they are the report and the claim charts, but there are no external references that were attached.

THE COURT: Mm-hmm. Mm-hmm.

Because I'll just say this. Mr. Kauth, when I admitted 38 and 47, Defendant's 38 and 47, I looked at them in the PDF format I have, and it's just the report without all the attachments. So I don't know if -- it wasn't clear to me that you were speaking to all of

that. And I may be mistaken --

MR. KAUTH: May I check the folder?

THE COURT: Yes.

MR. KAUTH: Okay. These are all listed as those exhibits. And my understanding was they're on our exhibit list as report with exhibits, and I thought my PDF had them as well. It's about 1,600 pages long.

THE COURT: All right.

Let's turn to the next issue, though, which is the evidence of motivation. As the case has been unfolding -- and I take very detailed notes. Periodically, I will word search for motivation or combine or something that takes me back to where a witness may have put these together.

My recollection of the testimony based upon my notes and my memory, which may not be perfect, is that I have heard several references to why a person of ordinary skill in the art might look -- well, let me put it this way -- that a person of ordinary skill in the art looking at Spaur or Bambini would know to look at J1978, because SAE standards for bus communication or what have you is -- you know, was around before.

What I didn't hear -- and maybe it's semantics -- I didn't hear the testimony of the motivation, why a person would choose to go from the patent, Spaur, for

example, or Bambini, to the SAE standard, you know, what would motivate one to do that, I didn't hear that.

The other concern I had is there is a litany of secondary considerations that the witness indicated he had not considered. Unknown to him, either it wasn't provided to him, such as licensing agreements, didn't understand that DEI was found to be a willful infringer.

It was -- they did set aside the judgment, but that was due to the settlement, as I recall on direct examination, I think, of Mr. Flick or one of the witnesses which doesn't, in my mind, take away the weight that one would attach to a willful infringement finding.

And there were other secondary considerations, such as the fact that large vendors, such as Voxx or DEI, were utilizing the technology that's contained within in the patents in suit. And if those secondary considerations weren't considered, that's troubling. I'm not going to get into some of the opinions and their foundation, because there's no Daubert challenge. I'm just talking about the test for obviousness.

So let's assume, just for the moment, that J1978 and 79 are properly in the record because they're part of the folder, and experts can rely upon hearsay, and they can rely upon hearsay without the foundation

coming in separately.

Expert witnesses rely on medical records they didn't authenticate themselves routinely. I'm not as concerned about that. It goes more to the likelihood that the document is what it purports to be. An SAE standard has some inherent indicia of reliability.

I'm concerned about the evidence of motivation. And there is one statement made by Mr. Andrews that troubles me, and I'll read it to you, because I wrote it down and then highlighted it. He testified that he looked at each claim in the patents in suit and compared them to Braitberg to match them up and then added 1978, which strikes me as hindsight.

So if we're looking at evidence of motivation, it's improper to generate that evidence of motivation by looking at the claims and going back and picking prior art that might work and then combining it with something else to close the gap.

And that particular sentence was asked right after a long colloquy between plaintiff's counsel and the witness regarding the need to avoid hindsight and what did you do to ensure you avoid that very easy trap, and the answer was, I looked at the claims, compared them, and went back.

When I consider that in light of the fact that

the witness was unaware of many of the PTO references, that gives me some concern. How can you argue obviousness if you don't know if the material reviewed by the PTO is not the most relevant?

MR. KAUTH: I think there's a misnomer about having to be the most relevant. I think cumulative does not say that anything you rely on -- you can actually, you know, rely on litigation or a re-exam on the exact same references previously considered, so I don't think that's dispositive. I think Mr. Andrews' statement is likely more of a ministerial in that you have to see if all of the elements are in one reference and does it anticipate before you have a -- know it's obviousness.

But I think his testimony was back in 1993 when this J1978 specification came out. He was working in the industry. It dictates -- well, the SAE standards, as a whole, dictate how you talk on the bus. It's not an option. If you're on a vehicle data bus, you must follow the SAE standards to have the communications work, unless you're in a very proprietary space. But any of the major manufacturers that had to comply with the federal mandate had to do that.

And his testimony was that people looking at telematics devices in the automotive industry, such as all the reference he cited, would look to the

controlling automotive specs that control the bus those devices are designed to work on, including, I think, several of them referenced the CAN bus, which multiple flavors of it we heard about, but would all follow the SAE protocols.

I think under the KSR ruling, the old teaching suggestion motivation is out, there doesn't need to be an explicit motivation to combine. You're allowed to give credit to one of ordinary skill in the art. I think the Court said they're not automatons. They actually can think. If it's an obvious combination of something, if it would have -- I don't think it has to be obvious to try. There's a litany of suggestions the Court gives that say you must give more credit to one skilled in the art. It may include fitting things together like a jigsaw puzzle is one of their quotes. And you can't shortchange these people. You know, they're innovators for a reason.

THE COURT: Now what about the secondary considerations that were not factored in, such as licensing which he was completely unaware of, and we heard many references to licensing. And it wasn't brought up, but there were royalties that were paid in a very high amount. What do you think of these?

MR. KAUTH: And I think Mr. Tregillis noted

that a lot of those -- all but five of those royalties were probably very low volume and the result of litigation. He could not identify for me any product that was actually covered by the four patents in this lawsuit. Those license agreements cover hundreds. And what has happened is you miss the required nexus that is -- has to be present before you can even consider the secondary considerations. We think there's been no evidence of that, and so it doesn't trump. I think if we had a license agreement that actually said this company's making a product and it's covered by this patent, we would have given it to him, but we asked for that from Omega. We didn't get it.

THE COURT: All right. Let me turn back to your colleague just for a second.

Mr. Santurri, the notion -- and I think your colleague is correct that motivation is not as hard and fast a rule as it once was. I recall that from my review of the case law that it's no longer the silver bullet it once was. It's a factor. And so there's been some references to why one of ordinary skill in the art would know to look and combine these. Whether the jury accepts that or not is another story. But I tend to think the point made by Mr. Kauth is correct, that motivation is not as hard and fast a rule as it once

was, and I may have gotten a little bit off the beaten path when I stated it so strongly.

MR. SANTURRI: I think the KSR decision does say that the teaching-suggestion-motivation test isn't as rigid a rule as applied, but I believe there is a statement in KSR that specifically says that the person that is arguing for invalidity still has to articulate -- I think the language is articulate a reason that combines the references. There must be some articulated reason. I don't have the quote directly in front of me.

THE COURT: But didn't he do that by simply saying -- whether the jury accepts it or not is not germane at the moment. But the witness identified the two or three or whatever it may be, prior art pieces -- Spaur, Bambini, Mobile-Trak, et cetera -- for various purposes and realized they were deficient to get to where he needed to get. So he looked at the SAE standards and testified that at the time people in the industry dealing with vehicles, in general, would have been aware generally of SAE, and it wouldn't have been a big stretch to look.

Now the point made, of course, on cross is that other people who are learned did not look, presumably, if that was Mr. Chen's testimony, which I seem to recall it was, but it may not be quite that

clear. But that seemed to me more of a jury question. But going back to the point, the witness did identify why one skilled in the art would combine these together.

MR. SANTURRI: Well, I think what he did was say in order to get to the claimed invention, I have to combine them, because something's missing. But when he was asked --

THE COURT: In fairness, he was a little bit broader than that.

MR. SANTURRI: But when asked -- well, you know -- I mean, I think the test is when you look at the first reference, if it's lacking, is there something within that reference that suggests you go elsewhere, I think that, you know, was there a problem that's still left there; I think the point is that all the references they present -- the Bambini, the Spaur, those -- they're directed to a single bus, the single type of device. I think Mr. Andrews conceded that they were all single bus controllers.

And so, there was no reason for those inventors or one of skill in the art to try to convert that into a multi-vehicle device. I mean, that just isn't part of those patents. There was no indication that any those had any -- you know, that multi-vehicle wasn't important to any of them.

THE COURT: But isn't that why you combine for obviousness? Otherwise, it would be anticipated.

MR. SANTURRI: Right.

But the point is that there was nothing within, for example, the Bambini reference that suggested that you would use it in multiple buses. It was directed to a single bus. And the only reason you would go to look for multi-bus compatibility is if you knew the problem you were trying to solve ahead of time, and I think that's the essence of --

THE COURT: Let's turn to secondary considerations. As to secondary considerations, there is some issue about licenses and the use of the product, and so forth. Let's assume that Mr. Andrews did not know about licensing or did not know about DEI or did not know about Voxx, but does that go to the weight of his opinions or does it go to the admissibility? I mean, how strict is that rule, in your view?

MR. SANTURRI: Well, I think in our view the Federal Circuit says that secondary considerations must be considered. And --

THE COURT: But if you consider some you may miss some. And I'm sorry to interrupt you, but I'm just mindful of the jury sitting there. If you have considered secondary considerations, which he lists in

his opinion, but you miss some of the secondary considerations. There is a distinction, it seems to me, that if you just fail to look at secondary considerations, you don't think about profitability, you don't think about any of these things, that's one thing. But if it's in your analysis and you miss some of the evidence doesn't that go to the cross examination that you did a poor job of considering secondary --

MR. SANTURRI: What I think -- my recollection of what he read while he was on the stand was he read the four Graham factors that -- you know, those were inserted as sort of the legal test for obviousness in his report.

THE COURT: Right.

MR. SANTURRI: And, of course, the fourth factor says to consider secondary considerations, such as whatever it mentioned. And so, it wasn't that he offered any opinions or did any analysis of that factor number four. He just recited factor number four as being the test. I think, you know, you won't find anything in those reports that talks about any of the secondary consideration.

I know we asked him about several of them. He didn't consider any of the ones we asked about. And so, it's not that he just missed some. It's just that

he said this is the standard, but he didn't bother to apply it. And so I think that's -- you know, that's the argument is that without consideration, that undermines any analysis that he has. It was a basis for our Daubert, but I think the Court at the time found it was a little unclear from the deposition. So I think we believe that without that that's the end of the day.

THE COURT: All right. Let me turn back to Mr. Kauth one last time. This final point is the one that gives me the most trouble, to tell you the truth, because the motivation, I think, it's not -- the KSR opinion makes it clear that it's not as Draconian as I may have started off with, and I think there was some evidence as to why some people with skill in the art would look at SAE. We can let the jury decide if they agree with that or not.

But on secondary considerations, the DEI suit, for example, Mr. Andrews testified very clearly that if he had known that the DEI suit had been filed and that there was a willfulness found, that that could effect his opinions, that he just hadn't thought about it. Isn't that fatal to his obviousness analysis?

MR. KAUTH: I don't think it is. I don't think secondary considerations -- well, in answer to an earlier question you posed, we believe it does go to

weight. It's how you attack the opinion. But there is cases out there where courts have done sort of a sliding scale. And if it's found to be extremely obvious, they basically don't consider the secondary considerations. I think, depending on which three-judge panel you get from the Fed Circuit, there's very different treatment of the secondary considerations.

But here in trial, at his deposition, he did talk about many of those Graham versus Deere factors. I think the licenses, he wasn't aware of any. And if we had ever been given that, that we asked for, he could have opined on that, but he didn't.

THE COURT: Okay. Here's what I'm going to do. I'm going to withhold ruling on the judgment as a matter of law on obviousness dealing specifically with secondary considerations. The jury will get the case. They'll make their findings. And depending on how they come back on their verdict, if I need to have some post-trial briefing on obviousness and the law that deals with it and whether or not the failure to consider some of these secondary considerations should preclude the matter from going to the jury, then I can deal with it since ultimately obviousness falls on my shoulders, nonetheless.

I think for where we are right now, as to the

1978 and 79, it's in the report. Experts rely on hearsay. I don't have any real problem with reliability of an expert relying upon hearsay, periodicals and publications. And it wasn't objected to as it came in. I know that's a bit of a punt, but that is what it is.

The motivation. I think there's enough evidence under the standard that I'm applying at the moment to allow that to go to the jury.

Secondary considerations is a bit trickier since there is some direct testimony as to what was considered and what was not considered. But it strikes me that the argument, that it goes to the weight.

I don't feel comfortable precluding that issue to the jury at this juncture. I'm not going to reserve. I'm not going to foreclose a later second look at that, because that is a very significant issue based on the questions that were asked very directly.

MR. SANTURRI: We do have a couple more.

THE COURT: Okay.

MR. SANTURRI: They're brief.

And I believe this may have already been resolved. We sort of touched on it in the context of the jury instructions. But after summary judgment, there was still written description. As a defense, I don't think we have a ruling on that, though they agreed

that would be dropped so we don't believe there's any testimony. We'll move on that.

THE COURT: And there's not. And to the extent that written description was a defense, then judgment as a matter of law will be entered in favor of the plaintiff.

MR. SANTURRI: And the other -- I don't recall off the top of my head if there were other equitable defenses pending, but I don't think we've gotten evidence on any of them, so --

THE COURT: And there was a motion -- I'm failing to recall the name of it -- dealing with the equitable defenses, whether they should be bifurcated or not and I ruled upon that, but none of that is present in this case. I am reluctant to rule on it as a matter of law, because it could be something that could have been tried separately.

MR. SANTURRI: Okay.

THE COURT: And if it's not before us, it's improper to preclude it right now.

MR. SANTURRI: I understand, Your Honor.

And then, the final one is that we're going to move for judgment as a matter of law on infringement. We don't think that they have been able to overcome the evidence put on in direct.

And, in particular, Mr. Andrews focused primarily on his interpretation of control functions which he made very clear was an amalgamation, at the very best, of this Court's definition and the SAE definitions which aren't anywhere in the claim construction or even in the patent. So I think that we'll move that they haven't rebutted our case, and that we should have judgment as a matter of law on infringement.

THE COURT: That motion will be denied.

Control function issues, as I've indicated in my order, dealing with whether or not the expert had deviated from the claim construction, the trouble I have, and you may prove that I'm completely wrong on this point, but it struck me that the law is clear that an expert cannot stray from the claim construction, but the dilemma is that within the terms that are construed, there are some terms of art that were not construed. And it would be very difficult -- it seems to me it's appropriate for an expert to disagree as to the meaning of something like control and function. Like circuitry may not be subject to dispute, but control function, there's been evidence presented, whether the jury accepts it or not, that it has a different meaning than perhaps the patents provide. It could very well be the

testimony of the various witnesses who talk about getting a response when the bus is queried is, in fact, a control function, but that's for the jury to determine. There seems to have been some concessions in that regard. But as it stands right now, I'll allow that to go to the jury. Any motion by the defense?

MR. KAUTH: Yes, Your Honor. We'd like to renew our prior motion. And I can step through that if you want or we can leave that as it was --

THE COURT: If there's anything new, tell me that. If not, then the ruling is the same.

MR. KAUTH: For the same reasons, so nothing there.

THE COURT: Same ruling.

MR. KAUTH: The new one is we move that -- for judgment as a matter of law that the plaintiff has failed to provide evidence sufficient to overcome the finding of obviousness for all four of the patents in suit based on the combinations put forth by Mr. Andrews.

THE COURT: All right. That motion will be denied. And the reason being that it is a matter for the jury to determine whether or not one would have combined the various pieces of art and whether or not, even in combination, those pieces anticipated what we have here in terms of making it obvious. I just don't

think that's as clear-cut as is necessary for judgment as a matter of law.

MR. KAUTH: Our second motion would be for judgment as a matter of law that the plaintiffs failed to provide legally sufficient evidence to show willful infringement. CalAmp put forth Mr. Chen for the extensive search that CalAmp commissioned from him, as well as the extensive opinion letters from counsel, and we've seen no rebuttal to that.

THE COURT: I'm going to deny that motion, and let me tell you why. And this is -- I'm being careful in my wording, because I know that sometimes lawyers hear things louder than I intend to say them.

But a jury could look at an opinion letter from a lawyer who works for the same firm that's defending the case with some -- being somewhat skeptical. And in certain circumstances, you would have an outside firm do an opinion letter of non-infringement so that they could critique the lawyers who either are advising that their product go to the market or what have you.

So whether or not the opinion letters or the opinions provided by the attorneys -- or the attorney, in this case, will convince the jury that there was a lack of willfulness or whether they will conclude, that

is the jury, that the written opinion letters that occurred after the suit was filed are designed to protect coverage is up for them.

There was testimony that there was oral communications of certain non-infringement opinions by the attorneys. It's not very clear as to exactly when. And a jury could conclude that lawyers don't typically give important advice of that type orally, unless they don't want it found in discovery. And that's, I think, a matter for a jury to determine.

MR. KAUTH: And our last motion -- and I apologize, because I do not recall if this was part of our motion at the close of plaintiff's evidence -- was judgment on a matter of law that the notice date is the filing date of the lawsuit for lack of any evidence of prior notice being granted to -- or being given to CalAmp and notice being used. And the way the Fed Circuit uses it where it's notice of the patents and the products you believe it infringes.

I think for some of our issues, they're claiming notice of the 3030 before the 3030 was even produced, and on others it's notice going back years before the '278 patent had issued and before they had provided a copy, I think, to CalAmp in late 2013.

THE COURT: All right. Help me to understand,

Mr. Santurri, the notice issue. When does notice materialize for these purposes? I understand the 3030, the European version of the -- or the 3050, rather, the European version of the 3030 is roughly the same. So it would seem if you have notice for the 3030, you have it for the 3050. But what's the time line?

MR. SANTURRI: I apologize, Your Honor. I wanted to see if I could grab my exhibit list.

I know that we had testimony from Chen and an e-mail from Mr. Chen where he explained having gone through all of the patents in suit, except for the '278 -- the first e-mail dealt with that -- and recall there was testimony and e-mails from Mr. Chen prior to creating these devices, contacting Omega, discussing specifically products they were going to put on the bus to which Omega directed Mr. Chen and to CalAmp back to the same patents, offered to license the patents.

We also had the e-mail from Mr. Chen, who specifically called out the '278 patent and said this one's going to be harder to avoid. So, I think that the jury could easily determine that they had notice of the patents and specifically before these products were even developed. And then once they began discussions with Omega as to the specific products, they were certainly on notice at that point.

So, you know, I think the important thing is that with patents having issued and then the product subsequently being developed and offered for sale, remember the damages won't start until those products are being offered for sale. And clearly, at that point in time there was not only notice of the patents but also ongoing discussions with Omega that any products that went on to the bus were going to be viewed as infringing.

THE COURT: Well, and the argument on advice of counsel is that prior to the lawsuit there was verbal discussion regarding the patents and whether they infringed or not.

MR. SANTURRI: Exactly. The opinion letters made reference, and I think they talked about having analyzed the patents for non-infringement and validity going back prior to these products even being issued. And I think Mr. Bailey explained that not only did he offer them opinions prior to the products, but he went back and confirmed that the products worked as he believed when he gave the earlier opinions and we affirmed his opinions, essentially.

THE COURT: All right. Thank you very much.

I think there's sufficient evidence in the record for the jury to determine the date that notice

commences in this matter. Is there any other motions to take up at this time?

MR. KAUTH: None here, Your Honor.

THE COURT: All right, very good.

So when we come back we'll have Mr. McAlexander, I guess, back on the stand, whoever is taking him.

MR. SANTURRI: Yes, Your Honor.

THE COURT: Mr. McAlexander, do you want to come on up so we can save some time. If there are any documents left there from the last witness, if we can just kind of sort that out. Thank you very much.

(Pause in proceedings.)

Are we all set? All right. If we could have the jury, please. Thank you, Mel.

(Jury present at 2:25 p.m.)

The record should reflect the jury has returned, and we are now in the plaintiff's rebuttal case with Mr. McAlexander on the stand. And, sir, you are still under oath. All right. You may proceed when you are ready.

MR. SANTURRI: Thank you, Your Honor.

JOSEPH McALEXANDER, PREVIOUSLY SWORN, PLAINTIFF WITNESS

DIRECT EXAMINATION

BY MR. SANTURRI:

Q Welcome back, Mr. McAlexander.
A Thank you.
Q Did you offer rebuttal opinions in this case as to the invalidity positions of CalAmp?
A Yes. I offered a rebuttal response report.
Q And so, you generated a written report in response to CalAmp's invalidity theories?
A Yes, sir, that's correct.
Q And you have it in front of you? Is that what we have as Exhibit -- Plaintiff's Exhibit 105?
A That is correct.
Q And as part of your analysis of validity did you take steps to prevent the use of improper hindsight that we've heard so much talk about today?
A Yes. I took steps not to do that.
Q Did you identify evidence of secondary considerations in your report?
A Yes. In my rebuttal report, I actually identified a number of different secondary considerations for non-obviousness.
Q And those were the same considerations that we heard Mr. Andrews did not consider, right?
A That is correct.
Q We also heard some discussion about patent examiners. Do you know whether patent examiners have to

have a specific level of education?
A By law, they have to have at least a bachelor of science degree from an accredited university in an engineering field.
Q Is that consistent with your work with patent examiners over the years?
A Oh, yes. I've actually interviewed with a number of patent examiners orally. And I've actually gone to the Patent Office a number of times and sat and conferred with patent examiners, so I know it to be true. I also have a number of patent attorneys I work with on other cases who were prior examiners, and they have also confirmed that.
Q All right, sir. Now, you've been here throughout the trial; is that right?
A Yes, I have.
Q And is there anything that you've heard throughout the course of the trial that changes your opinions that each of the asserted claims of the patents in suit are valid?
A No. Nothing's changed my opinion that each of the claims that have been asserted in this case for each of the patents are valid.
Q And is there anything you've heard over the course of the trial that changes your opinion that each of the

asserted claims has been infringed by the CalAmp devices?
A No. I still stand by my testimony that each of the claims are being practiced by the 3000, 3030, 3050, the VPOD, VPOD2, with the exception of the VPOD and VPOD2 are not enclosed in the housing.
Q All right, sir.
MR. SANTURRI: I don't have any further questions, Your Honor.
THE COURT: All right. Thank you.
Any cross examination?
MR. KAUTH: No cross, Your Honor.
THE COURT: Very good. Well, that was much quicker than we expected.
Any other witnesses in your rebuttal case?
MR. SANTURRI: No, Your Honor.
THE COURT: All right. Ladies and gentlemen, I can tell you, it always concerns me when I start and stop, because we are all very aware of the fact that you are leaving your work and your other responsibilities to be here and serve and it is truly a service.
I just think if we start with closings now -- the instructions that I will be giving you are quite long -- we won't get this to you by 5:00. It's my preference that we start first thing in the morning. If we could start at 8:30, you will have the case before

lunch. We'll order lunch in for you. We'll have menus given to you, and that way you can have a day that's fairly --
DEPUTY CLERK: We don't have menus, Judge.
THE COURT: Pardon me?
DEPUTY CLERK: We do not have menus.
THE COURT: She's telling me we don't have any menus, but there will be a list of options for you. It's not the -- I just realized it's not the Ritz. So it is my suggestion that we start in the morning, because I think you will be fresh and it will make your day be more productive tomorrow. Is there any objection to proceeding in that manner? No?
I understand we're taxing your goodwill here, and that's my fault. The lawyers will do whatever I tell them to do. It is my decision entirely. I just think it's better if we start in the morning. So if there's no strenuous objection, we'll start in the morning. Would you like to start at 8:30 or 9? It's your preference. Do you want to confer? Some of you are driving in quite far, I know. Nine o'clock?
THE JURY: 8:30.
THE COURT: 8:30, it is. We'll be here at 8:30 and ready to go. I apologize again for not getting a full day in, but there were some matters we had to

deal with to make the day more productive. And I just know from the clock we won't get it to you by the close of business, and that's not right, and it doesn't really do service to the parties either. So thank you for your patience. I do appreciate it. This is entirely my decision. So if it offends anyone, please be offended with me and not the parties. Thank you.

Have a very good evening. Please do not discuss the case amongst yourselves or with anyone else. Please refrain from an independant research. We will see you tomorrow morning at 8:30 bright and early, ready to go. All right. Thank you very much. I appreciate your cooperation.

(Jury exits at 2:31 p.m.)

The record should reflect the jury has withdrawn. The courtroom deputy goes in to talk to them, but only to determine food allergies to make sure that their menu is fine in today's world.

So that concludes the case for the time being. We'll be back at 8:30 in the morning. Are we close to having the jury instructions ready?

LAW CLERK: I have them on the printer.

THE COURT: Okay. If you would stand by, we'll have the jury instructions given to you. If for some reason they're not exactly correct, I'll be here

before 8:00. We can always talk about them, if need be.

How much time would you like for closing? We have the day, so you're doing pretty good.

MR. GILCHRIST: An hour and 30 minutes, I believe, and then another 15 for rebuttal.

THE COURT: Okay. And how about defense?

MR. KAUTH: I think probably closer to an hour for me.

THE COURT: All right, very good. So you have an hour and thirty, plus fifteen; an hour, and if you want to go over, feel free to do so.

MR. KAUTH: Thank you.

THE COURT: All right, very good.

I'm going to just step down and get ready for my next hearing. Robin will bring you the instructions. If there are any problems with them, just let me know, and we'll get them squared away. Thank you very much.

(Adjourned at 2:32 p.m.)

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Reporter's Certification

I certify that the foregoing is a correct transcript from the record of proceedings in the above matter.

s/Koretta Stanford

Official Court Reporter
United States District Court
Middle District of Florida Date: April 14, 2016

UNITED STATES DISTRICT COURT

MIDDLE DISTRICT OF FLORIDA

ORLANDO DIVISION

OMEGA PATENTS, LLC,
Plaintiff,
v.
CALAMP CORP.,
Defendant.

Case Number 6:13-CV-1950

WEDNESDAY, FEBRUARY 24, 2016, 8:30 A.M.
CIVIL JURY TRIAL - VOLUME VII (DAY 7)
BEFORE THE HONORABLE PAUL G. BYRON, AND A JURY
UNITED STATES DISTRICT JUDGE
ORLANDO, FLORIDA

COUNSEL FOR PLAINTIFF:
Brian Gilchrist, Esq.
Ryan Santurri, Esq.

COUNSEL FOR DEFENDANT:
Joel Kauth, Esq.
Eugene Chong, Esq.
Carrie Wozniak, Esq.
Charles Halloran, Esq.

*Proceedings recorded by mechanical stenography
Transcript produced by computer transcription*

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PROCEEDINGS

(Jury not present.)

THE COURT: The record should reflect the jury is absent, and the parties are present.

All right. The instructions, the final set we got to you all. Any issues or problems with the instructions, other than those previously discussed?

MR. CHONG: Your Honor, madam clerk has found one spelling error.

THE COURT: I think that was -- yes, that was corrected.

MR. CHONG: Okay. That's all we had.

THE COURT: And then, there were three opinion letters you wanted marked as a court's exhibit for your proffer.

MR. KAUTH: Four, Your Honor.

THE COURT: Four. Can you identify those, which exhibit numbers they are. We discussed it at sidebar, and my clerk could not hear that.

MR. KAUTH: That is Defendant's Exhibit 71, 73, 74, and 75.

THE COURT: Great. All right, thank you.

Those will be assigned the next sequential court number so they will go with the record.

DEPUTY CLERK: So that will be 11, 12, 13, 14.

THE COURT: There you go. All right.

Are we ready to proceed?

MR. GILCHRIST: Yes, we are.

THE COURT: Very good.

Please call the jury, please.

(Jury present at 8:32 a.m.)

The record should reflect the jury is present.

The parties are present as well.

Good morning, ladies and gentlemen.

THE JURY: Good morning.

THE COURT: We are about to start our closing arguments in the case. But, of course, I need to ask you if anyone has discussed the case with anyone else or even amongst yourselves or conducted any independent research? If so, please raise your hand. There are no affirmative responses. Then, we are ready to go.

Mr. Gilchrist.

MR. GILCHRIST: Thank you, Your Honor.

I'd like to start this morning and give you a very brief lesson in American history. Back in the 1850s, there was a gentleman by the name of L. L. Langstroth. He was a rather uneducated man. He didn't have formal training. He was a minister at times. He was a schoolmaster at times. But he had a certain interest in bees, of all things. Bees produced the

honey that created the -- what we now know as sugar, but sweetness for the food at the time.

At the time, beekeepers had to create hives in a single embodiment. And in order to recover the honey, they had to break the hives. And if folks tried to make slats in them, if they were too close together, the bees would just make one big honeycomb. If they were too far apart, the bees weren't interested. Mr. Langstroth thought, well, that's odd.

He spent hours in his backyard after school adjusting these slats trying to figure out a way to make it more reasonable that he could pull out slats and make the bee hives. He finally discovered the magical number. It was a certain range of inches that those bee slats that you see in beehives had to be apart in order to be useful. And he just did that through trial and error. He did what he was supposed to do. He said, wow, I've discovered something.

He went to a cabinetmaker. The cabinetmaker made it according to his specifications. He took it out back. It worked incredible. The bees could be removed for harvesting the honey, and they would come right back. No disruption of the hive at all. So he went to his patent lawyer and said, I think I've got something here. His patent lawyer took his information, sent it

off to the Patent Office, and he got a patent on these beehives. I mean, the idea that if they are between this range, they will be successful.

Mr. Langstroth didn't notice, but people were starting to copy his beehives. In fact, everyone in his neighborhood was copying. The surrounding counties were copying. So, he went to his patent lawyer and said, wait a minute, I've got a patent. So his lawyer went around and tried to get people to stop, or at least take a license.

The response was, well, Mr. Langstroth, you don't have a degree in entomology. You couldn't have come up with this. Mr. Langstroth, these were European designs. I learned it when I was visiting France. Mr. Langstroth, you're not the inventor. The cabinetmaker is the one who designed it, not you. Mr. Langstroth, this is obvious. It's just a measurement, the two slats.

Years went by, and he was trying to enforce what the United States federal government gave him as an exclusive right to his beehives. And after years, he went back to his lawyer's office, sat down exhausted, gathered up his papers, said it's just not worth it. I can't continue this. They can have the hives.

/////

Mr. Langstroth -- you can look it up in Wikipedia -- is now known as the king of American beekeeping. He is now recognized as being the inventor. Never made a penny on his invention.

In this case, Mr. Flick, rather than gathering his documents at his lawyer's office, he said, I'm going to fight. That's why we're here. Mr. Flick decided to stand up to others that wanted to take his inventions. He's put up with all the same arguments.

Mr. Flick, you don't have an education. You barely got out of high school. Mr. Flick, this was all known. You're not even in the automobile industry. Come on, Mr. Flick. You don't even know about computers. You don't even know about data buses. How can you possibly be an inventor of this complicated technology? You went to trade school.

We've heard all those same defenses here for the last week and a half. But Mr. Flick was undeterred and he's been doing this for years, standing up for his rights, and that's why we're here. He's standing up for what he invented, what he did, and what he got from the Patent Office.

Oftentimes, in cocktail parties or social gatherings, people ask me what I do for a living and I'll explain, I'm a patent lawyer and I try these patent

cases, and I can see the glossiness wash over their face as they look over my shoulder for something more interesting. But I do this for the stories that I get. I have met some of the most unique inventors, some of the strangest personalities, some of the wildest stories of inventorship.

This is a unique area of the law. These folks that come before you as inventors, as patentholders, are some of the most creative people in the United States. They think outside what the rest of us think. They come up with ideas far beyond what those with technical degrees may come up with to follow the normal path.

Instead, they look beyond it. And as you heard from Mr. Flick, when he went to his patent lawyer years ago, his patent lawyer said what's your industry going to be in five years. Mr. Flick had already foreseen it. He can't explain it all that well to you. He certainly couldn't write about it. But he could draw pictures, and he could talk all day about it.

You saw his passion on the witness stand. You saw his interest. It's his baby. And those are the kind of human stories I get to deal with all the time. I get to learn new technology all the time. And I get the opportunity to try and teach folks, such as yourself, this new technology. So let's take a step

back from the technology aspect of this case and look at the human side of this story.

Mr. Flick, a trade school attendee, had this rather unique circumstance of when his car was broken into, rather than stomping his feet and calling it all the misfortune, the world's against me, people such as Mr. Flick decided, I'm going to do something about it. He went out and designed a car alarm. It became his passion.

He spent years developing his business. He designed car alarms. He designed speaker systems. He designed all kinds of things. This from a man who didn't have a degree from Berkeley. This from a man who slept in a stereo shop in the back office for three years to develop his business. This is a man who refuses to back down and refuses to give up.

The easy course would have been, I can't continue this. I can't continue these fights. He's had to fight Directed Electronics, as you've heard. A similar group, such as yourself, sat there and listened to these very similar stories with DEI, Directed Electronics. He's had to fight for every one of those licensees that I walked through with you. Now a couple of them, say, for instance, Voxx, they approached him. They recognized him. They studied his

patent and said, we'll take a license. No need to fight.

That's not the same with CalAmp. As you may recall, CalAmp met with Mr. Flick in 2009, sat down with him and asked Mr. Flick to explain his patents. And you saw Mr. Chen, and you heard Mr. Flick's testimony. And Mr. Flick began to try and explain it to him. And Mr. Chen didn't think much of him. I'm sure if you can put yourself in that room, you can see Mr. Chen snickering at him.

You heard his testimony. Mr. Flick thought he designed and invented hysteresis. I had to look that up. It's an electronic term about debouncing. But you heard the contempt in that room. You heard the contempt for Mr. Flick and for his inventions.

And so what happened? They went out. Mr. Chen and his staff of lawyers, and began to get all the evidence they could, all these big stacks, little stacks, in order to try and defeat Mr. Flick and his patents. But they weren't done. Mr. Flick filed suit against them. And what did they do? They said, not us. Not only are your patents invalid, but we don't even load those scripts on these units, so you can't sue us. It's our customers. We don't do a thing.

So, Mr. Flick was directed to the customers.

He fought that fight. The customer took a license. He fought the next fight against a group known as Sky Patrol, another one of their customers. It turns out Sky Patrol said, wait a minute. I don't know what CalAmp told you, but they're the ones who loaded the script. So CalAmp said, all right, caught me. I'll buy that lawsuit off. I'll take a license, but I don't want any other licenses.

And one of the unique things -- and I'll go into it in more detail later -- during this very time that Mr. Chen was creating big stacks, little stacks, telling anyone who would listen that Mr. Flick didn't invent anything, telling anyone, listen, that we don't even put scripts on the units, he went to the United States Patent Office and sought a patent for himself over nearly identical technology.

So, here he is telling the world, all this is known. It's obvious. Anybody in the industry would know it. He went out and tried to get his own patent on the same technology to cover the LMU products so he can stand in this courtroom and say, I didn't copy Mr. Flick. Look, I have my own patent.

So, let's talk a little bit about what we did here in this last week. It was somewhat difficult for us in that we couldn't present direct testimony. We had

to present it by videotape. That wasn't our choice. Those were all CalAmp employees.

But what we learned -- part of this human story we learned -- is that, first of all, they just don't like Mr. Flick. You heard Mr. Chen call him a troll. Doesn't like a troll. Doesn't think he should be enforcing his inventions. They all thought they were smarter than Mr. Flick, but he stood up. He fought.

Then they said, well -- and you may hear in this some of the argument -- well, we weren't aware of the patents, so you can't award damages that early when the LMUs came out 'cause we weren't even aware of them.

And if you will look on Exhibit 39 -- and you will have all four boxes back with you, and you will be able to look at these in detail -- Exhibit 39 is an e-mail from Mr. Flick's employee, Mr. Duffy, that identifies all of his patents. Said look here, these are the patents I have and the communication back and forth at CalAmp about, well, let's take a look at all these patents. So if you hear anybody suggest they weren't aware of it, I want you to look at Exhibit number 39.

But it goes further. And sometimes these things are hard to flesh out in the context of videotape depositions. But you heard in the testimony that while

Mr. Flick was sending him his patents, trying to negotiate a license, customers of CalAmp were saying, we really need this On-Board Diagnostic technology. You heard Mr. Hergesheimer tell you that. You heard Mr. Hall tell you that. We really need it.

So, what did CalAmp do? They decided that they were going to take a look at the patents and begin to gather evidence 'cause they knew they were going to infringe. They knew this day would come. And rather than negotiating with Mr. Flick, they decided, let's put up our defense.

So in words spoken between them, not believing that it would ever see the light of day, you can look at Exhibit number 47. Exhibit number 47 talks frankly as opposed to the carefully-crafted testimony you heard that they want to take a look at the '278 patent that's been part of their review. And when they were talking amongst themselves you don't hear them say these are all invalid, Mr. Flick didn't invent anything. What they say is 13 may relate to how we program a unit at the factory so it may be harder to avoid.

Internally, they're acknowledging that they're going to be infringing. That's the evidence that they had when they were not coached, when they were talking frankly, quite a different story when we get here.

'278, it would be harder to avoid.

And what did they do next behind Mr. Flick's back? You can take a look at Exhibit number 48. Exhibit number 48 is a series of e-mails back and forth amongst CalAmp and their lawyer, and it talks about, let's take the LMUs down from our website. Well, why would you want to do that? Well, here's the answer.

Number one -- this is the third page of 48 -- starting next week, we will be on a fast track to a lawsuit. I think it's okay to share the data with them today. Your call. Number two. We don't want to make it easy for Omega to build their infringement case by just looking at the data sheets on our website.

Talking internally, they acknowledge if they could see our data sheets, if they had that information, they would have their infringement case. These are internal documents. These aren't the carefully-crafted testimony that we've got at trial.

So that's real evidence of CalAmp trying their best to take that beekeeper's invention away from him. Let's make it as expensive as possible. Let's hide information. This one's going to be harder to avoid. Let's take it off our website. We know we're going to get sued, but our customers need it, so we're going to go forward.

And it didn't stop there. We get into the courtroom. And you saw in the opening, here's a big long list of patents that are going to invalidate clear and convincingly all the patents. We heard about Lang. We heard about Nathanson. We heard about several of them. And yet, when the time came to present that evidence, we heard about big stacks, little stacks.

You can't find Lang anywhere in what Mr. Andrews talked about. You can't find all of the lists of patents that Mr. Kauth indicated would convince you, clear and convincingly, that the patents are invalid.

So what did they do? They brought in an expert to add words to the judge's construction. You heard him. A controller is not something that controls. A controller is something that not only controls, but has some physical reaction.

Take a look at the judge's construction. He provided you with a copy. Not a word in there about any physical activity. He said, well, really in the LMU it's not a controller. Take a look at their schematics, and I'll go over it in a minute.

Their own schematics identify it as a controller. And yet, it's not a controller for your purposes. And then, they brought in their lawyer to

create plausible deniability. Well, I took a look at it, and I don't think it's infringed. And that lawyer with the same law firm that's defending it, I think he said it best when he said, well, we'll do anything for our clients.

This is a client that internally said, this one's going to be harder to avoid, then internally said we're on a fast track to a lawsuit, let's not give them the information to make their case. And their lawyer comes in and says, well, I don't think they're valid. That's the continuation of the effort to avoid paying Mr. Flick for his invention.

So what did we do during the trial? As I was preparing last night and thinking about what we've been doing since last Tuesday, I had sort of fuzzy memories at times about some of those videos that we watched. So I want to sort of walk you through and remind you of the evidence that we put through.

As you recall in my opening statement, I told you, I've got to prove by a preponderance of the evidence that we have -- own patents, how the LMUs work, and whether they meet the claims of the patent and what our damages are. I don't have to do a thing about validity. That is the defendant's burden. They're presumed valid.

So, did I do so? We start with Mr. Flick. He explained the details about his invention. He described climbing in that Jeep Cherokee. He described realizing the difficulty that we would have in five years. A different man, someone other than Mr. Flick, would have crawled under that Jeep Cherokee and said, wow, there's a lot of computer stuff in here. I'm a trade school dropout. I give up. Let's hard wire it. I can run a wire over there, just like I've been doing since 1975.

But Mr. Flick says, can't do that. I foresee this is where the future's going. I've got to learn what's going on here. And I understand, because of the way my mind works, that in five, ten years there's going to be cables like these running everywhere in the car. He understood that the car manufacturers would each have their own unique type of computer system, like a Mac versus a PC.

And he understood at that time that if he was going to remain competitive, if he was going to stay ahead of the market, he had to design a product that would come up and work in multiple vehicles, access that database that he discovered, and learn the system so that he would only have to carry one SKU, he could plug it in, and he would be good for a number of vehicles.

That's what he envisioned long before anybody else through his hard work, through his efforts at studying what's going on, and the way his mind works, the creativity it took somebody in that unique market.

And the market, as you may recall that he explained that the OEMs -- the Fords, the GMs of the world -- they try to keep these aftermarket people out of their cars -- because if you can buy a car alarm for $70 at the auto parts store, they can't sell their car alarm for $2,000 as an option package when they sell you the car.

Mr. Flick realized that. He had been working against that his entire career. So he understood these types of things. He understood how this system would go down the future. Everyone would have their own unique device codes. Everyone would have their own unique command codes. That's why he went to his lawyer -- or when he went to his lawyer, his lawyer asked him in five years what's going on, he explained it to him. And when he put it down on paper, sent it to the Patent Office, then received patents, over 50 of them, variations of this. His mind is working a mile a minute on all kinds of different things.

He explained that he had a difficult time getting people to the table to take a license on his

inventions, that one of the larger aftermarket companies in the world, Directed Electronics, absolutely not. He explained that it's almost a sense of deja vu sitting here today on what DEI did. The same patent, '885 patent, and they took all the same shots at him. You didn't invent anything. Your patents are worthless. Somebody else with more degrees would have come up with it. And a jury, just like yourself, returned a verdict and said, no, the patents are valid, and you infringed. And that started the ball rolling. That's why Mr. Flick was able to generate a substantial income in royalties.

Once Voxx, one of the other largest companies, publicly-traded companies, took a look at Mr. Flick's patents, Voxx didn't ask for a fight. Voxx didn't come to him and say, you didn't invent anything. They said, how much? We need it. Our systems need it. Our customers need it. How much? They negotiated a license for his patents, and they continue to pay today. Those are the same publicly-traded corporations with the same groups of lawyers who looked at the same thing and they said, we need a license.

And he went through all the licenses, the fights he had to pick. He made some -- licensed some folks out there that he didn't trust, made them take them out of the business. He wouldn't license them.

He didn't need the headache of licensing every-- that's his right. He has exclusive rights to his invention, so he excluded some people.

You heard about them. And I'm sure you were angry with me at the time, but we had to go through all the licenses to help understand the extent of what he's done and what the type of damages have we got folks out in the market that refuse to abide by the law.

So then, he went and met CalAmp, and that began the process of why we're here today. Met CalAmp at a show and he explained to you, they talked down to him. They mentioned their degrees to him. They told him, you didn't invent anything. I can just imagine being in that room at that trade show and Mr. Flick being asked by Mr. Chen, explain your invention. And Mr. Flick struggling with it and trying to explain it and talking about it. You saw him talk.

He's very passionate, doesn't always get the words right. He called the controller and the microcircuitry a brain box. You can imagine the chuckling that went on in that room from the CalAmp side. Brain box? I didn't learn that in Berkeley. And so what did they do? They said, well, we're not going to take a license. If you've got the wherewithal and you've got the time, we've got the money.

So, Mr. Flick sued them, and I put together a time line for you to try and sort through what we've got here.

So we have the first CalAmp lawsuit in 2009. After the lawsuit was filed, as Mr. Flick testified, they met again at a trade show and Mr. Chen confirmed this. And Mr. Flick told you, what they told me was they don't load any of these scripts. They sell a blank box, a paper weight I think one of the witnesses called it. And the customers take care of all the programming. If they use the data bus, if they use the speed, if they do the vehicle, multi-vehicle control, that's on them. We don't tell them what to do.

So, Mr. Flick accepted that, dismissed the lawsuit with the understanding he could bring it again, and filed against one of their customers, Numerex, and that was September 2, 2010. And Numerex, with their stable of lawyers, looked at the Flick patents and said, all right, I think we need a license, and they took a license. Didn't go to trial. No jury had to sit there and analyze the same arguments. Numerex recognized it, and moved on.

And then November 10th, while the Numerex lawsuit was still going on, we have Plaintiff's Exhibit 39. That's the list of the patents that Omega sent to CalAmp and said, take a look at all these. I really

think you need a license. There's the list of the patents, including a couple of patents at issue. So, CalAmp was aware of the ongoing dispute with Numerex. They were told about the patents. And what do they do? Short stack, big stack.

And then on November 17th, Mr. Chen contacts Omega and says, you know, we're thinking about doing an OBD product -- and you will see this in Exhibit 38 -- but it really doesn't operate like your patents say so I think it'll be okay, didn't explain the details of what it was, but you can take a look at 39 and determine if Mr. Chen is telling the truth. I'm sorry, 38.

And then, December 21, 2010, just after he says, we're thinking about an OBD product -- Exhibit number 14, Mr. Chen, while he has a list of Mr. Flick's patents, while he has a short stack and a big stack, while he's telling you that the patents are known and obvious to one of ordinary skill in the art, he files his own patent application with the United States Patent Office claiming the same subject matter, naming himself an inventor, representing to the Patent Office that all this is new, novel, and unique to him.

Take a look at Exhibit number 14. Look at what he's claiming. He's claiming Mr. Flick's invention with memory. That's what he added as an inventor.

All the short stack, big stack, prior art, all the SAE documents, as you heard, that are supposed to be disclosed to the Patent Office, take a look at Plaintiff's Exhibit 14 and see if he submitted any of those to the Patent Office. All this important prior art that absolutely destroys any suggestion of how you would look up data bus and do the data bus protocol absent when Mr. Chen is looking for a patent.

So after he files his patent application, the LMU-30 -- or 3000 launches. And you can find that date on Exhibit number 159. Shortly thereafter, as I mentioned, Omega goes after Sky Patrol. And Sky Patrol says, whoa, whoa, wait a minute, why are you suing me for a CalAmp product? And Sky Patrol says, I didn't put the script on it. I didn't design this programming. I bought it from CalAmp. Whoops. CalAmp was caught.

What did they do? They said, all right, we'll take a license, but only for those Sky Patrol units. We're still going to force you to fight. If you want a real license, you're going to fight us for it. And that's when in August of 30 -- as they're looking at the two -- or they're contemplating what's going to happen now that they have been caught with this Sky Patrol lawsuit, in July 30th, Plaintiff's Exhibit 47, the '278, that's going to be harder to avoid infringement.

They recognize that.

Exhibit 48. We're on a fast track to a lawsuit. Let's make it harder for Omega to make their infringement case. Exhibit 48. They knew they were infringing. They knew the patents were valid. They sought their own patent. And yet, they forced Mr. Flick to come to this courtroom and bring this lawsuit.

Lawsuit was filed December of 2013. Mr. Flick provided that information for you during his direct testimony and his cross testimony. You saw it. You saw his passion. You saw that he couldn't get the technical terms right. That's the nature of the beast. Doesn't mean he's not an inventor.

So then, we were forced by video to bring Mr. Gallin Chen before you. You may recall Mr. Chen's video. Mr. Chen chose not to show up at trial. I can't force him. It's his right not to show up, not to participate, not to care about these proceedings. That's his right.

In his video deposition, first he claims he didn't really recall this meeting with Mr. Flick. The second meeting he testified, well, Mr. Flick was trying to explain his technology, and he thought he invented hysteresis. That's the debouncing. You can see his contempt for Mr. Flick as he said that.

Mr. Chen acknowledged that he had the patent application in his name, Exhibit 14. And then, Mr. Chen, through his videotape deposition, had some other interesting things to say. When they were developing this LMU-3000 that was so obvious to anybody in the marketplace, they couldn't develop it, they hired B&B to develop it for them.

B&B, without patents, without any rights, exclusive rights, to any of the technology, designed it for them and charged them $7.00 a unit. That was more than what Mr. Flick was seeking. They could not develop themselves 15 years later. It took them a year and a half for B&B to develop a product that was so obvious.

When they went to the 3030, they had to hire somebody else to develop it, Innova. Again, no patents. They paid Innova millions of dollars for this obvious everybody knows SAE standard technology. Eight months it took Innova to develop it. Very interesting that in the real world it takes a long time to develop it, and they're willing to pay a lot of money. But in the courtroom, it was all known. It would have been obvious to the village idiot if they had just looked at SAE. But in the real world, they had to pay millions of dollars to develop it.

Mr. Chen also testified that the reason they

were developing is because customers were demanding it. This was an important aspect to the industry, something Mr. Flick saw years earlier, 15 years earlier, CalAmp was now discovering. Customers were demanding it.

If you may recall, the PJC dispute, Mr. Chen testified, that's a group that sued CalAmp 'cause they were infringing their patents on different products, and CalAmp again directed PJC, go after my customers. And they got together in a settlement agreement with PJC that the customers contributed to, but CalAmp paid not a dime for their products. It's a pattern with CalAmp. It's always somebody else.

Mr. Chen acknowledged that he sent Mr. Flick to Numerex, acknowledged that they didn't put any scripts in the units, and he acknowledged they knew the patents. So, Mr. Chen, I've got knowledge, I've got their activity, and I've got some development information.

So then, we had to call Mr. Peter Hergesheimer, and you may recall him. He's an engineer with CalAmp. He had some very dry, technical testimony. He described how the LMUs work. He was the one that, again, acknowledged that a lot of customers were calling for this data bus functionality, that it was a customer-driven decision, this obvious technology that

Mr. Flick envisioned 15 years ago. He also testified that he studied within CalAmp how to avoid the patents. And he couldn't come up -- he didn't make a single change to the LMU product. He could not design around these patents. He tried. He couldn't do it.

We heard a lot of technical information about how the LMUs work. We confirmed that the flow chart of working and non-working codes was how the LMU worked. You will find that flow chart in Mr. McAlexander's exhibit, in his report. And you may recall this flow chart. And that was in response to one of CalAmp's positions that if I send out a signal and I get a response, I don't send out any more. Mr. Hergesheimer confirmed, well, this is the flow chart. This is the way it works. It sends out a signal sequentially, gathers those signals, and then makes a determination on which bus they are. That's what their own engineer said, the one who helped design it.

Mr. Hergesheimer also said he was identified by CalAmp as the one who could tell us why they don't willfully infringe. And what he said was, well, CalAmp doesn't willfully infringe, because our customers ask for it. We didn't go out and steal it. We were just responding to customer demand. That's still infringement, and that's still intentional. They were

very well aware of the patents.

Mr. Hergesheimer also confirmed that one of the patents, as you may recall, requires certain downloading means. He confirmed what used downloading means and have a downloading interface and confirmed it was very important to the product. He said the customers wouldn't buy the LMU without the downloading feature 'cause they needed to download their scripts.

He described the technical aspects of the VPOD. This was the technical data that I had to prove to you -- teach you how the LMU units work. This is the technical information that Mr. McAlexander had to know and had to rely upon in order to provide his opinions that they infringe.

Then you saw Mr. Jeffrey Eiberger. He's another engineer from CalAmp. He confirmed, contrary to what CalAmp has told you, that the speed exceedance notifications often come from the bus. He said the majority of CalAmp customers use CalAmp to write the scripts, configure the devices and program the devices, directly contrary to what Mr. Chen said, directly contrary to what Mr. Chen told Mr. Flick -- we don't do anything. They're paperweights.

Mr. Eiberger said, no, the majority of our customers have us write all the scripts. We load and

test the units before we ship them out of Oxnard, California. That was important, because you may hear, well, we don't directly infringe. It must be our customers. Well, every time they load and test, that's infringement.

You heard the testimony or the cross examination, rather. Well, it doesn't infringe sitting there, does it? And you will hear the test for infringement is make, use, or sell. Just defense after defense. I didn't do it. I don't know who did it. Doesn't do it there. Doesn't do it here. That's why we had to bring Mr. Eiberger in to identify that they actually wrote the scripts, they downloaded the scripts, and they tested the scripts.

Then, you met Joe McAlexander. He was our expert on the technical issues. And you may recall Mr. McAlexander, he methodically went through each of the claims of the patent. Claim by claim, he identified where they were in the various documents. You may recall him pulling up the schematics and identifying that this is the controller, this is where it sends command signals, the flow chart. He identified every element of every asserted claim found on the LMU. It's a process. It's not an easy process. It's a long process. But we went through it. Evidence connecting

each element of the LMU to the claims of the patent.

You can judge Mr. McAlexander's demeanor. Was he shady? Was he fudging anything? Did the cross examination reveal any errors in his analysis? Mr. McAlexander, I would suggest to you, was very clear, very steadfast. It's there. Here's the controller. Here's where it sends the signal. Here's the ECU that receives the signal. The signal comes back. The controller takes that signal and determines what bus. They download codes. We've heard it all, bit by bit.

And you may recall the chart, Plaintiff's Exhibit number 162. You can bring that back with you. Each of these red check marks, as Mr. McAlexander went through all of the claims, pulled out the schematic, here it is, here it is, here it is, bit by bit, slowly developed it.

He confirmed every single one of the asserted claims, except those that require certain housings are infringed by the LMU. That's Exhibit number 163. So you can make your determination on what Mr. McAlexander relied upon to give you the evidence of infringement, his analysis, and whether that analysis is appropriate.

Then, you heard from Mr. Stephen Hall. Mr. Stephen Hall was another one of CalAmp's employees. He identified -- as you may recall, there was some cross

examination of Mr. McAlexander. And the idea behind it was, well, there's not really any evidence that the speed is read off the bus, is there, Mr. McAlexander? And he said, no, I think there is. I read it in the depositions. Oh, are you sure? Do you remember that line of cross examination?

Well, then, we played Mr. Hall. What did Mr. Hall say? Yes, there are customers who read speed off the bus. Here's the list of them. And that list is in evidence. You see that list. Those are the people that they've told you, we don't know if they read speed off the bus. There's the list. Their own employee.

Mr. Hall identified them, how valuable it is to have a multi-bus LMU unit. He identified the importance of the units for sales purposes. And again, confirmed that it's the customers who drove this invention or drove this development 'cause the customers were demanding it. They couldn't continue to sell their LMU products without taking Mr. Flick's technology.

Then, you heard from Mr. Christian Tregillis. He was our expert on damages. He was the accountant that sat up here. And he went through the licenses. He went through the analysis of this hypothetical negotiation. And he told you that if the two had sat down at about the time of the infringement, that the two

would have reached an agreement on royalty per unit of about $6.38, I think it was, 6.38.

He explained how he got there. He explained the variations in the license agreements. He explained the importance of some of the elements on the clauses, the innovation clause, that where those voluntary licensees assign their rights to future inventions to Mr. Flick and that such a thing couldn't be done in the context of this proceeding. And he gave you a chart and outlined his damages, outlined how he calculated a 6.38 per unit royalty to come to the conclusion of $2,975,200. And you will have that chart back with you.

At that point, we closed our case. We had shown you how the LMUs worked. We had shown you who owned the patents. We had shown you the patents. We had shown you the file history. We had done our best to explain to you how to read a patent, how you look at those claims and match up each element of those claims to what the LMUs do.

We brought in Mr. Joe McAlexander to do that and help you walk through that process. And just as I told you in opening, that was our burden. We had to prove that it infringed all the claims we were asserting, and we had to show you how much the damages were. We did what we promised you. We showed you

infringement of the asserted claims and damages.

Which then became CalAmp's turn to explain to you why they shouldn't have to take a license, why they shouldn't be charged for using Mr. Flick's technology. CalAmp's case consisted of three witnesses.

We saw Mr. Chen again. He decided to show up. And you heard a long background about his technical expertise and how smart he was and all the jobs he had and how he got a pink slip and a job in Hawaii and a promotion of some sort all in the same day, and then somehow chose a pink slip.

We heard how he develops things. He goes out and buys companies. We didn't hear any independent development. We didn't hear about innovation within CalAmp. We heard, well, we sell to the Tampa Fire Department, as if that means anything for purposes of today.

We heard all about his big stack and his little stack. Didn't hear any analysis of those patents. We just -- "I did a bunch of work. I worked really hard." He acknowledged he knew of the patents. He acknowledged he had been in an effort for hundreds of hundreds of hours, he said, in an effort to defeat the patents.

He admitted he knew of the DEI situation and

that a jury had returned a verdict of willful infringement and validity for the '885. He admitted he knew of the Voxx voluntary license. He, again, described how it took so long, a year and a half for the LMU-3000, eight months for the LMU-3030 to develop what CalAmp contends would have been obvious 15 years ago.

You're entitled to judge his demeanor. Did he have contempt for this proceeding? I asked him a simple question. In this time line I was developing, when did this lawsuit start? "I don't know. I don't have time for those details." He doesn't have time to sit in this courtroom, defend his company, or even care much about the lawsuit. It was his decision not to come, therefore, forcing us to play videotape deposition of him. Presumably, it was his decision to try to keep his engineers at home so we couldn't inquire any further than what we saw in the videotaped deposition.

It came across, I believe, a superiority complex. He believed he was above this, that he was above spending time in this courtroom defending. He knew, and he did all the research. He spent hundreds of hours. And besides that, he had lawyers. He mentioned that. They had lawyers look through this, so we don't need to worry. Why am I here?

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And as I was listening to him provide his testimony and during my cross examination of him, I kept going back to that meeting at that trade show. And if that's how he acted in this courtroom in the United States District Court for the Middle District of Florida, I can only imagine the contempt he must have shown for Mr. Flick as Mr. Flick described his brain box invention.

Next witness. So, Mr. Chen didn't really offer anything that you can rely upon for anything. Came in and told you what CalAmp does. He told you how important he was and all the companies he's acquired, but he didn't tell you anything about what we're here about, infringement or invalidity.

So they brought in Mr. Bailey, their attorney. Mr. Bailey came in and said, yeah, I've been working with Mr. Chen. I've been working on the big stack, little stack, and I agree, I agree with my partner that all these things must be either invalid or infringed.

You heard that he was the managing partner of my opposition's law firm, that they were responsible for the financial interest of the firm. They had four lawyers sitting here full time, plus Mr. Bailey here all week. Five lawyers, not Mr. Chen. What a billing opportunity.

And I think, ultimately, Mr. Bailey said it best when I asked him, he said, we will do anything for our clients. That includes making up opinions of counsel to try to cover for them. Hey, look, we didn't do anything wrong. We had lawyers look at it. We'll do anything for our clients.

So the entire defense of CalAmp Corporation to Omega Patents, LLC, boil down to one witness, Mr. Andrews. He was the expert witness they brought in. And he was going to provide testimony on both infringement and invalidity, very nice man. Unfortunately for CalAmp, very honest.

I think he did an admirable job of trying to hold the party line for quite some time. But on cross examination, he acknowledged, well, yes, I was -- my theories are the same as Examiner Pham's that were rejected. Yes, I acknowledge that the term controller can be used as Mr. Bergesheimer -- or that there be no requirement for physical action.

He acknowledged that, yes, there would be a command and a response, but he said it's more of a hi, how are you, please respond. So I guess it's a level of politeness within the microchip controller.

He acknowledged that if you, the jury, rejected his idea of what a controller was that nearly

all the claims would be infringed.

He agreed that his opinions were on the losing side of the team Pham. He agreed that the only way to avoid infringement was if he took Judge Byron's claim construction order on controller and added the SAE definition of controller, and that if he was allowed to do that, then he had a credible argument for non-infringement.

And this is what -- as I sat at the table I was thinking, this is a defense of, because I said so. Did you see any SAE document that said controller must take some physical activity? No. Mr. Andrews said it is, because I said so.

Did you see Mr. Andrews pull out a single diagram? No. It's not infringing, because I said so. Did you see Mr. Andrews identify anywhere within any of the exhibits why they didn't infringe? No. Because I said so. Mr. Andrews went through similar charts. And all he said was no, no, no, because I said so.

They didn't provide you any evidence of why it doesn't infringe, except for the idea that the controller must have some physical activity because that's what an unknown SAE document says to him and that one of ordinary skill in the art would somehow understand that.

But as you recall, Mr. Chen, with all of his degrees, all of his information, all of his activity in telematics, he testified and admitted, I didn't know about SAE until I was trying to invalidate Mr. Flick's patents. One of ordinary skill in the art, Mr. Chen, did not know about SAE. He can we possibly interpret Judge Byron's claim construction to require it to incorporate an unidentified and unknown SAE definition? Well, we can't. That's simply a made-up defense.

Mr. Andrews acknowledged that it has to be made, used, or sold, that this idea that if I've got it on the witness stand, I don't infringe, is nonsense. Mr. Andrews acknowledged that all the devices were multi-vehicle compatible. He acknowledged that it was set up and performed in the exact manner that Mr. McAlexander described.

There was no argument that they performed in a different way. It's only his idea, that I interpret it different, because I am an expert on SAE documents that I'm not going to show you and, therefore, my view of the world is that all these things are not found, because I say so.

As you may recall, the '885 patent is a patent that describes a match between a stored and read code. Mr. Andrews acknowledged that, yeah, he was taking a

position that Examiner Pham had rejected by the Patent and Appeals Board. And if the Patent and Appeals Board was correct, he was incorrect.

The '876, that's the one with working and non-working signals. And that was -- again, goes to that flow chart we saw, that if it sends out a request and gets something back immediately, it doesn't send out any more, contrary to what CalAmp's engineer said. But even then, it's somewhat of a silly defense. Some of our products, we don't infringe, because if it happens to get the right match the first time, it won't send out the second control. They still infringe. When you put it in there, it goes through that process.

'278. That's the control for using code from a selection of code with a downloading interface. Mr. Andrews said, well, I didn't see a downloading interface, and yet he acknowledged there was a downloading socket for it. But because it was enclosed within the housing, then he probably didn't infringe.

Remember, he said he never saw a device before he rendered his opinion. He never talked to an engineer at CalAmp before he rendered his opinions. Really, what he did was take what the lawyers gave him and put his signature on it. There was no independent investigation.

One of the first things we talked about on cross examination, Mr. Andrews got in front of you on direct and said, I reviewed all of the depositions for all the engineers, and that's how I arrived at my opinions. One of my first questions was, that's not true, is it? We went through his report and he looked and said, you're right, I did not review all the things I said when I arrived at my opinion. He simply took what the lawyers gave him, put his signature to it.

The speed notification argument, that's the last patent, the '727. Again, he said, I was told that they never use speed from the data bus. I asked him if his opinion might change if one of their experts or one of their engineers said otherwise. He acknowledged that. He was a fair, honest man. And that's exactly what Mr. Hall did. Yeah, here's the whole list of the people that do that. Mr. Andrews was spoon-fed the information that the lawyers wanted him to know and kept away from the information that may alter his opinion.

So then, we get to validity. This is the heart of what their position and what their defense seems to be, that it was all obvious to one of ordinary skill in the art. They've got to prove that by clear and convincing evidence.

If you have -- if you believe it could be, not

necessarily absolutely is, it's not clear and convincing. Are you clearly convinced that the patents are invalid? Well, let's take a look at what Mr. Andrews said.

His first goal, of course, would be define a product that had everything in a claim, everything in the claim, something that would prove somebody actually invented it 15 years ago. And despite all the efforts by Mr. Chen and his lawyers and Mr. Andrews, nobody, nobody could find a reference, a patent, a product that did everything that's claimed in those inventions, not one. Objective evidence, then it wasn't obvious, nobody did it. Nobody had done it for years before Mr. -- years after Mr. Flick.

So he began to look at, well, let's see if I can piece this argument together. Let's combine some references with an SAE document, and we'll just push them together and that will be his invention and one of ordinary skill in the art would do so, because I say so. He even acknowledged that on cross examination.

He doesn't have any objective evidence on why one of ordinary skill in the art would combine the two. He just thinks they would. Despite the fact no one had. Despite the fact Mr. Chen, one of ordinary skill in the art, didn't even know about SAE.

These inventions took the unique creativity of somebody in the aftermarket field, who recognized years before anybody else that all the OEMs would have all different buses and in order to remain competitive he had to have the ability to utilize the different buses for his data bus and for his communication and for his GPS. Certainly easy to sit here 15 years later and say, all right, it would have been obvious to me, and perhaps you might believe him. But let's take a look at the objective evidence.

Did he ever do it? No. He worked at Cummins, large diesel provider, on their data bus technology. He never came up with it. And this is a man not of ordinary skill in the art. This man was far beyond an ordinary technician. He didn't come up with it.

You will be provided by Judge Byron your instructions. How do we go about resolving this dispute between Omega and CalAmp? You will take those instructions back. And there's a few instructions I want you to particularly pay attention to, not that you would ignore any of them, but there are some that are more important on this issue.

In instruction number 20, Judge Byron will advise you that in order to avoid this trap of hindsight, you cannot use the patents as a road map.

In other words, you can't take Mr. Flick's claims and say, let me have that element, let me have that element, let me have that element, and I'll find something that fits that. You can't do it. It's not proper. The law doesn't allow it. And yet, Mr. Andrews told you that's what he did. He looked at it and said, I need to find these elements, and I'll find them through Bambini, I might find them through Spaur, and the SAE documents.

I asked him time and time again, what objective evidence -- or how did you avoid this trap of falling into hindsight analysis? Because I didn't. He had no response to how he avoided this hindsight analysis.

Jury instruction number 22 will tell you that a claim is not obvious by merely demonstrating that all of the elements are in the prior art. That is exactly what Mr. Andrews did. It's exactly what Mr. Andrews admitted he did. He looked at the claims and looked for those elements in the art.

The instruction number 22 will tell you there's got to be some articulated reason to combine these references 15 years later. You can't just say, well, I would have done it. Instead, there's got to be some reason. All you heard was, because I say so.

I want you to look at instruction number 24.

Instruction number 24 instructs you that one of the safeguards against this hindsight analysis is that you look at secondary considerations, what else was going on in the real world. There's a whole list of these considerations. Were there other licensees taking license to these products? Was there copying by others? There was DEI. Were there licenses? Certainly. Those are the objective evidence of what's happening in the real world. Mr. Andrews didn't consider any of them.

He wasn't told anything about DEI by the lawyers. He wasn't given any information about licenses by the lawyers. Instead, he was spoon-fed his information and told, repeat it. On this basis alone, I think you should reject the entirety of Mr. Andrews' testimony on validity. If he didn't consider something that you must consider, you as a jury, by law, must consider it. He can't be trusted on his opinion.

You will also learn in the instructions that when we look at these prior art references 15 years later, you've got to look at the reference as a whole, what it teaches. In other words, what would one of ordinary skill in the art understand from the reference? If you look at, say, for instance, Braitberg, Braitberg dealt with a phone charger, a universal hookup for a phone in the mid '90s. And that phone could be charging

various phones, so it's got universality of phones. Braitberg wasn't even addressing the issue that Mr. Flick recognized. It had nothing to do with data bus. Data bus is mentioned. I'll give him that. It's in there. But there's nothing that has anything to do with the problem Mr. Flick was trying to solve, with the problem that he recognized and that he resolved. It's about a phone charger. Again, you can't just pick something out of the blue and say, there's an element, there's an element.

The Bambini reference. It says data bus, therefore, it must be important. Instead, Bambini was an early version of the OnStar that we're all familiar with where you can record turn-by-turn directions as you drive. It has nothing to do with compatibility with multiple vehicles. It really doesn't have anything to do with what we're doing here today. And instead, what the examiner had was all the relevant prior art, the details about data bus technology.

You will see some of the articles, the IEEE articles, The Thin and Thick of Car Cabling. There were articles before the Patent Office that specifically dealt with issues involving data bus. And yet, Mr. Andrews comes in and wants you to take a look at a cumulative reference that has to do with turn-by-turn

directions and combine it with SAE. You heard that he didn't even look at the extensive prior art that the examiner had.

Spaur reference he also pulled out. And he said, well, that's got two buses in it. It identifies two CAN buses. I got you. And yet, he acknowledged on his own lawyer's questioning that they were the same bus. They operated the same way. And again, it has nothing to do with the problem that Mr. Flick identified and solved. And even within it, those references, they still couldn't find anything to do with this data bus compatibility analysis, so they had to turn to a scan tool reference. They kept referencing it as a required SAE code.

Take a look at the SAE reference they keep talking about. You didn't see much of it, but it's a recommendation. It's not a requirement. It's a recommendation on how to set up a scan tool. Again, nothing to do with what Mr. Flick was involved in.

So why would one of ordinary skill combine the two? Because I said so. No other reason. They would know -- absolutely they would know about SAE documents. Well, the Patent Office knew about them 'cause they were referenced in the patents. The examiner knew about them. The Patent Appeals Board knew about SAE

documents, patent issue.

You know who didn't know about SAE documents? One of ordinary skill in the art, Mr. Chen. He hadn't even seen them. And yet, somehow Mr. Andrews is here to tell you that one of ordinary skill in the art absolutely would have combined them, because they would have known about them.

Mr. Andrews' testimony is the classic example of looking back in the past and using the patents as a blueprint to do what Mr. Flick did before anyone else. The law doesn't allow that. Your instructions will tell you the law doesn't allow that. You look at objective criteria. You look at reasons to combine. It would be far, far too easy to invalidate every United States patent if all you had to do was check off these elements.

As Mr. Andrews acknowledged, every patent is built upon what is known. If all you had to do was check it off, well, you wouldn't have lightbulbs, because the glass bulb was known. Certainly filaments were known. Electricity was known. I would have come up with it. The law doesn't allow that type of hindsight analysis. If he didn't consider secondary considerations, he didn't do his job, and he provided you faulty opinions. He could not provide you one bit,

one iota, of objective evidence that these patents would have been obvious to one of ordinary skill in the art.

The damages analysis by Mr. Tregillis of $6.38 a unit was unrebutted. You didn't hear any testimony that that would not have been fair, would not have been right, would not have been anything but fair under the circumstances. The only evidence you have for purposes of damages is Mr. Tregillis' testimony and the spreadsheet, Exhibit 164, and that's $2,975,200.

So at the end of the day, when Mr. Kauth and I are done talking and presenting our show and tell, you will be asked to go back to your room. All these exhibits will be wheeled back for you. And you will be presented with a verdict form.

May I go to the document camera?

THE COURT: Yes, sir, you may.

MR. GILCHRIST: This is a copy of the verdict form that you will be asked to fill out, and there's a series of questions. And you will select a foreman. And that foreman will ultimately sign it, but all of you will discuss the verdict form and decide how to fill it out.

First question is: Do you find Omega has proven by a preponderance of the evidence that any of the accused CalAmp devices infringe any of the asserted

claims of Omega's asserted patents? Do you find there's any infringement? Of course, there is. Mr. McAlexander went through painstaking detail that, yes, this is how the LMU works. These are the elements that are in the patent, and here they are.

The next question is somewhat longer for you. And if you said yes that there is infringement, what we need to know, what you find to be infringed. So you will be asked to identify that LMU-3000, 3030, 3050, infringed every claim of the patents. And you heard the testimony, they all operate essentially the same way. So I would suggest to you that if the LMU-3000 infringes, they all infringe.

The VPODs, you heard testimony, only work through an LMU. So, I would suggest to you that if the LMUs infringe, the VPODs necessarily infringe. You will be asked to check "yes" as to each claim that you find infringes as to each product you find infringes.

And you may recall that because of a housing requirement, Mr. McAlexander acknowledged that some of the VPODs wouldn't infringe some of the claims. We don't contend they infringe. So we've left these blank for you. So you don't have to try and remember which were the claims that Mr. McAlexander acknowledged didn't infringe.

You will next be asked has CalAmp proven by clear and convincing evidence -- now that's a different standard than what I had to meet for infringement. I had to prove to you by a preponderance of the evidence. CalAmp's got to prove that it's clearly invalid, that any of the claim is invalid.

Remember for invalidity, just like infringement, each claim is an independent invention. They have to prove that each claim is rendered invalid under their obviousness theory. So we've got to say no for Omega. But if there's a claim, say it's Claim 12, if you believe to be infringed or invalid, you can identify it, and then tell us exactly what those references are you're referring to. Is that the Bambini reference? Is that the SAE document? Is that Spaur? Is it something -- one of those references that we saw in opening -- Lang, Suman -- things we didn't see? You will be asked to fill in that information, if there is anything.

You will get to question 5. And this is what I keep talking about on the secondary considerations that Mr. Andrews didn't even know about. And that's to help make sure that it's clear in the jury's mind that you must consider these factors. Has the evidence established that any of these factors are present:

Were the accused products covered by the claim commercially successful? Absolutely. Mr. Flick talked about his Omega products that were covered by it. I think he said he grew that company to a $34 million a year business. They were successful. DEI, the group that fought him and got caught willfully infringing, their product's successful. You heard that testimony.

Now, I will acknowledge that there was no evidence for this one or this one. But you heard evidence of copying of the claimed invention. DEI was found to have willfully infringed at least the '885 patent. I don't think it achieved unexpected results. I just think Mr. Flick was ahead of his time.

Did the others in the field praise the invention? Well, I can say unequivocally they did not. They all made fun of Mr. Flick. But did others accept licenses under patents because of the merits of the claimed invention? Absolutely. AudioVox, now known as Voxx, came to them and said, I reviewed your patents. I want a license.

The next question, 6-A, goes to the issue of whether you believe CalAmp took these actions willfully. In other words, have I proven that CalAmp willfully chose to ignore all these patents, chose to ignore all the evidence in front of it and decide I'm going to go

ahead and infringe? Have I proven that despite an objectively high likelihood that its actions infringed the valid patent? I think the clear answer is yes, CalAmp knew they were infringing. You saw the e-mails. This one's going to be hard to avoid. We're on the fast track to a lawsuit. We'd better take that information off our website so they can't get their case together.

The next question, very similar, but was there an objectively high likelihood of infringement so it would have been obvious to CalAmp? Absolutely. They knew it was infringed. They said it internally, this one's going to be harder to avoid. Watch out for the '278, Claim 13. I don't think we can get around it. You heard Mr. Hergesheimer. He said, yeah, we tried to design around it, couldn't do it. They absolutely knew they were infringing valid claims.

So then, you will be asked the amount of damages. And the only evidence you've got before you is Mr. Tregillis' evidence, and that's the -- make sure I get this right -- $2,975,200. That is the only evidence before us. It's unrebutted.

Then, you will be asked to sign this verdict form and date it and return it. And upon returning this verdict in favor of Mr. Flick and Omega Patents, LLC, your service will be over. You would have helped.

Mr. Flick ensure justice. You would have protected the inventions of Mr. Flick. And you would have said no to those that used their power, their wealth in order to steal the inventions that others have worked so hard to achieve.

And I'm sure I speak on behalf of all the folks in this courtroom. I thank you for your attention. You've been an incredibly attentive jury through some oftentimes difficult and dry subject matter. I ask you to return a verdict in favor of my client in the amount that Mr. Tregillis had and that you find that CalAmp's actions were willful. Thank you.

THE COURT: All right, thank you.

Ladies and gentlemen, since we have about at least an hour, perhaps more than an hour of the next closing statement, why don't we take a short break so you can clear your minds and get ready to come back and listen some more, and then you will have instructions from me. Thank you very much.

COURT SECURITY OFFICER: All rise for the jury.

THE COURT: And again, please do not start discussing the case until after you receive the instructions from me.

(Jury exits at 9:53 a.m.)

COURT SECURITY OFFICER: Please be seated.

THE COURT: Thank you.

The jury has withdrawn. It's about ten minutes to 10:00. Let's come back at five after. That will give you a chance to get everything set up and use the rest room, if you need to, what have you.

All right, thank you.

(Recess from 9:54 a.m. to 10:06 a.m.)

Mr. Kauth, you all set?

MR. KAUTH: Yes, Your Honor.

THE COURT: All right. You can get the jury, please.

(Jury present at 10:09 a.m.)

The record should reflect the jury has returned. We will now hear closing arguments from Mr. Kauth. When you're ready, sir.

MR. KAUTH: Good morning. You've heard a lot of testimony this week. Well, there have been a lot of different stories on a lot of the different events that have happened on what things mean. There has been one thing that everyone has agreed on, the CalAmp products in this case just read data. They don't unlock doors. They don't perform alarm functions. They don't remotely start the car. They just read data.

Omega insists that when the patent talks about

those control functions -- starting the car and unlocking the doors -- that those are just examples and that much more is covered in the patent. But no one has been able to identify where in the patent more is disclosed.

The claims cover what the patent covers. The specification can include more or less, but the scope of the claims can't exceed what's included in the specification. And here, the specification, that written part of the patent that we talked about, doesn't explain anything beyond the control functions like unlocking doors, remotely starting the engine, or arming an alarm system.

It's undisputed that Omega did not invent the bus discovery process. It's not listed in the patent, and Mr. Flick admitted he didn't invent that. Mr. Andrews testified that that was a prior art standard known since 1994.

Mr. Flick testified that his innovation was using the bus to connect to car alarms. He had started his business long ago, innovated in the car alarm industry, went from the old discreet wiring systems, and decided he could connect to the bus to perform those same control functions he used to do with discreet wiring.

Omega urges you to ignore the context of the patent, the discussion in the specification, and the claim construction of this Court that specifically set out command signals, device codes, and controller. Under Omega's view, every function is a control function. However, if that's true, then Omega's invention was disclosed years ago and cannot be valid.

The prior art we looked at, like the Bambini reference. I think you heard moments ago that this wasn't really related to Mr. Flick's invention. But Mr. Andrews showed you that this was a device that could connect to the vehicle data bus. It could control vehicle devices connected to that bus, which is the same thing that we've been hearing these claims cover in this case. Unlike the CalAmp products, Bambini could actually unlock doors. It was for much more than just reading data.

We heard about the Braitberg patent as well. It was belittled as just being a car charger. In fact, it was a cradle for your phone so that your phone could hook into the bus system of your vehicle and allow you to contact through the bus of the vehicle different vehicle devices within the vehicle and either adjust or control them.

Another one of the prior art references we

heard about was Mobile-Trak. The purpose of Mobile-Trak, it's a telematics device, just like the CalAmp devices. It had an optional GPS unit for location information. It could connect -- Mr. Andrews testified and the brochure listed -- three different bus types, so not only compatible with multiple vehicles, but compatible with multiple types of buses. It specifically mentioned that it could do speeding alerts.

We also heard about the Spaur patent, the '074. Again, it connected to the vehicle data bus, performed control functions on these vehicle devices connected there, included the GPS unit for location information, these very same features that the CalAmp devices perform. But unlike the CalAmp devices that only read data, Spaur could actually perform true control functions.

When you get back into the jury room, I direct you to Exhibits 10 for the Braitberg patent, 11 for the Bambini patent, 24 for the Mobile-Trak device, and 17 for the Spaur patent. And I further urge you to consider Mr. Andrews' report, Exhibit 38. At page 981 of that report, you will see the MobileWeb reference. And at page 1039 of that report, you will see the J1978 SAE specification that you've been hearing about so much this week.

During the past week, you've seen that the '876 patent involved in this case discusses signals that cause a response or an operation. That's listed right in the patent. You've heard from Mr. Andrews that the Society of Automotive Engineers makes a similar distinction between commands that load or modify things and queries for data.

And you've heard CalAmp witnesses testify that the CalAmp devices don't send commands, as the Court has described those, to cause operation of vehicle devices and instead they simply query for data.

But in order to try and make the patents cover the CalAmp devices, Omega's ignoring its own patent language and expanding the patents to claim that all messages must be commands.

The witnesses talked about the Court's claim construction that requires a controller perform one or more control functions. And a big dispute has been well, what does a control function mean?

On one hand, Mr. McAlexander said, well, any function a controller performs is automatically a control function. And he pointed to a diagram that showed an ST microcontroller. It's a type of product, a microprocessor. Just because it has the word microcontroller on it doesn't mean it means -- it meets

this Court's definition of a control function. Mr. McAlexander basically took the word control function out of its definition by saying any function's a control function.

In contrast, Mr. Andrews said what would one of ordinary skill in the art understand a control function to be. And he applied his skill and knowledge from his actual work as one of ordinary skill in the art to tell us what a control function may include, which included that physical change he mentioned.

He was not adding to the Court's construction or changing the Court's construction. He was giving you the context of someone who was actually working in the automotive industry in the year 2000 or 2007 when these patents were filed to understand what the term of art control function means.

Mr. Chen also testified in his testimony that a control function would require a state change in a vehicle device. It's just another way of saying there would be a physical change in the vehicle device.

We've heard a lot about Mr. Hergesheimer's testimony. And I know you saw the video. I trust you remember what it was. But he noted in a question about whether he would consider a query and a response to be a control function, no, I would consider that a query

process. He didn't agree that was a control function.

You may recall back in the opening statement Omega said this whole case started with a Cherokee, that Mr. Flick first discovered the vehicle bus in that Cherokee and quickly set out to figure out how he could tap into that vehicle bus and control the door locks. We're back to door locks again.

You heard Mr. Flick testify that he was able to hook a device up to that Cherokee and look at the codes coming across the screen and push certain of those codes back into the vehicle to unlock the doors. That Cherokee had one type of bus. I believe Mr. McAlexander and I agreed it was the ISO 9141-2, just a single bus.

The patents tell a similar single bus story. When you go back in the jury room and you look at Joint Exhibit 1, 3, 4, and 5 -- those are the four patents in this suit -- you won't see any discussion in there of the bus discovery procedure. Mr. Flick admitted he didn't invent the bus. He didn't invent command signals. He didn't invent devices. And he didn't invent bus discovery. Those are all known things that have been codified by the SAE.

If you needed to speak on the vehicle bus or communicate, if you wanted to listen to data like CalAmp, if you wanted to perform command signals and

control the operation of the vehicle devices, like the prior art, you actually had to follow those SAE standards so that the bus could understand the messages, kind of like if you try and run a Mac program on a PC, it just doesn't work very well. You have to follow the right protocol.

Now, Mr. Flick's invention was to send different codes on that one bus. In the Cherokee, he could send different codes until the doors unlocked. He had samples in his patent. If you look at Figure 3 of the '876 patent, you will see a table that we talked about a lot, Table 3, that listed multiple device codes for different vehicle devices.

And the theory was you could just keep sending codes until you got to the right code and the device operation would occur and you'd know I sent the right code, and then the next time you wouldn't have to look through all those. It was a great invention, but it wasn't what we're talking about here. It's not bus discovery. That was all on a single bus.

The patents talk about sending working and non-working command signals. You probably remember Mr. McAlexander and I having quite a discussion about that. The patent gives an example. It says you could have a code for a '96 Cherokee and a 2000 Cherokee.

And if you're on the 2000 Cherokee, only the door lock code for the 2000 Cherokee will work. And if you try using the '96 Cherokee code, it just won't work. It's not the right code. But both of those Cherokees had the same ISO 9141-2 type of bus.

Mr. Flick's invention in the alarm space have carried over to the bus. He took his door locks, his remote starting, his alarm functions, and connected them to the bus. He testified that it made it easier for installation. Instead of having to run wires everywhere in the vehicle, you could run one wire and tap it into the bus and control these devices. We admit that's what he did, but that's not what CalAmp's doing.

His story is that by doing that, he could save a lot of time, installers could save a lot of time and explains why a lot of people in the alarm space, people making remote starters were willing to license those patents.

The testimony -- you have heard of lots of licensees. I think we saw 15 or 16 licenses from Mr. Tregillis, but he told us that I believe 11 of those were very small licensees with low volume and were the result of litigation, so it was probably cheaper to take the license than to litigate, but there were some big players in there, too. Mr. Tregillis couldn't tell us

what they actually make or what their devices were. He seemed to agree with me when I asked him, well, were those remote start systems, alarm systems. They weren't just data monitoring systems.

Now, Mr. Gilchrist told you a story about a beekeeper. I believe his name was Mr. Langstroth. Got a patent number 9300 back in 1852. Just for reference I believe, you know, we have seven digits in the patent numbers now, and I believe we're up over nine million, so that was quite awhile ago.

Mr. Langstroth came up with an 8-millimeter groove that was a better mousetrap, if you will. It was a better beehive. But the story is not quite so simple. Over the years it's been sanitized a bit, but there was a very large dispute over whether Mr. Langstroth actually invented that 8-millimeter strip or space. There's tales out there that he spoke to a man name Berlepsch and to Dzierzon, two other beekeepers, and that he knew about their inventions in the area.

He actually did try to enforce his patent. There's coverage in the Kansas City Beekeeper, a periodical from May of 1884, so it goes pretty far back. In that one, the Kansas City Beekeeper noted that Mr. Langstroth knew about the mun hive [phonetic], another piece of prior art out there that he hadn't

disclosed to the Patent Office.

The article says that Mr. Langstroth took the witness stand and gave testimony. But after cross examination, when the defendants were prepared to show that Mr. Langstroth was not an original inventor, he abandon his suit. It wasn't that he didn't have the opportunity. It was that he may not have been the original inventor. I don't particularly think a story about beekeeping from 1852 is relevant here, but I think what is relevant is you have to know all the facts. Here, Omega is saying Mr. Flick is a great inventor, he has over 150 patents, and no one's disputing that. The dispute is over what his patents cover.

You've heard testimony that CalAmp values technology. They've got a lot of technical expertise in-house and sometimes, when necessary, they go outside to get that expertise. It's how Mr. Hergesheimer ended up at CalAmp when the LMU product line was acquired from Technocom. It's how Mr. Chen ended up there when his start-up, Aircept or Skybility, was acquired by CalAmp.

You've also heard that CalAmp has licensed technologies from others. Even in the LMU devices involved in this case there was testimony that they took a license on the wireless technologies and had to pay a royalty on that. CalAmp is willing to pay the license

when they believe the technology they are licensing is actually included in their products, but here we don't agree.

There was testimony from Mr. Chen that Omega initially offered to license its patents to CalAmp. A lot of discussion about the meetings, whether it was at SEMA or at CES in Vegas. But what came down to it was Mr. Chen met with Mr. Flick and Mr. Flick offered him a license and said it would allow you to add more features to your product. He actually told him you could unlock the doors, you could remotely start the engine. Well, that's not a market CalAmp was interested in, and CalAmp declined the license.

You may recall Mr. Flick testifying that he thought the CalAmp engineers were belittling him at that meeting and that he was being attacked and being called uneducated. But what struck him was he said they were smiling too much. He had to get in their face. He had to shake them up, start calling them names and calling them liars. That doesn't sound like someone that was demeaning Mr. Flick. I think you saw from Mr. Gallin's demeanor, he's a very calm and rational guy.

Over the years, Omega and CalAmp continued discussions. When CalAmp declined the license for control functions, Omega offered a different license.

They said, well, you can have a limited license. It'll just cover the features of the LMU.

Well, Omega wasn't able to assign that license. CalAmp declined that license as well, because they looked at the Omega patents and they thought they lined up with Omega's first offer, that it has to perform these control functions. And when Omega came back with the second license and said, well, we believe our patents now cover anything, including just reading data like your devices, CalAmp declined.

Another topic we've heard a lot about is bus discovery. You heard about the SAE standard, this J1978 standard that when you're plugging a device into the bus and you need to find out what type of bus that device has, you send messages. I think it was the CAN 11 bit message first, then the CAN 29 bit message, then the J1850 message.

CalAmp follows that standard. The standard's been around since 1994. However, despite the fact that the CalAmp devices are following that prior art standard, Omega claims that by performing the bus discovery process, the CalAmp devices must infringe.

I mentioned earlier Mr. Flick admitted he didn't invent the command signals, the device codes. He was utilizing technology that others had and he had

an innovative way to use it for his control functions. He didn't invent the bus discovery either. In fact, if he had known about the bus discovery, he would have had to disclose that to the Patent Office when he filed his patent. He said he didn't know about it, it's not on the face of the patent, so we can assume he knew nothing about J1978 and the bus discovery procedure.

Well, if he knew nothing about it, it's awfully hard to believe that it's something covered by the claims of his patent. To be the inventor of that patent you need to know what you invented. And if you didn't know what the bus discovery process was, that can't be part of what you invented.

You heard Mr. McAlexander say that by following the teaching of the '876 patent to send working and non-working command signals on the same bus type, such as the Grand Cherokee that was listed in the patent, he told me that would be a waste of time, despite the fact that that's one of the examples in the patent.

In fact, he asked me, why in the world would you send a non-working signal when you already know what the bus is? Well, the answer is because that's what's disclosed in the '876 patent. There's nothing in there about finding out what the bus is. The '876 patent

talks about being on the bus and sending your different door lock code signals or your remote start signals until the action you want actually happens.

Omega has the burden in this case to show infringement by a preponderance of the evidence. And that means for each asserted claim they have to show every element is present.

Now, Omega's expert based his opinion on a flow chart that he didn't create, that he knew nothing about, and that does not accurately reflect the operation of the CalAmp devices.

Mr. McAlexander speculated that, well, this must have been made when they tested an LMU-3000, but he had no evidence of that. He had no personal knowledge of any actual testing. He couldn't identify any testing procedure that was used, any testing equipment that was used or anyone that might have performed such a test. He didn't know when, where, or how such testing might have occurred. There is no evidence of any test actually being performed. There's just an anonymous unsupported flow chart that he relied on for his report.

You remember back to Mr. Andrews' testimony and Mr. Chen's testimony. They both testified that that chart didn't accurately reflect how the CalAmp devices work. They said the CalAmp devices send a standard

which means they send out that CAN 11 bit signal, and they wait. If they get a response, they don't send any more signals. If they don't get a response, they move on to the next signal. Mr. Chen testified he personally observed the testing on both the LMU-3000 and the LMU-3030 to make sure he understood how it worked.

We've also heard a lot about Mr. Hergesheimer and that he supposedly agreed that that chart was correct. Well, first, as you recall from the video, when they put the chart in front of him, he said he had never seen it before. He said he was sort of familiar with the procedure on J1978 and it sent a sequence of signals. And under questioning, he didn't agree that the chart was correct. He simply agreed that the bus messages were sent out one at a time and that a new message was sent out only if no response was received.

The chart shows that no matter what -- and Mr. McAlexander told us that's what the chart shows -- that all six messages had to be send and that the results were stored somewhere else and after sending six messages you go back and check, but the CalAmp devices don't operate that way. They follow the standard.

You will see, I think, in 6.5.1 of the J1978 document, it shows the steps that are followed, and it says you send out a message. If you get a response,

you're on this bus, and there's not a second step. Mr. Chen, Mr. Andrews, Mr. Hergesheimer all confirm that that's the way it works, but Mr. McAlexander insisted that his chart was correct.

Well, creating even more error in his opinion and his report that rely on that chart is the fact that he starts with unreliable, unknown data in the chart, and then he expands that and says, well, I think it works the way this chart shows. Even though I'm not sure where the chart comes from, I don't know who did the testing, how it was performed, or if a device was even used. This could be something somebody just drew up on the computer. When I asked where he got it from, it came from his lawyers, no actual technical knowledge that this is, in fact, how an LMU-3000 works.

Well, he took that and said, well, since I think the LMU-3000 works like that chart, I'm just going to assume the LMU-3030, VPOD, and VPOD2 all work that way as well. This is despite the testimony from Mr. Chen, Mr. Andrews, Mr. Hergesheimer, and the support of the SAE J1978 document that shows the actual procedure to the contrary. Because Mr. McAlexander's report is based on unreliable data, his entire opinion is unreliable.

You've heard testimony that for every Omega

patent involved in this suit, there are at least two claim elements not present in the accused CalAmp devices. You probably remember I was standing back there and Mr. Andrews was checking off the boxes and telling me which elements were missing.

For the '876 patent, the LMU devices didn't have a controller as defined by this Court, because they didn't perform a control function. The LMU devices also lacked the working and non-working command signals required by the Court's claim construction.

We've heard the SAE standards make a distinction between queries and commands. When you look at the '876 and '885 patents, you will see the passage that says you can send signals to cause operations or responses. This is confirmed by the Court's claim construction where command signal is a signal generated on the data communications bus for operating a vehicle device, not just getting a response.

But Omega argues that queries for data constitute commands, ignoring this distinction. If you apply that definition, well, then, command signal really has no meaning. It should just be signal, but that's not what the claim construction is.

You also saw the '876 patent says that command signals must be bus compatible. When I spoke with

Mr. McAlexander about that, he said, well, not always. So the patent says it has to be that way, but in hindsight, Mr. McAlexander says, well, that only applies to working command signals, not non-working command signals. But the patent says it applies to all command signals.

If you follow the examples in the patent, it would be true. When you're on that Cherokee bus and you're sending the different door lock codes, the one that works, that's a bus compatible command signal, and it's a working command signal.

The one that doesn't work, remember on the 2000 Cherokee and we send that 96 bus signal, that's still a command signal, but it's a non-working command signal, and it's still compatible with the bus, just like the patent says it should be.

When we look to what the CalAmp devices are doing, they're following that SAE J1978 procedure, sending out those six different messages.

Mr. McAlexander testified, and I think one of the few points probably Mr. Andrews agreed with, that only one of those messages is compatible with the bus that that vehicle's on. The other five are going to be non-bus compatible.

Mr. McAlexander agreed that, yep, only one of

those six messages would be bus compatible. But it didn't bother him, because he said that portion of the patent that said they must be bus compatible was sort of an optional part. It didn't apply here.

For the '885 patent, you heard that the CalAmp devices are not for storing a set of device codes for a given vehicle device from among a plurality of different vehicles for reading a device code from the data communications bus and for determining a match between the read device codes and storing device codes.

That's an awful lot of words. But when we've heard Omega go over this, they've simplified it and just said, well, is there a read device code and a stored device code. They left out all that other language.

As you probably noticed, I'd like to leave out that language, too. I've had a pretty tough time the last couple days pronouncing plurality, especially when your mouth gets dry. But you can't just leave out language from the claims. It's in there for a reason. The Patent Office allowed that patent based on that language. If you take that out, you're making your patent even broader. That's not what the Patent Office gave you. A patent in this country is a limited monopoly. You have the right to exclude others from doing what's covered in your patent. You don't have the

right to keep expanding that monopoly to cover everything you want.

Here, we're talking about patents where the Patent Office didn't have all the information in front of them. When you look at the front of every patent, J1978's not listed on there. In fact, all of the references we've told you about -- Bambini, Braitberg, Spaur, Suman, the Mobile-Trak reference, the MobileWeb reference -- none of those were considered by the Patent Office when issuing all four of the patents in this lawsuit.

For the '278 patent, you heard that the CalAmp devices, again, don't have a controller, they don't perform that required control function, and they don't -- they're not coupled to the vehicle data bus for communication thereover with at least one vehicle device using at least one corresponding device code from among a plurality thereof for different vehicles.

We saw no evidence of that. We just heard, well, they send this bus signal -- we use that first CAN 11 bit message -- and a response comes back. And they somehow match the response to the sent message. But when queried further on that, Mr. McAlexander actually said, well, the command signal in the '876 patent, that's that bus message, the bus discovery message.

When we get to '278 we asked him, well, what's the device code that's been defined as something from a vehicle device? A signal from a vehicle device, well, it's the same thing. He thinks this one bus discovery message can be both a command signal and it could be a vehicle -- sorry -- a device code where the Court's definition has specifically culled them out as different things.

For the '727 patent, you've heard testimony that the CalAmp device uses speed from the GPS device. It's not on the bus side of things. It's on the LMU side of things. And you heard testimony that using GPS speed's been known for a pretty long time. I believe Mr. Chen testified that back when he had his company, Aircept, not a company he bought, the company where he actually built a working telematics device, they used GPS speed.

You probably recall Mr. Eiberger's testimony. I think there's been a lot of dispute about that. We're going to try and remember back to what he actually said. He testified that he thought about 95 percent of CalAmp customers used GPS speed for speed thresholds. He also testified that CalAmp provides pre-defined functions for their customer. There's a speed above threshold, speed below threshold, and a debounce

feature. He said all of those pre-defined functions use GPS speed.

Mr. Hergesheimer testified that the app layer in the LMU didn't use bus speed. It used GPS speed. So then, we get to the five percent. Mr. Eiberger testified that although he thought 95 percent of the people -- or the CalAmp customers use GPS speed for speed thresholds, he ran a query for scripts, and he got back this five percent.

Now that five percent was not people that were using scripts to set up a threshold using vehicle bus speed and send out a notification report. That five percent was for people who were accumulating vehicle bus speed, and he said he would have to look at each script to figure out what they actually did. He said he wasn't aware of anyone actually using bus speed for a speed threshold.

Mr. McAlexander tried to get around all that testimony. When we asked him why does he think the CalAmp patents infringe, the testimony was, well, they're hooked to the bus and they can get bus speed from the bus, but I know they're just using GPS speed for speed thresholds, but that doesn't matter. You can use the GPS speed for speed thresholds, just like everyone else has done for years. But even if you have

an unrelated connection to the vehicle data bus for speed for another purpose, I think that satisfies the claim. So he basically said, I'm just going to ignore the part that says speed from the data bus. And I'm going to let it be data bus speed in this part of the claim, and it's going to be GPS for this part of the claim.

The burden is on Omega to show each and every element of the asserted claims in the accused devices and they can't meet this burden, because the evidence shows that in every CalAmp device for every Omega claim at least two of the elements are missing.

As you heard during trial, and you will hear again in the jury instructions, you will hear about independent and dependant claims. And the rule is if a party doesn't infringe an independent claim, they can't infringe the dependent claims that depend from that. So here, if we show that CalAmp does not infringe Claim 1 of the '876 patent, they can't infringe any of the other claims of the '876 patent either, just like Mr. Andrews showed you on the chart.

As we mentioned before, Omega claims in this case that bus discovery infringes the patent, even though Mr. Flick admitted he didn't invent that concept. The evidence showed that was a concept that's been

around since at least 1994 in the SAE giant J1978 protocol. There's been a lot of discussion, well, J1978, that's just for scan tools. No one would ever use that. But if you recall from Mr. Chan's testimony, he pointed out the Nathanson and Lang patents where there was a scan tool connected to the vehicle data bus.

He told you that some of the CalAmp customers have used the AutoTap scan tool and connected to a CalAmp device. So it's clear that people in the industry know that you can connect a scan tool to a telematics device, to achieve connection with the bus. In doing that, when you get into that diagnostic layer that Mr. McAlexander testified about, the controlling specification for that diagnostic layer is J1978.

Now, Mr. McAlexander testified that the set of bus discovery messages were both command signals and device codes, as I mentioned earlier. We also had a hard time when we got to, I believe, the '278 patent. You remember we went round and round about, it was quite a mouthful, but what's a corresponding vehicle device code. And he said, well, the device code -- well, he identified the ECU or ECM, which is the engine control unit or engine control module in the vehicle. And he said for the purposes of this claim, that's the device -- I mean, the vehicle device I identified.

But when we got to corresponding vehicle device codes, that meant that code was coming from the wrong place. He didn't identify any signal from the ECU or ECM, which is what he would have had to do to satisfy the Court's construction that the device code is a signal from a vehicle device.

Instead, he said, well, to satisfy that definition, let's just pretend the LMU is the vehicle device. That would result in the LMU trying to communicate with itself and frustrate the purpose of the claim. You can't keep changing the vehicle device in each part of the claim to try and get around and make it fit your construct. And I think the problem was he was trying to shoe horn in the same bus message that he says is a command signal -- make it a device code, make it a corresponding device code. It's kind of the universal piece that he kept trying to fill in to try and claim infringement. It satisfied many and many of the elements of the claim.

You heard testimony from both Mr. Eiberger and Hergesheimer about GPS speed and CalAmp using GPS speed. I think that in one of the e-mails that was up earlier today, CalAmp mentioned that they would use GPS speed, because that wasn't covered in the patent.

Mr. Gilchrist put up an e-mail that said there

were issues with, I think it was Claim 13 of the '278 patent. There was no discussion that we think our current product infringes that patent. They said it may be harder to avoid, so that meant they were going to make sure it operated in a way that didn't infringe that patent. The next two lines in that e-mail actually show we don't use GPS speed -- or we use GPS speed and don't use bus speed, so we're going to be fine on the '727 patent. We don't do command signals as required by the '876 patent.

Now, early on in opening statement, Omega said it was going to try and simplify this case. And patent cases are notoriously dry and boring. They're very, very technical. We had two experts talking about a lot of technical stuff. But when you go in to simplify the case, you can't simplify it by just ignoring certain portions of the claim.

There was discussion about, well, Mr. Andrews said there was a port, but then in his chart he said there wasn't a downloading interface, and that's because the claim didn't just say downloading interface. It had a whole section of what that downloading interface had to include.

It said, the downloading interface had to be for permitting downloading of enabling data related to

the at least one corresponding vehicle device code for use by said multi-vehicle compatible controller. But we didn't hear anything about that part of the claim.

You heard a lot of discussion of the CalAmp specifications and the drawings that showed the chips and the different pieces of the devices. Again, that's structure. And while these claims have structure, they all require more.

If you look at the '876 patent, it doesn't say it's configured to do something. It actually says generating -- that verb -- you've got to generate working and non-working command signals.

You can't just ignore that and say, well, they have structure. You actually have to read the entire claim and satisfy every limitation. Just like we talked about with '278 a minute ago, you can't just stop and say they have a downloading interface. You have to say, keep going further and identify, well, is there enabling data and is it related to the corresponding vehicle device code. There's been no evidence at all on that.

Giving the patents the proper meaning they're entitled to, as issued by the Patent Office and construed by the courts, the patents don't cover the CalAmp devices. However, if you think the patents are broad enough to cover the CalAmp devices, then that big

stack of prior art that we had renders the patents invalid, and you have to conclude they're invalid in view of that prior art.

CalAmp has the burden of proving invalidity by clear and convincing evidence. CalAmp put on Mr. Chen and Mr. Andrews to satisfy that burden. I think you saw Mr. McAlexander for about three or four minutes yesterday. He didn't even attempt to rebut that burden. He didn't tell you anything about the prior art that had been analyzed. You didn't hear him talk about Suman, Bambini, Braitberg, Spaur, Nathanson, Lang. He just chose to remain silent.

Mr. Chen and Mr. Andrews, both with years of experience in the telematics field, mentioned that they had seen wireless communications, GPS units, and controllers connected to the vehicle data bus.

Now, Omega's made a big deal that Mr. Chen didn't know about the vehicle data bus standard until, I believe, 2010 or 2011 when he learned about it from B&B. It was the first time Mr. Chen had actually made a device to work on the vehicle data bus.

Mr. Andrews, he'd been working on the data bus for years. He said, everybody working on the data bus would know about the data bus. But when we look at the prior art patents, there's been an argument that there's

no motivation to combine. Why would someone looking at the Bambini patent, that's this OnStar device that can actually control your door locks over the vehicle bus, why would they look to the SAE specifications?

Well, Bambini specifically discloses there's a CAN bus in there. The SAE specifications control operation on that CAN bus. That's what you have to follow if you want to be able to successfully communicate on that data bus.

There was no stretch. The references you saw were all one patent combined with the standard that controls operation of that patent. Those patents all had vehicle data buses in it. And Mr. Andrews combined them with the specification for that vehicle data bus.

This was not combining a baseball and a softball, baseball and basketball. These were things in a very narrow field. And as you saw, it was one structural device and then the specification that would say if you want to be compliant with the federal standards, this is the way you operate.

Now, I mentioned earlier that Mr. Chen found some diagnostic scan tools being used that interfaced to the bus. He also testified that he was aware of a company called B&B, a company that had come up for sale and CalAmp investigated, decided not to buy them, but

they partnered with them for technology. And why did they partner with their technology? Well, CalAmp had never made a device that connected to the vehicle data bus. B&B had. They had the AutoTap, this diagnostic scan tool that they had been selling for years.

So rather than try and re-invent the wheel, CalAmp said, there's a device that knows how to contact the bus, knows how to speak the language, and it also fit in with CalAmp's goal. CalAmp didn't want to control anything on the bus. They wanted to do the very same thing a diagnostic scan tool does. They wanted to read the data.

The next company you heard about with CalAmp was Innova, another scan tool maker. Not a coincidence that CalAmp went to two different scan tool makers to try and obtain the technology to connect to the data bus. Now you heard that while it took a long time for them to get that technology, must not have been that obvious. They went to B&B and they said you have this scan tool, pretty big device, we've got our LMU, the 2600 that these are based on, that's a good-sized device, we want to collapse it down into a device this size. That alone takes some impressive engineering.

But the next step is this is a device that's being plugged into the core of your automobile system.

The data bus is where all the communication happens. You don't want to put that device in the data bus and have it start causing problems, causing issues with the cars. So, CalAmp had to be careful and make sure that everything was right before they released the product.

You haven't heard that CalAmp copied the technology from anyone. What you heard is it took a year and a half of CalAmp engineering working with B&B, and then I think it was six months or eight months working with Innova to come up with these products. They built these products based on their previous LMU technology, combining it with the diagnostic scan tool from Innova or B&B, and following the J1978 specification.

We stepped through with Mr. Andrews all the prior art that he had compiled for his report. He had a lot of combinations -- Bambini and J1978, Braitberg and J1978. He explained how one of ordinary skill in the art working on the vehicle data bus would have been familiar with the J1978 bus discovery procedure, and one would have looked to J1978 for connecting to the vehicle data bus. He went through each of the asserted claims of the patent in suit, and he found that they were all obvious in view of the prior art. As I mentioned, Braitberg and J1978, Bambini and J1978, that's what

rendered the '876 patent obvious.

For the '885 patent, it was Braitberg and J1978 or MobileWeb and J1978; again, a device designed to connect to a vehicle data bus, and the specification that controls the operation or specifies the operation on that vehicle data bus.

The combination of Spaur and 1979 rendered the '727 patent invalid as obvious. Again, Spaur was a telematics device that said you could obtain parameters or data from the vehicle data bus. It didn't expressly mention speed. It said you could monitor location of vehicles. You could check their status. Well, if one skilled in the art read the Spaur patent, it said you can determine values from the data bus and you can set a threshold for a value and set a notification when that value exceeds their threshold.

The only question one skilled in the art would have is, well, what data can I get from the vehicle data bus? When it says I can use data from the data bus to set up this threshold, where is my menu of available data? Well, the SAE is the party that publishes that menu of available data, so that's how you get to J1979. This is the standard that says here are the data values that have to be available on the data bus.

So it's not a stretch that one skilled in the

art reading Spaur that says you can do these neat things with data from the data bus, set up a threshold. When you exceed that threshold, you will trigger a notification. The obvious place anyone would have looked is, well, where is the listing of what data I can do? Can I do speed? Can I do engine temperature? Can I do RPMs? One skilled in the art would understand that all those things were possible just by looking in the place that the patent directs you. It said, you need to know the bus values. So one skilled in the art, you look to the publication that tells you what bus values are available.

For the '278 patent, Mr. Andrews used combinations of Bambini and J1978, and Spaur and J1978, again, the device and the specification that teaches how that device operates on the bus.

Now, Mr. Chen testified that -- he went through, I believe, it was 300-plus patents, the big stack. He narrowed it down to the short stack. He didn't tell you a lot about them. He told you, these are the ones I compiled. These are the ones my company, CalAmp, relied on. Also testified that he worked with CalAmp's intellectual property counsel and obtained an opinion.

So, before CalAmp actually made these LMU

devices, they said we're going to investigate the lay of the land, I believe he called it, what's out there in the field. We need to see what's out there. It wasn't just Omega. They were looking at who else had patents. I think he said Hughes, Cellport, some of the others. Let's see what's out there, and what areas are free.

They weren't doing this hiding it from anyone. There's e-mails that were put up on the screen that he was communicating with Omega. He told Omega what the features would be. They provided sales data of their products once they started selling them. These were not hidden negotiations. It was an ongoing dialogue. It was CalAmp cooperating with Omega over what we thought was an actual despite over what the patents covered.

You saw a lot of e-mails about lists of patents that Omega provided to CalAmp, but missing from that list is what CalAmp products they thought were covered. It sounds like today they thought all CalAmp products were covered. But every time CalAmp spoke to them, you will see in the correspondence, it seemed like a different product was being asserted.

At times, it was products that connected to the data bus. At other times, it was, well, we think the LMU-2600 might infringe. There was the LMU-2000,

a device that looks the same, but only gets power from the data bus and doesn't communicate.

CalAmp didn't know which devices Omega thought infringed its patents. So, Omega didn't put CalAmp on notice of the infringement until they told them, we believe this device infringes a certain patent, and you've seen no evidence that that happened before the filing of this lawsuit.

Two of the patents I mentioned that Mr. Chen had in his short stack were Nathanson and Lang, and that's Defendant's Exhibit 27 and 28. I think those are really important for you to look at. Mr. Chen said he was happy they were very short patents. The figures are very straightforward. I believe each just had a single figure -- shows a data bus, a diagnostic scan tool connected to the data bus, and a telematics unit at the other end. You can think of that as an LMU-2600 connected to a diagnostic scan tool from B&B or Innova or you could think of it as one of the LMUs that supports the VPOD or VPOD2.

We heard testimony that these VPOD and VPOD2s that basically just have the diagnostic scan tool portion in them, these are basically shrinking down with Innova or what B&B used to make and put them in a small package for connection to the existing LMUs.

Another patent that you saw Mr. Chen found was the Lhamon patent. Sounded very simple. Had kind of a funny-looking diagram of a really boxy car. Showed the two-way signal going from a tower, hitting the car, and that was to unlock the doors in the vehicle using the vehicle data bus.

Now, Omega doesn't dispute that every element claimed in the Omega patents has been found in the prior art. We didn't hear any expert testimony from Mr. McAlexander that he thought certain elements were missing from any of the references found by CalAmp. And what we've heard today is, well, no one would have known to combine that, that Mr. Andrews didn't talk about that, but Mr. Andrews did talk about that.

He didn't have to speculate about what one of ordinary skill in the art would know, because he is one with ordinary skill in the art. He didn't need the time machine to go back to the 2000 period or guess what would one of skill in the art would know in 2000. He was one with skill in the art in 2000.

Omega's claimed that Mr. Andrews just used hindsight. That means he took the patent as a road map and just tried to piece together, like a jigsaw puzzle, all the pieces. Well, when you look at the combinations, you'll see that's not actually true.

These are not three or four references combined where it took a transmitter and a receiver from here and a GPS from here and a bus connection from here. These are references where all the hardware is in a single reference -- transmitter, receiver, GPS, bus connection, ability to control vehicle devices on the bus. I think the only issue that Mr. McAlexander would have with those is, well, there is the multi-vehicle compatibility. There's been a lot of testimony about the CAN bus, that there's a CAN 11 bit, CAN 29 bit.

The Court's definition regarding multi-vehicle compatibility is on your list. It comes in with multi-vehicle compatible controller. And when you look at the difference between that definition and the definition of controller, you will see that the difference is it works with more than one vehicle. Doesn't say more than one bus type. Doesn't say different models or platforms. It just says more than one vehicle.

When Mr. McAlexander was on the stand, he said, well, I think that really needs to mean more than one bus, and we seemed to have kind of a disagreement between what he thought, what the patent said, and what the Court's directed us that term must mean. Well, here, we have to follow the Court's definition.

It's more than one vehicle.

There was testimony all around that a CAN bus works with well over more than one vehicle, whether it's the 11 bit or the 29 bit variety. Testimony was that since 2008, every light-duty vehicle in the U.S. -- so anything under 8500 pounds -- has to have a CAN bus in it. That's a lot of different vehicles, definitely more than one.

Now, going back to this claim of hindsight reconstruction, Mr. Andrews was able to find one device. And as he read through the patent or in the MobileWeb case -- it's a publication regarding an actual device -- he could look and see, wow, this seems to say everything that Omega does.

And to be safe, I think on some of them, he said, well, I thought this did multi-vehicle, but I combined it with the SAE J1978 'cause I know that also does multi-vehicle. And I asked him, well, why would anyone want to combine that? And the answer was the same in every case, well, this is connected to the bus. And those working in the automotive industry, working on the vehicle bus, know that the SAE standards are what you have to follow to actually make a device communicate on the bus.

With respect to hindsight, Omega's own expert

in his report noted that prior art references are properly combined when they involve the use of known techniques to improve similar devices in the same way.

Well, we heard testimony that J1978 was a known technique for multi-vehicle compatibility across different bus types since 1994, so that would be a known technique. It's designed to work on devices that connect to the vehicle data bus.

Every prior art reference we saw talked about a device designed to connect to the vehicle data bus, so that's applying a known technique to improve similar devices in the same way, just as Mr. McAlexander admitted was a proper combination.

Another step that Mr. McAlexander noted would be proper was obvious to try. Would one skilled in the art say, you know, before I embark on this design of trying to figure out how to connect to the bus myself, maybe I should look and see if anyone else has tackled this project before.

I need to connect my device to the bus. I could use a scan tool or, if I don't want to compile all the information myself, I could just look to the SAE specification that's going to give me a step by step of how do I connect to the vehicle data bus. That's definitely a combination that would have been obvious to

try.

So, I direct your attention when you get back into the jury room and after the judge has read the instructions, jury instruction 22 specifically lists what are proper combinations of the prior art, and you will see that every combination proposed by CalAmp clearly fits within those guidelines.

Another theory that Omega has put up for why you should ignore the fact that every element is present in the prior art is called secondary indicia of non-obviousness. You will see the word non-obviousness in the jury instructions. But as you will see in the instructions, the law requires -- and this is jury instruction 24 -- the law requires that any purported evidence of non-obviousness has to have a connection, not just to the patent number, but to the merits of the invention.

Omega's been pointing to patent licenses that have 30, 40, 50 or upwards patents listed on them. For some of them, they include several of the patents in this lawsuit. I think there was a single patent where they identified -- a single license where they identified three of the patents in suit and they identified the publication of the '278 patent, so it hadn't actually issued as a patent yet.

That's not enough. The law says you can't just point to a patent number. It says specifically, licenses are not enough. You have to have what's called a nexus or a connection to the merits of the invention. So you've got to look past the numbers in the license and say, does that company make a product that's actually covered by one of the patents? And it's not one of the patents on that license of 50-some patents, it's one of the four patents in this lawsuit. There's been no evidence of any product covered by the four patents in this lawsuit. We haven't seen any samples. We haven't seen any pictures. CalAmp asked Omega for that information. Nothing was provided. There was no evidence that any product is covered by the patents in suit.

When Mr. Flick was stepping through his license agreements, he said, I have a marking provision. When my licensees make a product covered by the patents in suit, they have to mark it. And that's a federal provision. That's so that people who pick up that product can look at it and say, this product's covered by a patent. I should look up that patent and see what it covers. There's been no evidence of a single product out in the marketplace covered by any of the four patents in this lawsuit.

One of the other things that Mr. Flick mentioned about his licensees was they didn't really like that marking provision. It might look cool when you put in that big list of patents and he said everyone says, ooh, Omega R&D is a great inventor, kind of got a kick out of that, but he said they didn't like listing all those patents.

Some of these products are not particularly big since we -- we haven't seen what any of those licensees make. We don't really know how big their patents are, but he said they put it on their documentation. They didn't like having that. And he said a lot of licensees said, we don't want to list them all 'cause we don't use all the patents in his license.

We know that, I think, only in one case where we showed a patent that had almost all the licenses from this lawsuit, the rest had some -- I think Mr. Tregillis testified that from his count, six or seven of the licenses included patents that are involved in this lawsuit, but we saw no evidence that anyone was marking.

And those patentees -- Mr. Flick testified that his patentees said they don't use all the patents in the license. So even if you see one of the patent numbers from this lawsuit on the license, the testimony is that those licensees may not actually use them.

When Mr. Tregillis was asked for details on those licenses, what do those people make? Do they really just make alarm systems or remote starters? There was no evidence. I think we heard that Lear and GM, that those licenses involved remote starters.

Another non-obviousness factor that you'll hear about is copying. Well, you'll see in the jury instructions, did they copy the invention, not the patent, the invention. There's been no evidence of any product from the invention. I think Mr. Andrews testified on some of the other factors -- was there a long-felt, but unmet need? He said, no, people knew how to do this already.

Now getting back to some comments that were made earlier, there was a lot of testimony about Mr. Chen and his degree from Berkeley in sort of a condescending way about Berkeley, I guess.

Mr. Chen is a very skilled engineer. You heard he worked at a lot of different companies, worked on some interesting technology, had his own start-ups, ended up at CalAmp. He's been kind of the point man dealing with Mr. Flick and these license negotiations that have stretched for years. Well, Mr. Chen gave testimony about how the CalAmp devices work. You know, he said he wasn't at the SEMA meeting,

and he said he didn't get in Mr. Flick's face and call him names.

He also testified about those discussions that at one point he was -- understood that the license would include controlling door locks, remote starting. He said CalAmp wasn't interested and that some time later he got a different license proposal that said, well, this will be the light license. It's limited to just what the LMU can do now. And that's when he decided he had to kind of re-expand his search.

He had been looking for prior art that did control functions. Now he had to broaden it back out 'cause he understood that Omega was saying, well, even though our patents are about control functions, we're saying if you hook to the bus and do anything, we think our patents cover you, so he branched out and found even more prior art.

There's also been a lot of discussion that we had to hear Mr. Chen via video 'cause he refused to show up. There was an offer that the plaintiffs could have cross examined Mr. Chen in the defendant's case, but they declined that offer, said they'd play the video instead.

The other question is, well, why are all the CalAmp engineers flying across the country to Florida,

if we had it Omega's way. Well, we're in this Florida lawsuit, because in the prior lawsuit, I believe that one was in Georgia between CalAmp and Omega, the lawsuit that was settled where the parties had discussions, Omega had sued on different patents, not the patents in this suit, not covering the vehicle data bus, but as part of that lawsuit CalAmp agreed to a settlement agreement, had a long list of patents on the settlement agreement.

One is the '989 patent that you may have seen some stray evidence about. That settlement agreement said if we're ever in a dispute with Omega that involves any of the patents in this list, CalAmp will agree to come to Orlando for the trial. So when this lawsuit started, the '989 patent was part of this lawsuit, but fairly recently that patent dropped out.

But that's why CalAmp's here. If Omega really wanted to have all the CalAmp engineers testify, there's a really easy solution, they could have filed in California, all the CalAmp personnel would have had to be there, and would have been much more practical, CalAmp engineers not flying across the country for weeks. As you know, it's kind of an unpredictable schedule. They could have had all they wanted.

In this case, they did have all they wanted.

Omega took all the depositions of Omega personnel. CalAmp cooperated. But I think here if you look at it, is it reasonable to expect Mr. Hergesheimer, Mr. Hall, Mr. Chen -- I know I'm missing somebody else -- but to expect them to fly across the country and wait in the back until we get to them where just a single person, Mr. Flick, could have flown out to California if he really thought it was important to have their testimony? I think what we're seeing is that's sort of an excuse. That's why there isn't enough evidence. That's why the questions haven't been answered on certain items.

There's also testimony about Mr. Hall that he talked about a list. And that list was actually a list that had come up in Mr. Eiberger's deposition. I think we talked about it before. It was the five percent list. You saw it up on the screen. As I explained before, that's not a list of people that use data bus speed to set up a threshold and trigger a notification upon exceeding that threshold for a period of time. That's a list of everyone that had an accumulator set up to track vehicle speed.

You probably remember from the testimony, Mr. Eiberger went on and on about how one would go to set up this accumulator to track vehicle speed and could do all these other things. He said it was possible he

could do it in a short amount of time, but he wasn't aware of customers doing it. He also didn't even get to the last part of the claim requirement which is, well, you actually have to set up a notification, so we know he wasn't aware of anyone doing that speed section so, therefore, he wasn't aware of anyone doing a speed section plus a notification. Again, it was an instance of Omega picking out the key words and leaving out the rest of the requirements of the claim.

Another exhibit you saw was Exhibit 85. And that's been characterized as showing that CalAmp was trying to hide stuff. They had a data sheet. They didn't want to put it online. They wanted to hide it. Well, I urge you to read that e-mail 'cause you're going to see, the lawyer says put it online. That's the opposite of hide it. Everyone knows once something is online, it's out there. There was no instruction to hide it. There was the instruction to show it. He said, we're on a fast track to lawsuit, but he said put it online.

There was also some discussion about the license to B&B that CalAmp was willing to pay $7.17 to B&B, but they weren't willing to pay $5.00 to Mr. Flick. Well, Mr. Chen testified that when he asked Omega about the technology, he found out there was no technology to

be had. He would get a license on the patents, but CalAmp would still have to either spend the hours themselves to try and do their first vehicle bus project or do what they did and partner with someone with vehicle bus expertise.

This was not a choice. They needed the actual technology to accomplish the task. And what they found was there was pre-existing technology. It was pointed out that neither Innova nor B&B had patents. That's because this was basically known technology. This was how to operate on the vehicle data bus, not an area that CalAmp had ever participated in before, but definitely known in the industry. I think Mr. Chen testified that Innova was one of the largest diagnostic scan tool makers out there. And if they don't have patents to cover the technology, you have to believe that's pretty widely known.

There was also discussion about Mr. Hergesheimer, whether he saw the chart. I think we covered that. He never said that the chart that Mr. McAlexander had in his report was accurate. He said he knew there were sequences, sequence of messages that they were sent one at a time. And if they sent and received a response, they stopped. That's directly contrary to what Mr. McAlexander told us on the stand.

Mr. Hergesheimer testified, yeah, there's a serial port on the device. You could download with it. But again, the rest of the question was never asked. Omega never asked, well, can you use that serial port as a downloading interface for enabling data for corresponding vehicle device codes.

Mr. Hergesheimer never said all that was in there. He just said there was a physical port, so we're back to that same problem of just because the structure's there doesn't mean it can perform the steps in the claim. You heard, I believe, Mr. Andrews testify that it doesn't actually download enabling data that's related to a corresponding vehicle device code. He agreed, there is a serial port, but it doesn't do what the claim requires.

We heard a discussion of Steve Hall, I think, in reference to the list of customers. Well, we've heard a lot about degrees and that Mr. Flick has had a lot of success, and he doesn't have a college degree. No one can argue that. He's an extremely successful man. But it's been portrayed that CalAmp is kind of stuck on its degrees. But they have Mr. Hall, who was deposed. He's the director of system engineering and technology at CalAmp. He doesn't have a degree.

We also heard about the testimony of

Mr. Bailey, that he's my partner, can't be trusted. He's an Australian guy, came in and just said, wow, I gave an opinion, but I'll do anything for my client. Well, he gave a thoughtful reasoned opinion. Mr. Chen said, I worked with him over the months, that they had looked at the 300-some references. Mr. Bailey, I think, told us he had an electrical engineering degree, worked with some very high-tech clients. You can't just dismiss him because he knows me.

You have to actually weigh what CalAmp did, commissioning Mr. Chen to find all those patents, looking at Mr. Chen saying, you know, we want a second opinion. No offense to Mr. Chen, but let's ask a patent lawyer, not an engineer. So they asked a patent lawyer, and the patent lawyer said, yeah, you don't infringe the '876 patent. The '885 patent is invalid, as is the '278 and the '727 patent. CalAmp reasonably relied on those opinions.

You heard discussion about the damages case and Mr. Tregillis. Mr. Tregillis kind of inflated the damages a bit. He told us, while I looked at, I think, it was 16 or 17 Omega licenses, couldn't tell us if any of those licenses related to data reading technology, like we have here, but he considered them anyway.

He said that they were related to -- two of

the licenses included a provision where there was a higher royalty rate -- excuse me for just a second -- they started with a higher royalty rate, and they kicked down to a lower royalty rate. I think Mid City Engineering was one. Said they had a cap. They had to exceed 10,000 units before they would get down to the better rate. Never exceeded that cap. Mr. Tregillis admitted, yeah, they're a very low volume licensee.

There was another one, had a higher rate. I believe it was $10 to start with for the first, I think it was 20,000 units. For the second phase, the rate was zero. Mr. Tregillis admitted, yeah, the effective rate, if they ever met their units, was $5.00 a unit.

But Mr. Tregillis took the doubling of the royalty rate and the different periods and kind of morphed that all together and came up with a theory that he put on his chart. He said, well, if I do that instead of a $5.00 rate, I've got a $6.00 plus rate that I think is appropriate, increasing the damages by almost 30 percent based on two unrelated licenses that he kind of cobbled together for very low volume sellers.

As we discussed earlier, he admitted that a lot of these licenses were entered into to resolve litigation and that in his experience it was common for

parties to enter into licenses to resolve litigation when it's cheaper than paying for lawyers. As you heard from Mr. Gilchrist's cross of Mr. Bailey, lawyers are pretty expensive.

Now, Mr. Tregillis assumed that the licensees of the Omega patents used the patents in suit. But we heard there's no evidence of that, that even if all of the patents in suit were listed on any of the license agreements, which we never saw they issued '278 on any license agreement, but even if we assume it was there, there was no evidence that anyone was actually making a product covered by any of the patents in this lawsuit. Mr. Tregillis didn't need to worry about that, though. He just applied those licenses anyway.

There was also testimony that a lot of the licensees that he looked at were for alarm systems, for remote starting systems. He testified that, well, there's an established royalty, and then I used my methodology to increase it. But even his established royalty was a little off, because it was people making different products covered by different patents.

And he kind of left out a couple big factors. When looking at the established royalty, a lot of the licensees he considered were very small players, the ones he didn't have in his top five, but there were also

some very large licenses that didn't include a per-unit license. There was the Enfora license. That was a flat rate. He said, well, they estimated it to be the right amount of royalty.

There was the Lear and GM license. I think the GM license was $50,000. And we didn't have any evidence, but we had a lot of speculative testimony that, well, it was really cheap 'cause we were worried GM might go bankrupt and we wouldn't get paid, so we just took the money they had, but there was no evidence that GM is not still selling a product. GM is a really big company. It wouldn't take much to turn a $50,000 lump-sum payment into a penny a unit royalty.

There was also Lear, 5.9 million, I believe. When you looked at the back of the license, that was for supplying 11 different devices to five different companies, including Ford, Chrysler, General Motors, and Honda, again, four very large auto makers with an open-ended license.

Mr. Tregillis admitted that, well, they tried to estimate what they thought the sales would be and make that a $5.00 per unit royalty, but he admitted there was no actual certainty there. And again, it was an open-ended license for four different manufacturers, so we have no idea what the effective royalty rate is

there. Again, given the volume of cars sold by GM, Honda, Chrysler, and Ford, could easily be 5.9 million cars. This is over a number of years and continuing on. We could, again, get down to royalties on the order of pennies per unit.

Now in addition to considering licenses that were inappropriate that were Omega licenses, Mr. Tregillis failed to consider some of the appropriate CalAmp licenses. Now looking at a patent license, he knew that the B&B agreement had a 17-cent provision. That was a provision that B&B had to pay to Bosch, which Mr. Chen testified was a license for Bosch's CAN bus patents. So Omega was paying -- CalAmp was paying 17 cents to B&B and B&B was passing that on to Bosch, so 17 cents for patents that controlled access to the entire bus, not just the subset of being able to send particular signals in a particular order, working and non-working command signals. So if that was worth 17 cents, you have to ask yourself the subset that's described in the Omega patents, what's that worth.

Other evidence we heard was the wireless devices in the CalAmp units. CalAmp pays a percentage of royalty on those, somewhere between zero and half -- I mean, between half and one percent, I believe for key wireless technology. They also pay $1.50 royalty to

Innova for their codes, for their data, for their support. We heard that they paid, I think, a million and a half dollars to pay out the support provision, but that the per-unit royalty was going to end in a couple of years, so the royalty is just going to keep dropping and dropping and dropping. That's a payment for actual technology versus patents that CalAmp still doesn't believe cover simply reading data.

Another issue we have with Mr. Tregillis, you probably remember, he said in his report that GPS off the -- GPS location and GPS speed would not be referred to as bus speed. And his analysis for that was, well, I have a bike and I like to ride my bike and I have a consumer-level GPS unit. And when I take a corner on my bike, it thinks I'm going 150 miles an hour, and I'm not really going that fast. So he had a disparaged GPS speed reading based on a consumer-level GPS unit he had.

He had said how it worked, said he got that information from Mr. McAlexander. But on cross he testified he would actually be surprised if CalAmp used a much more advanced method of finding speed. You heard Mr. Chen testify that they use a doppler shift method to get much more accurate speed and nearly instantaneous readings from the GPS instead of from the bus.

Mr. Tregillis had used that factor to say,

well, CalAmp would be willing to pay more so that they could get speed from the bus in this hypothetical negotiation, because speed from the bus would be a much better alternative to speed from the GPS. But you heard Mr. Chen testify that CalAmp chooses to use speed from the GPS, because it's their preferred mode of operation. So in that hypothetical negotiation, they wouldn't have been willing to pay more for that feature.

The last part relating to damages is notice. We've talked a lot about when did Omega first tell CalAmp, we believe the LMU-3000 infringes the '876, the '885, the '727, and '278 patents. We saw in an e-mail earlier today that, I believe, it was July 31st, 2013, was the first evidence we saw of discussions regarding the '278 patent. That's years past the starting date on Mr. Tregillis' damages model.

We haven't had any evidence of a letter from Omega saying here's the patents that we think cover these particular devices. There have been negotiations back and forth, but no one's put up anything from those negotiations saying here's the product we thought was covered. Here are the patents or the claims we think cover it. The only evidence we have is Omega filed this lawsuit on December 20, 2013. So if you do feel that damages are necessary in this case, that should be the

starting date.

Another concept we have to look at is willfulness. Omega claims that time CalAmp willfully infringed its patents. The burden is on Omega to prove willfulness by clear and convincing evidence.

Omega has to show that CalAmp's conduct, in bringing its products to market, was reckless and that CalAmp actually knew or should have known its actions constituted an unjustifiably high risk of infringement of a valid and enforceable patent.

Well, you heard that rather than just making a product, putting it out on the market and seeing what happens, CalAmp started the diligence project. They tasked Mr. Chen with developing the big stack and the small stack. He disseminated the small stack, he said, to people at CalAmp. That wasn't enough. Even if they thought, well, we think we're safe, they went out and they got an attorney, not for one opinion, for four opinions. That is not the actions of someone that is -- those are not actions that constitute an unjustifiably high risk. The opinions came back that one patent was not infringed, that three patents were invalid. CalAmp relied reasonably on the opinions, both of its internal investigation and the opinions of outside counsel.

After the Court instructs you on the law, you will be given jury instructions and verdict forms. A couple of the jury instructions you should pay attention to. In addition to the ones I mentioned earlier, instructions 20 and 22, those talk about hindsight. They talk about a person of ordinary skill in the art. They talk about putting yourself in the place of a person of ordinary skill in the art.

Now, we heard Mr. McAlexander say he took steps to prevent hindsight reconstruction, never said what those steps were or how he did that, but Mr. McAlexander was not in the art in 2000, so he would have had to look back and do that.

Mr. Andrews, on the other hand, was a person of ordinary skill in the art in 2000. When it says put yourself in the place of the person of ordinary skill in the art in the year 2000 or 2007, the filing date of the other patent, you can put yourself in the place of Mr. Andrews. He was that person of ordinary skill in the art.

I'd like you to step --

Could I go to the Elmo?

I'd like to step you briefly through the verdict forms.

THE COURT: Go right ahead.

MR. KAUTH: Now as you saw earlier, the verdict form starts with a question. "Do you find that Omega has proven by a preponderance of the evidence that any of the accused CalAmp devices infringed any of the asserted claims of Omega's asserted patents?" We think the answer there is clearly no.

For each of the patents, Omega has failed to prove that they contain a controller as defined by this Court. For the '876 patent, they lack the working and non-working command signals. For the '885 patent, they don't have the reading, storing, and matching of device codes that is required. For the '278 patent, they don't have the communication over the vehicle, the bus, using a corresponding vehicle device code from among a plurality thereof. And for the '727, they don't use the required vehicle bus speed to set the speed threshold.

If your answer for question 1 is "No," then you proceed to question 3. For question 3: "Has CalAmp proven by clear and convincing evidence that any claim of the asserted patents is invalid?" We think the combinations that Mr. Andrews gave you, the stand-alone patents that Mr. Chen gave you, demonstrate that all of the patents in this lawsuit are invalid. If you find the patents are invalid, you move to question 4.

So, for example, with Claim 1, if you found

that claim to be invalid, you can put "yes" or a check mark in that box, and then you list the references disclosed in that claim. So for Claim 1 of the '876 patent, you'd put Braitberg and J1978, if you felt that way. If you think there is more, you can put more.

Once you complete Section 4, you move on to Section 5. "Which of the following factors that tend to indicate non-obviousness, if any, has been established by the evidence with respect to the claimed invention?" So if you think none of the factors apply, you move on. If you think certain factors apply, you move step by step through these.

Then we ask, were accused products by the claim commercially successful due to the merits of the claimed invention? That takes us back to that connection or nexus that you will read about in the jury instructions, that there has to be proof that these go to the merits of the patents in this suit and not just generally to license agreements on an entire portfolio of patents.

Yesterday, Mr. Andrews testified he didn't believe there was a long-felt need for the solution, that it was already being met. He didn't know of anyone that tried to solve this solution but failed. He mentioned that J1978 had already provided the road

map for multi-vehicle compatibility and other references like Suman, Spaur, Braitberg, and the rest had all the hardware.

Did others copy the claimed invention? There's been no evidence of an actual product that's covered by these patents and any copying of such a product. In fact, the evidence is the opposite. It's been that it took CalAmp several years to get this product up and functioning in a way that would integrate their existing product with the Omega -- or with the B&B or Innova product and shrink it down into the size they needed and then make sure it was compatible with the bus and not doing any harm. I think there was also testimony that there was no unexpected superior results. We didn't hear anything about praise of the invention.

The last factor is did others accept licenses under the patent because of the merits of the claimed invention? We heard a lot about licenses. We heard Mr. Tregillis say litigation was involved in at least some of them. We haven't seen anything that anyone took a license so they could make a product covered by either the '876, the '885, the '727, or the '278 patent.

The last question, I think, in our verdict form, we had a no, so we wouldn't get there. If you did get to this question, if you found there to be

infringement, you would have to determine were CalAmp's actions willful.

"Has Omega proven by clear and convincing evidence that CalAmp acted despite an objectively high likelihood that its actions infringed a valid patent?"

You've heard all the precautions that CalAmp took, the efforts it took both in-house and with its outside counsel. If you found there is infringement, I think it's clearly a no, that there was no willful infringement. CalAmp, in good faith, relied not only on opinions of its employees, but also of outside counsel, and it was reasonable for CalAmp to rely on that.

We urge you to look at the evidence very carefully. We know this is a technical case, and we think the exhibits that are in give you the road map you need to see how the CalAmp devices work, what the Omega patents cover. We think you will determine that when properly read, the Omega patents don't cover the data-reading capabilities of the LMU devices.

I want you to look at the prior art references, Mr. Andrews' reports at Exhibit 38 and 47, those show you how he combined the references. You will get his flavor for one of ordinary skill in the art and see why he thought those references went together. We think looking at that you will find that in view of

the prior art out there and the motivation to combine vehicle data bus products and patents with vehicle data bus standards, you will find the Omega patents to be invalid.

And we urge you not to rely on Mr. McAlexander's testimony, which is based almost solely on a chart that he knows nothing about. He didn't make it, doesn't know where it came from, other than counsel gave it to him and thought someone made a test, doesn't know the test performed, doesn't really know any reason to give it any reliability, and it contradicts the CalAmp testimony of how their devices actually work.

When you consider all the evidence, you will see that the CalAmp devices cannot infringe the patents and that the Omega patents are, indeed, invalid.

We thank you for all your time and effort in this matter. I know it's been a kind of long, dry case, and you've been great at paying attention. We're confident that when you go back to deliberate, you will find that the CalAmp products do not infringe and that if the Omega patents would cover the bus discovery process, you must find them invalid in view of the prior art. Thank you.

THE COURT: Thank you.

All right. We will take a short recess and we will come back for the rebuttal argument and the charge conference and then we will break for lunch. We'll be in recess for a few minutes.

(Jury exits at 11:36 a.m.)

All right. The jury has withdrawn. The note that was passed during the argument was simply that one of the jurors needed a rest room break. So I knew you were close to wrapping, so I thought we would hold on.

About ten minutes, all right? Thank you.

(Recess from 11:37 a.m. to 11:46 a.m.)

All right. Will you see if the jury is ready?

DEPUTY CLERK: I made this last note Court's 15.

THE COURT: Thank you.

(Jury present at 11:47 a.m.)

The record should reflect the jury has returned, and the parties are present.

Mr. Gilchrist, your rebuttal argument.

MR. GILCHRIST: Thank you, Your Honor.

I've been told that there are over 230 different defenses that one could raise to a patent infringement claim. I can swear I've heard nearly all of them in the last hour.

Mr. Kauth begins by saying, well, Mr. Flick

couldn't possibly be an inventor. He didn't know anything about SAE. Well, if you look at Mr. Andrews' report that they like to point to, he identifies one of those ordinary skill in the art in his opinion. That person is an SAE expert. That person doesn't necessarily have an automotive telematics database background. It's one of ordinary skill in the art.

Mr. Andrews would be classified as one far beyond that, extraordinary skill in the art. He knew about SAE. Mr. Chen, closer to one of ordinary skill in the art, didn't know about it, and yet Mr. Chen decides he's an inventor of the B&B device when he filed his patent applications.

Mr. Kauth reminds us that we have to look very carefully at the claim language unless it doesn't suit its purpose. So the claim language on controllers says controller, as defined -- well, let's add some additional factors, following physical operation of the door locks, let's go back to the specification and make sure we throw that in. He talked a great deal in the very beginning all about door locks and remote car starters. They're not in the claims. You can't import from the specification in the claims. The claims are what defines the invention. The specification is simply various embodiments of how you can use the invention.

Mr. Kauth complained that Mr. McAlexander never tested or never performed that flow chart analysis. I believe you heard that Mr. Andrews, not only didn't he test, he hadn't even seen a device when he rendered his opinions on invalidity.

He was told and he accepted that the start-up procedure follows SAE standards, so he made the decision that the SAE standards requires one signal and see if I -- and wait and see if I get something back, because I told you so.

Well, if you look at the SAE standards, it doesn't quite say that. He didn't point to anything in the SAE standards. Instead what it says is that these tests may be performed in any order and where possible may be performed in parallel. That's the chart that Mr. Kauth wants to dispute so vigorously.

And oddly enough, that chart and that issue goes to a single patent. That's in the '876 where it said working and non-working. And the argument, although it morphs quite a bit, is, well, in that occasion when that first signal is sent and gets a response, it doesn't send anymore. But the other times when it doesn't get the response, okay, maybe we're infringing, but let's not ignore that part, but we don't know where that flow chart came from. Well, let's look

at SAE. Well, SAE says it's appropriate. It's, again, as many defenses and as many road blocks as can be thrown up to avoid their day in court.

Mr. Kauth says, well, query is defined in the SAE as something other than command. Where? Just because Mr. Kauth says so or Mr. Andrews says so, it is because I say so. That's not a defense. It's not evidence.

We continued to hear about Mr. Andrews and he testified to this and he testified to that, limited to direct examination. And yet on cross examination, he testified just the opposite, and agreed with most of what I had to say. And then back on redirect, he went back to his report and read you what his report said, so we have three different stories from Mr. Andrews.

There was a complaint that Mr. McAlexander didn't have a lot to say in response to the invalidity position. You're welcome to look at Mr. McAlexander's report on the invalidity. It's at Exhibit number 105.

He takes those one by one and explains why there's a need -- there's no need to combine and there must be a need to combine. He explains what the patents are. And you're welcome to take a look at it. Simply because he didn't spend your time to reiterate what Mr. Andrews had already conceded on cross examination

does not mean it's not evidence.

And then, finally, I think this sort of drives home the point that I began this morning with. I gave you a story about Mr. Langstroth and his difficulties in pursuing those 230-something defenses. And the point was that Mr. Flick, unlike Mr. Langstroth, stood up for himself and has put himself out in front of you and has gone through the trouble of defending his patents, and CalAmp continues to hammer at him -- he's not an inventor. He doesn't have a degree. He doesn't know SAE. But CalAmp doesn't stop there. CalAmp cannot control themselves.

Now 150 years later, they're now accusing Mr. Langstroth of not being an inventor. And they're telling you information about some proceeding in Missouri somewhere that Mr. Langstroth said this so that, therefore, means he's not an inventor. One hundred and fifty years later, they still want to debate whether Mr. Langstroth's an inventor. It goes to the CalAmp mentality.

There is nothing that anybody can invent anywhere that good lawyers can't raise defenses around, 150 years later. All we've heard during these seven days is you can't prove this and you can't prove that and you should just believe us, because we said so.

It's not evidence. It's not appropriate. Clear and convincing burden is not met. CalAmp willfully chose to infringe upon Mr. Flick's patents. They did so with the intent to make it as difficult as possible for Mr. Flick, removed items from the website, sought cover with their lawyers, came up with all kinds of different theories.

We heard Mr. Kauth say, well, you need to look at these patents that I introduced but never talked about, because they're very important. 230-some defenses, and yet none of them apply in this case. I ask you to go back in that room, find that CalAmp is responsible for infringing Mr. Flick's patents and they did so willfully and intentionally. Thank you.

THE COURT: Thank you.

All right. Ladies and gentlemen, I'm going to charge you on your instructions to be used in your deliberations in this matter.

My courtroom deputy, Nancy, will place the instructions one at time on the overhead viewer there, the Elmo, so they'll come up on your screen. You don't need to take notes on these instructions. You will get copies to take back with you. So I'm going to read them to you and you will have them to read yourself and you will have sets to refer to during your deliberations.

Members of the jury, it's my duty to instruct you on the rules of law you must use in deciding this case. When I have finished, you will go to the jury room to begin your discussions, sometimes called your deliberations.

As I have said before, you must consider only the evidence that I have admitted in the case. Evidence includes the testimony of witnesses and the exhibits admitted, but anything the lawyers say is not evidence and is not binding on you. You should not assume from anything I have said that I have any opinion about any factual issue in this case. Except for my instructions to you on the law, you should disregard anything I may have said during the trial in arriving at your own decision about the facts. Your own recollection and interpretation of the evidence is what matters.

In considering the evidence, you may use reasoning and common sense to make deductions and reach conclusions. You should not be concerned about whether the evidence is direct or circumstantial.

Direct evidence is the testimony of a person who asserts that he or she has actual knowledge of a fact, such as an eyewitness. Circumstantial evidence is proof of a chain of facts and circumstances that tend to prove or disprove a fact. There is no legal difference

in the weight that you may gave to either direct or circumstantial evidence.

When I say you must consider all the evidence, I do not mean that you must accept all the evidence as true or accurate. You should decide whether you believe what each witness had to say and how important that testimony was.

In making that decision, you may believe or disbelieve any witness, in whole or in part. The number of witnesses testifying concerning a particular point does not necessarily matter. To decide whether you believe any witness, I suggest you ask yourself a few questions:

Did the witness impress you as one who was telling the truth? Did the witness have any particular reason not to tell the truth? Did the witness have a personal interest in the outcome of the case? Did the witness have a good memory? Did the witness have the opportunity and ability to accurately observe the things that he or she testified about? Did the witness appear to understand the questions clearly and answer them directly? Did the witness's testimony differ from other testimony or other evidence?

You should also ask yourself whether there was evidence that a witness testified falsely about an

important fact. Also, ask yourself whether there was evidence that at some other time a witness said or did something or did not say or do something that was different from the testimony the witness gave during this trial.

But keep in mind that a simple mistake does not mean that a witness wasn't telling the truth as he or she remembers it. People naturally tend to forget some things or remember them inaccurately. So if a witness misstated something, you must decide whether it was because of an innocent lapse in memory or an intentional deception. The significance of your decision may depend on whether the misstatement is about an important fact or about an unimportant detail.

When scientific, technical, or other specialized knowledge might be helpful, a person who has specialized training or experience in that field is allowed to state an opinion about the matter. But that does not mean you must accept the witness's opinion. As with any other witness, you must decide for yourself whether to rely upon the opinion.

When a witness is being paid for reviewing and testifying concerning the evidence, you may consider the possibility of bias and should view with caution the testimony of such witnesses where court testimony is

given with regularity and represents a significant portion of the witness's income.

In this case, it is the responsibility of Omega to prove every essential part of its infringement allegation by a preponderance of the evidence. This is sometimes called the burden of proof or the burden of persuasion.

A preponderance of the evidence simply means an amount of evidence that is enough to persuade you that Omega's allegations are more likely true than not. If the proof fails to establish any essential part of an allegation or contention by a preponderance of the evidence, you should find against Omega.

In deciding whether any fact has been proved by a preponderance of the evidence, you may consider the testimony of all of the witnesses regardless of who may have called them and all of the exhibits received in evidence regardless of who may have produced them.

If the proof fails to establish any essential part of Omega's allegations by a preponderance of the evidence, you should find for CalAmp as to that claim.

Even if Omega proves its claim of infringement by a preponderance of the evidence, CalAmp can prevail in this case if it proves its allegations of invalidity by clear and convincing evidence. This is a higher

standard of proof than proof by a preponderance of the evidence. It means the evidence must persuade you that the allegation or defense is highly probable or reasonably certain. The Court will tell you when to apply this standard.

I will now summarize the issues that you must decide and for which I will provide instructions to guide your deliberations. You must decide the following three issues:

1. whether Omega has proved by a preponderance of the evidence that CalAmp infringed Claims 1, 3 through 5, 12, 14, and 16 of the '876 patent; Claims 1 through 3, 12, and 14 of the '885 patent; Claims 1, 10, and 11 of the '727 patent; and Claims 1 through 6, 8, 11 through 14, 16, 18, 19, and 21 of the '278 patent. These are known as the "asserted claims."

2. whether CalAmp has proved by clear and convincing evidence that the asserted claims were obvious works in light of multiple pieces of prior art.

3. what amount of damages, if any, Omega has proved.

Before you decide whether CalAmp has infringed the claims of the patents or the patent claims are invalid, you will have to understand the patent claims.

The patent claims involved hear are Claims 1, 3 through 5, 12, 14, and 16 of the '876 patent; 1 through 3, 12, and 14 of the '885 patent; 1, 10, and 11 of the '727 patent; and Claims 1 through 6, 8, 11 through 14, 16, 18, 19, and 21 of the '278 patent, found at the end of the patents, which are exhibits in evidence.

The claims are intended to define in words the boundaries of the inventor's rights. Only the claims of the patent can be infringed. Neither the written description nor the drawings of a patent can be infringed. Each of the claims must be considered individually. You must use the same claim meaning for both your decision on infringement and your decision on invalidity.

Before you can decide many of the issues in this case, you will need to understand the role of patent "claims." The patent claims are numbered sentences at the end of each patent. The claims are important, because it is the words of the claim or claims that define what the patent covers.

A claim sets forth, in words, a set of requirements. Each claim sets forth its requirements in a single sentence. If a device or a method satisfies each of these requirements, then it is covered by the

claim.

The figures and text in the rest of the patent provide a description and/or examples of the invention and provide a context for the claims. But it is the claims that define the breadth of the patent's coverage. Each claim is effectively treated as if it were a separate patent. And each claim may cover more or less than another claim. Therefore, what a patent covers depends, in turn, on what each of its claims covers.

The coverage of a patent is assessed claim by claim. In patent law, the requirements of a claim are often referred to as claim elements or claim limitations. When a thing, such as a product or a process, meets all of the requirements of a claim, the claim is said to cover that thing, and that thing is said to fall within the scope of the claim.

In other words, a claim covers a product or process where each of the claim elements or limitations is present in that product or process.

You will first need to understand what each claim covers in order to decide whether or not there is infringement of the claim and to decide whether or not the claim is invalid.

The law says that it is my role to define the terms of the claims. And it is your role to apply my

definitions to the issues that you are asked to decide in this case. Therefore, as I explained to you at the start of the case, I have determined the meaning of the claims, and I will provide to you my definitions of certain claim terms. You must accept my definitions of these words in the claims as being correct. It is your job to take these definitions and apply them to the issues that you are deciding, including the issues of infringement and validity.

It is my job as judge to provide to you the meaning of any claim language that must be interpreted. You must accept the meanings I give you and use them when you decide any claim has been infringed and whether any claim is invalid.

I will now tell you the meanings of the following words and groups of words from the patent claims. For any words in the claim for which I have not provided you with a definition, you should apply their plain and ordinary meaning.

Claim term: Transmitter.

Court's construction: Radio frequency transmitter.

Claim term: Receiver.

Court's construction: Radio frequency receiver.

Claim term: Controller.

Court's construction: Electronic circuitry that performs one or more control functions.

Claim term: Data communication bus.

Court's construction: Wired connection for communication of digital messages among vehicle devices with each message including one or more device addresses.

Claim term. Multi-vehicle compatible controller.

Court's construction: Electronic circuitry that performs one or more control functions and can operate with more than one vehicle.

Claim term: Command signal.

Court's construction: Signal generated on the data communications bus for operating a vehicle device.

Claim term: Device codes.

Court's construction: Signal from a vehicle device.

Claim term: Enabling data.

Court's construction: Data related to the at least one corresponding vehicle device code for use by said multi-vehicle compatible controller.

Claim term: Programming instructions.

Court's construction: Code which instructs

the controller to perform an operation.

I will now instruct you as to the rules you must follow when deciding whether Omega has proved that CalAmp infringed any of the claims of the Omega patents.

Patent law gives the owner of a valid patent the right to exclude others from importing, making, using, offering to sell, or selling the patented invention within the United States during the term of the patent. Any person or business entity that has engaged in any of those acts without the patent owner's permission infringes the patent.

Here, Omega alleges that CalAmp's LMU-3000, LMU-3030, LMU-3050, VPOD, and VPOD-2, infringe the asserted claim of the Omega patents. In deciding the issue of infringement, you must compare the CalAmp accused products to the claims of the Omega patents.

A patent may be infringed directly or indirectly. As explained further in the following instructions, direct infringement results if the accused product is covered by at least one claim of the patent. Indirect infringement results if the defendant induces another to infringe a patent or contributes to the infringement of a patent by another.

In this case, Omega asserts that CalAmp has directly infringed the patent. CalAmp is liable for

directly infringing Omega's patent if you find that Omega has proven that it is more likely than not that CalAmp made, used, imported, offered to sell, or sold the invention defined in at least one claim of Omega's patent.

Someone can directly infringe a patent without knowing of the patent or without knowing that what they are doing is an infringement of the patent. They may also directly infringe a patent even though they believe in good faith that what they are doing does not infringe a patent or if they believe in good faith that the patent is invalid.

To determine literal infringement, you must compare the accused products with each claim that Omega asserts is infringed using my instructions as to the meaning of the patent claims.

A patent claim is literally infringed only if CalAmp's products include each and every element of that patent claim. If CalAmp's products do not contain one or more elements recited in a claim, CalAmp does not literally infringe that claim. You must determine literal infringement with respect to each claim of the '876, '885, '727, and '278 patents individually.

The accused product should be compared to the invention described in each patent claim it is alleged

to infringe. The same element of the accused product may satisfy more than one element of a claim.

In this case, CalAmp is accused of actively inducing its customers to directly infringe Omega's patent. To find that CalAmp actively induced infringement, it is not necessary to show that CalAmp personally infringed, provided, (a) a single actor is responsible for direct infringement, namely, all of the components or steps of the product or method accused of infringing the patent; and CalAmp actively induced these acts of infringement by its -- another entity. [sic]

If you do not find that there is direct infringement by a single actor or if you do not find that CalAmp actively induced these acts, you must find that CalAmp did not induce infringement of the patents.

To prove active infringement, Omega must establish it is more likely than not:

1. CalAmp aided, instructed, or otherwise acted with the intent to cause acts by CalAmp's customers that would constitute direct infringement of the patent;

2. CalAmp knew of the patent or showed willful blindness to the existence of the patent at the time;

3. CalAmp knew, or showed willful blindness,

that it consciously ignored the possibility that CalAmp's customers would infringe at least one claim of the patent; and

4. CalAmp's customers infringed at least one patent claim.

To find willful blindness, CalAmp must have subjectively believed that there was a high probability that a patent existed covering the accused CalAmp products and CalAmp must have taken deliberate actions to avoid learning of the patent.

There are two different types of claims in the patent. One type is called an independent claim. The other is called a dependent claim.

An independent claim does not refer to any other claim of the patent.

An independent claim must be read separately from the other claims to determine the scope of the claim.

An independent claim sets forth all the requirements that must be met in order to be covered by that claim.

A dependent claim is a claim that refers to at least one other claim in the patent.

A dependent claim includes all the elements of the claim to which the dependent claim refers, as well

as all the elements recited in the dependent claim itself.

To establish literal infringement of a dependent claim, Omega must show that it is more likely than not that CalAmp's products or methods include each and every element of the independent claim and the dependent claim.

If you find that the independent claim from which the dependent claim depends is not literally infringed, then you must find that the dependent claim is also not literally infringed.

CalAmp contends that the asserted claims of the patents in suit are invalid. CalAmp must prove by clear and convincing evidence that each asserted claim is invalid.

Claims of an issued patent may be found to be invalid. Thus, you must determine whether each of Omega's claims is invalid.

CalAmp contends that the patents in suit are invalid as obvious in light of the prior art, such as products, publications, and/or patents publicly known or available prior to the asserted patents.

I will now instruct you in more detail why CalAmp alleges that the asserted claims of Omega's patents are invalid.

Prior art includes any of the following items received into evidence during the trial:

1. Any product or method that was publicly known or used by others in the United States before the patented invention was made;

2. Patents that issued more than one year before the filing date of the patent, or before the invention was made;

3. Publications having a date more than one year before the filing date of the patent or before the invention was made;

4. Any product or method that was in public use or on sale in the United States more than one year before the patent was filed;

5. Any product or method that was made by anyone before the named inventors created the patented product or method where the product or method was not abandoned, suppressed, or concealed.

As I mentioned before, this case involves two types of claims, independent claims and dependent claims. An independent claim does not refer to any other claim of the patent. An independent claim must be read separately from the other claims to determine the scope of the claim. An independent claim sets forth all of the requirements that must be met in order to be

covered by that claim.

A dependent claim is a claim that refers to at least one other claim in the patent. A dependent claim includes all of the elements of the claim to which the dependent claim refers, as well as the elements recited in the dependent claim itself.

In this case, Claim 1 of the '876 patent; Claim 1 of the '885 patent; Claim 1 of the '727 patent; and Claims 1, 13, and 18 of the '278 patent are each independent claims.

You must evaluate the invalidity of each asserted claim separately. Even if an independent claim is invalid, this does not mean that the dependent claims that depend from it are automatically invalid. Rather, you must consider the validity of each claim separately.

You must decide the issue of validity on a claim-by-claim basis. However, if you find that a dependent claim is invalid, then you must find that the independent claim from which it depends is also invalid. The dependent claim includes all of the elements of the independent claim from which it depends.

The question of invalidity of a patent claim is determined from the perspective of a person of ordinary skill in the art in the field of the asserted invention.

You must determine the level of ordinary skill in the field of invention. The higher the level of ordinary skill, the easier it may be established that an invention would have been obvious.

Persons having a greater level of education, training or experience in the field will more readily appreciate technical details that may be more challenging for persons having a lower level of skill.

On the other hand, persons having a lower level of skill may not perceive as obvious technical details that would be apparent to persons having a greater skill.

In order to determine the obviousness of the invention, you will be asked to determine what the ordinary level of skill was in the field of the invention.

Regardless, whether you decide to articulate in your verdict what you believe was the level of ordinary skill in the field of the invention, you must consider and assess this factor before reaching your conclusion in the case.

In order to qualify as prior art, a printed publication must have been maintained in some tangible form, such as printed pages, typewritten pages, magnetic tape, microfilm, photographs, Internet publication,

photocopies, and must have been sufficiently accessible to persons interested in the subject matter of its contents.

Information is publicly accessible if it was distributed or otherwise made available to the extent that persons interested and ordinarily skilled in the subject matter exercising reasonable diligence can locate it. It is not necessary for the printed publication to have been available to every member of the public. An issued patent is a printed publication. A published patent application is a printed publication as of its publication date.

The disclosure of the claimed invention in the printed publication must be complete enough to enable one of ordinary skill in the art to use the invention without undue experimentation.

In determining whether the disclosure is enabling, you should take into account what would have been within the knowledge of a person of ordinary skill in the art one year before the application for the patent was filed, and you may consider evidence that sheds light on the knowledge such a person would have had.

CalAmp contends the asserted claims of Omega's patents are invalid as "obvious." A claimed invention

is invalid as "obvious" if it would have been obvious to a person of ordinary skill in the art of the claimed invention at the time the invention was made. Unlike anticipation, which allows consideration of only one item of prior art, obviousness may be shown by considering more than one item of prior art.

In deciding obviousness, you must avoid using hindsight. That is, you should not consider what is known today or what was learned from the teachings of the patent. You should not use the patent as a road map for selecting and combining items of prior art. You must put yourself in the place of a person of ordinary skill in the art at the time the invention was made. The following factors must be evaluated to determine whether CalAmp was establish that the claimed invention(s) is or are obvious:

1. the scope and content of the prior art relied upon by CalAmp;

2. the difference or differences, if any, between each claim of the patents that CalAmp contends is obvious and the prior art;

3. the level of ordinary skill in the art at the time the invention of the patent was made;

4. additional considerations, if any, that indicate the invention was obvious or not obvious.

Each of these factors must be evaluated, although they may be analyzed in any order, and you must perform a separate analysis for each of the claims. CalAmp must prove by clear and convincing evidence that the invention would have been obvious. I will now explain each of the four factors in more detail.

You must determine what is the prior art that may be considered in determining whether any claim of the Omega patents is obvious. A prior art reference may be considered if it discloses information designed to solve any problems or need addressed by the patent or if the reference discloses information that has obvious uses beyond its main purpose that a person of ordinary skill in the art would reasonably examine to solve any problem or need addressed by the patent.

You should analyze whether there are any relevant differences between the prior art and the claimed invention from the view of a person of ordinary skill in the art at the time of the invention. Your analysis must determine the impact, if any, of such differences on the obviousness or non-obviousness of the invention, as a whole, and not merely some portion of it.

In analyzing the relevance of the differences between the claimed invention and the prior art, you do

not need to look for precise teaching in the prior art directed to the subject matter of the claimed invention.

You may take into account the inferences and creative steps that a person of ordinary skill in the art would have employed in reviewing the prior art at the time of the invention.

For example, if the claimed invention combined elements known in the prior art and the combination yielded results that were predictable to a person of ordinary skill in the art at the time of the invention, then this evidence would make it more likely that the claim was obvious.

On the other hand, if the combination of known elements yielded unexpected or unpredictable results or if the prior art teaches away from combining the known elements, then the evidence would make it more likely that the claim that successfully combined these elements was not obvious.

Importantly, a claim is not proved obvious merely by demonstrating that each of the elements was independently known in the prior art. Most, if not all, inventions rely on building blocks long known, and claimed discoveries almost of necessity will likely be combinations of what was already known. Therefore, you should consider whether a reason existed at the time of

the invention that would have prompted a person of ordinary skill in the art in the relevant field to combine the known elements in the way the claimed invention does.

The reason could come from the prior art, the background knowledge of one of ordinary skill in the art, the nature of any problem or need to be addressed, market demand, or common sense.

You may also consider whether the problem or need was known, the possible approaches to solving the problem or addressing the need were known and finite, and the solution was predictable through use of a known option.

If you find that a reason existed at the time of the invention to combine the elements of the prior art to arrive at the claimed invention, this evidence would make it more likely that the claimed invention was obvious. Again, you must undertake this analysis separately for each claim that CalAmp contends is obvious.

The determination of whether a claimed invention is obvious is based on the perspective of a person of ordinary skill in the art. The person of ordinary skill is presumed to know all prior art that you have determined to be reasonably relevant. The

person of ordinary skill is also a person of ordinary creativity that can use common sense to solve problems.

When determining the level of ordinary skill in the art you should consider all the evidence submitted by the parties, including evidence of:

1. the level of education and experience of persons actively working in the field at the time of the invention, including the inventor;

2. the types of problems encountered in the art at the time of the invention;

3. the sophistication of the technology in the art at the time of the invention, including the rapidity with which innovations were made in the art at the time of the invention.

Before deciding the issue of obviousness, you must also consider certain factors which may help to determine whether or not the invention would not have been obvious. No factor alone is dispositive. And you must consider the obviousness or non-obviousness of the invention as a whole.

1. Were accused products covered by the claim commercially successful due to the merits of the claimed invention rather than due to advertising, promotion, salesmanship, or features of the product other than those found in the claim?

2. Was there a long-felt need for a solution to the problem facing the inventors, which was satisfied by the claimed invention?

3. Did others try, but fail to solve the problem solved by the claimed invention?

4. Did others copy the claimed invention?

5. Did the claimed invention achieve unexpectedly superior results over the closest prior art?

6. Did others in the field praise the claimed invention or express surprise at the making of the claimed invention?

7. Did others accept licenses under patents because of the merits of the claimed invention?

Answering all, or some, of these questions "yes" may suggest that the claim was not obvious.

Answering all or some of these questions "no" may suggest that the claims would have been obvious.

These factors are relevant only if there is a connection or nexus between the factor and the invention covered by the patent claims.

Even if you conclude that some of the above indicators have been established, those factors should be considered along with all the other evidence in the case in determining whether CalAmp has proved that the

claimed invention would have been obvious.

If you find that the accused device infringes any of the claims of the Omega patents and that those claims are not invalid, you must determine the amount of damages to be awarded Omega for the infringement.

On the other hand, if you find that each of the asserted patent claims is either invalid or is not infringed, then you need not consider damages in your deliberation.

Omega must prove each element of its damages, including the amount of the damages, by a preponderance of the evidence, which means more likely than -- pardon me -- more likely true than not.

If proven by Omega, damages must be an amount adequate to compensate Omega for the infringement. The purpose of a damage award is to put Omega in about the same financial position it would have been in if the infringement had not happened. But if the damages award cannot -- pardon me -- but the damages award cannot be less than a reasonable royalty.

You may not add anything to the amount of damages to punish an accused infringer or to set an example. You also may not add anything to the amount of damages for interest. The fact that I am instructing you on damages does not mean that the Court believes

that one party or the other should win the case. My instructions about damages are for your guidance only in the event you find in favor of Omega. You will need to decide the issue of damages only if you find that one or more of the asserted claims are both not invalid and infringed.

The date that Omega first notified CalAmp of its claim for patent infringement is the date for the start of damages. The parties do not agree on that date, and it is up to you to determine what that date is. Omega must prove that it is more likely than not that CalAmp actually was notified of the claim for patent infringement as of the date alleged by Omega.

Patent law provides that the amount of damages that CalAmp should pay Omega for infringing Omega's patents must be enough to compensate for the infringement, but may not be less than a reasonable royalty for the use of Omega's invention.

You must award Omega a reasonable royalty in the amount that Omega has proved. A royalty is a payment made to a patent owner by someone else in exchange for the right to make, use, sell, or import a patented product.

A reasonable royalty award must be based on the incremental value that the patented invention adds

to the end product. When the infringing products have both patented and unpatented features, measuring this value requires a determination of the value added by the patented features. The ultimate combination of royalty base and royalty rate must reflect the value attributable to the infringing features of the product and no more.

A reasonable royalty is a royalty that would have resulted from a hypothetical license negotiation between Omega and CalAmp. Of course, we know that they did not agree to a license and a royalty payment.

But in order to decide on the amount of reasonable royalty damages, you should assume that the parties did negotiate a license just before the infringement began. This is why it is called a hypothetical license negotiation.

You should assume that both parties to the hypothetical negotiation understood the patent was valid and infringed and both were willing to enter into a license. You should also presume that the parties had full knowledge of the facts and circumstances surrounding the infringement at the time of the hypothetical negotiation.

In determining the amount of reasonable royalty, you may consider evidence on any of the

following factors, in addition to any other evidence presented by the parties on the economic value of the patent:

1. any royalties received by the licensor for the licensing of the patent in suit proving or tending to prove an established royalty.

2. the rates paid by CalAmp to license other patents comparable to the patents in suit.

3. the nature and scope of the license, as exclusive or non-exclusive, or as restricted or non-restricted, in terms of its territory or with respect to whom the manufactured product may be sold.

4. the licensor's established policy and marketing program to maintain its right to exclude others from using the patented invention by not licensing others to use the invention or by granting licenses under special conditions designed to preserve that exclusivity.

5. the commercial relationship between the licensor and the licensee such as whether or not they are competitors in the same territory in the same line of business.

6. the effect of selling the patented product in promoting sales of other products of the licensee; the existing value of the invention to the licensor as a

generator of sales of its non-patented items; and the extent of such collateral sales.

7. the duration of the patents and the term of the license.

8. the established profitability of the product made under the patents in suit; its commercial success and its current popularity.

9. the utility and advantages of the patented invention over the old modes or devices, if any, that had been used for achieving similar results.

10. the nature of the patented invention; the character of the commercial embodiment of it as owned and produced by the licensor; and the benefits to those who have used the invention.

11. the extent to which CalAmp has made use of the invention and any evidence that it shows the value of that use.

12. the portion of the profit or of the selling price that may be customary in the particular business or in comparable businesses to allow for the use of the invention or an analogous inventions.

13. the portion of the profit that arises from the patented invention itself as opposed to profit arising from unpatented features, such as the manufacturing process, business risks, or significant

features or improvements added by the accused infringer.

14. the opinion testimony of qualified experts.

15. the amount that a licensor and a licensee, such as CalAmp, would have agreed upon at the time the infringement began, if both sides had been reasonably and voluntarily trying to reach an agreement at that time is the amount which a prudent licensee who desired as a business proposition to obtain a license to manufacture and sell a particular article embodying the patented invention would have been willing to pay as a royalty and yet be able to make a reasonable profit and which amount would have been acceptable by a patentee who was willing to grant a license.

16. any other economic factor that normally a prudent business person would, under similar circumstances, take into consideration in negotiating the hypothetical license.

Although the relevant date for the hypothetical license negotiation is just before the infringement began, you may consider evidence relating to events after the infringement began, any actual profits made by CalAmp due to its infringement, and any commercial success of the patented invention or the infringing products after that date.

When determining a reasonable royalty, you may consider evidence concerning the amounts that others have paid for rights to the patents in question or for rights to similar technologies. A license agreement must not be perfectly comparable to a hypothetical license that would be negotiated between Omega and CalAmp in order for you to consider it.

However, if you choose to rely upon evidence from any other license agreements, you must account for any differences between those licenses and the hypothetically negotiated license between Omega and CalAmp, in terms of the technologies and economic circumstances of the contracting parties when you make your reasonable royalty determination.

If you find that it is more likely than not that CalAmp infringed Omega's patent, then you must also determine whether or not CalAmp's infringement was willful. In contrast to proving that infringement is more likely than not, Omega must prove willfulness by clear and convincing evidence. Willfulness requires clear and convincing evidence that:

1. CalAmp acted despite an objectively high likelihood that its actions infringed a valid patent;

2. the objectively high likelihood of infringement was either known or so obvious that it

should have been known to CalAmp.

In making the determination of whether CalAmp acted despite an objectively high likelihood that its actions infringed a valid patent, you are to consider what a reasonable person would have believed and are not to consider CalAmp's actual state of mind.

In determining whether CalAmp knew of the objectively high likelihood of infringement or whether the likelihood was so obvious that CalAmp should have known of that likelihood, you must consider the totality of the circumstances.

The totality of the circumstances comprises a number of factors which include, but are not limited to whether CalAmp intentionally copied the claimed invention or a product covered by the patent, whether CalAmp relied on competent legal advice, and whether CalAmp presented a substantial defense to infringement, including the defense that the patent is invalid.

Of course, the fact that I have given you instructions concerning the issue of Omega's damages should not be interpreted as an indication in any way that I believe that Omega should, or should not, prevail in this case.

Your verdict must be unanimous. In other words, you must all agree. Your deliberations are

secret, and you will never have to explain your verdict to anyone. Each of you must decide the case for yourself, but only after fully considering the evidence with the other jurors. So you must discuss the case with one another to try to reach an agreement.

While you are discussing the case, do not hesitate to re-examine your own opinion and change your mind if you become convinced that you were wrong. But do not give up your honest belief just because others think differently or because you simply want to get the case over with.

Remember, ladies and gentlemen, that in a very real way, you are judges here, you are judges of the facts, and your only interest is to seek the truth from the evidence in the case.

Now when you go to the jury room, you will choose one of your members to act as a foreperson. The foreperson will direct your deliberations and speak for you in court. A verdict form has been provided for you assistance. The lawyers have spoken about it several times, but let me go through it with you.

All right. You will see the verdict form consists of a number of pages and each question is individually numbered. The first question states:

Do you find Omega has proved by a

preponderance of the evidence that any of the accused CalAmp devices infringed any of the asserted claims of Omega's asserted patents? You check either Yes or No.

You will see at the bottom of Question 1, further directions. If your answer to Question 1 is "No," proceed to Question 3. If your answer to Question 1 is "Yes" for any claims that Omega has proved by a preponderance of the evidence that any of the accused CalAmp devices infringed, indicate a finding of infringement by marking a "Yes" in the corresponding space provided in questions 2-A through 2-D below.

For any claim that Omega has failed to prove by a preponderance of the evidence that any of the accused CalAmp devices infringed, indicate a finding of non-infringement by marking "No" in the corresponding space in Questions 2-A through 2-D.

To facilitate that process, you will see in Questions 2-A through 2-D, the patent number, the claim number, the accused device, and a place for you to indicate "Yes" or "No," and that will be true all the way through.

The next question, which is Question 3, is:

Has CalAmp proved by clear and convincing evidence that any of the asserted patents is invalid? There's a check for "Yes" or "No." If your answer to

Question 3 is "No," you proceed to Question 5. If your answer to Question 3 is "Yes," then you answer Question 4 below by indicating with an X, whichever claim you find invalid by clear and convincing evidence and indicate the reasons for invalidity, that is, the identity of the prior art references that disclose the elements of the claim. Again, it's broken out by patent, by claim, for each of the patents in suit.

Question 5 asks you: Which of the following factors that tend to indicate non-obviousness, if any, has been established by the evidence with respect to the claimed invention? Write the word "Yes" in the blank below for any one that applies. You can check it or write "Yes," whatever you prefer.

6-A is a question that deals with the issue of willfulness and it states in 6-A: Has Omega proved by clear and convincing evidence that CalAmp acted despite an objectively high likelihood the actions infringed a valid patent? "Yes" or "No." If you answer "Yes" to that question, you go to 6-B, which asks: Has Omega proved by clear and convincing evidence that this objectively high likelihood of infringement was either known or so obvious that it should have been known? Answer "Yes" or "No." Now, obviously if you answer "No" to 6-A, you need not answer 6-B.

Finally, you will be asked to identify the amount of damages which you believe are adequate to compensate Omega for CalAmp's infringement of any claim found to be valid and not licensed. And then, you will date and sign the verdict form.

If you wish to communicate with me at any time during your deliberations, please write down your message or question and give it to the court security officer. He will then bring it to me, and I will respond as promptly as possible, either in writing or by having you return to the courtroom. It's my practice to respond in writing, so that's what you would expect.

Please understand that I may have to talk to the lawyers and the parties before I respond to your question or message, so please be patient while you await my response.

However, I caution you, please do not indicate your -- please do not indicate the -- how many jurors have voted one way or the other at the time.

For example, if you have taken a vote, we don't want to know what the vote is. That's for you all to know. That type of information remains with you in the jury room. It should not be shared with anyone, including me, in your question.

So your question would simply be the question

signed by the foreperson, and I will share it with the lawyers, and we will answer it to the extent that we can.

All right. Is there any objection to the instructions or the manner in which I gave them, other than those previously stated?

MR. GILCHRIST: None from the plaintiff.

MR. KAUTH: No, Your Honor.

THE COURT: Very good.

Ladies and gentlemen, the case is now yours.

This is the time when I will not be telling you not to discuss the case. You are now to actually discuss the case. Everyone here is greatly appreciative of your attention throughout this trial. It's gone longer than expected.

Any delay that occurred in this case, quite frankly, is my doing, not the lawyers'. We would work all night if I wanted to, but I try to keep an eye on the jury and get a sense for when I feel like you just need a break. And so with that, you are excused to begin your deliberations. Thank you very much.

(Jury exits at 12:44 p.m.)

THE COURT: All right. Well, it's 12:45.

MR. GILCHRIST: Your Honor?

THE COURT: Yes, sir.

MR. GILCHRIST: I have a quick motion for the Court.

THE COURT: Okay.

MR. GILCHRIST: While the original ribbed copies go back to the jury, once the deliberations are over and the verdict's in, I'd like to move to substitute copies for the originals.

THE COURT: That will be fine.

MR. KAUTH: No objection.

THE COURT: All right, very good.

Nancy should have your contact numbers in case you want to go back to your respective firms and await a phone call, if there's a question. If you'd prefer to stay in the area, that's fine as well, you're welcome to do so, but whatever you prefer.

All right. Thank you so much.

DEPUTY CLERK: All rise.

THE COURT: You should know I have a sentencing starting at 1:30, so you may want to kind of just start to collect up your items a bit. You don't need to take them out, just to let you know there will be people sitting at your tables.

(Recess from 12:45 p.m. to 3:53 p.m.)

THE COURT: All right. I am told we have a verdict. So we will get the jury in, and we'll find out

what it is when they're ready.

(Jury present at 3:54 p.m.)

The record should reflect the jury is present. The parties are present. I am told we have a verdict in this case; is that correct?

THE JUROR: Yes, Your Honor.

THE COURT: All right. Who speaks as the foreperson?

THE JUROR: I am, Your Honor, John Micelotta.

THE COURT: All right. Mr. Micelotta, if you would hand the verdict form to the court security officer please, and he will pass that up to me for inspection.

(Pause in proceedings.)

All right. Thank you very much. The verdict is in proper format. If you'd publish the verdict.

DEPUTY CLERK: Omega Patents, LLC, Plaintiff versus CalAmp Corp., Defendant, case number 6:13-CV-1950-Orlando-40DAB.

Verdict form.

1. Do you find Omega has proven by a preponderance of the evidence that any of the accused CalAmp devices infringed any of the asserted claims of Omega's asserted patents? Yes for Omega.

Question 2-A. U.S. patent number 6,346,876 B1

(the '876 patent.) Has Omega proven by a preponderance of the evidence that any of the accused CalAmp devices infringed any of the following claims of the '876 patent? Claim 1. Yes, as to all devices.

Claim 3. Yes, as to all listed devices.

Claim 4. Yes, as to all devices.

Claim 5. Yes, as to all devices.

Claim 12. Yes, as to all devices.

Claim 14. Yes, as to all devices.

Claim 16. Yes as to all devices.

Section 2-B. U.S. patent number 6,756,885 B1, (the '885 patent.) Has Omega proven by a preponderance of the evidence that any of the accused CalAmp devices infringed any of the following claims of the '885 patent? Claim 1. Yes, as to all devices.

Claim 2. Yes, as to all devices.

Claim 3. Yes, as to all devices.

Claim 12. Yes, as to all devices.

Claim 14. Yes, as to all devices.

Question 2-C. U.S. patent number 7,671,727 B2, (the '727 patent.) Has Omega proven by a preponderance of the evidence that any of the accused CalAmp devices infringed any of the following claims of the '727 patent? Claim 1. Yes, as to all devices.

Claim 10. Yes, as to all devices.

Claim 11. Yes, as to all devices.

2-D. U.S. patent number 8,032,278 B2, (the '278 patent.) Has Omega proven by a preponderance of the evidence that any of the accused CalAmp devices infringed any of the following claims of the '278 patent? Claim 1. Yes, as to all devices.

Claim 2. Yes, as to all devices.

Claim 3. Yes, as to all devices.

Claim 4. Yes, as to all devices.

Claim 5. Yes, as to all devices.

Claim 6. Yes, as to all devices.

Claim 8. Yes, as to all devices.

Claim 11. Yes, as to all devices.

Claim 12. Yes, as to all devices.

Claim 13. Yes, as to all devices.

Claim 14. Yes, as to all devices.

Claim 16. Yes, as to all devices.

Claim 18. Yes, as to all devices.

Claim 19. Yes, as to all devices.

Claim 21. Yes, as to all devices.

3. Has CalAmp proven by clear and convincing evidence that any claim of the asserted patent is invalid? No for Omega.

5. Which of the following factors that tend to indicate non-obviousness, if any, has been

established by the evidence with respect to the claimed invention?

Were accused products covered by the claim commercially successful due to the merits of the claimed invention rather than due to advertising, promotion, salesmanship, or a feature of the product other than those found in the claim? Yes.

Did others copy the claimed invention? Yes.

Did others accept licenses under patents because of the merits of the claimed invention? Yes.

6-A. Has Omega proven by clear and convincing evidence that CalAmp acted despite an objectively high likelihood that its actions infringed a valid patent? Yes.

6-B. Has Omega proven by clear and convincing evidence that this objectively high likelihood of infringement was either known or so obvious that it should have been known to CalAmp? Yes.

7. What amount of damages, if any, do you find is adequate to compensate Omega for CalAmp's infringement of any claim found to be valid and not licensed? That would be $2,975,200 and no cents.

So say we all this 26th day of February, the year of 2016, and it's signed by our foreperson, John Micelotta.

THE COURT: Very good.

Would anyone like the jury polled?

MR. GILCHRIST: Not for the plaintiff, Your Honor.

MR. KAUTH: Yes, Your Honor.

THE COURT: All right.

If you'd poll the jury, please.

DEPUTY CLERK: Natvar Nana, is this your verdict?

THE JUROR: Yes.

DEPUTY CLERK: Amy Luhn, is this your verdict?

THE JUROR: Yes.

DEPUTY CLERK: Kimberly Gibson, is this your verdict?

THE JUROR: Yes.

DEPUTY CLERK: Christine Steele, is this your verdict?

THE JUROR: Yes.

DEPUTY CLERK: Clyde Jackson, is this your verdict?

THE JUROR: Yes.

DEPUTY CLERK: John Micelotta, is this your verdict?

THE JUROR: Yes.

DEPUTY CLERK: Michael Wilson, is this your

verdict?

THE JUROR: Yes.

THE COURT: All right, ladies and gentlemen. The verdict is proper, as determined by the polling. This concludes your service in this case. And if you would do me one kindness. Before you go downstairs to the jury assembly room to have your final instructions before departing, if you would wait for me, I would like to speak with you.

I never discuss with juries how they reached their verdict or anything about the verdict. I'm more interested in, first off, personally thanking you for your service and then finding out if there is anything we can do to improve the experience of jurors that follow. So if you would wait just for a moment, I will be right in there. All right. Thank you very much. You're excused.

(Jury exits.)

DEPUTY CLERK: Please be seated.

THE COURT: The record should reflect the jury has withdrawn. Are there any other matters to take up this afternoon?

MR. GILCHRIST: Not this afternoon, Your Honor.

MR. KAUTH: No, Your Honor.

THE COURT: Thank you very much.

On a personal note, I would like to compliment all the lawyers involved in this case. The level of professionalism you showed each other was amazing. This has been, hands down, the most enjoyable trial that I have been involved in as a judge, and that's because the presentations were clear and crisp. Everyone accepted the rulings without a whole lot of looking disappointed. And I really do think you all represented your clients in a truly exemplary manner, and it was a real privilege to be here with you. So thank you very much. Have a good evening.

MR. GILCHRIST: Thank you, Your Honor.

MR. KAUTH: Thank you, Your Honor.

(Adjourned at 4:05 p.m.)

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Reporter's Certification

I certify that the foregoing is a correct transcript from the record of proceedings in the above matter.

s/Koretta Stanford

Official Court Reporter
United States District Court
Middle District of Florida

Date: April 18, 2016

EXHIBIT 6

EXHIBIT LIST

__PLAINTIFF _x_DEFENDANT
__JOINT

__GOVERNMENT __COURT

CASE NO. 6:13-cv-1950-PGB-DAB
STYLE: OMEGA PATENTS, LLC V. CALAMP CORP.

EXHIBIT NO.	DATE IDENTIFIED	DATE ADMITTED	SPONSORING WITNESS	OBJECTIONS/ STIPULATED ADMISSIONS[1]	DESCRIPTION OF EXHIBIT
1			Andrews/Chen/Flick	401	U.S. Pat. No. 5,719,551
2	FEB 2 2 2016	FEB 2 2 2016	Andrews/Chen		File History for U.S. Pat. No. 6,346,876
3			Andrews/Chen		File History for U.S. Pat. No. 6,737,989
4	FEB 2 2 2016	FEB 2 2 2016	Andrews/Chen		File History for U.S. Pat. No. 6,756,885
5	FEB 2 2 2016	FEB 2 2 2016	Andrews/Chen		File History for U.S. Pat. No. 7,671,727
6	FEB 2 2 2016	FEB 2 2 2016	Andrews/Chen		File History for U.S. Pat. No. 8,032,278
7			Flick	401	Provisional Application 60/205,178
8			Flick	401	Provisional Application 60/222,777
9			Flick	401	Provisional Application 60/258,005

[1] Use a code (e.g. "A" or "*") in this column to identify exhibits to be received in evidence by agreement without objection. Otherwise, specifically state each objection to each opposed exhibit. Please note that each date box on the left must be one inch wide to accommodate the Clerk's date stamp.

10	FEB 2 2 2016	FEB 2 2 2016	Andrews/Chen		U.S. Pat. No. 5,479,479 to Braitberg et al.
11	FEB 2 2 2016	FEB 2 2 2016	Andrews/Chen		U.S. Pat. No. 5,898,392 to Bambini et al.
12	2/22/16	2/22/16	Andrews/Chen	901	SAE J1978
13			Andrews/Chen	901	SAE J1979
14			Andrews/Chen	901	SAE J1850
15			Andrews/Chen	901	SAE J2201
16			Andrews	901	ISO 9141-2 Road Vehicles – Diagnostic Systems – Part 2: CARB requirements for interchange of digital information
17	FEB 2 2 2016	FEB 2 2 2016	Andrews/Chen		U.S. Pat. No. 5,732,074 to Spaur et al.
18			Andrews/Chen	901	CrossCheck AMPS Cellular Product Description
19			Chen	901; DISCLOSED FOR THE FIRST TIME AT PRETRIAL	CrossCheck AMPS Physical Device
20			Andrews/Chen	901	CrossCheck AMPS with IQEvent Engine Firmware Operations Manual
21			Andrews/Chen	901	IQEvent Engine Configuration Utility User's Guide
22			Andrews/Chen	901	TAIP/IQEventEngine Reference
23			Andrews/Chen	901	Neotech Website
24	2/22/16	2/22/16	Andrews/Chen	901	Mobile-Trak: A Vehicle Tracking System for Fleet Management

25			Andrews/Chen	901	MSC-9710 On-Line Brochure
26	2/22/16	cbf	Andrews/Chen	901	MobileWeb Article ("Changing the Face of Mobile Networking through Universal Wireless Connectivity")
27	FEB 2 2 2016	FEB 2 2 2016	Andrews/Chen		U.S. Pat. No. 8,295,492 to Lang et al.
28	FEB 2 2 2016	FEB 2 2 2016	Andrews/Chen		U.S. Pat. No. 6,263,268 to Nathanson
29	FEB 2 2 2016	FEB 2 2 2016	Andrews/Chen		U.S. Pat. No. 4,853,850 to Krass et al.
30	FEB 2 2 2016	FEB 2 2 2016	Andrews/Chen		U.S. Pat. No. 5,557,254 to Johnson et al.
31	FEB 2 2 2016	FEB 2 2 2016	Andrews/Chen		U.S. Pat. No. 6,505,108 to Lawrence et al.
32	FEB 2 2 2016	FEB 2 2 2016	Andrews/Chen		U.S. Pat. No. 5,959,545 to Lhamon
33	FEB 2 2 2016	FEB 2 2 2016	Andrews/Chen		U.S. Pat. No. 5,479,157 to Suman et al.
34	FEB 2 2 2016	FEB 2 2 2016	Andrews/Chen		U.S. Pat. No. 6,028,537 to Suman et al.
35			Andrews/Chen	901	OBD-II to RS-232 Interface Adapter Autotap
36			Andrews/Chen	901	Japanese Pub. Hei 11[1999]-62793
37	FEB 2 2 2016	FEB 2 2 2016	Andrews/Chen		U.S. Pat. Publication 2004/0249557
38	2/22/2016	2/23/16	Andrews	802	Andrews Report re Invalidity (including exhibits)
39	FEB 2 2 2016	FEB 2 2 2016	Andrews/Chen/Eiberger		PEG Programming Guide

40	FEB 2 2 2016	FEB 2 2 2016	Andrews/Chen/Eiberger		PEG Support Guide
41	FEB 2 2 2016	FEB 2 2 2016	Andrews/Chen/Eiberger		LM Direct Reference Guide
42	FEB 2 2 2016	FEB 2 2 2016	Andrews/Chen/Eiberger		LM Direct Reference Guide - PULS Wiki
43	FEB 2 2 2016	FEB 2 2 2016	Chen		LMU-2000 Data Sheet
44	FEB 2 2 2016	FEB 2 2 2016	Chen		LMU-2600 Data Sheet
45	FEB 2 2 2016	FEB 2 2 2016	Chen		LMU-3000 Data Sheet
46	FEB 2 2 2016	FEB 2 2 2016	Chen		LMU-3030 Data Sheet
47	2/22/16	2/23/16	Andrews	802	Andrews Rebuttal Report (including exhibits)
48	FEB 2 2 2016	FEB 2 2 2016	Chen/Sarkissian/ McDuff		Sales of Accused Devices
49	FEB 2 2 2016	FEB 2 2 2016	Chen/Sarkissian/ McDuff		Sales of Accused Devices
50	FEB 2 2 2016	FEB 2 2 2016	Chen/Sarkissian/ McDuff		Sales of Accused Devices
51	FEB 2 2 2016	FEB 2 2 2016	Chen/McDuff		Bosch Licensing info dated 06/2014
52	FEB 2 2 2016	FEB 2 2 2016	Chen/McDuff		Bosch Licensing info dated 01/2015
53			Chen	901	Xirgo Pricing
54	FEB 2 2 2016	FEB 2 2 2016	Chen		CalAmp License with B&B
55	FEB 2 2 2016	FEB 2 2 2016	Chen		CalAmp License with Innova
56	FEB 2 2 2016	FEB 2 2 2016	Chen		CalAmp License with WiLan
57	FEB 2 2 2016	FEB 2 2 2016	McDuff/Flick		Omega-Enfora License
58	FEB 2 2 2016	FEB 2 2 2016	McDuff/Flick		Omega-Lear License
59	FEB 2 2 2016	FEB 2 2 2016	McDuff/Flick		Omega-GM License
60			McDuff/Flick	802/ DAUBERT	McDuff Expert Report (including exhibits)
61			McAlexander/Flick	802, 901, 401	Opposition to DEI JMOL

62			McAlexander/Flick	802, 901, 401	1/31/2007 Transcript of Jury Trial (Omega v. DEI)
63			McAlexander/Flick	802, 401	McAlexander Rebuttal Report from Lear litigation
64			McAlexander/Flick	401	U.S. Pat. No. 6,812,829
65	FEB 2 2 2016	FEB 2 2 2016	McAlexander/Flick		Office Action mailed 7/30/2003 from Application No. 10/105,676
66	FEB 2 2 2016	FEB 2 2 2016	Flick		Signed Oath by Kenneth Flick to application for U.S. Patent 6,346,876
67	FEB 2 2 2016	FEB 2 2 2016	Flick		Signed Oath by Kenneth Flick to application for U.S. Patent 6,737,989
68	FEB 2 2 2016	FEB 2 2 2016	Flick		Signed Oath by Kenneth Flick to application for U.S. Patent 6,756,885
69	FEB 2 2 2016	FEB 2 2 2016	Flick		Signed Oath by Kenneth Flick to application for U.S. Patent 7,671,727
70	FEB 2 2 2016	FEB 2 2 2016	Flick		Signed Oath by Kenneth Flick to application for U.S. Patent 8,032,278
Court's 11					
71	2/22/16		Chen	802, 901	Opinion Letter re U.S. Pat. No. 6,346,876
72			Chen	802, 901	Opinion Letter re U.S. Pat. No. 6,737,989
Court's 12					
73	2/22/16		Chen	802, 901	Opinion Letter re U.S. Pat. No. 6,756,885

Court's 13 74	2/22/16		Chen	802, 901	Opinion Letter re U.S. Pat. No. 7,671,727
Court's 14 75	2/22/16		Chen	802, 901	Opinion Letter re U.S. Pat. No. 8,032,278
76	FEB 2 2 2016	FEB 2 2 2016			Plaintiff's Answers to Defendant's First Set of Interrogatories
77	FEB 2 2 2016	FEB 2 2 2016			Plaintiff's Answers to Defendant's Second Set of Interrogatories
78	FEB 2 2 2016	FEB 2 2 2016			Plaintiff's Response to Defendant CalAmp Corp.'s First Requests for Admissions
79	FEB 2 2 2016	FEB 2 2 2016			Plaintiff's Response to Defendant CalAmp Corp.'s Second Requests for Admissions
80	2/23/16	2/23/16	Andrews		Demonstrative Charts
81	2/23/16	2/23/16	Andrews		Demonstrative Charts

EXHIBIT 7

EXHIBIT LIST

_____Government __X__ Plaintiff _____Defendant _____Court
X Joint

Case No. 6:13-cv-01950-PGB-DAB
Style: Omega Patents, LLC v. Calamp Corp.

Exhibit No.	Date Identified	Date Admitted	Sponsoring Witness	Objection	Description of Exhibit	Ref. Nos.
JE1	2/17/16	2/17/16	Flick		US Patent No 6,346,876 B1	Doc. 1
JE2					US Patent No 6,737,989 B2	Doc. 1
JE3	2/17/16	2/17/16	Flick		US Patent No 6,756,885 B1	Doc. 1
JE4	2/17/16	2/17/16			US Patent No 7,671,727 B2	Doc. 1
JE5	2/17/16	2/17/16			US Patent No 8,032,278 B2	Doc. 1
JE6	2/17/16	2/17/16			File History-US Patent No 6,346,876 B1	OMEGA_CAL0 05315-6299
JE7					File History-US Patent No 6,737,989 B2	OMEGA_CAL0 03159-3346
JE8	2/17/16	2/17/16			File History-US Patent No 6,756,885 B1	OMEGA_CAL0 02939-3158
JE9	2/17/16	2/17/16			File History-US Patent No 7,671,727 B2	OMEGA_CAL0 02815-2938
JE10	2/17/16	2/17/16			File History-US Patent No 8,032,278 B2	OMEGA_CAL0 00796-1035
JE11	2/17/16	2/17/16			Calamp Product Exemplars-LMU-3000	
JE12	2/17/16	2/17/16			Calamp Product Exemplars-LMU-3000	
JE13	2/17/16	2/17/16			Calamp Product Exemplars-vPod	
JE14	2/17/16	2/17/16			Calamp Product Exemplars-vPod2	
PL1	2/17/16	2/17/16			LMU-3000 product information sheet	Pete Hergesheimer Depo Exhibit 1 CALAMP00003 04-0000305

Exhibit No.	Date Identified	Date Admitted	Sponsoring Witness	Objection	Description of Exhibit	Ref. Nos.
PL2	2/17/16	2/17/16			LMU-3030 product information sheet	Pete Hergesheimer Depo Exhibit 2 CALAMP00004 09-0000410
PL3	2/17/16	2/17/16			Product photos	Pete Hergesheimer Depo Exhibit 3
PL4	2/17/16	2/17/16			Product photos	Pete Hergesheimer Depo Exhibit 4
PL5	2/17/16	2/17/16			Product photos	Pete Hergesheimer Depo Exhibit 5
PL6	2/17/16	2/17/16			Calamp LM Direct Reference Guide	Pete Hergesheimer Depo Exhibit 6 OMEGA_CAL0 04306-004421
PL7				Relevance – FRE 401-403	Cron/Oracle Scheduler Package/Script Name	Pete Hergesheimer Depo Exhibit 7 CALAMP00028 67-0002876
PL8	2/17/16	2/17/16			Calamp PEG Programming Guide Version 1.0.0	Pete Hergesheimer Depo Exhibit 8 OMEGA_CAL0 04425-004554
PL9	2/17/16	2/17/16			Calamp PULS User Guide	Pete Hergesheimer Depo Exhibit 9 OMEGA_CAL0 04557-004599

Exhibit No.	Date Identified	Date Admitted	Sponsoring Witness	Objection	Description of Exhibit	Ref. Nos.
PL10	2/17/16	2/17/16			PEG Support Guide for Vehicle Bus Features	Pete Hergesheimer Depo Exhibit 10 CALAMP0000693-0000710
PL11	2/17/16	2/17/16			Product Schematic – LMU2000/3000	James Hardee Depo Exhibit 11
PL12	2/17/16	2/17/16			Product Schematic – LMU3030	James Hardee Depo Exhibit 12
PL13				Foundation; Hearsay	Product Flow Chart	Radhakarishnan Ramachandran Depo Exhibit 13
PL14	2/17/16	2/17/16		Relevance – FRE 401-403	US Patent No 2012/0158211 A1	Radhakarishnan Ramachandran Depo Exhibit 14
PL15	2/17/16	2/17/16			Calamp Corp's Supplemental Responses to Omega's First Set of Interrogatories	Stephen Hall Depo Exhibit 15
PL16	2/17/16	2/17/16			Calamp Corp's Second Supplemental Response to Omega's First Set of Interrogatories	Stephen Hall Depo Exhibit 16
PL17	2/17/16	2/17/16			Computer code	Stephen Hall Depo Exhibit 17 CALAMP0008417-0008423
PL18	2/17/16	2/17/16			Calamp OBDII Plug-On Tracking Unit CRS-Commercial Requirements Specification	Stephen Hall Depo Exhibit 18 CALAMP0008175-0008193
PL19	2/17/16	2/17/16			Calamp Corp's Responses to Omega's First Set of Interrogatories	Stephen Hall Depo Exhibit 19
PL20	2/17/16	2/17/16			Calamp LMU-3030 Tracking Unit CRS Commercial Requirements Specification	Stephen Hall Depo Exhibit 20 CALAMP0008205-0008222
PL21	2/17/16	2/17/16			Innova Calamp Software Interface Definition Version 3.8	Stephen Hall Depo Exhibit 21 CALAMP0008328-0008416

Exhibit No.	Date Identified	Date Admitted	Sponsoring Witness	Objection	Description of Exhibit	Ref. Nos.
PL22	2/17/16	2/17/16			Calamp's News Bulletin	Stephen Hall Depo Exhibit 22
PL23	2/17/16	2/17/16			LM Direct Reference Guide	Eiberger Depo Exhibit 23 CALAMP00005 24-0000636
PL24				Relevance	Settlement, Release & License Agreement between Melvino Technologies Lmtd. & ArrivalStar S.A.	Gallin Chen Depo Exhibit 25 CALAMP00412 55-0041260
PL25				Relevance	Settlement, Release & License Agreement between Melvino Technologies Lmtd. & ArrivalStar S.A.	Gallin Chen Depo Exhibit 26 CALAMP00412 76-0041282
PL26				Relevance	Settlement, Release, Covenant Not to Sue & Patent License Agreement between PJC Logistics, LLC, Calamp Corp, & GPS Insight, Inc.	Gallin Chen Depo Exhibit 27 CALAMP00412 61-0041275
PL27				Foundation; Hearsay	Email correspondence between Kevin Christensen & Bill Duffy	Gallin Chen Depo Exhibit 28 CALAMP00019 0-000191
PL28				Foundation; Hearsay	Email correspondence between Kevin Christensen & Bill Duffy	Gallin Chen Depo Exhibit 29 CALAMP00018 5
PL29				Relevance	Draft GPS Patent License Agreement between Omega Patents, LLC & Calamp, Corp 12.01.09	Gallin Chen Depo Exhibit 30 CALAMP00023 6-000247
PL30				Foundation; Hearsay	Email correspondence between David Bailey & Brian Gilchrist	Gallin Chen Depo Exhibit 31 CALAMP00016 7-000169
PL31				Foundation; Hearsay	Email correspondence between David Bailey & Brian Gilchrist	Gallin Chen Depo Exhibit 32 CALAMP00016 6

Exhibit No.	Date Identified	Date Admitted	Sponsoring Witness	Objection	Description of Exhibit	Ref. Nos.
PL32				Relevance	Draft GPS Patent License Agreement between Omega Patents, LLC & Calamp, Corp 02.15.10	Gallin Chen Depo Exhibit 33 CALAMP000967-000981
PL33				Foundation; Hearsay	Email correspondence between David Bailey & Brian Gilchrist	Gallin Chen Depo Exhibit 34 CALAMP000107-000108
PL34				Foundation; Hearsay	Email correspondence between David Bailey & Ryan Santurri	Gallin Chen Depo Exhibit 35 CALAMP000073-000076
PL35				Foundation; Hearsay	Email correspondence between Ken Flick & Ryan Santurri; Patent License and Settlement Agreement between Omega Patents, LLC & Calamp Corp. 06.01.10	Gallin Chen Dep Exhibit 36
PL36				Foundation; Hearsay	Email correspondence between David Bailey & Ryan Santurri	Gallin Chen Dep Exhibit 37
PL37				Hearsay; Relevance	Dismissal Agreement between Omega Patents, LLC & Calamp Corp. 06.09.10	Gallin Chen Depo Exhibit 38 CALAMP000001
PL38	2/17/16	2/17/16			Email correspondence between Gallin Chen & Ken Flick	Gallin Chen Depo Exhibit 39
PL39	2/17/16	2/17/16		Hearsay	Email correspondence between Gallin Chen & Garo Sarkissian	Gallin Chen Depo Exhibit 40 CALAMP0033420
PL40				Foundation; Hearsay	Email correspondence between David Bailey & Chris Regan	Gallin Chen Depo Exhibit 41
PL41				Hearsay	Email correspondence between Mike Crawford & Michael Burdiek, Garo Sarkissian, Justin Schmid, Rick Vitelle	Gallin Chen Depo Exhibit 42 CALAMP0020364-0020365
PL42				Foundation; Hearsay	Email correspondence between Ryan Santurri, Brian Gilchrist & David Bailey	Gallin Chen Depo Exhibit 43 CALAMP000178-000180

Exhibit No.	Date Identified	Date Admitted	Sponsoring Witness	Objection	Description of Exhibit	Ref. Nos.
PL43				Foundation; Hearsay	Email correspondence between Ken Flick & Chris Regan	Gallin Chen Depo Exhibit 44
PL44				Foundation; Hearsay	Email correspondence between Ken Flick & Ryan Santurri	Gallin Chen Depo Exhibit 45 OMEGA CAL000692-000713
PL45	2/17/16	2/17/16	Flick	Relevance	License Agreement between Omega Patents, LLC & Calamp Corp	Gallin Chen Depo Exhibit 46 CALAMP00163 11-0016312
PL46				Foundation; Relevance	Email correspondence between Ryan Santurri, Brian Gilchrist & David Bailey	Gallin Chen Depo Exhibit 47
PL47	2/17/16	2/17/16			Email correspondence between Gallin Chen, David Bailey & Garo Sarkissian	Gallin Chen Depo Exhibit 48 CALAMP00334 48-0033449
PL48	2/17/16	2/17/16		Hearsay; Relevance	Email correspondence between Gallin Chen, David Bailey & Garo Sarkissian	Gallin Chen Depo Exhibit 49 CALAMP00411 34-0041150
PL49	2/17/16	2/17/16			Email correspondence between Gallin Chen, Kim Cauthorn & Garo Sarkissian	Gallin Chen Depo Exhibit 50 CALAMP00304 26-0030438
PL50				Relevance, Hearsay	Calamp Corp's Response to Request for Proposal – Enterprise Holdings RFP	Gallin Chen Depo Exhibit 56 CALAMP00257 75-0025837
PL51				Relevance, Hearsay	Email correspondence between Gregory Gower, Joyce Tam & Steve Hall	Gallin Chen Depo Exhibit 57 CALAMP00157 10-0015750
PL52					**WITHDRAWN** Letter from David Bailey to Garo Sarkissian	Gallin Chen Depo Exhibit 58 CALAMP00072 00-0007225

Exhibit No.	Date Identified	Date Admitted	Sponsoring Witness	Objection	Description of Exhibit	Ref. Nos.
PL53					**WITHDRAWN** Letter from David Bailey to Garo Sarkissian	Gallin Chen Depo Exhibit 59 CALAMP00059 81-0006097
PL54					**WITHDRAWN** Letter from David Bailey to Garo Sarkissian	Gallin Chen Depo Exhibit 60 CALAMP00054 18-0005535
PL55					**WITHDRAWN** US Patent No 5,732,074	Gallin Chen Depo Exhibit 61 CALAMP00023 39-0002353
PL56					**WITHDRAWN** Letter from David Bailey to Garo Sarkissian	Gallin Chen Depo Exhibit 62 CALAMP00040 79-0004158
PL57					**WITHDRAWN** Letter from David Bailey to Garo Sarkissian	Gallin Chen Depo Exhibit 63 CALAMP00029 47-0003019
PL58					**WITHDRAWN** US Patent No 5,898,392	Gallin Chen Depo Exhibit 64 CALAMP00023 54-0002372
PL59	2/17/16	2/17/16			Calamp vpod schematics	Hergesheimer-30(b)(6) Depo Exhibit 65
PL60	2/17/16	2/17/16			Calamp OBD-II Devices Presentation	Hergesheimer-30(b)(6) Depo Exhibit 66
PL61				Hearsay, Relevance	Sarkissian timeline	Garo Sarkissan Depo Exhibit 67
PL62	2/17/16	2/17/16			Financial Spreadsheet	Garo Sarkissan Depo Exhibit 68
PL63	2/17/16	2/17/16			Financial Spreadsheet	Garo Sarkissan Depo Exhibit 69
PL64	2/17/16	2/17/16			Charts with asserted claim language	N/A
PL65	2/17/16	2/17/16			Expert Report of Christian Tregillis	Christian Tregillis Depo Exhibit 2

Exhibit No.	Date Identified	Date Admitted	Sponsoring Witness	Objection	Description of Exhibit	Ref. Nos.
PL66	2/17/16	2/17/16			Supplemental Expert Report of Christian Tregillis	Christian Tregillis Depo Exhibit 3
PL67	2/17/16	2/17/16	Flick	Hearsay, Relevance	License Agreement between Omega Patents LLC & Mid City Engineering, LLC	Christian Tregillis Depo Exhibit 4 OMEGA_CAL 000171-000180
PL68	2/17/16	2/17/16	Flick	Hearsay, Relevance	License Agreement between Omega Patents LLC & Cimble Corp.	Christian Tregillis Depo Exhibit 5 OMEGA_CAL 007374-007383
PL69	2/17/16	2/17/16	Flick	Hearsay, Relevance	Patent License & Settlement Agreement between Omega Patents LLC & 160031 Canada Inc	Christian Tregillis Depo Exhibit 6 OMEGA_CAL 000003-000015
PL70	FEB 17 2016	FEB 17 2016			License Agreement between Omega Patents LLC & Numerex	Christian Tregillis Depo Exhibit 7 OMEGA_CAL 000181-000195
PL71	2/17/16	FEB 17 2016	Flick		Patent License & Settlement Agreement between Omega Patents LLC & Lear Corp.	Christian Tregillis Depo Exhibit 8 OMEGA_CAL 007362-007371
PL72	FEB 17 2016	FEB 17 2016			Settlement Agreement & Covenant Not to Sue between Omega Patents LLC & OnStar, LLC	Christian Tregillis Depo Exhibit 9 OMEGA_CAL 000229-000239
PL73	2/17/16	2/17/16			Settlement Agreement between Omega Patents LLC & Enfora Inc.	Christian Tregillis Depo Exhibit 10 OMEGA-CAL 000132-000140
PL74	FEB 17 2016	FEB 17 2016			Automotive Electronics License Conditions CAN Protocol and CAN FD Protocol	Christian Tregillis Depo Exhibit 11

Exhibit No.	Date Identified	Date Admitted	Sponsoring Witness	Objection	Description of Exhibit	Ref. Nos.
PL75	FEB 17 2016	FEB 17 2016			Automotive Electronics License Conditions CAN Protocol and CAN FD Protocol	Christian Tregillis Depo Exhibit 12
PL76	FEB 17 2016	FEB 17 2016			Wi-Lan Inc. Patent License Agreement	Christian Tregillis Depo Exhibit 13 CALAMP 0041285-0041314
PL77	FEB 17 2016	FEB 17 2016			Settlement, Release, Covenent Not to Sue and Patent License Agreement between PJC Logistics LLC, Calamp Corp, & Procon Fleet Services LLC	Christian Tregillis Depo Exhibit 14 CALAMP 0041261-0041275
PL78	FEB 17 2016	FEB 17 2016			Screen Shot of OBD Device Xirgo XT-2000	Christian Tregillis Depo Exhibit 16
PL79	FEB 17 2016	FEB 17 2016			Calamp LMU-2600 GPRS/CDMA/HSPA Series	Christian Tregillis Depo Exhibit 17
PL80	FEB 17 2016	FEB 17 2016			Calamp LMU-2000 GPRS/CDMA/HSPA Series	Christian Tregillis Depo Exhibit 18
PL81	2/17/16	2/17/16	Flick	Hearsay, Relevance	License Agreement between Omega Patents, LLC and Accele Electronics, Inc.	OMEGA_CAL 007401-007410
PL82	2/17/16	2/17/16	Flick	Hearsay, Relevance	License Agreement between Omega Patents, LLC and Accessories Electroniques Bomar, Inc.	OMEGA_CAL 007395-007400
PL83	2/17/16	2/17/16	Flick	Hearsay, Relevance	License Agreement between Omega Patents, LLC and Applicated Security Technologies, Inc.	OMEGA_CAL 000030-000035
PL84	2/17/16	2/17/16	Flick	Hearsay, Relevance	License Agreement between Omega Patents, LLC and Astroflex, Inc.	OMEGA_CAL 000040-000045
PL85	2/17/16	2/17/16	Flick	Hearsay, Relevance	License Agreement between Omega Patents, LLC and Audiovox Corporation	OMEGA_CAL 000053-000072

Exhibit No.	Date Identified	Date Admitted	Sponsoring Witness	Objection	Description of Exhibit	Ref. Nos.
PL86	2/17/16	2/17/16	Flick	Hearsay, Relevance	License Agreement between Omega Patents, LLC and Automotive Data Solutions, Inc.	OMEGA_CAL 000017-000029
PL87				Hearsay, Relevance	License Agreement between Omega Patents, LLC and Autopage, Inc.	OMEGA_CAL 000073-000079
PL88	2/17/16	2/17/16			License Agreement between Omega Patents, LLC and Calamp Corp.	OMEGA_CAL 000080-000083
PL89				Hearsay, Relevance	License Agreement between Omega Patents, LLC and Designtech International, Inc.	OMEGA_CAL 000129-000131
PL90	2/17/16	2/17/16			License Agreement between Omega Patents, LLC and Enfora, Inc.	OMEGA_CAL 000132-000144
PL91				Hearsay, Relevance	License Agreement between Omega Patents, LLC and Firsttech, LLC	OMEGA_CAL 007414-007417
PL92	2/17/16	2/17/16	Flick	Hearsay, Relevance	License Agreement between Omega Patents, LLC and Fortin Auto Radio, Inc.	OMEGA_CAL 000145-000166
PL93	2/17/16	2/17/16	Flick	Hearsay, Relevance	License Agreement between Omega Patents, LLC and JSB Technologies, LLC	OMEGA_CAL 000167-000170
PL94				Hearsay, Relevance	License Agreement between Omega Patents, LLC and Limitless Creations, LLC	OMEGA_CAL 007384-007386
PL95				Hearsay, Relevance	License Agreement between Omega Patents, LLC and Magnadyne Corporation	OMEGA_CAL 007388-007390
PL96	2/17/16	2/17/16	Flick	Hearsay, Relevance	License Agreement between Omega Patents, LLC, Omega Research and Development, Inc and Directed Electronics, Inc.	OMEGA_CAL 000084-000101
PL97	2/17/16	2/17/16	Flick	Hearsay, Relevance	License Agreement between Omega Patents, LLC and Omega Research and Development, Inc.	OM EGA_CAL 000196-000228
PL98	2/17/16	2/17/16	Flick	Hearsay, Relevance	License Agreement between Omega Patents, LLC and Autosport, LLC	OMEGA-00182-OMEGA-00188

Exhibit No.	Date Identified	Date Admitted	Sponsoring Witness	Objection	Description of Exhibit	Ref. Nos.
PL99	2/17/16	2/17/16			License Agreement between Omega Patents, LLC and Numerex Corporation	OMEGA_CAL 000181-000195
PL100	2/17/16	2/17/16	Flick		License Agreement between Omega Patents, LLC and OnStar, LLC	OMEGA_CAL 000229-000239
PL101	2/17/16	2/17/16	Flick	Hearsay, Relevance	License Agreement between Omega Patents, LLC and Portman Security Systems, Ltd.	OMEGA_CAL 000240-000248
PL102	2/17/16	2/17/16	Flick	Hearsay, Relevance	License Agreement between Omega Patents, LLC and Precision Engineering Industries, Inc.	OMEGA_CAL 000249-000252
PL103	2/17/16	2/17/16	Flick	Hearsay, Relevance	License Agreement between Omega Patents, LLC and Trilogix Electronics Systems, Inc.	OMEGA-CAL 000523-000270
PL104	2/17/16	2/17/16			Expert Report of Joseph McAlexander	Joseph McAlexander Depo Exhibit 2
PL105	2/17/16	2/17/16			Rebuttal Expert Report of Joseph C. McAlexander	Joseph McAlexander Depo Exhibit 6
PL106	2/17/16	2/17/16			Supplemental Expert Report of Joseph C. McAlexander (5-22-2015)	
PL107				Foundation; Hearsay, Relevance	"Telematics," Gartner IT Glossary, <http://www.gartner.com/it-glossary/telematics/>.	Tregillis Expert Report Page 4
PL108				Foundation; Hearsay, Relevance	"Telematics," Gartner IT Glossary, <http://www.gartner.com/it-glossary/telematics/>.	Tregillis Expert Report Page 4
PL109				Foundation; Hearsay, Relevance	Setar, Lauren, "IBIS World Industry Report OD4546 Fleet Telematics Systems," November 2012.	Tregillis Expert Report Page 4
PL110				Foundation; Hearsay, Relevance	"Telematics," Automotive Fleet Encyclopedia, <http://www.automotive-fleet.com/encyclopedia/telematics.aspx>.	Tregillis Expert Report Page 4

Exhibit No.	Date Identified	Date Admitted	Sponsoring Witness	Objection	Description of Exhibit	Ref. Nos.
PL111				Foundation; Hearsay, Relevance	"M2M," Automotive Fleet Encyclopedia, <http://www.automotive-fleet.com/encyclopedia/m2m.aspx>.	Tregillis Expert Report Page 4
PL112				Foundation; Hearsay, Relevance	"Machine-to-Machine (M2M) Communications," Gartner IT Glossary, <http://www.gartner.com/it-glossary/machine-to-machine-m2m-communications>.	Tregillis Expert Report Page 4
PL113				Foundation; Hearsay, Relevance	Crosby, Tim, "How Machine-to-Machine Communication Works," How Stuff Works, <http://computer.how stuffworks.com/m2m-communication.htm/printable>.	Tregillis Expert Report Page 4
PL114				Foundation; Hearsay, Relevance	Emmerson, Bob, "M2M: the Internet of 50 billion devices," M2M the Magazine, <http://204.93.85.96/servlet/JiveServlet/previewBody/1043-102-1-1033/M2M_Magazine_The_internet_of_50_billion_devices.pdf>	Tregillis Expert Report Page 4
PL115				Foundation; Hearsay, Relevance	"Consumer Telematics," Gartner IT Glossary, <http://www.gartner.com/it-glossary/consumer-telematics/>.	Tregillis Expert Report Page 5
PL116				Foundation; Hearsay, Relevance	"OnStar Services," Onstar, <https://www.onstar.com/us/en/services/services.html>	Tregillis Expert Report Page 5
PL117				Foundation; Hearsay, Relevance	"OnStar Company Information," OnStar,<http://media.gm.com/Media/us/en/onstar/company/company.html	Tregillis Expert Report Page 5

Exhibit No.	Date Identified	Date Admitted	Sponsoring Witness	Objection	Description of Exhibit	Ref. Nos.
PL118				Foundation; Hearsay, Relevance	Fletcher, Lauren, "Focus on Telematics Goals for Greater ROI," Automotive Fleet, January 2013, <www. automotive-fleet.com/article/print/ story/2013/01/ focus-on-telematics-goals- for-greater-roi.aspx>.	Tregillis Expert Report Page 5
PL119				Foundation; Hearsay, Relevance	Kolman, David, "How to Harness the Power of Vehicle Telematics," Vehicle Service Pros , August 30, 2011, <http:// www.vehicleservicepros .com/article/ 10291142/how-to- harness-the-power-of-vehicle- telematics>	Tregillis Expert Report Page 5
PL120				Foundation; Hearsay, Relevance	"Beyond the Basics : Fleet Management Solutions at the Next Level," <http://www. automotive-fleet.com/channel/gps- telematics/whitepapers/detail/ beyond-the-basics-fleet- management- solutions-at-the-next-level. aspx>	Tregillis Expert Report Page 5
PL121				Foundation; Hearsay, Relevance	"Telematics ROI Beyond Fuel Savings," Automotive Fleet, October 2014, <http://www.automotive-fleet. com/article/print/story/2014 /10/telematics-roi-beyond-fuel- savings.aspx>	Tregillis Expert Report Page 5
PL122				Foundation; Hearsay, Relevance	"Usage-Based Insurance and Telematics," National Association of Insurance Commissioners and The Center for Insurance Policy Research, <http:// www.naic.org/ cipr_topics/topic_usage_ based_insurance.htm>.	Tregillis Expert Report Page 5

Exhibit No.	Date Identified	Date Admitted	Sponsoring Witness	Objection	Description of Exhibit	Ref. Nos.
PL123				Foundation; Hearsay, Relevance	Wolski, Chris, "How Telematics is Improving Fleet Productivity," Automotive Fleet, February 2015, <http://www.automotive-fleet.com/article/print/story/2015/02/how-telematics-is-improving-fleet-productivity.aspx>	Tregillis Expert Report Page 5
PL124				Foundation; Hearsay, Relevance	Mika, Shelly, "Telematics Sensor-Equipped Trucks Help UPS Control Costs," Automotive Fleet, July 2010, <www.automotive-fleet.com/article/print/story/2010/07/green-fleet-telematics-sensor-equipped-trucks-help-ups-control-costs.aspx>.	Tregillis Expert Report Page 6
PL125				Foundation; Hearsay, Relevance	"Wireless OBD-2 Vehicle Monitor Analyzer for Fleet Management Applications," Fleet Genius, 2013, <http://www.fleetgenius.com/wireless_fleet_management_monitors_obd2_remote_diagnostics>.	Tregillis Expert Report Page 6
PL126				Foundation; Hearsay, Relevance	Top 300 have over 1 million. "The Blog for AutoGas Fleets," AutoGas Fleet, <http://www.autogasfleet.com>.	Tregillis Expert Report Page 8
PL127				Foundation; Hearsay, Relevance	*See*, for example, "Top 100 Truck Fleets," Fleet Central, 2013, <http://www.fleet-central.com/TopFleets/pdf/AUTOF_top100trucks.pdf>. The top ten include UPS, AT&T, PepsiCo, and Comcast	Tregillis Expert Report Page 8

Exhibit No.	Date Identified	Date Admitted	Sponsoring Witness	Objection	Description of Exhibit	Ref. Nos.
PL128				Foundation; Hearsay, Relevance	"Top 300 commercial Fleets", 2012, Automotive Fleet 500, <http://www.fleetcentral.com/TopFleets/pdf/FLT500top300.pdf>	Tregillis Expert Report Page 8
PL129				Foundation; Hearsay, Relevance	"Types of Vehicles by WeightClass," US Department of Energy Alternative Fuels Data Center, <http://www.afdc.energy.gov/data/widgets/10381>.	Tregillis Expert Report Page 8
PL130				Foundation; Hearsay, Relevance	"Top 300 commercial Fleets", 2012, Automotive Fleet 500, <http://www.fleet-central.com/TopFleets/pdf/FLT500top300.pdf>.	Tregillis Expert Report Page 8
PL131				Foundation; Hearsay, Relevance	Antich, Mike, "2013: State of the Commercial Fleet Market," Automotive Fleet, April 1, 2013, <http://www.automotive-fleet.com/article/print/story/2013/04/2013-state-of-the-commercial-fleet-market.aspx>.	Tregillis Expert Report Page 8
PL132				Foundation; Hearsay, Relevance	"Fleetmatics Introduces Fleetbeat Report, an Industry First, Revealing Fleet Benchmarking Data and the Economic Impact of Commercial Fleet Telematics," Fleetmatics, April 23, 2014, <http://www.fleetmatics.com/fleetmatics-introduces-fleetbeat-report>.	Tregillis Expert Report Page 8
PL133				Foundation; Hearsay, Relevance	"Telematics Usage in the Fleet Industry Survey Results," Donlen, 2012, <http://www.donlen.com/pdf/Donlen-Telematics-Survey.pdf>.	Tregillis Expert Report Page 9

Exhibit No.	Date Identified	Date Admitted	Sponsoring Witness	Objection	Description of Exhibit	Ref. Nos.
PL134				Foundation; Hearsay, Relevance	Wolski, Chris, "How Telematics is Improving Fleet Productivity," Automotive Fleet, February 2015, <http://www.automotive-fleet.com/article/print/story/2015/02/how-telematics-is-improving-fleet-productivity.aspx>.	Tregillis Expert Report Page 9
PL135				Foundation; Hearsay, Relevance	"Verizon Telematics Offers The Right Solutions," Verizon, 2015, <https://www.verizontelematics.com/>; "Fleet, Trailer and Asset Management," Sprint Business, 2015, <https://www.sprint.com/business/solutions/fleet_and_asset_management/index.htmlINTNAV=ATG:HE:FleetTrailAssetMgmt&ECID=vanity:connected fleet>	Tregillis Expert Report Page 10
PL136				Foundation; Hearsay, Relevance	"GE Capital Fleet Services," General Electric Company, 2015,<https://www.gefleet.com/home>; "Complete Suite of Vehicle Management Solutions," LeasePlan, <http://www.us.leaseplan.com/pu/enUS/>	Tregillis Expert Report Page 10
PL137				Foundation; Hearsay, Relevance	"Working Smarter Starts Here," Fleetmatics, 2015, <http://www.fleetmatics.com/>; "Real World Wireless Solutions," Sierra Wireless,<http://www.sierrawireless.com/>.	Tregillis Expert Report Page 10
PL138				Foundation; Hearsay, Relevance	"Fleet Management & Computerized Systems." NAFA Fleet Management Association Online Buyer's Guide <http://nafa.official buyersguide.net/Search Results?categories=16&pg=1>.	Tregillis Expert Report Page 11

Exhibit No.	Date Identified	Date Admitted	Sponsoring Witness	Objection	Description of Exhibit	Ref. Nos.
PL139				Foundation; Hearsay, Relevance	"Telematics Usage in the Fleet Industry Survey Results", Donlen, 2012,http://www.donlen.com/pdf/Donlen-Telematics-Survey.pdf >.	Tregillis Expert Report Page 11
PL140				Foundation; Hearsay, Relevance	Setar, Lauren, "IBIS World Industry Report OD4546 Fleet Telematics Systems," November 2012, p. 5.	Tregillis Expert Report Page 12
PL141	2/11/16	2/11/16	Flick	Foundation; Hearsay, Relevance	Omega/Audiovox GPS Patent License and Settlement Agreement, April 1, 2007	Tregillis Expert Report Page 24
PL142				Foundation; Hearsay, Relevance	CalAmp Corp. Form 10-K for the fiscal year ended February 28, 2014, p. 2	Tregillis Expert Report Page 28
PL143				Foundation; Hearsay, Relevance	"CalAmp Products," CalAmp, <http://www.calamp.com/products> .	Tregillis Expert Report Page 29
PL144				Foundation; Hearsay, Relevance	"Tracking and Telemetry Devices," CalAmp, <http://www.calamp.com/products#term=93>.	Tregillis Expert Report Page 31
PL145				Foundation; Hearsay, Relevance	"LMU-2600 Series," CalAmp, <http://www.calamp.com/products/tracking-and-telemetry-devices/fleet-tracking-units/lmu-2600-series>.	Tregillis Expert Report Page 32
PL146				Foundation; Hearsay, Relevance	"OBD-3000 – OBDII Plug-On Tracking Unit CRS – Commercial Requirements Specification," CalAmp, October 29, 2010	Tregillis Expert Report Page 32
PL147				Foundation; Hearsay, Relevance	"OBD-3030 – LMU-3030 Tracking Unit CRS – Commercial Requirements Specification," CalAmp, January 11, 2013,	Tregillis Expert Report Page 32
PL148				Foundation; Hearsay, Relevance	"On-Board Diagnostics (OBD) Basic Information," United States Environmental Protection Agency, <http://www.epa.gov/obd/basic.htm >	Tregillis Expert Report Page 32

Exhibit No.	Date Identified	Date Admitted	Sponsoring Witness	Objection	Description of Exhibit	Ref. Nos.
PL149				Foundation; Hearsay, Relevance	"On-Board Diagnostic Guidance – Diagnostic Link Connector Location and Accessibility," United States Environmental Protection Agency, December 14, 1998, <http://www.epa.gov/obd/pubs/vpcd 9814.txt>	Tregillis Expert Report Page 32
PL150				Foundation; Hearsay, Relevance	"On-Board Diagnostics (OBD) Basic Information," United States Environmental Protection Agency, <http://www.epa.gov/obd/basic.htm >.	Tregillis Expert Report Page 33
PL151				Foundation; Hearsay, Relevance	"OBD-II Background," The OBD II Home Page, <http://www.obdii.com/background. html>.	Tregillis Expert Report Page 33
PL152				Foundation; Hearsay, Relevance	"On-Board Diagnostic Guidance – Diagnostic Link Connector Location and Accessibility," United States Environmental Protection Agency, December 14, 1998, <http://www.epa.gov/obd/pubs/vpcd 9814.txt>.	Tregillis Expert Report Page 33
PL153				Foundation; Hearsay, Relevance	"Programmable Event Generator," CalAmp, <http://www.calamp.com/products/ peg>.	Tregillis Expert Report Page 34
PL154	2/17/16	2/17/16	Flick	Foundation; Hearsay, Relevance	Omega Patent Royalty Chart (all years)	OMEGA_CAL0 07418
PL155				Foundation; Hearsay, Relevance	Omega Patent Royalty Chart (all years)	OMEGA_CAL0 07949-7954
PL156	2/17/16	2/17/16	Flick		Assignments for Omega patents	OMEGA_CAL0 07955-07967
PL157				Foundation, Relevance	U.S. Patent No. 8,812,173	McAlexander Report, p. 59
PL158				Foundation, Relevance	U.S. Patent No. 6,924,750	
PL159	2/17/16	2/17/16			Calamp's response to Omega's First Set of Interrogatories	

Exhibit No.	Date Identified	Date Admitted	Sponsoring Witness	Objection	Description of Exhibit	Ref. Nos.
PL160	2/17/16	2/17/16			Calamp's first supplemental response to Omega's First Set of Interrogatories	
PL161	2/17/16	2/17/16			Calamp's second supplemental response to Omega's First Set of Interrogatories	
PL162	2/18/16	2/18/16	McAlexander		Chart	
PL163	2/18/16	2/18/16	McAlexander		Summary Infringed Claims	
PL164	2/19/16	2/19/16	Tregillis		Chart	
PL165						
PL166						
PL167						
PL168						
PL169						
PL170						

EXHIBIT 8

Exhibit List

___Government ___Plaintiff ___Defendant X Court

Exhibit No.	Date Identified	Date Admitted	Witness	Objections	Description
1	2/16/16				Civil Challenge Sheet
2	2/16/16				Juror note
3	2/17/16				juror note
4	2/17/16				Deposition of Gallin Chen
5	2/18/16				Deposition dated 8-18-2014 of Peter Hergesheimer
6	2/18/16				Deposition dated 4-22-2015 of Peter Hergesheimer
7	2/18/16				Deposition of Jeffrey Eiberger
8	2/18/16				Claim Construction for the Case
9	2/19/16				Deposition of Stephen Hall
10	2/23/16				Juror note

Case Number: 6:13cv1950-ORL-40DAB Style: Omega -vs- Cal Comp

Exhibit list continued:

Style: Omega v CalAmp Case No. 6:13cv-950-ORL-40 DAB

Government ☐ Plaintiff ☐ Defendant ☐ Court ☒

Exhibit No.	Date Identified	Date Admitted	Witness	Objections	Description
Deft 11	11	2/23/16			opinion letter re: patent 876
Deft 13	12	2/23/16			opinion letter re: patent 885
Deft 14	13	2/23/16			opinion letter re: patent 727
Deft 15	14	2/23/16			opinion letter re: patent 278
	15	2/24			juror note

EXHIBIT 9

UNITED STATES DISTRICT COURT
MIDDLE DISTRICT OF FLORIDA
ORLANDO DIVISION

OMEGA PATENTS, LLC,

Plaintiff,

v. Case No: 6:13-cv-1950-Orl-40DAB

CALAMP CORP.,

Defendant.
_____/

COURT'S INSTRUCTIONS TO THE JURY

Members of the jury:

It's my duty to instruct you on the rules of law that you must use in deciding this case. When I have finished you will go to the jury room and begin your discussions, sometimes called deliberations.

JURY INSTRUCTION NO. 1

As I said before, you must consider only the evidence that I have admitted in the case. Evidence includes the testimony of witnesses and the exhibits admitted. But, anything the lawyers say is not evidence and isn't binding on you.

You shouldn't assume from anything I've said that I have any opinion about any factual issue in this case. Except for my instructions to you on the law, you should disregard anything I may have said during the trial in arriving at your own decision about the facts.

Your own recollection and interpretation of the evidence is what matters.

In considering the evidence you may use reasoning and common sense to make deductions and reach conclusions. You shouldn't be concerned about whether the evidence is direct or circumstantial.

"Direct evidence" is the testimony of a person who asserts that he or she has actual knowledge of a fact, such as an eyewitness.

"Circumstantial evidence" is proof of a chain of facts and circumstances that tend to prove or disprove a fact.

There's no legal difference in the weight you may give to either direct or circumstantial evidence.

JURY INSTRUCTION NO. 2

When I say you must consider all the evidence, I don't mean that you must accept all the evidence as true or accurate. You should decide whether you believe what each witness had to say, and how important that testimony was. In making that decision you may believe or disbelieve any witness, in whole or in part. The number of witnesses testifying concerning a particular point doesn't necessarily matter.

To decide whether you believe any witness I suggest that you ask yourself a few questions:

- Did the witness impress you as one who was telling the truth?
- Did the witness have any particular reason not to tell the truth?
- Did the witness have a personal interest in the outcome of the case?
- Did the witness seem to have a good memory?
- Did the witness have the opportunity and ability to accurately observe the things he or she testified about?
- Did the witness appear to understand the questions clearly and answer them directly?
- Did the witness's testimony differ from other testimony or other evidence?

JURY INSTRUCTION NO. 3

You should also ask yourself whether there was evidence that a witness testified falsely about an important fact. Also ask yourself whether there was evidence that at some other time a witness said or did something, or didn't say or do something, that was different from the testimony the witness gave during this trial.

But keep in mind that a simple mistake doesn't mean a witness wasn't telling the truth as he or she remembers it. People naturally tend to forget some things or remember them inaccurately. So, if a witness misstated something, you must decide whether it was because of an innocent lapse in memory or an intentional deception. The significance of your decision may depend on whether the misstatement is about an important fact or about an unimportant detail.

JURY INSTRUCTION NO. 4

When scientific, technical or other specialized knowledge might be helpful, a person who has special training or experience in that field is allowed to state an opinion about the matter.

But that doesn't mean you must accept the witness's opinion. As with any other witness's testimony, you must decide for yourself whether to rely upon the opinion.

When a witness is being paid for reviewing and testifying concerning the evidence, you may consider the possibility of bias and should view with caution the testimony of such witness where court testimony is given with regularity and represents a significant portion of the witness's income.

JURY INSTRUCTION NO. 5

In this case it is the responsibility of Omega to prove every essential part of its infringement allegation by a "preponderance of the evidence." This is sometimes called the "burden of proof" or the "burden of persuasion."

A "preponderance of the evidence" simply means an amount of evidence that is enough to persuade you that Omega's allegations are more likely true than not true.

If the proof fails to establish any essential part of an allegation or contention by a preponderance of the evidence, you should find against Omega.

In deciding whether any fact has been proved by a preponderance of the evidence, you may consider the testimony of all of the witnesses, regardless of who may have called them, and all of the exhibits received in evidence, regardless of who may have produced them.

If the proof fails to establish any essential part of Omega's allegations by a preponderance of the evidence, you should find for CalAmp as to that claim.

Even if Omega proves its claim of infringement by a preponderance of the evidence, CalAmp can prevail in this case if it proves its allegations of invalidity by clear and convincing evidence. This is a higher standard of proof than proof by a preponderance of the evidence. It means the evidence must persuade you that the allegation or defense is highly probable or reasonably certain. The Court will tell you when to apply this standard.

JURY INSTRUCTION NO. 6

I will now summarize the issues that you must decide and for which I will provide instructions to guide your deliberations. You must decide the following three issues:

1. Whether Omega has proved by a preponderance of the evidence that CalAmp infringed claims 1, 3-5, 12, 14, and 16 of the '876 patent, 1-3, 12, and 14 of the '885 patent, 1, 10, and 11 of the '727 patent, and claims 1-6, 8, 11-14, 16, 18, 19, and 21 of the '278 patent. These are known as the "asserted claims."

2. Whether CalAmp has proved by clear and convincing evidence that the asserted claims were obvious in light of multiple pieces of prior art.

3. What amount of damages, if any, Omega has proved.

JURY INSTRUCTION NO. 7

Before you decide whether CalAmp has infringed the claims of the patents or whether the patent claims are invalid, you will have to understand the patent claims. The patent claims involved here are claims 1, 3-5, 12, 14, and 16 of the '876 patent, 1-3, 12, and 14 of the '885 patent, 1, 10, and 11 of the '727 patent, and claims 1-6, 8, 11-14, 16, 18, 19, and 21 of the '278 patent, found at the end of the patents, which are exhibits in evidence. The claims are intended to define, in words, the boundaries of the inventor's rights. Only the claims of the patent can be infringed. Neither the written description, nor the drawings of a patent can be infringed. Each of the claims must be considered individually. You must use the same claim meaning for both your decision on infringement and your decision on invalidity.

JURY INSTRUCTION NO. 8

Before you can decide many of the issues in this case, you will need to understand the role of patent "claims." The patent claims are the numbered sentences at the end of each patent. The claims are important because it is the words of the claims that define what a patent covers. A claim sets forth, in words, a set of requirements. Each claim sets forth its requirements in a single sentence. If a device or a method satisfies each of these requirements, then it is covered by the claim.

The figures and text in the rest of the patent provide a description and/or examples of the invention and provide a context for the claims, but it is the claims that define the breadth of the patent's coverage. Each claim is effectively treated as if it were a separate patent, and each claim may cover more or less than another claim. Therefore, what a patent covers depends, in turn, on what each of its claims covers.

The coverage of a patent is assessed claim-by-claim. In patent law, the requirements of a claim are often referred to as "claim elements" or "claim limitations." When a thing (such as a product or a process) meets all of the requirements of a claim, the claim is said to "cover" that thing, and that thing is said to "fall" within the scope of that claim. In other words, a claim covers a product or process where each of the claim elements or limitations is present in that product or process.

You will first need to understand what each claim covers in order to decide whether or not there is infringement of the claim and to decide whether or not the

claim is invalid. The law says that it is my role to define the terms of the claims and it is your role to apply my definitions to the issues that you are asked to decide in this case. Therefore, as I explained to you at the start of the case, I have determined the meaning of the claims and I will provide to you my definitions of certain claim terms. You must accept my definitions of these words in the claims as being correct. It is your job to take these definitions and apply them to the issues that you are deciding, including the issues of infringement and validity.

JURY INSTRUCTION NO. 9

It is my job as judge to provide to you the meaning of any claim language that must be interpreted. You must accept the meanings I give you and use them when you decide whether any claim has been infringed and whether any claim is invalid. I will now tell you the meanings of the following words and groups of words from the patent claims. For any words in the claim for which I have not provided you with a definition, you should apply their plain and ordinary meaning.

CLAIM TERM	COURT'S CONSTRUCTION
Transmitter	Radio frequency transmitter
Receiver	Radio frequency receiver
Controller	Electronic circuitry that performs one or more control functions
Data communication bus	Wired connection for communication of digital messages among vehicle devices, with each message including one or more device addresses
Multi-vehicle compatible controller	Electronic circuitry that performs one or more control functions, and can operate with more than one vehicle
Command signal	Signal generated on the data communications bus for operating a vehicle device
Device codes	Signal from a vehicle device
Enabling data	Data related to the at least one corresponding vehicle device code for use by said multi-vehicle compatible controller
Programming instructions	Code which instructs the controller to perform an operation

JURY INSTRUCTION NO. 10

I will now instruct you as to the rules you must follow when deciding whether Omega has proven that CalAmp infringed any of the claims of the Omega patents.

Patent law gives the owner of a valid patent the right to exclude others from importing, making, using, offering to sell, or selling the patented invention within the United States during the term of the patent. Any person or business entity that has engaged in any of those acts without the patent owner's permission infringes the patent. Here, Omega alleges that CalAmp's LMU-3000, LMU-3030, LMU-3050, vpod, and vpod2 infringe the asserted claims of the Omega patents.

In deciding the issue of infringement, you must compare the CalAmp accused products to the claims of the Omega patents.

A patent may be infringed directly or indirectly. As explained further in the following instructions, direct infringement results if the accused product is covered by at least one claim of the patent. Indirect infringement results if the defendant induces another to infringe a patent or contributes to the infringement of a patent by another.

JURY INSTRUCTION NO. 11

In this case, Omega asserts that CalAmp has directly infringed the patent. CalAmp is liable for directly infringing Omega's patent if you find that Omega has proven that it is more likely than not that CalAmp made, used, imported, offered to sell, or sold the invention defined in at least one claim of Omega's patent.

Someone can directly infringe a patent without knowing of the patent or without knowing that what they are doing is an infringement of the patent. They also may directly infringe a patent even though they believe in good faith that what they are doing does not infringe a patent or if they believe in good faith that the patent is invalid.

JURY INSTRUCTION NO. 12

To determine literal infringement, you must compare the accused products with each claim that Omega asserts is infringed, using my instructions as to the meaning of the patent claims.

A patent claim is literally infringed only if CalAmp's products include each and every element in that patent claim. If CalAmp's products do not contain one or more elements recited in a claim, CalAmp does not literally infringe that claim.

You must determine literal infringement with respect to each patent claim of the '876, '885, '727 and '278 patents individually.

The accused product should be compared to the invention described in each patent claim it is alleged to infringe. The same element of the accused product may satisfy more than one element of a claim.

JURY INSTRUCTION NO. 13

In this case, CalAmp is accused of actively inducing its customers to directly infringe Omega's patent. To find that CalAmp actively induced infringement, it is not necessary to show that CalAmp personally infringed, provided: (a) a single actor is responsible for direct infringement, namely, all of the components or steps of the product or method accused of infringing the patent; and (2) CalAmp actively induced these acts of infringement by its another entity. If you do not find that there is direct infringement by a single actor, or if you do not find that CalAmp actively induced these acts, you must find that CalAmp did not induce infringement of the patents.

To prove active infringement, Omega must establish it is more likely than not that:

1. CalAmp aided, instructed, or otherwise acted with the intent to cause acts by CalAmp's customers that would constitute direct infringement of the patent;
2. CalAmp knew of the patent, or showed willful blindness to the existence of the patent, at that time;
3. CalAmp knew, or showed willful blindness that it consciously ignored the possibility that CalAmp's customers would infringe at least one claim of the patent; and
4. CalAmp's customers infringed at least one patent claim.

To find willful blindness: (1) CalAmp must have subjectively believed that there was a high probability that a patent existed covering the accused CalAmp

products and (2) CalAmp must have taken deliberate actions to avoid learning of the patent.

JURY INSTRUCTION NO. 14

There are two different types of claims in the patent. One type is called an independent claim. The other is called a dependent claim.

An independent claim does not refer to any other claim of the patent. An independent claim must be read separately from the other claims to determine the scope of the claim. An "independent claim" sets forth all of the requirements that must be met in order to be covered by that claim.

A dependent claim is a claim that refers to at least one other claim in the patent. A dependent claim includes all of the elements of the claim to which the dependent claim refers, as well as the elements recited in the dependent claim itself.

To establish literal infringement of a dependent claim, Omega must show that it is more likely than not that the CalAmp's products or methods include each and every element of the independent claim and the dependent claim.

If you find that the independent claim from which the dependent claim depends is not literally infringed, then you must find that the dependent claim is also not literally infringed.

JURY INSTRUCTION NO. 15

CalAmp contends that the asserted claims of the patents-in-suit are invalid. CalAmp must prove by clear and convincing evidence that each asserted claim is invalid.

Claims of an issued patent may be found to be invalid. Thus, you must determine whether each of Omega's claims is invalid.

CalAmp contends that the patents-in-suit are invalid as obvious in light of prior art such as products, publications, and/or patents publicly known or available prior to the asserted patents.

I will now instruct you in more detail why CalAmp alleges that the asserted claims of Omega's patents are invalid.

JURY INSTRUCTION NO. 16

Prior art includes any of the following items received into evidence during trial:

1. any product or method that was publicly known or used by others in the United States before the patented invention was made;

2. patents that issued more than one year before the filing date of the patent, or before the invention was made;

3. publications having a date more than one year before the filing date of the patent, or before the invention was made;

4. any product or method that was in public use or on sale in the United States more than one year before the patent was filed;

5. any product or method that was made by anyone before the named inventors created the patented product or method where the product or method was not abandoned, suppressed, or concealed.

JURY INSTRUCTION NO. 17

This case involves two types of patent claims: independent claims and dependent claims.

An independent claim does not refer to any other claim of the patent. An independent claim must be read separately from the other claims to determine the scope of the claim. An "independent claim" sets forth all of the requirements that must be met in order to be covered by that claim.

A dependent claim is a claim that refers to at least one other claim in the patent. A dependent claim includes all of the elements of the claim to which the dependent claim refers, as well as the elements recited in the dependent claim itself.

In this case, claim 1 of the '876 patent; claim 1 of the '885 patent; claim 1 of the '727 patent; and claims 1, 13, and 18 of the '278 patent are each independent claims.

You must evaluate the invalidity of each asserted claim separately. Even if an independent claim is invalid, this does not mean that the dependent claims that depend from it are automatically invalid. Rather, you must consider the validity of each claim, separately. You must decide this issue of validity on a claim-by-claim basis. However, if you find that a dependent claim is invalid, then you must find that the independent claim from which it depends is also invalid. The dependent claim includes all of the elements of the independent claim from which it depends.

JURY INSTRUCTION NO. 18

The question of invalidity of a patent claim is determined from the perspective of a person of ordinary skill in the art in the field of the asserted invention.

You must determine the level of ordinary skill in the field of the invention. The higher the level of ordinary skill, the easier it may be to establish that an invention would have been obvious. Persons having a greater level of education, training, or experience in the field will more readily appreciate technical details that may be more challenging for persons having a lower level of skill. On the other hand, persons having a lower level of skill may not perceive as obvious technical details that would be apparent to persons having greater skill. In order to determine the obviousness of the invention you will be asked to determine what the ordinary level of skill was in the field of the invention. Regardless whether you decide to articulate in your verdict what you believe was the level of ordinary skill in the field of the invention, you must consider and assess this factor before reaching your conclusion in this case.

JURY INSTRUCTION NO. 19

In order to qualify as prior art, a printed publication must have been maintained in some tangible form, such as printed pages, typewritten pages, magnetic tape, microfilm, photographs, internet publication, photocopies, and must have been sufficiently accessible to persons interested in the subject matter of its contents.

Information is publicly accessible if it was distributed or otherwise made available to the extent that persons interested and ordinarily skilled in the subject matter exercising reasonable diligence can locate it. It is not necessary for the printed publication to have been available to every member of the public. An issued patent is a printed publication. A published patent application is a printed publication as of its publication date.

The disclosure of the claimed invention in the printed publication must be complete enough to enable one of ordinary skill in the art to use the invention without undue experimentation. In determining whether the disclosure is enabling, you should take into account what would have been within the knowledge of a person of ordinary skill in the art one year before the application for the patent was filed, and you may consider evidence that sheds light on the knowledge such a person would have had.

JURY INSTRUCTION NO. 20

CalAmp contends the asserted claims of the Omega's patents are invalid as "obvious."

A claimed invention is invalid as "obvious" if it would have been obvious to a person of ordinary skill in the art of the claimed invention at the time the invention was made. Unlike anticipation, which allows consideration of only one item of prior art, obviousness may be shown by considering more than one item of prior art.

In deciding obviousness, you must avoid using hindsight; that is, you should not consider what is known today or what was learned from the teachings of the patent. You should not use the patent as a road map for selecting and combining items of prior art. You must put yourself in the place of a person of ordinary skill in the art at the time the invention was made.

The following factors must be evaluated to determine whether CalAmp has established that the claimed invention(s) is obvious:

1. the scope and content of the prior art relied upon by CalAmp;
2. the difference or differences, if any, between each claim of the patents that CalAmp contends is obvious and the prior art;
3. the level of ordinary skill in the art at the time the invention of the patent was made; and
4. additional considerations, if any, that indicate that the invention was obvious or not obvious.

Each of these factors must be evaluated, although they may be analyzed in any order, and you must perform a separate analysis for each of the claims.

CalAmp must prove by clear and convincing evidence that the invention would have been obviousness.

I will now explain each of the four factors in more detail.

JURY INSTRUCTION NO. 21

You must determine what is the prior art that may be considered in determining whether any claim of the Omega patents is obvious. A prior art reference may be considered if it discloses information designed to solve any problem or need addressed by the patent or if the reference discloses information that has obvious uses beyond its main purpose that a person of ordinary skill in the art would reasonably examine to solve any problem or need addressed by the patent.

JURY INSTRUCTION NO. 22

You should analyze whether there are any relevant differences between the prior art and the claimed invention from the view of a person of ordinary skill in the art at the time of the invention. Your analysis must determine the impact, if any, of such differences on the obviousness or nonobviousness of the invention as a whole, and not merely some portion of it.

In analyzing the relevance of the differences between the claimed invention and the prior art, you do not need to look for precise teaching in the prior art directed to the subject matter of the claimed invention. You may take into account the inferences and creative steps that a person of ordinary skill in the art would have employed in reviewing the prior art at the time of the invention. For example, if the claimed invention combined elements known in the prior art and the combination yielded results that were predictable to a person of ordinary skill in the art at the time of the invention, then this evidence would make it more likely that the claim was obvious. On the other hand, if the combination of known elements yielded unexpected or unpredictable results, or if the prior art teaches away from combining the known elements, then this evidence would make it more likely that the claim that successfully combined those elements was not obvious.

Importantly, a claim is not proved obvious merely by demonstrating that each of the elements was independently known in the prior art. Most, if not all, inventions rely on building blocks long known, and claimed discoveries almost of necessity will likely be combinations of what is already known. Therefore, you should consider whether a reason existed at the time of the invention that would

have prompted a person of ordinary skill in the art in the relevant field to combine the known elements in the way the claimed invention does. The reason could come from the prior art, the background knowledge of one of ordinary skill in the art, the nature of any problem or need to be addressed, market demand, or common sense. You may also consider whether the problem or need was known, the possible approaches to solving the problem or addressing the need were known and finite, and the solution was predictable through use of a known option.

If you find that a reason existed at the time of the invention to combine the elements of the prior art to arrive at the claimed invention, this evidence would make it more likely that the claimed invention was obvious. Again, you must undertake this analysis separately for each claim that CalAmp contends is obvious.

JURY INSTRUCTION NO. 23

The determination of whether a claimed invention is obvious is based on the perspective of a person of ordinary skill in the art. The person of ordinary skill is presumed to know all prior art that you have determined to be reasonably relevant. The person of ordinary skill is also a person of ordinary creativity that can use common sense to solve problems.

When determining the level of ordinary skill in the art, you should consider all the evidence submitted by the parties, including evidence of:

1. the level of education and experience of persons actively working in the field at the time of the invention, including the inventor;
2. the types of problems encountered in the art at the time of the invention; and
3. the sophistication of the technology in the art at the time of the invention, including the rapidity with which innovations were made in the art at the time of the invention.

JURY INSTRUCTION NO. 24

Before deciding the issue of obviousness, you must also consider certain factors, which may help to determine whether or not the invention would not have been obvious. No factor alone is dispositive, and you must consider the obviousness or nonobviousness of the invention as a whole.

1. Were accused products covered by the claim commercially successful due to the merits of the claimed invention rather than due to advertising, promotion, salesmanship, or features of the product other than those found in the claim?

2. Was there long felt need for a solution to the problem facing the inventors, which was satisfied by the claimed invention?

3. Did others try, but fail, to solve the problem solved by the claimed invention?

4. Did others copy the claimed invention?

5. Did the claimed invention achieve unexpectedly superior results over the closest prior art?

6. Did others in the field, praise the claimed invention or express surprise at the making of the claimed invention?

7. Did others accept licenses under patents because of the merits of the claimed invention?

Answering all, or some, of these questions "yes" may suggest that the claim was not obvious. Answering all, or some, of these questions "no" may suggest that the claims would have been obvious. These factors are relevant only if there is a connection, or nexus, between the factor and the invention covered by the patent claims. Even if you conclude that some of the above indicators have been established, those factors should be considered along with all the other evidence

in the case in determining whether CalAmp has proven that the claimed invention would have been obvious.

JURY INSTRUCTION NO. 25

If you find that the accused device infringes any of the claims of the Omega patents, and that those claims are not invalid, you must determine the amount of damages to be awarded Omega for the infringement. On the other hand, if you find that each of the asserted patent claims is either invalid or is not infringed, then you need not consider damages in your deliberations.

Omega must prove each element of its damages – including the amount of the damages – by a preponderance of the evidence which means more likely true than not.

If proven by the Omega, damages must be in an amount adequate to compensate Omega for the infringement. The purpose of a damage award is to put Omega in about the same financial position it would have been in if the infringement had not happened. But, the damage award cannot be less than a reasonable royalty. You may not add anything to the amount of damages to punish an accused infringer or to set an example. You also may not add anything to the amount of damages for interest.

The fact that I am instructing you on damages does not mean that the Court believes that one party or the other should win in this case. My instructions about damages are for your guidance only in the event you find in favor of Omega. You will need to decide the issue of damages only if you find that one or more of the asserted claims are both not invalid and infringed.

JURY INSTRUCTION NO. 26

The date that Omega first notified CalAmp of its claim for patent infringement is the date for the start of damages. The parties do not agree on that date, and it is up to you to determine what that date is. Omega must prove that it is more likely than not that the CalAmp actually was notified of the claim for patent infringement as of the date alleged by Omega.

JURY INSTRUCTION NO. 27

The patent law provides that the amount of damages that CalAmp should pay Omega for infringing Omega's patents must be enough to compensate for the infringement, but may not be less than a reasonable royalty for the use of Omega's invention.

You must award Omega a reasonable royalty in the amount that the Omega has proved. A royalty is a payment made to a patent owner by someone else in exchange for the rights to make, use, sell, or import a patented product.

The reasonable royalty award must be based on the incremental value that the patented invention adds to the end product. When the infringing products have both patented and unpatented features, measuring this value requires a determination of the value added by the patented features. The ultimate combination of royalty base and royalty rate must reflect the value attributable to the infringing features of the product, and no more.

JURY INSTRUCTION NO. 28

A reasonable royalty is the royalty that would have resulted from a hypothetical license negotiation between Omega and CalAmp. Of course, we know that they did not agree to a license and royalty payment. But, in order to decide on the amount of reasonable royalty damages, you should assume that that the parties did negotiate a license just before the infringement began. This is why it is called a "hypothetical" license negotiation. You should assume that both parties to the hypothetical negotiation understood that the patent was valid and infringed and both were willing to enter into a license. You should also presume that the parties had full knowledge of the facts and circumstances surrounding the infringement at the time of the hypothetical negotiation.

JURY INSTRUCTION NO. 29

In determining the amount of a reasonable royalty, you may consider evidence on any of the following factors, in addition to any other evidence presented by the parties on the economic value of the patent:

1. Any royalties received by the licensor for the licensing of the patent-in-suit, proving or tending to prove an established royalty.

2. The rates paid by CalAmp to license other patents comparable to the patents in suit.

3. The nature and scope of the license, as exclusive or non-exclusive, or as restricted or non-restricted in terms of its territory or with respect to whom the manufactured product may be sold.

4. The licensor's established policy and marketing program to maintain its right to exclude others from using the patented invention by not licensing others to use the invention, or by granting licenses under special conditions designed to preserve that exclusivity.

5. The commercial relationship between the licensor and the licensee, such as whether or not they are competitors in the same territory in the same line of business.

6. The effect of selling the patented product in promoting sales of other products of the licensee; the existing value of the invention to the licensor as a generator of sales of its non-patented items; and the extent of such collateral sales.

7. The duration of the patents and the term of the license.

8. The established profitability of the product made under the patents in suit; its commercial success; and its current popularity.

9. The utility and advantages of the patented invention over the old modes or devices, if any that had been used for achieving similar results.

10. The nature of the patented invention; the character of the commercial embodiment of it as owned and produced by the licensor; and the benefits to those who have used the invention.

11. The extent to which CalAmp has made use of the invention; and any evidence that shows the value of that use.

12. The portion of the profit or of the selling price that may be customary in the particular business or in comparable businesses to allow for the use of the invention or analogous inventions.

13. The portion of the profit that arises from the patented invention itself as opposed to profit arising from unpatented features, such as the manufacturing process, business risks, or significant features or improvements added by the accused infringer.

14. The opinion testimony of qualified experts.

15. The amount that a licensor and a licensee (such as CalAmp) would have agreed upon (at the time the infringement began) if both sides had been reasonably and voluntarily trying to reach an agreement; that is, the amount which a prudent licensee—who desired, as a business proposition, to obtain a license to manufacture and sell a particular article embodying the patented invention—would have been willing to pay as a royalty and yet be able to make a reasonable profit and which amount would have been acceptable by a patentee who was willing to grant a license.

16. Any other economic factor that a normally prudent business person would, under similar circumstances, take into consideration in negotiating the hypothetical license.

JURY INSTRUCTION NO. 30

Although the relevant date for the hypothetical license negotiation is just before the infringement began, you may consider evidence relating to events after the infringement began, any actual profits made by CalAmp due to its infringement and any commercial success of the patented invention or the infringing products after that date.

JURY INSTRUCTION NO. 31

When determining a reasonable royalty, you may consider evidence concerning the amounts that other parties have paid for rights to the patents in question, or for rights to similar technologies. A license agreement must not be perfectly comparable to a hypothetical license that would be negotiated between Omega and CalAmp in order for you to consider it. However, if you choose to rely upon evidence from any other license agreements, you must account for any differences between those licenses and the hypothetically negotiated license between Omega and CalAmp, in terms of the technologies and economic circumstances of the contracting parties, when you make your reasonable royalty determination.

JURY INSTRUCTION NO. 32

If you find that it is more likely than not that CalAmp infringed Omega's patent, then you must also determine whether or not Calamp's infringement was willful. In contrast to proving that infringement is more likely than not, Omega must prove willfulness by clear and convincing evidence. Willfulness requires clear and convincing evidence that:

1. CalAmp acted despite an objectively high likelihood that its actions infringed a valid patent, and
2. This objectively high likelihood of infringement was either known or so obvious that it should have been known to CalAmp.

In making the determination of whether CalAmp acted despite an objectively high likelihood that its actions infringed a valid patent, you are to consider what a reasonable person would have believed and are not to consider CalAmp's actual state of mind.

In determining whether CalAmp knew of the objectively high likelihood of infringement or whether the likelihood was so obvious that CalAmp should have known of that likelihood, you must consider the totality of the circumstances. The totality of the circumstances comprises a number of factors, which include, but are not limited to, whether CalAmp intentionally copied the claimed invention or a product covered by patent, whether CalAmp relied on competent legal advice, and whether CalAmp presented a substantial defense to infringement, including the defense that the patent is invalid.

JURY INSTRUCTION NO. 33

Of course, the fact that I have given you instructions concerning the issue of Omega's damages should not be interpreted in any way as an indication that I believe that the Omega should, or should not, prevail in this case.

Your verdict must be unanimous—in other words, you must all agree. Your deliberations are secret, and you'll never have to explain your verdict to anyone.

Each of you must decide the case for yourself, but only after fully considering the evidence with the other jurors. So you must discuss the case with one another and try to reach an agreement. While you're discussing the case, don't hesitate to reexamine your own opinion and change your mind if you become convinced that you were wrong. But don't give up your honest beliefs just because others think differently or because you simply want to get the case over with.

Remember that, in a very real way, you're judges— judges of the facts. Your only interest is to seek the truth from the evidence in the case.

JURY INSTRUCTION NO. 34

When you get to the jury room, choose one of your members to act as foreperson. The foreperson will direct your deliberations and speak for you in court.

A verdict form has been prepared for your convenience.

[Explain verdict]

Take the verdict form with you to the jury room. When you've all agreed on the verdict, your foreperson must fill in the form, sign it and date it. Then you'll return it to the courtroom.

If you wish to communicate with me at any time, please write down your message or question and give it to the court security officer. The court security officer will bring it to me and I'll respond as promptly as possible – either in writing or by talking to you in the courtroom. Please understand that I may have to talk to the lawyers and the parties before I respond to your question or message, so you should be patient as you await my response. But I caution you not to tell me how many jurors have voted one way or the other at that time. That type of information should remain in the jury room and not be shared with anyone, including me, in your note or question.

Electronic Acknowledgement Receipt

EFS ID:	30397804
Application Number:	90013851
International Application Number:	
Confirmation Number:	8717
Title of Invention:	Vehicle Tracking Unit with Downloadable Codes and Associated Methods
First Named Inventor/Applicant Name:	8032278
Correspondence Address:	CHRISTOPHER F. REGAN, ESQUIRE ALLEN, DYER, DOPPELT, MILBRATH & GILCHRIST, P.A. P. O. BOX 3791 - ORLANDO FL 32802-3791 US 407-841-2330 -
Filer:	Jack G. Abid/sheryllee scheibe
Filer Authorized By:	Jack G. Abid
Attorney Docket Number:	C13-03896.RE2
Receipt Date:	18-SEP-2017
Filing Date:	28-OCT-2016
Time Stamp:	17:08:27
Application Type:	Reexam (Patent Owner)

Payment information:

Submitted with Payment	no

File Listing:

Document Number	Document Description	File Name	File Size(Bytes)/ Message Digest	Multi Part /.zip	Pages (if appl.)
1		ss58106rex2resp.pdf	1346531 cda3bc9d4c24bf9ef14d65a70f624dd2fcca53a7	yes	41

Multipart Description/PDF files in .zip description		
Document Description	**Start**	**End**
Amendment/Req. Reconsideration-After Non-Final Reject	1	1
Claims	2	7
Applicant Arguments/Remarks Made in an Amendment	8	40
Reexam Certificate of Mailing	41	41

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Miscellaneous Incoming Letter	7	33
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Miscellaneous Incoming Letter	42	51
Miscellaneous Incoming Letter	52	368
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If a new application is being filed and the application includes the necessary components for a filing date (see 37 CFR 1.53(b)-(d) and MPEP 506), a Filing Receipt (37 CFR 1.54) will be issued in due course and the date shown on this Acknowledgement Receipt will establish the filing date of the application.

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If a timely submission to enter the national stage of an international application is compliant with the conditions of 35 U.S.C. 371 and other applicable requirements a Form PCT/DO/EO/903 indicating acceptance of the application as a national stage submission under 35 U.S.C. 371 will be issued in addition to the Filing Receipt, in due course.

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If a new international application is being filed and the international application includes the necessary components for an international filing date (see PCT Article 11 and MPEP 1810), a Notification of the International Application Number and of the International Filing Date (Form PCT/RO/105) will be issued in due course, subject to prescriptions concerning national security, and the date shown on this Acknowledgement Receipt will establish the international filing date of the application.

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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
90/013,851	10/28/2016	8032278	C13-03896.RE2	8717

7590 07/19/2017

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EXAMINER	
REICHLE, KARIN M	

ART UNIT	PAPER NUMBER
3992	

MAIL DATE	DELIVERY MODE
07/19/2017	PAPER

Please find below and/or attached an Office communication concerning this application or proceeding.

The time period for reply, if any, is set in the attached communication.

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EX PARTE REEXAMINATION COMMUNICATION TRANSMITTAL FORM

REEXAMINATION CONTROL NO. *90/013,851*.

PATENT NO. *8032278*.

ART UNIT *3992*.

Enclosed is a copy of the latest communication from the United States Patent and Trademark Office in the above identified *ex parte* reexamination proceeding (37 CFR 1.550(f)).

Where this copy is supplied after the reply by requester, 37 CFR 1.535, or the time for filing a reply has passed, no submission on behalf of the *ex parte* reexamination requester will be acknowledged or considered (37 CFR 1.550(g)).

Karin M. Reichle

PTOL-465 (Rev.07-04)

Primary Examiner

Art Unit: 3992

DETAILED ACTION

Introduction:

This Office Action addresses the *ex parte* reexamination of claims 1-22 of U.S. Patent No. 8,032,278 (hereinafter also referred to as '278) issued to Flick for which a Substantial New Question of Patentability has been deemed to exist. The status of the claims is as follows:

Claims 1-22 are rejected.

Patents, Non-Patent Literature, Other Evidence:

(1) U.S. Patent No. **5,732,074** to **Spaur et al**, published March 24, 1998, filed January 26, 1996 (hereinafter also referred to as '**074** or **Spaur**).

(2) U.S. Patent No. **6,028,537** to **Suman et al**, published February 22, 2000, filed June 3, 1997 (hereinafter also referred to as **'537** or **Suman**).

(3) U.S. Patent No. **6,330,499** to **Chou et al**, published December 11, 2001, filed July 21, 1999 (hereinafter also referred to as **'499** or **Chou**).

Response to Arguments and Declarations

Declaration under 37 CFR 1.132

The declaration under 37 CFR 1.132 filed June 12, 2017, and accompanying exhibits, hereinafter referred to as the declaration, have been received. Such declaration under 37 CFR 1.132 has been considered but is ineffective to overcome the rejection of claims, see Response to Arguments section *infra*.

Response to Arguments

The Remarks filed June 12, 2017, hereinafter referred to as the Remarks or the Response, have been received. Such remarks, and accompanying exhibits, have also been considered in their entirety but are not persuasive for the reasons discussed below.

Related Litigation:

Patent Owner's (hereinafter also referred to as PO) discussion of the related litigation, pages 8-10, including Exhibits 1-3, has been noted and considered. See MPEP 2259 and thereby 2242, III and 2286. See also Secondary Considerations of Non-Obviousness section and Claim Construction section *infra*. See also 3/29/2017 Search Notes.

The First Reexamination

PO's discussion of the first reexam '587, pages 10-11, has been noted and considered. With regard to the last two paragraphs thereof see MPEP 2242, II, 2258.01, the December 15, 2016 Order, pages 42-46 and pages 5-23 as well as the cited page 41 and the March 29, 2017 Office Action.

Other Related Reexaminations

PO's discussion of the related reexaminations, pages 11-12, has been noted and considered. See 3/29/2017 Search Notes as well as the Search Notes accompanying this Office Action. It is noted that the Chou '499 reference is not of record in any of the related copending reexaminations.

Pending Claim

PO's presentation of the pending claims 1, 13 and 18, pages 12-13, has been noted and considered.

Claim Construction

PO's discussion of the construction of the claims, pages 13-16, has been noted and considered.

First, see MPEP 2258, 1, G, and MPEP 2181, I, third paragraph and 2181, I, C, fourth paragraph (i.e. the lack of the explicit use of the terminology "means" creates a rebuttable presumption that 112, sixth paragraph, does not apply) and pages 2-20 of the 3/29/2017 Office Action (rebuttal of the presumption), especially the paragraph bridging pages 2-3, and the discussions of "*3-Prong Analysis Prong (A)*" of the various specific phrases, and pages 15-20

with regard to the phrase "a downloading interface….controller". Attention is also invited to the prosecution history of copending reexaminations 90/013659 and 90/013832 with regard to claim language interpretation.

Second, it is further noted that the agreed construction of the claim term "Multi-vehicle compatible controller" during the related litigation was "[e]lectronic circuitry that performs one or more control function, and can operate with more than one vehicle". In other words electronic circuitry that has the capability to operate with at least two vehicles but those vehicles do not have to be of different models and/or from different manufacturers, i.e. could be of the same make and model from the same manufacturer. See again the paragraph bridging pages 2-3 of the 3/29/2017 Office Action. Note also the discussion of the patentability of the pending claims *infra*.

Finally, PO merely concludes with:

> The Patent Owner disagrees with the Examiner's assertion that any of the claim terms should be construed in accordance with §112, 6th paragraph for the first time now. The Patent Owner notes that there are differences between the Examiner's claim interpretations under §112, 6th paragraph, and Patent Owner's asserted interpretations consistent with the Court, but believes these differences are not likely material for purposes of this Response.

However PO does not set forth any specifics as to why the claim terms should not be construed in accordance with 112, 6th paragraph nor what the asserted differences are regardless of whether such are "material for the purposes of this Response".

Note also the discussion with regard to the declaration *infra*.

Claim Patentability-Multi-Vehicle Compatible Controller

PO's discussion of the recitation "a multi-vehicle compatible controller to be coupled to the vehicle data bus for communication thereover with at least one vehicle device using at least one corresponding vehicle device code from among a plurality thereof for different vehicles", pages 16-19, has been noted and considered.

Examiner respectfully disagrees with PO. As best understood, PO asserts/concludes (following a quotation of a portion of Chou (col. 4, lines 20-38 were reproduced) and an excerpt of part of page 26 of the 3/29/2017 Office Action) that Chou fails to disclose the recited controller because there is a lack of vehicle code compatibility among vehicles of different manufacturers and in some cases, even between different "products" of the same manufacturer which lack was discussed by SAE 3000 and the problem addressed by the '278 patent. However such assertions/conclusions are not commensurate with the terms of the claim/recited feature itself and/or such terms given the broadest reasonable interpretation consistent with the specification but not reading limitations in the specification into the claims, the teachings of Chou and/or the 3/29/2017 Office Action.

First, the language of the phrase does not require compatibility among vehicles of different manufacturers and/or different "product" lines of the same manufacturer. See the 3/29/2017 Office action at the paragraph bridging pages 2-3, i.e. "different vehicles" can be, e.g., same make and model with different trims (not different electronics). Note also pages 10-15 and 24-26, in their entirety, of the 3/29/2017 Office Action as well as the discussion in Claim Interpretation section *supra* (note even the Markman Order shows "multi-vehicle compatible

controller" was construed as electronic circuitry that "can operate with more than one vehicle", not vehicles of different manufacturers and/or different "product" lines of the same manufacturer). Continuing, the phrase, see again the 3/29/2017 Office Action at page 13, as construed does not require the corresponding structure (e.g. circuitry, memory, CPU) simultaneously store codes of vehicles of different manufacturers and/or different "product" lines of the same manufacturer and/or be capable of using any of such stored codes from vehicles of different manufacturers and/or different "product" lines of the same manufacturer. The phrase requires of corresponding structure merely the capability of using at least one code from among a plurality thereof for "different vehicles", see again the 3/29/2017 Office action bridging pages 2-3 and 24-26, i.e. teaching of such a capability by '499, i.e. capable of using a code from among a plurality thereof, i.e. model dependent.

Note also the discussion with regard to the declaration *infra*.

Claim Patentability-Downloading Interface

PO's discussion of the recitation "a downloading interface for permitting downloading of enabling data related to the at least one corresponding vehicle device code for use by said multi-vehicle compatible controller", pages 20-22, has been noted and considered.

Examiner respectfully disagrees with PO. As best understood, PO asserts/concludes, (after quotations of the pertinent claim language and portions of pages 18 and 27 of the 3/39/2019 Office Action and a reproduction of Figure 5 of '499) that Chou does not discuss the

recited feature but instead merely discloses passing data between the in-vehicle system and the remote service center. However such assertions/conclusions are not commensurate with the terms of the claim itself and/or such terms given the broadest reasonable interpretation consistent with the specification but not reading limitations in the specification into the claims, the teachings of Chou and/or the 3/29/2017 Office Action.

First see pages 15-17 as well as the cited page 18 of the 3/29/2017 Office Action with regard to the interpretation of the claim phrase. It is again noted such phrase recites the function or capability of the corresponding structure as "permitting downloading of enabling data **related to** the at least one corresponding vehicle device **code** for use by *said multi-vehicle compatible controller*". Attention is again invited to the discussion in the Claim Patentability-Multi-Vehicle Compatible Controller section *supra*. Second, see again pages 26, 28 and 38-40 of the 3/29/2017 Office action as well as the cited page 27. PO's conclusions do not discuss the entirety of the rejection, i.e. all the cited portions of Chou, e.g. col. 9, lines 35-45, col. 4, lines 15-38, col. 10, lines 1-11, with regard to the corresponding structure and function/capability of the functional phrase.

Note also the discussion with regard to the declaration *infra*.

Claim Patentability-Teachings of Chou

PO's discussion of Chou teaching away from the invention, pages 22-25, which relies on the same portions of '278 cited in paragraph 17 of the declaration, has been noted and considered but are not persuasive.

Again PO's assertions/conclusions are not commensurate with the terms of the claim itself and/or such terms given the broadest reasonable interpretation consistent with the specification but not reading limitations in the specification into the claims. See again the prior discussion of the multi-vehicle compatible controller and downloading interface, i.e. the claim language does not require specifics (e.g. on-board structure with the ability to work with different vehicles having different codes, i.e. simultaneous storage data/codes of vehicles from different manufacturers and/or different models and use of such codes) as asserted, as best understood.

Note also the discussion with regard to the declaration *infra*.

Secondary Considerations

PO's discussion of secondary considerations, pages 22-25, which relies on the declaration, paragraph 19 and Exhibit 1 (Jury Verdict Form) and Exhibit 2 (The Final Order) and Exhibit 3 (The Final Judgement) and excerpts of testimony (Stephen Hall and Peter Hergesheimer), has been noted and considered but are not persuasive.

First, to be of probative value, evidence of secondary considerations must be related to the claimed invention, i.e. a nexus between the invention as claimed and evidence of the

secondary consideration. As discussed *supra*, the claimed invention as discussed by PO is not commensurate with the invention as claimed. Second, with regard to the litigation evidence relied upon, see again MPEP 2259. See also discussion of the declaration *infra*. Third, PO asserts litigation evidence (testimony/trial transcript, exhibits, instructions, see, e.g., page 26, first full paragraph, page 26, second to last line-page 27, line 12, page 28, line 4-page 30, last line, section 3 on page 31 and the testimony excerpts bridging pages 32-37) for the conclusions regarding the secondary considerations. However such referenced testimony/trial transcript, exhibits, instructions are not of record, e.g. jury instructions, or only partially of record, e.g. excerpts of testimony of trial transcript, as best understood. Finally PO asserts the declaration for the conclusions regarding the secondary considerations. However see the discussion of the declaration *infra*. Note also the evidence of record is silent with regard to the Chou '499 reference.

Declaratory Evidence

Section I, paragraphs 1-6, with regard to Background have been noted.

Section II, The '278 Patent and Current Office Action, paragraphs 7-9, with regard to evidence reviewed (e.g. "the related litigation trial transcript and exhibits", the statements of the statutory grounds of the pending rejections and the declarant's presentation of "representative" claims 1, 13 and 18 recitations) have been noted. As best understood from the identification of "the related litigation trial transcript and exhibits", such are not of record or only partly of record. See again the Secondary Considerations section *supra*.

Section III, The Prior Art Analysis, paragraphs 10-17, (declarant's understanding of what Chou and SAE HS-3000 disclose, declarant's understanding of Examiner's interpretation and prior art position with regard to "down loading interface", declarant's "opinion" that Chou "fails to disclose the multi-vehicle compatible controller and downloading interface of the claimed vehicle tracking unit, as these claim recitations are interpreted by the Examiner" and declarant's "opinion" that "Chou teaches away from the claimed invention" including citations to columns and lines of '278) have been noted. However, declarant's understanding of the Examiner's interpretation/positions, as best understood (merely portions thereof reproduced without reference to, i.e. page, line nos/the pertinent portions of the 3/29/2017 Office action) and/or declarant's "opinion" with regard to Chou's disclosure as to "claim recitations as interpreted by the Examiner" are merely conclusory. Declarant's "opinion" as to Chou teaching away is likewise conclusory (the cited portions as best understood are those of '499). See also the discussion supra of the multi-vehicle compatible controller and downloading interface of the claimed vehicle tracking unit.

Section IV, Evidence of Secondary Considerations, paragraphs 18-19 (including reliance on litigation evidence, i.e. Jury Verdict, The Final Judgement, portions of depositions, financial expert Reports), have been noted. Declarant's submissions regarding non-obviousness are merely conclusory. See the discussion in Secondary Considerations section *supra.* Again the evidence of non-obviousness (i.e. testimony/trial transcript, exhibits, instructions) are not of record, e.g. jury instructions, financial expert Reports, or only partially of record, e.g. excerpts of testimony of trial transcript, as best understood.

In conclusion neither the PO' remarks and/or the declaration are not effective to overcome the rejection of the claims as set forth in the 3/29/2017 Office Action.

Claim Interpretation/Analysis:

Lexicographic Definitions

See MPEP § 2111.01, IV and 2163.07(a). The original specification (col. 22, first full paragraph) incorporates by reference U.S. 6,011,460 with regard to the tracking device communicating with one or more other vehicle devices via a vehicle data communication bus which '460 at col. 6, lines 14-18 sets forth "As would be readily understood by those skilled in the art, the term different vehicles [sic] may include vehicles from different manufacturers, different models, or even different trim levels of the same make and model."

35 U.S.C. §112 Sixth Paragraph

"Means-plus function" language of a claim if meeting the 3-prong analysis set forth in MPEP 2181, I, "shall be construed to cover the corresponding structure, material, or acts described in the specification and equivalents thereof", see MPEP 2181, II. As also set forth in 2181, II, "If one employs means plus function language in a claim, one must set forth in the specification an adequate disclosure showing what is meant by that language", i.e. sets forth the structure, materials, or acts corresponding to a means- (or step-) plus-function.

Specifically:

> …examiners will apply 35 U.S.C. 112(f) or pre-AIA 35 U.S.C. 112, sixth paragraph to a claim limitation if it meets the following 3-prong analysis:

(A) the claim limitation uses the term "means" or "step" or a term used as a substitute for "means" that is a generic placeholder (also called a nonce term or a non-structural term having no specific structural meaning) for performing the claimed function;

(B) the term "means" or "step" or the generic placeholder is modified by functional language, typically, but not always linked by the transition word "for" (e.g., "means for") or another linking word or phrase, such as "configured to" or "so that"; and

(C) the term "means" or "step" or the generic placeholder is not modified by sufficient structure, material, or acts for performing the claimed function.

The Examiner concludes that claims 1-22 include a phrase or phrases that invokes/invoke 35 U.S.C. §112, 6th paragraph. For support of the Examiners conclusion the Examiner notes the following 3-prong analyses.

"a vehicle position determining device"

Analysis of Independent Claims 1, 13 and 18

The Examiner concludes the phrase "*a vehicle position determining device*," as recited in claims 1, 13 and 18, line 5, (Functional Phrase #1) invokes 35 U.S.C § 112, 6th paragraph. To support the Examiner's conclusion, the Examiner notes the following 3-Prong analysis:

a) 3-Prong Analysis Prong (A):

As an initial matter, the Examiner finds that Functional Phrase #1 does not use the term "means." The issue arising under Prong (A) then becomes whether or not the claimed phrase "device" is a generic placeholder for 'means'. *See MPEP 2181 I ¶3 and MPEP 2181 I (C) ¶4.*

The Examiner has reviewed the specification of '278 and finds: (1) insufficient evidence that '278 Patent lexicographically defines the phrase "device" as a particular structure for performing the entire claimed function; (2) insufficient evidence that '278 indicates that the phrase "device" refers to a particular structure in the art, that a person having ordinary skill in the art (PHOSITA) would recognize as a structure known to perform the entire claimed function. *See Williamson v. Citrix Online, L.L.C.,* 115 USPQ2d 1105, 1112 (Fed. Cir. 2015).

In addition the Examiner has reviewed the prior art and finds that while the phrase "device" can be a particular structure in the art, the Examiner finds insufficient evidence that the phrase "device" infers or requires any particular structure as related to the function of Functional Phrase #1.

Accordingly based upon a review of '278 itself and the prior art, the Examiner concludes that the phrase "device" as set forth in Functional Phrase #1 is being applied as a generic term/placeholder having no particular structure associated therewith as related to the entire claimed function. Because "device" is merely a generic placeholder having no specific structure associated therewith, the Examiner concludes that Functional Phrase #1 meets invocation Prong (A).

b) 3-Prong Analysis Prong (B):

Based upon a review of claims 1, 13 and 18 in '278, the Examiner finds that the function associated with Functional Phrase #1 is: "*vehicle position determining*" ('278 Patent, Claims 1, 13 and 18, line 5). *See MPEP 2181 I (B) ¶2.*

Because Functional Phrase #1 includes the function expressly noted above, the Examiner concludes that Functional Phrase #1 meets invocation Prong (B). Additionally, the Examiner notes that because nothing in the written description contradicts the plain language describing this function, the function within Functional Phrase #1 will have its ordinary and accustomed meaning.

c) 3-Prong Analysis: Prong (C)

Based upon a review of the entire Functional Phrase #1, the Examiner finds that Functional Phrase #1 does not contain sufficient structure for performing the entire claimed function that is set forth within Functional Phrase #1. In fact, the Examiner finds that Functional Phrase #1 recites very little structure (if any) for performing the claimed function.

Because Functional Phrase #1 does not contain sufficient structure for performing the entire claimed function, the Examiner concludes that Functional Phrase #1 meets invocation Prong (C).

d) Corresponding Structure

Based upon a review of the original disclosure, the Examiner finds that the corresponding structure for Functional Phrase #1 includes a device (42 in Figure 1, 112 in Figure 10) receiving multiple signals from spaced apart satellites (38 in Figure 1), e.g. a GPS receiver, or communications with the cellular telephone network, e.g. time of arrival techniques available based upon multiple reception paths to determine position via the cellular telephone network, or other satellite transmissions ('278 at col. 5, lines 15-26 and col. 23, lines 46-47 and 51-54) . Therefore the corresponding structure for Functional Phrase #1 is a receiver of communications/transmissions from satellites or cellular telephone networks for achieving the function.

Analysis of Dependent Claim 11

The Examiner concludes that dependent claim 11 modifies and/or adds to the structure of Functional Phrase #1 forming modified Functional Phrase #1. Accordingly the Examiner finds that the corresponding structure for modified Functional Phrase #1 is a GPS receiver of communications/transmissions with satellites for determining vehicle position.

Analysis of Other Dependent Claims

The Examiner finds that the dependent claims other than claim 11 do not modify the function of nor the corresponding structure for Functional Phrase #1.

"a wireless communications device"

Analysis of Independent Claims 1, 13 and 18

The Examiner concludes the phrase "*wireless communications device*" as recited in claims 1, 13 and 18, line 6, (Functional Phrase #2) invokes 35 U.S.C § 112, 6th paragraph. To support the Examiner's conclusion, the Examiner notes the following 3-Prong analysis:

a) 3-Prong Analysis Prong (A):

As an initial matter, the Examiner finds that Functional Phrase #2 does not use the term "means." The issue arising under Prong (A) then becomes whether or not the claimed phrase "device" is a generic placeholder for 'means'. *See MPEP 2181 I ¶3 and MPEP 2181 I (C) ¶4.*

The Examiner has reviewed the specification of '278 and finds: (1) insufficient evidence that '278 lexicographically defines the phrase "device" as a particular structure for performing the entire claimed function; (2) insufficient evidence that '278 indicates that the phrase "device" refers to a particular structure in the art, that a person having ordinary skill in the art (PHOSITA) would recognize as a structure known to perform the entire claimed function. *See Williamson v. Citrix Online, L.L.C.,* 115 USPQ2d 1105, 1112 (Fed. Cir. 2015).

In addition the Examiner has reviewed the prior art and finds that while the phrase "device" can be a particular structure in the art, the Examiner finds insufficient evidence that the phrase "device" infers or requires any particular structure as related to the function of Functional Phrase #2.

Accordingly based upon a review of '278 itself and the prior art, the Examiner concludes that the phrase "device" as set forth in Functional Phrase #2 is being applied as a generic term/placeholder having no particular structure associated therewith as related to the entire claimed function. Because "device" is merely a generic placeholder having no specific structure associated therewith, the Examiner concludes that Functional Phrase #2 meets invocation Prong (A).

b) 3-Prong Analysis Prong (B):

Based upon a review of claims 1, 13 and 18 in '278, the Examiner finds that the function associated with Functional Phrase #2 is: "*wireless communications*" ('278 Patent, Claims 1, 13 and 18, line 6.) *See MPEP 2181 I (B) ¶2.*

Because Functional Phrase #2 includes the function expressly noted above, the Examiner concludes that Functional Phrase #2 meets invocation Prong (B). Additionally, the Examiner notes that because nothing in the written description contradicts the plain language describing this function, the function within Functional Phrase #2 will have its ordinary and accustomed meaning.

c) 3-Prong Analysis: Prong (C)

Based upon a review of the entire Functional Phrase #2, the Examiner finds that Functional Phrase #1 does not contain sufficient structure for performing the entire claimed function that is set forth within Functional Phrase #2. In fact, the Examiner finds that Functional Phrase #2 recites very little structure (if any) for performing the claimed function.

Because Functional Phrase #2 does not contain sufficient structure for performing the entire claimed function, the Examiner concludes that Functional Phrase #2 meets invocation Prong (C).

d) Corresponding Structure

Based upon a review of the original disclosure, the Examiner finds that the corresponding structure for Functional Phrase #2 is a device (44 in Figure 1, 113 in Figures 10 and 12) configured to wirelessly transmit/communicate in a voice band or on a control channel, e.g. cellular phone transceiver, of a cellular network, over other networks, e.g. over satellite, or via wireless internet services ('278 at col. 5, lines 31-49 and col. 23, lines 47-48 and 55-58). Therefore the corresponding structure for Functional Phrase #2 is a transceiver for wirelessly communicating/transmitting in a voice band or on a control channel of a cellular network or over other networks, e.g. over satellite, or via wireless internet services.

Analysis of Dependent Claims

The Examiner finds that the dependent claims do not modify the function of nor the corresponding structure for Functional Phrase #2.

"a multi-vehicle compatible controller…"

Analysis of Independent Claims 1, 13 and 18

The Examiner concludes "*a multi-vehicle compatible controller for cooperating with said vehicle position determining device and said wireless communications device to send vehicle position information; said multi-vehicle compatible controller to be coupled to the vehicle data bus for communication thereover with at least one vehicle device using at least one corresponding vehicle device code from among a plurality thereof for different vehicles*"[1] as recited in claims 1, 13 and 18, lines 7-15, (Functional Phrase #3) invokes 35 U.S.C § 112, 6th paragraph. To support the Examiner's conclusion, the Examiner notes the following 3-Prong analysis:

a) 3-Prong Analysis Prong (A):

As an initial matter, the Examiner finds that Functional Phrase #3 does not use the term "means." The issue arising under Prong (A) then becomes whether or not the claimed phrase "device" is a generic placeholder for 'means'. *See MPEP 2181 I ¶3 and MPEP 2181 I (C) ¶4.*

The Examiner has reviewed the specification of '278 and finds: (1) insufficient evidence that '278 lexicographically defines the phrase "multi-vehicle compatible controller" as a particular structure for performing the entire claimed function; (2) insufficient evidence that '278 indicates that the phrase "multi-vehicle compatible controller" refers to a particular structure in the art, that a person having ordinary skill in the art (PHOSITA) would recognize as a structure known to perform the entire claimed function. *See Williamson v. Citrix Online, L.L.C.,* 115 USPQ2d 1105, 1112 (Fed. Cir. 2015).

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[1] Again the original specification (col. 22, first full paragraph) incorporates by reference U.S. 6,011,460 with regard to the tracking device communicating with one or more other vehicle devices via a vehicle data communication bus which at col. 6, lines 14-18 sets forth "As would be readily understood by those skilled in the art, the term different vehicles [sic] may include vehicles from different manufacturers, different models, or even different trim levels of the same make and model."

In addition the Examiner has reviewed the prior art and finds that while the phrase "multi-vehicle compatible controller" can be a particular structure in the art, the Examiner finds insufficient evidence that the phrase "device" infers or requires any particular structure as related to the function of Functional Phrase #3.

Accordingly based upon a review of '278 itself and the prior art, the Examiner concludes that the phrase "multi-vehicle compatible controller" as set forth in Functional Phrase #3 is being applied as a generic term/placeholder having no particular structure associated therewith as related to the entire claimed function. Because "multi-vehicle compatible controller" is merely a generic placeholder having no specific structure associated therewith, the Examiner concludes that Functional Phrase #3 meets invocation Prong (A).

b) 3-Prong Analysis Prong (B):

Based upon a review of claims 1, 13 and 18 in '278, the Examiner finds that the function associated with Functional Phrase #3 is: "*for cooperating with said vehicle position determining device and said wireless communications device to send vehicle position information"* and "*to be coupled to the vehicle data bus for communication thereover with at least one vehicle device using at least one corresponding vehicle device code from among a plurality thereof for different vehicles"* ('278 Patent, Claims 1, 13 and 18, lines 7-15).

Because Functional Phrase #3 includes the function expressly noted above, the Examiner concludes that Functional Phrase #3 meets invocation Prong (B). Additionally, the Examiner notes that because nothing in the written description contradicts the plain language describing

this function, the function within Functional Phrase #3 will have its ordinary and accustomed meaning.

c) 3-Prong Analysis: Prong (C)

Based upon a review of the entire Functional Phrase #3, the Examiner finds that Functional Phrase #3 does not contain sufficient structure for performing the entire claimed function that is set forth within Functional Phrase #3. In fact, the Examiner finds that Functional Phrase #3 recites very little structure (if any) for performing the claimed function.

Because Functional Phrase #3 does not contain sufficient structure for performing the entire claimed function, the Examiner concludes that Functional Phrase #3 meets invocation Prong (C).

d) Corresponding Structure

Based upon a review of the original disclosure, the Examiner finds that the corresponding structure for Functional Phrase #3 is a controller including a central processing unit (CPU) (126, Fig. 10) or other logic circuitry, a memory (125, Fig. 10), a clock (124, Figure 10) and input/output circuitry (127, Fig. 10). The memory may store vehicle position information, and a vehicle device code or codes ('278 at col. 6, lines 28-35, col. 11, lines 24-35, col. 22, lines 1-7 (and thereby '460 at col. 3, lines first full paragraph and lines 52-60, col. 4, line 44-col. 5, line 31, col. 5, line 66-col. 6, line 23 and col. 6, lines 36-58 and Figure1, elements 12, 15, and 17) and col. 23, line 41-col. 24, line 13). The corresponding structure for Functional Phrase #3, therefore, is a controller including CPU, operating under stored program control, or other logic circuit, a

memory, a clock and input/output circuitry for cooperating with said vehicle position determining device and said wireless communications device to send vehicle position information and for coupling to a vehicle data bus for communication thereover with at least one vehicle device using at least one corresponding vehicle device code from among a plurality thereof for different vehicles.

Analysis of Dependent Claims 2-5, 8, 11-12, 16, and 21

The Examiner finds that these dependent claims do not modify the function nor the corresponding structure for Functional Phrase #3.

Analysis of Dependent claims 6-7, 14-15, and 19-20

The Examiner concludes that dependent claims 6-7, 14-15, and 19-20 modify and/or add to the function of Functional Phrase #3 forming first modified Functional Phrase #3. (See '278 at col. 23, line 67-col. 24, line 3.) Accordingly the Examiner finds that the corresponding structure for first modified Functional Phrase #3 is that same as that as for Functional Phase #3 however for the modified function of communication over the data bus with at least one vehicle device using at least one corresponding vehicle device code from among a plurality thereof for different vehicles which is for reading from (claim 6, 14, or 19) or writing to (claim 7, 15, or 20) the at least one vehicle device.

Analysis of dependent claims 9-10, 17, and 22

The Examiner concludes that dependent claims 9-10, 17, and 22 modify and/or add to both the structure and the function of Functional Phrase #3 forming second and third modified Functional Phrase #3. (See '278 at col. 23, line 67-col. 24, line 3.) Accordingly the Examiner finds that claims 9, 17 and 22 additionally require a remote transmitter (117, Figure 10) and the corresponding structure for second modified Functional Phrase #3 additionally includes a remote receiver (118, Figure 10) (See '278 at col. 24, last full paragraph) for the additional function of, responsive to the remote transmitter, performing at least one vehicle remote control function responsive to the remote transmitter and that claim 10 additionally requires a remote transmitter (117, Figure 10) and the corresponding structure for third modified Functional Phrase #3 additionally includes a remote receiver (118, Figure 10 (See '278 at col. 24, last full paragraph) for the additional function of, responsive to the remote transmitter, performing at least one vehicle remote control function comprising at least one of a vehicle security function, a remote keyless entry function and a remote engine starting function.

"a downloading interface…"

Analysis of Independent Claim 1

The Examiner concludes the phrase "*a downloading interface for permitting downloading of enabling data related to the at least one corresponding vehicle device code for use by said multi-vehicle compatible controller.*" as recited in claim 1, lines 16-19, (Functional

Phrase #4) invokes 35 U.S.C § 112, 6th paragraph. To support the Examiner's conclusion, the Examiner notes the following 3-Prong analysis:

a) 3-Prong Analysis Prong (A):

As an initial matter, the Examiner finds that Functional Phrase #4 does not use the term "means." The issue arising under Prong (A) then becomes whether or not the claimed phrase "downloading interface" is a generic placeholder for 'means'. *See MPEP 2181 I ¶3 and MPEP 2181 I (C) ¶4.*

The Examiner has reviewed the specification of '278 and finds: (1) insufficient evidence that '278 lexicographically defines the phrase "downloading interface" as a particular structure for performing the entire claimed function; (2) insufficient evidence that '278 indicates that the phrase "downloading interface" refers to a particular structure in the art, that a person having ordinary skill in the art (PHOSITA) would recognize as a structure known to perform the entire claimed function. *See Williamson v. Citrix Online, L.L.C.,* 115 USPQ2d 1105, 1112 (Fed. Cir. 2015).

In addition the Examiner has reviewed the prior art and finds that while the phrase "downloading interface" can be a particular structure in the art, the Examiner finds insufficient evidence that the phrase "device" infers or requires any particular structure as related to the function of Functional Phrase #4.

Accordingly based upon a review of '278 itself and the prior art, the Examiner concludes that the phrase "downloading interface" as set forth in Functional Phrase #4 is being applied as a generic term/placeholder having no particular structure associated therewith as related to the

entire claimed function. Because "downloading interface" is merely a generic placeholder having no specific structure associated therewith, the Examiner concludes that Functional Phrase #4 meets invocation Prong (A).

b) 3-Prong Analysis Prong (B):

Based upon a review of claim 1 in '278, the Examiner finds that the function associated with Functional Phrase #4 is: "*for permitting downloading of enabling data related to the at least one corresponding vehicle device code for use by said multi-vehicle compatible controller.*" ('278 Patent, Claim 1, lines 16-19.)

Because Functional Phrase #4 includes the function expressly noted above, the Examiner concludes that Functional Phrase #4 meets invocation Prong (B). Additionally, the Examiner notes that because nothing in the written description contradicts the plain language describing this function, the function within Functional Phrase #4 will have its ordinary and accustomed meaning.

c) 3-Prong Analysis: Prong (C)

Based upon a review of the entire Functional Phrase #4, the Examiner finds that Functional Phrase #4 does not contain sufficient structure for performing the entire claimed function that is set forth within Functional Phrase #4. In fact, the Examiner finds that Functional Phrase #4 recites very little structure (if any) for performing the claimed function.

Because Functional Phrase #4 does not contain sufficient structure for performing the entire claimed function, the Examiner concludes that Functional Phrase #4 meets invocation Prong (C).

d) Corresponding Structure

Based upon a review of the original disclosure, the Examiner finds that the corresponding structure for Functional Phrase #4 is a downloading interface (Figure 10, 116), e.g. interface circuitry 132 (e.g. logic circuitry or other control circuitry along with switching components) for controlling communication with a downloading device, and either a wireless signal downloading interface (e.g. a wireless receiver 114, such as for temporary connection to the downloading device 115 via any one or more of a number of wireless technologies, such as cellular, satellite, IR, Bluetooth or WiFi technologies (Fig. 11) or a temporary wireless communication link with the downloading device provided by sharing the wireless communications device that sends position data (Fig. 12)) or a wired signal downloading interface (e.g. a connector 133a in the form of a socket to accept a memory card or other data storage medium capable of transferring data or a connector 133a for temporary connection to a mating connector 133b of the downloading device (Fig. 13) wherein the downloading device can be, e.g., a laptop computer, via RS232/429 protocol, USB, FireWire, TCP/IP (Internet), or any other wired protocol.) (See '278 at col. 24, lines 14-51.) The corresponding structure for Functional Phrase #4 is therefore such a downloading interface for permitting downloading of enabling data related to the at least one corresponding vehicle device code, e.g. vehicle device code or codes, an instruction to select a code or codes from among those already stored, or the data or sequence to allow the controller

to generate the vehicle device code or codes, for use by said multi-vehicle compatible controller ('278 at col. 24, lines 8-12).

Analysis of Dependent Claims 2-3 and Independent claim 13

The Examiner concludes that dependent claim 2, independent claim 13 and dependent claim 3 modify and/or add to the structure of Functional Phrase #4 forming first and second modified Functional Phrases #4. (See '278 at col. 24, second full paragraph.) Accordingly the Examiner finds that for claim 2 the corresponding structure for first modified Functional Phrase #4 additionally includes the structure of a wired signal downloading interface and that for claims 3 and 13 the corresponding structure for second modified Functional Phrase #4 additionally includes the structure of a wired signal downloading interface comprising a connector for temporary connection to a downloading device.

Analysis of Dependent Claims 4 and 5 and Independent Claim 18

The Examiner concludes that dependent claim 4, independent claim 18 and dependent claim 5 modify and/or add to the structure of Functional Phrase #4 forming third and fourth modified Functional Phrases #4. (See '278 at col. 24, second full paragraph.) Accordingly the Examiner finds that for claim 4 the corresponding structure for third modified Functional Phrase #4 additionally includes the structure of a wireless signal downloading interface and that for claims 5 and 18 the corresponding structure for fourth modified Functional Phrase #4 additionally includes the structure of a wireless signal downloading interface comprising a wireless receiver connector for temporary connection to a downloading device.

Analysis of Dependent Claims 8, 16 and 21

The Examiner concludes these dependent claims modify and/or add to the function of Functional Phrase #4 forming modified, modified second and modified fourth Functional Phrases #4, respectively. (See '278 at col. 24, lines 46-51.) Accordingly the Examiner finds that with regard to claims 8, 16 and 21 the corresponding function for the respective phrases includes permitting downloading of at least one programming instruction for said multi-vehicle compatible controller.

Conclusion

Finally, see MPEP 2258, I., G, "During reexamination, claims are given the broadest reasonable interpretation consistent with the specification and limitations in the specification are not read into the claims (*In re Yamamoto*, 740 F.2d 1569, 222 USPQ 934 (Fed. Cir. 1984)). See also MPEP 2111, e.g. "[T]he ordinary and customary meaning of a claim term is the meaning that the term would have to a person of ordinary skill in the art in question at the time of the invention, i.e., as of the effective filing date of the patent application." *Phillips v. AWH Corp.*, 415 F.3d 1303, 1313, 75 USPQ2d 1321, 1326 (Fed. Cir. 2005) (*en banc*) and "The ordinary and customary meaning of a term may be evidenced by a variety of sources, including 'the words of the claims themselves, the remainder of the specification, the prosecution history, and extrinsic evidence concerning relevant scientific principles, the meaning of technical terms, and the state of the art." *Phillips v. AWH Corp.*, 415 F.3d at 1314, 75 USPQ2d at 1327.

Rejections based on Prior Art:

Statutory Bases

The following is a quotation of the appropriate paragraphs of pre-AIA 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

> A person shall be entitled to a patent unless –
>
> (a) the invention was known or used by others in this country, or patented or described in a printed publication in this or a foreign country, before the invention thereof by the applicant for a patent.
>
> (b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.
>
> (e) the invention was described in (1) an application for patent, published under section 122(b), by another filed in the United States before the invention by the applicant for patent or (2) a patent granted on an application for patent by another filed in the United States before the invention by the applicant for patent, except that an international application filed under the treaty defined in section 351(a) shall have the effects for purposes of this subsection of an application filed in the United States only if the international application designated the United States and was published under Article 21(2) of such treaty in the English language.
>
> (e) the invention was described in a patent granted on an application for patent by another filed in the United States before the invention thereof by the applicant for patent, or on an international application by another who has fulfilled the requirements of paragraphs (1), (2), and (4) of section 371(c) of this title before the invention thereof by the applicant for patent.

The changes made to 35 U.S.C. 102(e) by the American Inventors Protection Act of 1999 (AIPA) and the Intellectual Property and High Technology Technical Amendments Act of 2002 do not apply when the reference is a U.S. patent resulting directly or indirectly from an international application filed before November 29, 2000. Therefore, the prior art date of the reference is determined under 35 U.S.C. 102(e) prior to the amendment by the AIPA (pre-AIPA 35 U.S.C. 102(e)).

The following is a quotation of pre-AIA 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

> (a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the

> invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negatived by the manner in which the invention was made.

The factual inquiries set forth in *Graham v. John Deere Co.*, 383 U.S. 1, 148 USPQ 459 (1966), that are applied for establishing a background for determining obviousness under pre-AIA 35 U.S.C. 103(a) are summarized as follows:

1. Determining the scope and contents of the prior art.

2. Ascertaining the differences between the prior art and the claims at issue.

3. Resolving the level of ordinary skill in the pertinent art.

4. Considering objective evidence present in the application indicating obviousness or nonobviousness.

Claim Rejections

Claim(s) 1, 4-8, 11-12, and 18-21 are rejected under pre-AIA 35 U.S.C. 102(b) as anticipated by or, in the alternative, under pre-AIA 35 U.S.C. 103(a) as obvious over U.S. Patent No. 6,330,499 to Chou et al (hereinafter also referred to as '499 or Chou).

The patent to Chou includes a/an publication/issue date more than one year prior to the effective filing date of June 3, 2007 of '278, and thus are available as prior art under 35 USC 102(b) and 35 USC 103.

Claim 1

A multi-vehicle compatible tracking unit for a vehicle comprising a vehicle data bus extending throughout the vehicle, the multi-vehicle compatible tracking unit comprising:

See '499 at, e.g., Fig. 1, elements 1000, 100 and 317, col. 2, lines 39-43, Figure 2, esp. elements 330, 335 and the dotted line therebetween, col. 3 lines 33-46 ("The processor 300 is coupled to a vehicle bus 335 through a vehicle bus interface 330. The coupling between the client computer device and the vehicle bus interface 106 of FIG. 3, may be one of RS-232, USB (Universal Serial Bus), IDB (ITS Data Bus), Ethernet, and the like. The vehicle bus interface may support one of vehicle bus standards such as CAN (Controller Area Network) and the Society of Automotive Engineers' SAE J1850 - Class B Data Communication Network Interface. Alternatively, the processor supports some or all of the functions of the vehicle bus interface and connects directly to the vehicle bus 335. The vehicle bus shown in FIG. 2 is an inherent part of all new automobiles. The dotted line is used as an indication that the vehicle bus is built into the vehicle."), col. 3, lines 54-56, col.4, lines 2-38 (esp. "model dependent"), Fig. 3, elements 103 and 104, col. 1, lines 11-17 and col. 6, lines 39-41, col. 7, lines 32-40, and claims 2 and 7-9. Therefore '499 discloses a multi-vehicle compatible, i.e. multi-model compatible, tracking unit for a vehicle comprising a vehicle data extending throughout the vehicle.

a vehicle position determining device;

See *Claim Interpretation/Analysis* section, **"a vehicle position determining device"** *supra*, the discussion of claim 11 infra and '499 at, e.g., Figure 1, element 150A and 317, col. 2,

lines 39-43, col. 3, lines 54-59 ("Optionally, the processor 300 may be coupled to a location sensing device such as a GPS receiver 317 (FIG. 1) to provide vehicle location information. The system may or may not assume the availability of the automatic vehicle position information. Location-related scenario, such as emergency help dispatch may use automatic vehicle positioning …."), col. 7, lines 32-40 and claims 1-2. Therefore '499 discloses the tracking unit comprising "a vehicle position determining device".

a wireless communications device;

See *Claim Interpretation/Analysis* section, **"a wireless communications device"** *supra* and '499 at, e.g., Figure 1, element 150, Figure 2, element 320, col. 2, lines 30-39 ("As shown in FIG. 1, the system 1000 includes a vehicle 10 with a vehicle driver or user 140, having an in-vehicle computing system 100, a client computer device 101 installed to enable vehicle health checkup and remote diagnostics, a communication link 150 (e.g., via wireless base stations 150B, or the like) for communicating vehicle information (e.g., vehicle identification number, (VIN), diagnostic data, and the like). Such a link can be interfaced with an internet 150C, the Internet 150D, or a public (or private) switch telephone network (PSTN) 150E."), col. 3, lines 15-32, Figure 3, elements 107 and 102, and col. 4, lines 39-42. Therefore '499 further discloses the tracking unit comprising "a wireless communications device".

a multi-vehicle compatible controller for cooperating with said vehicle position determining device and said wireless communications device to send vehicle position information;

See *Claim Interpretation/Analysis* section, **"a multi-vehicle compatible controller…"** and prior discussion of the preamble, "a vehicle position determining device" and "a wireless communications device". Additionally see Fig. 2, elements 300 and 350, col. 2, lines 44-52 and 55 et seq, col. 3, line 62-col. 4, line 14 and Figure 3, element 101/120. Therefore Chou discloses a CPU operating under stored program/software control, e.g. 300, 101, a memory, e.g. 350, and input/output circuitry, e.g. 330. '499 further discloses time stamping information or data, e.g. test data or fault codes ('499 at col. 5, first full paragraph and the paragraph bridging cols. 7-8 and Figure 4). Therefore Chou is also considered to either implicitly disclose or obviously suggest a clock since it discloses some structure/device for providing an indication of time. Thus, '499 further implicitly or obviously discloses a "a multi-vehicle compatible controller" and such for cooperating with said vehicle position determining device and said wireless communications device to send vehicle position information.

said multi-vehicle compatible controller to be coupled to the vehicle data bus for communication thereover with at least one vehicle device using at least one corresponding vehicle device code from among a plurality thereof for different vehicles; and

See *Claim Interpretation/Analysis* section, **"a multi-vehicle compatible controller…"**. See also the prior discussion of the preamble, esp. col. 3 lines 33-46 ("The processor 300 is coupled to a vehicle bus 335 through a vehicle bus interface 330. The coupling between the client computer device and the vehicle bus interface 106 of FIG. 3, may be one of RS-232, USB (Universal Serial Bus), IDB (ITS Data Bus), Ethernet, and the like. The vehicle bus interface may support one of vehicle bus standards such as CAN (Controller Area Network) and the Society of Automotive Engineers' SAE J1850 - Class B Data Communication Network

Interface. Alternatively, the processor supports some or all of the functions of the vehicle bus interface and connects directly to the vehicle bus 335. The vehicle bus shown in FIG. 2 is an inherent part of all new automobiles. The dotted line is used as an indication that the vehicle bus is built into the vehicle."), and col. 4, lines 15-38 ("The vehicle bus interface 120 is responsible for replying to requests for parametric data. It is also responsible for continuously monitoring the vehicle bus 104 for any fault reported by the ECUs 103, in terms of diagnostic trouble codes (DTCs). The vehicle bus interface 120 includes the following modules: vehicle bus adapter 120C, fault detector 120B, and diagnostic data service 120A. The fault detector 120B polls the vehicle bus 104 through the vehicle bus adapter 120C checking for fault codes reported by the vehicle ECUs 103. The vehicle bus adapter 120C translates the messages received from the vehicle bus into the language of the fault detector. It also translates messages from the fault detector into the language of the vehicle bus. **The fault code specifications and protocols of the vehicle may be Original Equipment Manufacturer (OEM) and model dependent.** The term 'vehicle fault codes' is meant to be synonymous with the term 'trouble code' or 'diagnostic trouble code'. A listing of such codes may be found in the publication of the Society of Automotive Engineers, 'SAE On-Board Diagnostics for Light and Medium Duty Vehicles Standards Manual'. The diagnostic data service 120A accepts request for vehicle parametric data and retrieves the data using the vehicle bus adapter." (Emphasis added).), and "**said multi-vehicle compatible controller for cooperating with said vehicle position determining device and said wireless communications device to send vehicle position information"**. Thus Chou either implicitly discloses or obviously suggests a "multi-vehicle compatible controller" and such controller is coupled to a vehicle data bus, e.g. 335, 104, for communication thereover, e.g. via

330, 120, with at least one vehicle device, e.g. 103, using at least one corresponding vehicle device code, i.e. (DTC), vehicle fault codes/protocols, which is vehicle model dependent, i.e. from among a plurality thereof for "different vehicles".

a downloading interface for permitting downloading of enabling data related to the at least one corresponding vehicle device code for use by said multi-vehicle compatible controller.

See *Claim Interpretation/Analysis* section, "**a downloading interface…**". See also, e.g., '499 at Figure 1, element 150, Figure 2, elements 320, 360, Figure 3, elements 102, 107, Figure 4, 102, NETWORK INTERFACE, arrow 7,14 and "HTTP, TCP/IP, PPP/SLIP, DIAL-UP, GSM", and Figure 5, 102, NETWORK INTERFACE, arrow 3,9, arrow 4,7, arrow 5,6 and "HTTP, TCP/IP, PPP/SLIP, DIAL-UP, GSM", col. 3, lines 49-53, col. 4, lines 15-19, and 36-46, col. 6, lines 11-14 and 37-47, col. 7, lines 32-40, col. 8, line 65-col. 10, line 11, and claim 10. See also the discussion of "a wireless communications device" limitation *supra* and claims 2-5 and 8 *infra*. '499 discloses, e.g., interface circuitry, e.g. NETWORK INTERFACE, 320, 107, docking facility, and a temporary wireless communication link, e.g. arrow 7, 14, arrow 3, 9, with the downloading device, i.e. TCP/IP(an internet/ the Internet), 201, provided by sharing the wireless communications device, e.g. 102, that sends position data, see, e.g. col. 7, lines 32-40, (see also discussion of claims 2-5) and such structure permits downloading of enabling data, e.g. instruction to gather data, vehicle parameter update/change, related to the at least one corresponding vehicle device code for use by said multi-vehicle compatible controller, e.g. steps 2-6 in Figure 5. Thus '499 discloses or obviously suggests "a downloading interface" and such

permits downloading of enabling data related to the at least one corresponding vehicle device code for use by said multi-vehicle compatible controller.

Claim 4

The multi-vehicle compatible tracking unit according to claim 1 wherein said downloading interface comprises a wireless signal downloading interface.

See *Claim Interpretation/Analysis* section and discussion of claim 1 *supra*, "downloading interface for …controller" and "a wireless communications device" limitation *supra* esp. Figure 1, 150, Figure 2, elements 300, 320, Figs. 3-5, elements 107, 102, arrow 7, 14, arrow 3, 9, col. 3, lines 15-32 ("The processor is integrated with a network interface 320 to provide communication capability with the remote service center 200. Preferably, the network interface comprises a removable wireless telephone such as the Motorola i1000+ and a docking facility for the wireless phone integrated with the client computer device. Both voice and data connections can be supported by interfacing the processor 300 and the wireless phone. The telephone integration provides basic communication functions. It establishes a data (e.g. TCP/IP) connection with a remote service center (e.g., remote service center 200). Wireless technologies such as GSM (Global System for Mobile Communications), CDMA (Code Division Multiple Access), TOMA (Time Division Multiple Access), iDEN™ (a TOMA-based Motorola technology), and AMPS (Advanced Mobile Phone System) can all be supported. The phone may also be used for wireless voice communications.". Therefore '449 discloses or obviously suggests a wireless signal downloading interface.

Claim 5

The multi-vehicle compatible tracking unit according to claim 4 wherein said wireless signal downloading interface comprises a wireless receiver for temporary connection to a downloading device.

See *Claim Interpretation/Analysis* section and discussion of claim 1, "downloading interface for …controller" limitation and "a wireless communications device" limitation, *supra* (e.g. col. 4, lines 39-43, col. 7, lines 32-40col. 9, lines 1-59, i.e. data link/connection 150, arrows 3,9, 7,14, between wireless phone 102 and server 201 opened and terminated during health checkup process). Therefore '499 teaches or obviously suggests a wireless receiver 102 of the wireless signal downloading interface for temporary connection to a downloading device.

Claim 6

The multi-vehicle compatible tracking unit according to claim 1 wherein the corresponding at least one vehicle code is for reading from the at least one vehicle device.

See *Claim Interpretation/Analysis* section and discussion of claim 1 *supra*, e.g. col. 4, lines 15-38 ("The vehicle bus interface 120 is responsible for replying to requests for parametric data. It is also responsible for continuously monitoring the vehicle bus 104 for any fault reported by the ECUs 103, in terms of diagnostic trouble codes (DTCs). The vehicle bus interface 120 includes the following modules: vehicle bus adapter 120C, fault detector 120B, and diagnostic data service 120A. The fault detector 120B polls the vehicle bus 104 through the vehicle bus adapter 120C checking for fault codes reported by the vehicle ECUs 103. The vehicle bus adapter 120C translates the messages received from the vehicle bus into the language of the fault detector. It also translates messages from the fault detector into the language of the vehicle bus.

The fault code specifications and protocols of the vehicle may be Original Equipment Manufacturer (OEM) and model dependent. The term 'vehicle fault codes' is meant to be synonymous with the term 'trouble code' or 'diagnostic trouble code'. A listing of such codes may be found in the publication of the Society of Automotive Engineers, 'SAE On-Board Diagnostics for Light and Medium Duty Vehicles Standards Manual'. The diagnostic data service 120A accepts request for vehicle parametric data and retrieves the data using the vehicle bus adapter." (Emphasis added).), col. 5, lines 25-28 ("Similar to the health checkup request, the in-vehicle system collects and uploads a snapshot of vehicle data including any trouble code reported by the ECUs."), col. 6, lines 55-58 ("In such a case, for example, one or more diagnostic trouble codes, generated by the vehicles' ECUs 103, are detected in the vehicle bus interface 120 by the fault detector 120B. These trouble codes are sent to the fault monitor 420 component of the vehicle client computer device 101. The fault monitor may further process these trouble codes and finally sends them to the diagnostic client 421." (Emphasis added).), col. 8, lines col. 9, lines 35-48 ("Then in step 2, the diagnostic client 421 initiates a health checkup session with the diagnostic server 201, and in step 3, the diagnostic server instructs the diagnostic client to gather vehicle data, such as VIN, malfunction codes, and/or a snapshot of the vehicle data. Then in step 4, the diagnostic client 421 requests the data from the diagnostic data service 120A at the vehicle bus interface 120. Then, in step 5, the diagnostic data service interrogates the ECUs 103 via the vehicle bus adapter 120C for the requested data. In step 6, the ECUs 103 provide the requested data and in step 71 the data is returned to the diagnostic client 421. Then, in step 8, the data is in turn transmitted to the diagnostic server 201." (Emphasis added).) and paragraph bridging cols. 9-10.

Therefore, since '499 discloses or obviously suggests fault codes or DTC reported or generated by the at least one vehicle device, '499 discloses or obviously suggests the corresponding at least one vehicle code is for reading from the at least one vehicle device.

Claim 7

The multi-vehicle compatible tracking unit according to claim 1 wherein the corresponding at least one vehicle code is for writing to the at least one vehicle device.

See *Claim Interpretation/Analysis* section and discussion of claim 6 *supra.* Since '499 further teaches or obviously suggests the fault codes/DTCs are Original Equipment Manufacturer (OEM) and/or the interface 120 polls or interrogates the ECUS for malfunction or fault codes, '499 discloses or obviously suggest the corresponding at least one vehicle code is for writing to the at least one vehicle device.

Claim 8

The multi-vehicle compatible tracking unit according to claim 1 wherein said downloading interface is also for permitting downloading of at least one programming instruction for said multi-vehicle compatible controller.

See *Claim Interpretation/Analysis* section and discussion of claim 1 *supra,* e.g. '499 at col. 9, lines 28-62 ("Then in step 2, the diagnostic client 421 initiates a health checkup session with the diagnostic server 201, and in step 3, the diagnostic server instructs the diagnostic client to gather vehicle data, such as VIN, malfunction codes, and/or a snapshot of the vehicle data. Then in step 4, the diagnostic client 421 requests the data from the diagnostic data service 120A at the vehicle bus interface 120. Then, in step 5, the diagnostic data service interrogates the

ECUs 103 via the vehicle bus adapter 120C for the requested data. In step 6, the ECUs 103 provide the requested data and in step 71 the data is returned to the diagnostic client 421. Then, in step 8, the data is in turn transmitted to the diagnostic server 201." (Emphasis added).), and Figure 5, arrow 3, 9. Note also the paragraph bridging cols. 9-10. Therefore, '499 discloses or obviously suggests the downloading interface, 107/102, receives at least one programming instruction, e.g. data gather instruction, for the controller 300/101.

Claim 11

The multi-vehicle compatible tracking unit according to claim 1 wherein said wireless position determining device comprises a Global Positioning System (GPS) receiver.

See *Claim Interpretation/Analysis* section and discussion of claim 1, preamble and "a vehicle position determining device" limitation, *supra* (e.g. Figure 1, element 317). Therefore '499 discloses a Global Positioning System (GPS) receiver comprising the vehicle position determining device.

Claim 12

The multi-vehicle compatible tracking unit according to claim 1 further comprising a housing containing said vehicle position determining device, said wireless communications device, said multi-vehicle compatible controller, and said downloading interface.

See '499 at, e.g., elements 10, elements 317 and 101 inside box designated 100 "IN-VEHICLE SYSTEM", Figure 2, col. 2, lines 55-56, col. 3, lines 15-61, Figure 3, element 100 "IN VEHICLE SYSTEM" and col. 4, lines 5-9. Therefore, '499 discloses or obviously suggests

a housing, e.g. 10, "IN VEHICLE SYSTEM", containing said vehicle position determining device, said wireless communications device, said multi-vehicle compatible controller, and said downloading interface.

Claim 18

A multi-vehicle compatible tracking unit for a vehicle comprising a vehicle data bus extending throughout the vehicle, the multi-vehicle compatible vehicle tracking unit comprising: a vehicle position determining device; a wireless communications device; a multi-vehicle compatible controller for cooperating with said vehicle position determining device and said wireless communications device to send vehicle position information; said multi-vehicle compatible controller to be coupled to the vehicle data bus for communication thereover with at least one vehicle device using at least one corresponding vehicle device code from among a plurality thereof for different vehicles; and a downloading interface for permitting downloading of enabling data related to the at least one corresponding vehicle device code for use by said multi-vehicle compatible controller; said downloading interface comprising a wireless receiver for temporary connection to a downloading device.

See discussion of claims 1 and 4-5 *supra*.

Claim 19

The multi-vehicle compatible tracking unit according to claim 18 wherein the corresponding at least one vehicle code is for reading from the at least one vehicle device.

See discussion of claim 6 *supra*.

Claim 20

The multi-vehicle compatible tracking unit according to claim 18 wherein the corresponding at least one vehicle code is for writing to the at least one vehicle device.

See discussion of claim 7 *supra*.

Claim 21

The multi-vehicle compatible tracking unit according to claim 18 wherein said downloading interface is also for permitting downloading of at least one programming instruction for said multi-vehicle compatible controller.

See discussion of claim 8 *supra*.

Claims 9-10 and 22 are rejected under pre-AIA 35 U.S.C. 103(a) as being unpatentable over U.S. Patent No. 6,330,499 to Chou et al (hereinafter also referred to as '499 or Chou) in view of U.S. Patent No. 6,028,537 to Suman et al, (hereinafter also referred to as '537 or Suman).

The patent to Suman includes a/an publication/issue date more than one year prior to the effective filing date of June 3, 2007 of '278, and thus are available as prior art under 35 USC 102(b) and 35 USC 103.

Claim 9

The multi-vehicle compatible tracking unit according to claim 1 further comprising a remote transmitter;

See *Claim Interpretation/Analysis* section and discussion of claims 1 and 8 *supra,* '499 at, e.g., col. 3, lines col. 4, lines 39-42 ("The client computer device 101 performs several functions including communicating to the remote service center 200 by means of the network

interface 107 using the cell phone 102."), col. 5, lines 1-3 ("The in-vehicle system establishes a data connection, using a cellular phone 102, with a diagnostic server at the service center 200,…), col. 7, lines 32-40 ("In this case, a data communication link is established through the network interface 320 to the service center 200, and data containing fault codes, DTCs, vehicle parameter values, and vehicle ID information, is sent to the diagnostic server 201. The size of the data stream is estimated to be on the order of 1 kilobyte. Optional information includes a callback number, GPS coordinates, etc. The exchange of information may be repeated more than once before the data link is closed."), col. 9, lines 28-62 ("Referring now to FIG. 5, a health checkup event flow is presented. The numbers of the steps refer to the numbers found in the flow, as shown in FIG. 5…. Then in step 2, the diagnostic client 421 initiates a health checkup session with the diagnostic server 201, and in step 3, the diagnostic server instructs the diagnostic client to gather vehicle data, such as VIN, malfunction codes, and/or a snapshot of the vehicle data. Then in step 4, the diagnostic client 421 requests the data from the diagnostic data service 120A at the vehicle bus interface 120. Then, in step 5, the diagnostic data service interrogates the ECUs 103 via the vehicle bus adapter 120C for the requested data. In step 6, the ECUs 103 provide the requested data, and in step 7, the data is returned to the diagnostic client 421. Then, in step 8, the data is in turn transmitted to the diagnostic server 201…. The diagnostic server 201 prepares a report and transmits it to the client computer 101…. Thereafter, the data connection is terminated. The above-described health checkup process may be completely automated without intervention or involvement by a person at the remote service center."), Figures and claim 1 ("…a communication system, coupled to said client computer device, for providing remote communication of data including data derived from said monitoring systems of

the vehicle; and a remote service center including a vehicle data store, a server computer, a diagnostic engine, and a communicator for communicating the results of analysis of vehicle information to said client computer device via said communication system, …"). Therefore '499 discloses a remote transmitter, e.g., a communicator of the remote service center. See also the remainder of the discussion of this claim.

and wherein said multi-vehicle compatible controller also performs at least one vehicle remote control function responsive to said remote transmitter.

See discussion of this claim *supra* and, e.g., col. 9, line 63-10, line 11 ("The present invention is not limited to the scenarios and embodiments listed above, but instead may be practiced with a plurality of modifications and extensions. For example, remote health monitoring and diagnostics shares many features with other automotive applications and services. It may be desirable to bundle the remote health monitoring and diagnostics with other services or to extend it with related application functions. For example, the remote diagnostics service could certainly be offered on top of an Emergency/Mayday service (e.g., 'OnStar'). Other applications and services that can be developed or bundled as extensions of the diagnostics services include: breakdown service, network diary, vehicle user manual update, OEM Callback Services, fleet management, theft prevention, vehicle parameter update/change, remote vehicle access, concierge services, etc."). Therefore at the very least '499 suggests the controller, i.e.in-vehicle client computer device 101 and vehicle bus connected interface 120, performing functions, e.g. requests for diagnostic data, responsive to a remote transmitter and remote health/diagnostic services may be practiced/bundled with other services or extensions such as remote vehicle access. However '537 not only teaches a diagnostic system connected to the

vehicle bus for remote diagnostics to be performed on the vehicle but also providing remote control to the vehicles accessories in response to a transmitted control signal from a service center, see, e.g., col. 15, line 52-col. 16, line 15 and Fig. 4. Therefore to employ the multi-vehicle compatible controller responsive to a remote transmitter, e.g. the communicator of the remote service center, in '499, if not already, as known from '537 to in order to provide the desired remote vehicle access, e.g. door unlocking, i.e. at least one vehicle remote control function, would have been obvious to one of ordinary skill in the art. Therefore the prior art obviously teaches said multi-vehicle compatible controller also performing at least one vehicle remote control function responsive to said remote transmitter.

Claim 10

The multi-vehicle compatible tracking unit according to claim 9 wherein the at least one vehicle remote control function comprises at least one of a vehicle security function, a remote keyless entry function, and a remote engine starting function.

See discussion of claim 9 *supra*, e.g. the prior art teaches the at least one vehicle remote control function of remote keyless entry.

Claim 22

The multi-vehicle compatible tracking unit according to claim 18 further comprising a remote transmitter; and wherein said multi-vehicle compatible controller also performs at least one vehicle remote control function responsive to said remote transmitter.

See discussion of claim 9 *supra*.

Claims 2-3 and 13-16 are rejected under pre-AIA 35 U.S.C. 103(a) as being unpatentable over U.S. Patent No. 6,330,499 to Chou et al (hereinafter also referred to as '499 or Chou) in view of U.S. Patent No. 5,732,074 to Spaur et al (hereinafter also referred to as '074 or Spaur).

The patent to Spaur includes a/an publication/issue date more than one year prior to the effective filing date of June 3, 2007 of '278, and thus are available as prior art under 35 USC 102(b) and 35 USC 103.

Claim 2

The multi-vehicle compatible tracking unit according to claim 1 wherein said downloading interface comprises a wired signal downloading interface.

See discussion of "**a downloading interface…**" and *Claim Interpretation/Analysis* section *supra*, e.g. Figure 2, elements 320 and 300, col. 2, lines 59-63 ("FIG. 2 is a block diagram providing an exemplary component overview for the in-vehicle hardware. The in-vehicle hardware provides a platform for the client computer device 101 and for the system functions shown in the architectural design in FIG. 3. As shown in FIG. 2, the in-vehicle hardware includes a processor 300 coupled with memory 350, a user interface 310, a network interface 320, a vehicle interface 330, at least one persistent storage device 340, and optional external devices 360."), col. 3, lines 16-32 ("The processor is integrated with a network interface 320 to provide communication capability with the remote service center 200. Preferably, the network interface comprises a removable wireless telephone such as the Motorola i1000+ and a docking facility for the wireless phone integrated with the client computer device. Both voice

and data connections can be supported by interfacing the processor 300 and the wireless phone. The telephone integration provides basic communication functions. It establishes a data (e.g. TCP/IP) connection with a remote service center (e.g., remote service center 200). Wireless technologies such as GSM (Global System for Mobile Communications), CDMA (Code Division Multiple Access), TDMA (Time Division Multiple Access), iDEN.TM. (a TDMA-based Motorola technology), and AMPS (Advanced Mobile Phone System) can all be supported. The phone may also be used for wireless voice communications."), col. 3, last paragraph, col. 4, lines 7-9, Figure 3, "NETWORK INTERFACE" 107, and col. 4, lines 39-43. This claim requires the downloading interface comprising a wired signal downloading interface. While '499 teaches the signal downloading interface 320, 107, 102 coupled to the processor 300 and comprising a docking facility "integrated" with the computer device and a removeable cellular phone, it does specifically teach the interface being "wired". See however '074 at, e.g., Figure 2, elements 80-82, 30 and col, 7, lines 45 et seq and thereby, '177 at, e.g., Figures 4 and 7, abstract, lines 1-5, col. 1, first and third full paragraphs, col. 2, lines 4-16, col. 3, second full paragraph, col. 5, lines 60-62, i.e. a known cellular phone/controller/processor interface which is wired. Therefore it would have been obvious to one of ordinary skill in the art to substitute a wired cellular phone interface, e.g., a connector/cable to removeably attach 102 and 107, for the '499 cellular phone interface, if such is not already "wired", for the predictable result of interconnecting the cellular phone and processor/computer. Therefore the prior art obviously teaches the "downloading interface" comprises a wired signal downloading interface.

Claim 3

The multi-vehicle compatible tracking unit according to claim 2 wherein said wired signal downloading interface comprises a connector for temporary connection to a downloading device.

See *Claim Interpretation/Analysis* section and discussion of claims 1-2 *supra*, e.g., Fig. 3, elements 102 and 107, i.e. cell phone attached to network interface, and col. 3, lines 17-21 and cited portions of '074 and '177. The prior art obviously teaches a connector for temporary connection between 107 and 102 and thereby, the wired signal downloading interface comprising a connector for temporary connection to a downloading device, e.g. an internet, the Internet.

Claim 13

A multi-vehicle compatible tracking unit for a vehicle comprising a vehicle data bus extending throughout the vehicle, the multi-vehicle compatible vehicle tracking unit comprising: a vehicle position determining device; a wireless communications device; a multi-vehicle compatible controller for cooperating with said vehicle position determining device and said wireless communications device to send vehicle position information; said multi-vehicle compatible controller to be coupled to the vehicle data bus for communication thereover with at least one vehicle device using at least one corresponding vehicle device code from among a plurality thereof for different vehicles; and a downloading interface for permitting downloading of enabling data related to the at least one corresponding vehicle device code for use by said multi-vehicle compatible controller; said downloading interface comprising a connector for temporary connection to a downloading device.

See discussion of claims 1-3 *supra*.

Claim 14

The multi-vehicle compatible tracking unit according to claim 13 wherein the corresponding at least one vehicle code is for reading from the at least one vehicle device.

See discussion of claim 6 *supra.*

Claim 15

The multi-vehicle compatible tracking unit according to claim 13 wherein the corresponding at least one vehicle code is for writing to the at least one vehicle device.

See discussion of claim 7 *supra.*

Claim 16

The multi-vehicle compatible tracking unit according to claim 13 wherein said downloading interface is also for permitting downloading of at least one programming instruction for said multi-vehicle compatible controller.

See discussion of claim 8 *supra.*

Claim 17 is rejected under pre-AIA 35 U.S.C. 103(a) as being unpatentable over U.S. Patent No. 6,330,499 to Chou et al (hereinafter also referred to as '499 or Chou) in view of U.S. Patent No. 6,028,537 to Suman et al, (hereinafter also referred to as '537 or Suman) and U.S. Patent No. 5,732,074 to Spaur et al (hereinafter also referred to as '074 or Spaur).

Claim 17

The multi-vehicle compatible tracking unit according to claim 13 further comprising a remote transmitter; and wherein said multi-vehicle compatible controller also performs at least one vehicle remote control function responsive to said remote transmitter.

See discussion of claim 9 *supra*.

Finality

THIS ACTION IS MADE FINAL.

A shortened statutory period for response to this action is set to expire TWO from the mailing date of this action.

Extensions of time under 37 CFR 1.136(a) do not apply in reexamination proceedings. The provisions of 37 CFR 1.136 apply only to "an applicant" and not to parties in a reexamination proceeding. Further, in 35 U.S.C. 305 and in 37 CFR 1.550(a), it is required that reexamination proceedings "will be conducted with special dispatch within the Office."

Extensions of time in reexamination proceedings are provided for in 37 CFR 1.550(c). A request for extension of time must specify the requested period of extension and it must be accompanied by the petition fee set forth in 37 CFR 1.17(g). Any request for an extension in a third party requested ex parte reexamination must be filed on or before the day on which action by the patent owner is due, and the mere filing of a request will not effect any extension of time. A request for an extension of time in a third party requested ex parte reexamination will be granted only for sufficient cause, and for a reasonable time specified. Any request for extension in a patent owner requested ex parte reexamination (including

reexamination ordered under 35 U.S.C. 257) for up to two months from the time period set in the Office action must be filed no later than two months from the expiration of the time period set in the Office action. A request for an extension in a patent owner requested ex parte reexamination for more than two months from the time period set in the Office action must be filed on or before the day on which action by the patent owner is due, and the mere filing of a request for an extension for more than two months will not effect the extension. The time for taking action in a patent owner requested ex parte reexamination will not be extended for more than two months from the time period set in the Office action in the absence of sufficient cause or for more than a reasonable time.

The filing of a timely first response to this final rejection will be construed as including a request to extend the shortened statutory period for an additional two months. In no event, however, will the statutory period for response expire later than SIX MONTHS from the mailing date of the final action. See MPEP § 2265.

Prior Art

It is again noted that the 1994 edition of the SAE On-Board Diagnostics for Light and Medium Duty Vehicles Standards submitted as Exhibit G (hereinafter also referred to as 1994 SAE Manual or 94SAE) is the 1994 version of a publication of the Society of Automotive Engineers, "SAE On-Board Diagnostics for Light and Medium Duty Vehicles Standards Manual", which includes the Society of Automotive Engineers' vehicle bus standards SAE J1850 - Class B Data Communication Network Interface as referred to by '499. See 94SAE at, e.g., SAE J1850, page 159, sections 4.2-4.2.2 regarding "manufacturer-specific" fault/(DTC)

codes specifications and protocols. Similarly the 1997 edition of the SAE On-Board Diagnostics for Light and Medium Duty Vehicles Standards submitted as Exhibit H (hereinafter also referred to as 1997 SAE Manual or 97SAE) is the 1997 version of a publication of the Society of Automotive Engineers, "SAE On-Board Diagnostics for Light and Medium Duty Vehicles Standards Manual", which includes the Society of Automotive Engineers' vehicle bus standards SAE J1850 - Class B Data Communication Network Interface as referred to by '499.

Conclusion

Extensions of Time

Extensions of time under 37 CFR 1.136(a) will not be permitted in these proceedings because the provisions of 37 CFR 1.136 apply only to "an applicant" and not to parties in a reexamination proceeding. Additionally, 35 U.S.C. 305 requires that reexamination proceedings "will be conducted with special dispatch" (37 CFR 1.550(a)). Extension of time in *ex parte* reexamination proceedings are provided for in 37 CFR 1.550(c).

Notification of Concurrent Proceedings

The patent owner is reminded of the continuing responsibility under 37 CFR 1.565(a), to apprise the Office of any litigation activity, or other prior or concurrent proceeding, involving Patent No. 8,032,278 throughout the course of this reexamination proceeding. The third party requester is also reminded of the ability to similarly apprise the Office of any such activity or

proceeding throughout the course of this reexamination proceeding. See MPEP §§ 2207, 2282 and 2286.

Amendment in Reexamination Proceedings

Patent owner is notified that any proposed amendment to the specification and/or claims in this reexamination proceeding must comply with 37 CFR 1.530(d)-(j), must be formally presented pursuant to 37 CFR 1.52(a) and (b), and must contain any fees required by 37 CFR 1.20(c). See MPEP § 2250(IV) for examples to assist in the preparation of proper proposed amendments in reexamination proceedings.

Submissions

In order to insure full consideration of any amendments, affidavits or declarations or other documents as evidence of patentability, such documents must be submitted in response to the first Office action on the merits (which does not result in a close of prosecution). Submissions after the second Office action on the merits, which is intended to be a final action, will be governed by the requirements of 37 CFR 1.116, after final rejection and by 37 CFR 41.33 after appeal, which will be strictly enforced.

IDS Submissions

Regarding IDS submissions MPEP 2256 recites the following: "Where patents, publications, and other such items of information are submitted by a party (patent owner or

requester) in compliance with the requirements of the rules, the requisite degree of consideration to be given to such information will be normally limited by the degree to which the party filing the information citation has explained the content and relevance of the information." Accordingly, the IDS submissions have been considered by the Examiner only with the scope required by MPEP 2256.

Service of Papers

After filing of a request for *ex parte* reexamination by a third party requester, any document filed by either the patent owner or the third party requester must be served on the other party (or parties where two or more third party requester proceedings are merged) in the reexamination proceeding in the manner provided in 37 CFR 1.248. The document must reflect service or the document may be refused consideration by the Office. See 37 CFR 1.550(f).

Correspondence

All correspondence relating to this ex parte reexamination proceeding should be directed:

By Mail to: Mail Stop *Ex Parte* Reexam
Central Reexamination Unit
Commissioner for Patents
United States Patent & Trademark Office
P.O. Box 1450
Alexandria, VA 22313-1450

By FAX to: (571) 273-9900
Central Reexamination Unit

By hand: Customer Service Window
Randolph Building
401 Dulany Street
Alexandria, VA 22314

Registered users of EFS-Web may alternatively submit such correspondence via the electronic filing system EFS-Web, at https://efs.uspto.gov/efile/myportal/efs-registered. EFS-Web offers the benefit of quick submission to the particular area of the Office that needs to act on the correspondence. Also, EFS-Web submissions are "soft scanned" (i.e., electronically uploaded) directly into the official file for the reexamination proceeding, which offers parties the opportunity to review the content of their submissions after the "soft scanning" process is complete.

Any inquiry concerning this communication should be directed to the Central Reexamination Unit at telephone number 571-272-7705.

Other useful telephone numbers:

Reexamination Practice (571) 272-7703

/Karin M. Reichle/
Examiner, CRU
Art Unit 3992

Conferees:
/J. W./
Primary Examiner, Art Unit 3992

/WHC/
SPRS, Art Unit 3992

Office Action in Ex Parte Reexamination	Control No. 90/013,851	Patent Under Reexamination 8032278	
	Examiner Karin Reichle	Art Unit 3992	AIA (First Inventor to File) Status No

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

a. ☒ Responsive to the communication(s) filed on *6/12/2017* .
☐ A declaration(s)/affidavit(s) under **37 CFR 1.130(b)** was/were filed on _____.

b. ☒ This action is made FINAL.

c. ☐ A statement under 37 CFR 1.530 has not been received from the patent owner.

A shortened statutory period for response to this action is set to expire *2* month(s) from the mailing date of this letter. Failure to respond within the period for response will result in termination of the proceeding and issuance of an *ex parte* reexamination certificate in accordance with this action. 37 CFR 1.550(d). **EXTENSIONS OF TIME ARE GOVERNED BY 37 CFR 1.550(c).** If the period for response specified above is less than thirty (30) days, a response within the statutory minimum of thirty (30) days will be considered timely.

Part I THE FOLLOWING ATTACHMENT(S) ARE PART OF THIS ACTION:

1. ☐ Notice of References Cited by Examiner, PTO-892.
2. ☐ Information Disclosure Statement, PTO/SB/08.
3. ☐ Interview Summary, PTO-474.
4. ☐ _____.

Part II SUMMARY OF ACTION

1a. ☒ Claims *1-22* are subject to reexamination.
1b. ☐ Claims _____ are not subject to reexamination.
2. ☐ Claims _____ have been canceled in the present reexamination proceeding.
3. ☐ Claims _____ are patentable and/or confirmed.
4. ☒ Claims *1-22* are rejected.
5. ☐ Claims _____ are objected to.
6. ☐ The drawings, filed on _____ are acceptable.
7. ☐ The proposed drawing correction, filed on _____ has been (7a) ☐ approved (7b) ☐ disapproved.
8. ☐ Acknowledgment is made of the priority claim under 35 U.S.C. § 119(a)-(d) or (f).
   a) ☐ All b) ☐ Some* c) ☐ None of the certified copies have
   1 ☐ been received.
   2 ☐ not been received.
   3 ☐ been filed in Application No. _____ .
   4 ☐ been filed in reexamination Control No. _____.
   5 ☐ been received by the International Bureau in PCT application No. _____.
   * See the attached detailed Office action for a list of the certified copies not received.
9. ☐ Since the proceeding appears to be in condition for issuance of an *ex parte* reexamination certificate except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte* Quayle, 1935 C.D. 11, 453 O.G. 213.
10. ☐ Other: _____

cc: Requester (if third party requester)

Search Notes	Application/Control No.	Applicant(s)/Patent Under Reexamination
	90013851	8032278
	Examiner	Art Unit
	KARIN REICHLE	3992

CPC- SEARCHED		
Symbol	Date	Examiner

CPC COMBINATION SETS - SEARCHED		
Symbol	Date	Examiner

US CLASSIFICATION SEARCHED			
Class	Subclass	Date	Examiner

SEARCH NOTES		
Search Notes	Date	Examiner
Prosecution History set forth on BIB sheet reviewed. Also reviewed 90/013,659 and 90/013741 referred to in the Request.	11/16/2016, updated 3/20/2017	/KR/
Reviewed 90013832	3/20/2017	/KR/
Updated Review of prosecution history and related reexamination files referenced in 6/12/2017 response	6/29/2017	/KMR?/KR/

INTERFERENCE SEARCH			
US Class/ CPC Symbol	US Subclass / CPC Group	Date	Examiner

IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

In re Patent of **KENNETH E. FLICK**	)	
	)	
Request for Reexamination of **U.S. PATENT NO. 8,032,278**	)	
	)	
Control No. **90/013,851**	)	Attorney Docket No.: **C13-03895(58106CIP1_REX2)**
Confirmation No. **8717**	)	
	)	Examiner: **K. Reichle**
Filing Date: **OCTOBER 28, 2016**	)	
	)	Art Unit: **3992**
For: **VEHICLE TRACKING UNIT WITH DOWNLOADABLE CODES AND ASSOCIATED METHODS**	)	

RESPONSE TO THE OFFICE ACTION MAILED MARCH 29, 2017 IN EX-PARTE REEXAMINATION

EFILE
Commissioner for Patents

Commissioner:

Responsive to the Official Action of March 29, 2017, and based upon the two-week Extension of Time granted on May 23, 2017, please enter and consider the remarks set out below.

In the Claims:

This listing of claims replaces all prior versions and listings of claims in the application.

1. (Pending) A multi-vehicle compatible tracking unit for a vehicle comprising a vehicle data bus extending throughout the vehicle, the multi-vehicle compatible tracking unit comprising:

a vehicle position determining device;

a wireless communications device;

a multi-vehicle compatible controller for cooperating with said vehicle position determining device and said wireless communications device to send vehicle position information;

said multi-vehicle compatible controller to be coupled to the vehicle data bus for communication thereover with at least one vehicle device using at least one corresponding vehicle device code from among a plurality thereof for different vehicles; and

a downloading interface for permitting downloading of enabling data related to the at least one corresponding vehicle device code for use by said multi-vehicle compatible controller.

2. (Pending) The multi-vehicle compatible tracking unit according to claim 1 wherein said downloading interface comprises a wired signal downloading interface.

3. (Pending) The multi-vehicle compatible tracking unit according to claim 2 wherein said wired signal downloading

interface comprises a connector for temporary connection to a downloading device.

4. (Pending) The multi-vehicle compatible tracking unit according to claim 1 wherein said downloading interface comprises a wireless signal downloading interface.

5. (Pending) The multi-vehicle compatible tracking unit according to claim 4 wherein said wireless signal downloading interface comprises a wireless receiver for temporary connection to a downloading device.

6. (Pending) The multi-vehicle compatible tracking unit according to claim 1 wherein the corresponding at least one vehicle code is for reading from the at least one vehicle device.

7. (Pending) The multi-vehicle compatible tracking unit according to claim 1 wherein the corresponding at least one vehicle code is for writing to the at least one vehicle device.

8. (Pending) The multi-vehicle compatible tracking unit according to claim 1 wherein said downloading interface is also for permitting downloading of at least one programming instruction for said multi-vehicle compatible controller.

9. (Pending) The multi-vehicle compatible tracking unit according to claim 1 further comprising a remote transmitter; and wherein said multi-vehicle compatible

controller also performs at least one vehicle remote control function responsive to said remote transmitter.

10. (Pending) The multi-vehicle compatible tracking unit according to claim 9 wherein the at least one vehicle remote control function comprises at least one of a vehicle security function, a remote keyless entry function, and a remote engine starting function.

11. (Pending) The multi-vehicle compatible tracking unit according to claim 1 wherein said wireless position determining device comprises a Global Positioning System (GPS) receiver.

12. (Pending) The multi-vehicle compatible tracking unit according to claim 1 further comprising a housing containing said vehicle position determining device, said wireless communications device, said multi-vehicle compatible controller, and said downloading interface.

13. (Pending) A multi-vehicle compatible tracking unit for a vehicle comprising a vehicle data bus extending throughout the vehicle, the multi-vehicle compatible vehicle tracking unit comprising:

a vehicle position determining device;

a wireless communications device;

a multi-vehicle compatible controller for cooperating with said vehicle position determining device and said wireless communications device to send vehicle position information;

said multi-vehicle compatible controller to be coupled to the vehicle data bus for communication thereover with at least one vehicle device using at least one corresponding vehicle device code from among a plurality thereof for different vehicles; and

a downloading interface for permitting downloading of enabling data related to the at least one corresponding vehicle device code for use by said multi-vehicle compatible controller;

said downloading interface comprising a connector for temporary connection to a downloading device.

14. (Pending) The multi-vehicle compatible tracking unit according to claim 13 wherein the corresponding at least one vehicle code is for reading from the at least one vehicle device.

15. (Pending) The multi-vehicle compatible tracking unit according to claim 13 wherein the corresponding at least one vehicle code is for writing to the at least one vehicle device.

16. (Pending) The multi-vehicle compatible tracking unit according to claim 13 wherein said downloading interface is also for permitting downloading of at least one programming instruction for said multi-vehicle compatible controller.

17. (Pending) The multi-vehicle compatible tracking unit according to claim 13 further comprising a remote transmitter; and wherein said multi-vehicle compatible

controller also performs at least one vehicle remote control function responsive to said remote transmitter.

18. (Pending) A multi-vehicle compatible tracking unit for a vehicle comprising a vehicle data bus extending throughout the vehicle, the multi-vehicle compatible vehicle tracking unit comprising:

a vehicle position determining device;

a wireless communications device;

a multi-vehicle compatible controller for cooperating with said vehicle position determining device and said wireless communications device to send vehicle position information;

said multi-vehicle compatible controller to be coupled to the vehicle data bus for communication thereover with at least one vehicle device using at least one corresponding vehicle device code from among a plurality thereof for different vehicles; and

a downloading interface for permitting downloading of enabling data related to the at least one corresponding vehicle device code for use by said multi-vehicle compatible controller;

said downloading interface comprising a wireless receiver for temporary connection to a downloading device.

19. (Pending) The multi-vehicle compatible tracking unit according to claim 18 wherein the corresponding at least one vehicle code is for reading from the at least one vehicle device.

20. (Pending) The multi-vehicle compatible tracking unit according to claim 18 wherein the corresponding at least one vehicle code is for writing to the at least one vehicle device.

21. (Pending) The multi-vehicle compatible tracking unit according to claim 18 wherein said downloading interface is also for permitting downloading of at least one programming instruction for said multi-vehicle compatible controller.

22. (Pending) The multi-vehicle compatible tracking unit according to claim 18 further comprising a remote transmitter; and wherein said multi-vehicle compatible controller also performs at least one vehicle remote control function responsive to said remote transmitter.

REMARKS

The Patent Owner thanks the Examiner for the careful and thorough reexamination of the present application, and thanks the U.S. Patent and Trademark Office and the Examiners for extending all courtesies to the Patent Owner's Representatives during the telephonic interview of June 1, 2017. The Patent Owner files herewith under separate cover an Interview Summary.

The Patent Owner includes herewith a Rule 132 Declaration from Joseph C. McAlexander, III in support of the arguments for patentability. Mr. McAlexander has served as the technical consultant during the related litigation with the Requester, and the consultant for all of the related reexaminations initiated by the Requester, described in greater detail below.

The Patent Owner submits that all of the claims are patentable, presents arguments herein supporting such patentability, and respectfully requests that the Examiner withdraw all pending rejections and issue a Reexamination Certificate confirming all claims as patentable.

I. Background

A. The Related Litigation

The status of the related litigation between the Requester and the Patent Owner is as follows. Patent Owner filed its complaint alleging patent infringement against the Requester on December 20, 2013. After extensive discovery, including discovery from the trial experts, the trial commenced on February 16, 2016 and concluded on February 24, 2016. The jury found that all of asserted claims from all four of the

asserted patents were infringed, and, as particularly relevant in this reexamination, that all of the asserted claims were not invalid -- rejecting Requester's invalidity contentions (Jury Verdict, Exhibit 1).

Attached as Exhibit 2 is the Court's Final Order dated April 6, 2017. The Court has determined that the *claims asserted by the Patent Owner (including those in the '278 patent) were not invalid, and that infringement by the Requester was willful. The Patent Owner has been awarded treble damages of $8,925,600; prejudgment interest; and attorneys' fees*. The asserted claims from the '278 patent include Claims 1-6, 8, 11-16, 18, 19 and 21.

Also attached as Exhibit 3 is the Court's Final Judgment of April 24, 2017 which includes a calculation for interest, and stipulated attorneys' fees, bringing the final judgment amount to $10,144,286. The parties entered a stipulation as to supplemental damages of an additional $4,860,009.66 for the period from the jury's verdict until the Court's Final Order, and agreed to a doubling of the jury-awarded license rate of $6.38 for continuing sales thereafter.

Requester has obtained an order for a stay of execution of judgment based upon posting a supersedeas bond in the amount of $17,000,000.00. Requester has filed a renewed motion for judgment as a matter of law and for a new trial, and has just filed a motion to vacate the judgment for lack of venue. These motions are pending.

At trial, Requester offered failed theories of invalidity of the '278 patent based upon a combination of U.S. Patent No. 5,898,392 (Bambini et al.) and the SAE Publication

J1978, titled "OBD Scan Tool"; and a combination of U.S. Patent No. 5,732,074 (Spaur et al.) and SAE J1978. The SAE J1978 document is among the compendium of SAE documents found in the SAE HS-3000 Manual.

B. The First Reexamination

The Requester filed a first reexamination (90/013,587) of the '278 patent on September 14, 2015, just prior to the scheduled start of trial which was postponed. In that first reexamination, Requester initially presented invalidity positions based on: (1) U.S. Patent No. 6,028,537 (Suman et al.) alone; (2) U.S. Patent No. 5,732,074 (Spaur et al.) alone; and (3) Spaur et al. in combination with various secondary references. Requester added additional invalidity positions based on: (1) U.S. Patent No. 6,009,363 (Beckert et al.) alone; (2) U.S. patent No. 7,484,008 (Gelvin et al.) alone; and Published Application 2001/0033225 (Razavi et al.) alone.

All of these invalidity positions of Requester were carefully considered and overcome as the Patent Office issued a Notice of Intent to Issue a Reexam Certificate on December 1, 2016, and issued a Reexamination Certificate on December 28, 2016.

The second reexamination request was filed after the Patent Owner's response in the first reexamination, and before the decision of the Patent Office to confirm patentability of the claims. This second reexamination request asserted invalidity positions based upon the same recycled Beckert et al., Spaur et al., and Suman et al. patents - sometimes in combination with an SAE document compendium, SAE HS-3000 which

includes the SAE J1978 reference asserted at trial. The SAE HS-3000 is titled "SAE On-Board Diagnostics for Light and Medium Duty Vehicles Standards Manual" (1994 Edition). Beckert et al. was asserted alone, and in combination with SAE HS-3000. Suman et al. was asserted alone, and in combination with SAE HS-3000. Spaur et al. was asserted in combination with SAE HS-3000.

Requester did add a new "old art" reference, Chou et al., to the request leading to this second reexamination. Despite the Requester's arguments to the contrary, Chou et al. is not a new reference. Indeed, Chou et al. was considered in the original prosecution of the '278 patent as correctly noted by the Examiner on page 41 of the Reexam Order Determination dated December 15, 2016.

Chou et al. is cited in the '278 parent patent, U.S. Patent No. 7,720,597; grandparent patent, U.S. Patent No. 7,149,623; and great-grandparent, U.S. Patent No. 6,606,561. The MPEP provides that in continuation applications "[t]he examiner will consider information which has been considered by the Office in a parent application ... A listing of the information need not be resubmitted in the continuing application unless the applicant desires the information to be printed on the patent." (MPEP §609.02II.A.2.; emphasis added).

C. Other Related Reexaminations

The Requester has filed reexamination requests against the three other patents of the Patent Owner found to be willfully infringed by the Court in the related litigation. This is the list of the other reexaminations:

U.S. Patent No. 6,756,885; Reexamination 90/013,741 - filed April 28, 2016

U.S. Patent No. 6,346,876; Reexamination 90/013,659 - filed December 11, 2015.

U.S. Patent No. 7,671,727: Reexamination 90/013,832 - filed October 12, 2016.

The Examiner is encouraged to consider each of these other reexamination proceedings; however, it is noted that the '885 and '876 patent reexaminations also deal with proposed prior art combinations including the SAE HS-3000 Manual.

II. The Pending Claims

The claimed invention, as recited in independent Claim 1, for example, is directed to a multi-vehicle compatible tracking unit for a vehicle comprising a vehicle data bus extending throughout the vehicle. The multi-vehicle compatible tracking unit comprises a vehicle position determining device, a wireless communications device, and a multi-vehicle compatible controller for cooperating with the vehicle position determining device and the wireless communications device to send vehicle position information. The multi-vehicle compatible controller is to be coupled to the vehicle data bus for communication thereover with at least one vehicle device using at least one corresponding vehicle device code from among a plurality thereof for different vehicles. The multi-vehicle compatible tracking unit comprises a downloading interface for permitting

downloading of enabling data related to the at least one corresponding vehicle device code for use by the multi-vehicle compatible controller.

Independent Claims 13 and 18 are directed to related multi-vehicle compatible vehicle tracking units. Independent Claim 13 recites that the downloading interface includes a connector for temporary connection to a downloading device. Independent Claim 18 recites that the downloading interface includes a wireless receiver for temporary connection to a downloading device.

III. Claim Construction

For the Examiner's convenience, attached is the Court's *Markman* Order for the related litigation (Exhibit 4). The claim terms are summarized in the following tabular portions of the Court's *Markman* Order:

CLAIM TERM	AGREED CONSTRUCTION
Controller	Electronic circuitry that performs one or more control functions.
Multi-vehicle compatible controller	Electronic circuitry that performs one or more control functions, and can operate with more than one vehicle.

CLAIM TERM	COURT'S CONSTRUCTION
Transmitter	Radio frequency transmitter.
Receiver	Radio frequency receiver.
Data communication bus/ vehicle data communications bus/ vehicle data bus	Wired connection for communication of digital messages among vehicle devices, with each message including one or more device addresses.
Vehicle device	Plain meaning
Command signal	Signal generated on the data communications bus for operating a vehicle device.
Device codes	Signal from a vehicle device.
Function	Plain meaning
Remote vehicle speed exceeded notification	Plain meaning
Downloading interface	Plain meaning
Enabling data	Data related to the at least one corresponding vehicle device code for use by said multi-vehicle compatible controller.
Programming instructions	Code which instructs the controller to perform an operation.

Consistent with the Examiner, neither of the parties raised any proposed claim interpretations, of the '278 patent or other asserted patents, based upon the inventor functioning as his own lexicographer. And, the Court did not find the inventor acted as his own lexicographer for any claim terms.

Neither of the parties raised any proposed claim interpretations under 35 U.S.C. §112, 6th paragraph for any term of any of the asserted patents, including the '278 patent. The Court did not find that any of the terms invoked 35 U.S.C. §112, 6th paragraph.

The Patent Owner respectfully points out "means" is not used anywhere in the claims of the '278 patent, or in the specification, or in the drawings. The original Examiner for

the '278 patent did not find that any of the terms invoked 35 U.S.C. §112, 6th paragraph. In addition, the Requester's technical expert did not assert such a construction in his Expert Reports or at trial, and Requester did not raise such a construction in its Reexamination Request. The Patent Office, in the first reexamination of the '278 patent, did not propose claim interpretations under 35 U.S.C. §112, 6th paragraph.

The Examiner now contends that "a downloading interface" should be interpreted under §112, 6th paragraph, and that the corresponding structure is described, on pages 17 and 18 of the Office Action, as follows:

> [b]ased upon a review of the original disclosure, the Examiner finds that the corresponding structure for Functional Phrase #4 is a downloading interface (Figure 10, 116), e.g. interface circuitry 132 (e.g. logic circuitry or other control circuitry along with switching components) for controlling communication with a downloading device, and either a wireless signal downloading interface (e.g. a wireless receiver 114, such as for temporary connection to the downloading device 115 via any one or more of a number of wireless technologies, such as cellular, satellite, IR, Bluetooth or WiFi technologies (Fig. 11) or a temporary wireless communication link with the downloading device provided by sharing the wireless communications device that sends position data (Fig. 12)) or a wired signal downloading interface (e.g. a connector 133a in the form of a socket to accept a memory card or other data storage medium capable of transferring data or a connector 133a for temporary connection to a mating connector 133b of the downloading device (Fig. 13) wherein the downloading device can be, e.g., a laptop computer, via RS232/429 protocol, USB, Fire Wire, TCP/IP (Internet), or any other wired

> protocol.) (See '278 at col. 24, lines 14-51.) The corresponding structure for Functional Phrase #4 is therefore such a downloading interface for permitting downloading of enabling data related to the at least one corresponding vehicle device code, e.g. vehicle device code or codes, an instruction to select a code or codes from among those already stored, or the data or sequence to allow the controller to generate the vehicle device code or codes, for use by said multi-vehicle compatible controller ('278 at col. 24, lines 8-12; emphasis added).

The Patent Owner disagrees with the Examiner's assertion that any of the claim terms should be construed in accordance with §112, 6th paragraph for the first time now. The Patent Owner notes that there are differences between the Examiner's claim interpretations under §112, 6th paragraph, and Patent Owner's asserted interpretations consistent with the Court, but believes these differences are not likely material for purposes of this Response.

IV. Patentability of the Pending Claims

The Examiner rejected independent Claims 1 and 18 as being anticipated by or, in the alternative as being obvious over Chou et al. Independent Claim 13 was rejected over the combination of Chou et al. and Spaur et al.

FIG. 1 from Chou et al. is reproduced below for convenience.

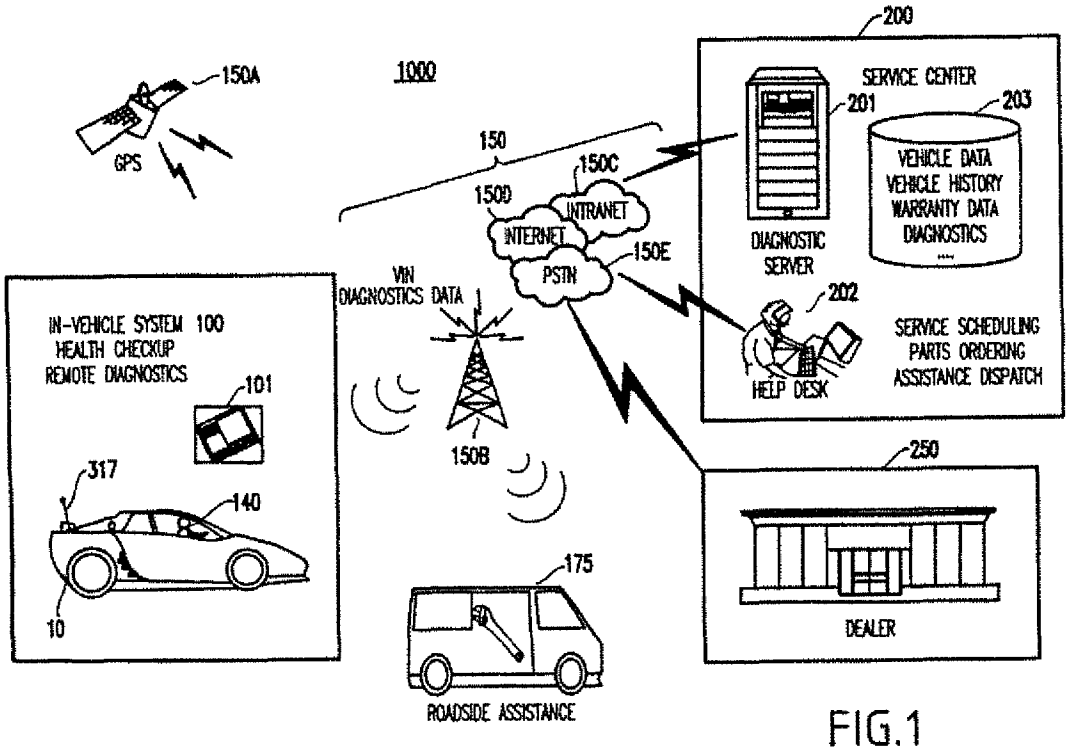


FIG.1

The Chou et al. system includes a vehicle 10 having an in-vehicle computing system 100, and a client computer device 101 to enable vehicle health checkup and remote diagnostics. A communication link 150 is for communicating vehicle information (e.g., vehicle identification number, (VIN), diagnostic data, and the like). The vehicle location is established, for example, by a device 317 (e.g., antenna or the like) for receiving positioning information. A remote service center 200 is also provided having a diagnostic server 201, a help desk 202 and a data repository 203. The help desk 202 schedules services, orders parts, and dispatches assistance through the roadside assistance unit 175.

The Patent Owner submits that Chou et al. fails to disclose the claimed vehicle tracking unit including the multi-vehicle compatible controller and the downloading interface for the reasons set forth below.

A. Chou et al. Fails to Disclose the Multi-Vehicle Compatible Controller and Downloading Interface

1. Multi-Vehicle Compatible Controller

Independent Claim 1, for example, recites a multi-vehicle compatible controller to be coupled to the vehicle data bus for communication thereover with at least one vehicle device using at least one corresponding vehicle device code from among a plurality thereof for different vehicles.

Chou et al. provides the following description of the vehicle bus interface as is pertinent to the different device codes for different vehicles:

> [t]he vehicle bus interface 120 includes the following modules: vehicle bus adapter 120C, fault detector 120B, and diagnostic data service 120A. The fault detector 120B polls the vehicle bus 104 through the vehicle bus adapter 120C checking for fault codes reported by the vehicle ECUs 103. The vehicle bus adapter 120C translates the messages received from the vehicle bus into the language of the fault detector. It also translates messages from the fault detector into the language of the vehicle bus. The fault code specifications and protocols of the vehicle may be Original Equipment Manufacturer (OEM) and model dependent. The term "vehicle fault codes" is meant to be synonymous with the term "trouble code" or "diagnostic trouble code". A listing of such codes may be found in the publication of the Society of Automotive Engineers, "SAE On-Board

> Diagnostics for Light and Medium Duty Vehicles Standards Manual". The diagnostic data service 120A accepts request for vehicle parametric data and retrieves the data using the vehicle bus adapter. (Col. 4, lines 20-38; emphasis added).

The Examiner, on page 26, contends that "Chou either implicitly discloses or obviously suggests a 'multi-vehicle compatible controller' and such controller is coupled to a vehicle data bus, e.g. 335, 104, for communication thereover, e.g. via 330, 120, with at least one vehicle device, e.g. 103, using at least one corresponding vehicle device code, i.e. (DTC), vehicle fault codes/protocols, which is vehicle model dependent, i.e. from among a plurality thereof for 'different vehicles'".

The cited SAE On-Board Diagnostics for Light and Medium Duty Vehicles Standards Manual, i.e. the SAE HS-3000, provides that: "[c]urrently there is no uniformity in these numeric Diagnostic Trouble Codes (DTC) between manufacturers, and in some cases, even within the same manufacturer across different product lines." (SAE HS-3000, 1997, page 39).

Indeed, the lack of vehicle code compatibility among different vehicles for vehicle tracking units is the problem addressed by the claimed invention of the '278 patent. The inventor, Mr. Flick, recognized that having many different model vehicle tracking units for many different vehicles presented significant inventory control and product development challenges, particularly in the aftermarket vehicle tracking unit area.

2. Downloading Interface

Independent Claim 1, for example, further recites that the vehicle tracking unit comprises "a downloading interface for permitting downloading of enabling data related to the at least one corresponding vehicle device code for use by said multi-vehicle compatible controller". Accordingly, the combination of the multi-vehicle controller and downloading interface reduces the need for expansive inventory and simplifies supplying vehicle tracking units for new vehicles.

As noted above, the Examiner has interpreted the downloading interface of the claimed vehicle tracking unit as structure "for permitting downloading of enabling data related to the at least one corresponding vehicle device code, e.g. vehicle device code or codes, an instruction to select a code or codes from among those already stored, or the data or sequence to allow the controller to generate the vehicle device code or codes, for use by said multi-vehicle compatible controller." (Office Action, page 18).

The Examiner, on page 27, contended that Chou et al. discloses the claimed downloading interface as follows:

> interface circuitry, e.g. NETWORK INTERFACE, 320, 107, docking facility, and a temporary wireless communication link, e.g. arrow 7, 14, arrow 3, 9, with the downloading device, i.e. TCP/IP(an internet/the Internet), 201, provided by sharing the wireless communications device, e.g. 102, that sends position data, see, e.g. col. 7, lines 32-40, (see also discussion of claims 2-5) and such structure permits downloading of enabling data, e.g. instruction to gather data, vehicle parameter update/change, related to the at least one corresponding vehicle device code for use by

said multi-vehicle compatible controller, e.g. steps 2-6 in Figure 5.

FIG. 5, which illustrates a health checkup event operation flow, is reproduced below for convenience.

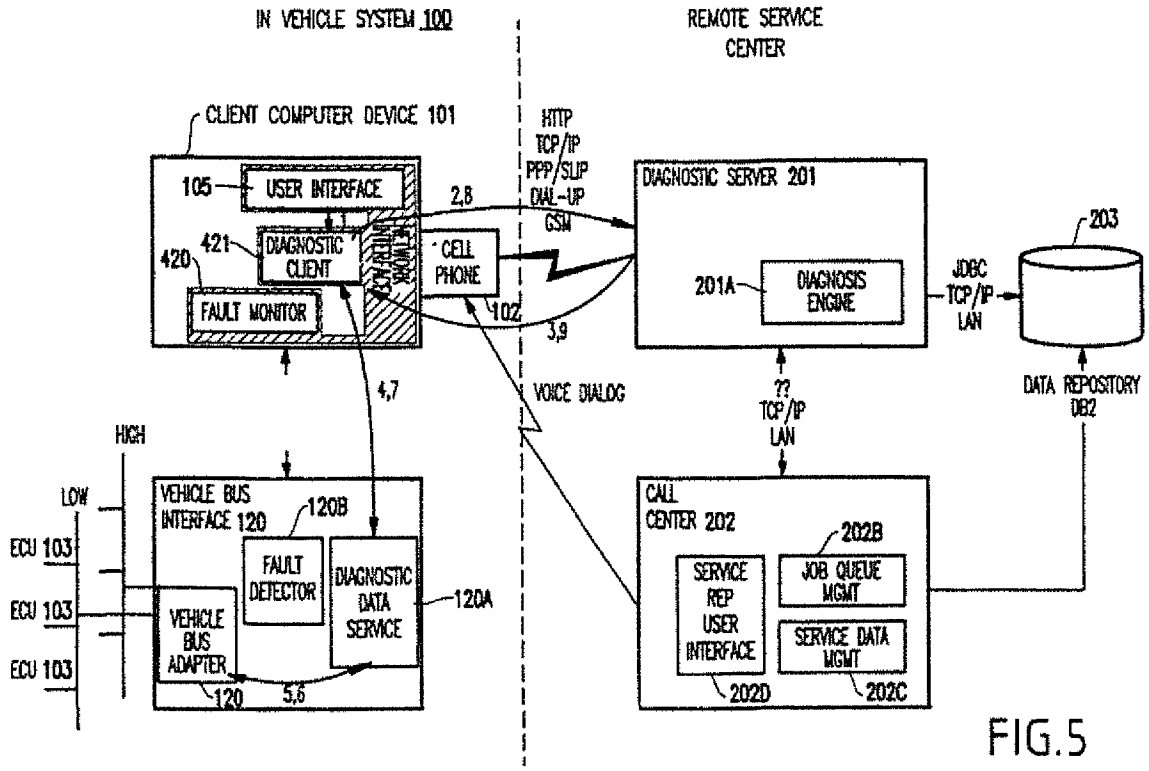


FIG.5

Based upon FIG. 5 and these cited portions of Chou et al., the Examiner contended that: "[t]hus '499 discloses or obviously suggests 'a downloading interface' and such permits downloading of enabling data related to the at least one corresponding vehicle device code for use by said multi-vehicle compatible controller." (Page 27).

The Patent Owner respectfully submits that Chou et al. fails to disclose or obviously suggest the claimed multi-vehicle

compatible controller and downloading interface in the vehicle tracking unit. Instead, data from the ECUs on the vehicle bus is merely passed from the in-vehicle system to the remote service center of Chou et al. And, in the reverse direction, data is passed to the in-vehicle system in Chou et al. There is no discussion in Chou et al. of downloading enabling data related to at least device code for use by the multi-vehicle controller in the vehicle.

B. Chou et al. Teaches Away from the Claimed Invention

The Patent Owner contends that the teachings of Chou et al. include that the in-vehicle computer system (the left hand side of FIG. 5) simply interfaces to the various specific ECUs on the bus. Further, Chou et al. teaches that the diagnostic server of the remote service center (on the right hand side of FIG. 5) provides the ability to read data from the data bus or write data to the data bus, even though different manufacturers and different models use different codes for their ECUs. In other words, Chou et al. teaches away from the claimed vehicle tracking unit including the multi-vehicle controller and downloading interface.

For example, Chou et al. provides that:

> [t]he remote service center 200 of FIG. 3 comprises a diagnostic server 201 that has access to data related to the vehicle such as as-built, history, diagnostics, warranty, service information and failure mode data. The diagnosis server 201 is linked to the data repository 203 via a TCP/IP link, LAN, or the like. (Col. 5, lines 34-39; emphasis added).

And Chou et al. also provides:

> [w]ithin the diagnostic server 201 at the service center 200 is a diagnosis engine 201A. The main function of the diagnosis engine 201A is to provide a health checkup or a diagnosis using the data obtained from the vehicle, the vehicle's past history, and the diagnostics information about the particular model of the vehicle. (Col. 5, line 53-58; emphasis added).

In operation, "[t]he diagnosis engine 201A first determines if a fault or a potential of a fault is present by checking if any trouble code is reported by the client, and checking a predetermined list of vehicle attribute values against their normal operating characteristics." (Col. 5, lines 61-64).

During diagnosis session "the diagnostic client 421 passes the fault codes, vehicle identification and other relevant information to the [diagnostic] server 201". (Col. 8, lines 19-21). The fault detector and diagnostic client are both at the vehicle, and, the diagnostic server is at the remote service center. The diagnostic server can also request data from the diagnostic client at the vehicle.

The vehicle driver may also initiate a vehicle health checkup. Chou et al. further describes this health checkup as follows:

> [t]hen, vehicle information, estimated to be on the order of 1 kilobyte in size, including, for example, vehicle identification number (VIN), any trouble codes, and/or a snapshot of the vehicle data, are retrieved by the vehicle client 101 through the vehicle bus interface 120. The vehicle client 101 combines vehicle ID information with the information from the vehicle bus interface 120 and sends the data to the Diagnostic Server 201 over a data link. The data link is kept open. The diagnostics server 201

> retrieves vehicle information from the data repository 203 and compares the data from the vehicle with the repository data. Then, the diagnostic server 201 prepares a report listing any out-of-range parameters and actions required (e.g., "coolant level is low"). (Col. 9, lines 3-16; emphasis added).

The Patent Owner submits that Chou et al. teaches that the ability to work with different vehicles, having different vehicle device codes, is provided at the remote service center using the diagnostic server 201 in combination with the data repository 203 (FIG. 1) also at the remote service center - and not at the vehicle. Chou et al. provides no disclosure, and no reason, for this capability to be provided at the in-vehicle system.

Thus Chou et al. teaches away from the vehicle tracking unit of the claimed invention that includes: the multi-vehicle compatible controller to be coupled to the vehicle data bus for communication thereover with at least one vehicle device using at least one corresponding vehicle device code from among a plurality thereof for different vehicles, and the downloading interface for permitting downloading of enabling data related to the at least one corresponding vehicle device code for use by said multi-vehicle compatible controller.

Accordingly, the Patent Owner submits that independent Claims 1 and 13 are patentable over Chou et al. Spaur et al. is cited for the teaching of a wired connection in the rejection of independent Claim 13, and, the Patent Owner submits that Spaur et al. adds nothing to the deficiencies of Chou et al. Accordingly, independent Claim 13 is also patentable. In view of the patentability of the independent Claims 1, 13 and 18, it

is submitted that their dependent claims are also patentable, and require no further discussion herein.

C. Secondary Considerations of Non-Obviousness

To the extent that the Examiner is relying on an obviousness argument based upon the Chou et al. patent, the Patent Owner can offer the following secondary considerations supporting non-obviousness. As noted by the Federal Circuit in *Mintz v. Dietz*, 679 F.3d 1372 (Fed. Cir. 2012), the following helpful guidance is provided with respect to the objective criteria of secondary considerations:

> [t]hese objective criteria thus help turn back the clock and place the claims in the context that led to their invention. Technical advance, like much of human endeavor, often occurs through incremental steps toward greater goals. These marginal advances in retrospect may seem deceptively simple, particularly when retracing the path already blazed by the inventor. For these reasons, this court requires consideration of these objective indicia because they "provide objective evidence of how the patented device is viewed in the marketplace, by those directly interested in the product." (*Id.* at 1378; emphasis added).

Mintz further provides:

> [i]ndeed, where the invention is less technologically complex, the need for Graham findings can be important to ward against falling into the forbidden use of hindsight. Simply because the technology can be easily understood does not mean that it will satisfy the legal standard of obviousness. In fact, objective consideration of simple technology is often the most difficult because, once the

> problem and solution appear together in the patent disclosure, the advance seems self-evident. Instead, the proper analysis requires a form of amnesia that "forgets" the invention and analyzes the prior art and understanding of the problem at the date of invention.
> (*Id.* at 1379; emphasis added).

The Patent Owner sets forth below evidence of licensing, commercial success, copying by others, customer need, and limited value of products without the claimed invention.

1. Licensing

The '278 patent in Claim 1, for example, is directed to a multi-vehicle compatible tracking unit for a vehicle comprising a vehicle data bus extending throughout the vehicle. The multi-vehicle compatible tracking unit comprises a vehicle position determining device, a wireless communications device, and a multi-vehicle compatible controller for cooperating with the vehicle position determining device and the wireless communications device to send vehicle position information. The multi-vehicle compatible controller is to be coupled to the vehicle data bus for communication thereover with at least one vehicle device using at least one corresponding vehicle device code from among a plurality thereof for different vehicles. The multi-vehicle compatible tracking unit comprises a downloading interface for permitting downloading of enabling data related to the at least one corresponding vehicle device code for use by the multi-vehicle compatible controller.

The Patent Owner points to the following excerpt from the Jury Verdict form (Exhibit 1) from the related litigation

establishing the merits of the claimed invention and the licenses:

5. **Which of the following factors that tend to indicate nonobviousness, if any, has been established by the evidence with respect to the claimed invention (write the word "yes" in the blank below to any question that you answer "yes" to):**

YES **Did others accept licenses under patents because of the merits of the claimed invention?**

In other words, after observing all of the testimony of the witnesses, reviewing the exhibits presented during trial, and applying the Court's Jury Instructions, the Jury determined that the licenses were based on the merits of the claimed invention, including the '278 patent.

As noted in Mr. McAlexander's Declaration, the Patent Owner has received in excess of $50 million in licensing revenue, from the '278 patent and the other asserted patents in the related litigation.

Mr. McAlexander also notes that the '278 patent is one of three patents asserted in the related litigation providing features for multi-vehicle compatibility; and, multi-vehicle compatibility is important for the overall licensing program of the Patent Owner.

Mr. McAlexander cites to Requester's own employees' trial testimony for the propositions that the multi-vehicle compatibility provides for simplified installation and avoids the need to have multiple SKUs (stock keeping units). Further

details regarding the "customer need" and "limited value" without the multi-vehicle compatibility are provided below.

2. Commercial Success

The Patent Owner respectfully points to the following excerpt from the Jury Verdict form from the related litigation that provides evidence of commercial success due to the merits of the claimed invention:

5. **Which of the following factors that tend to indicate nonobviousness, if any, has been established by the evidence with respect to the claimed invention (write the word "yes" in the blank below to any question that you answer "yes" to):**

yes **Were accused products covered by the claim commercially successful due to the merits of the claimed invention rather than due to advertising, promotion, salesmanship, or features of the product other than those found in the claim?**

Furthermore, the Jury also determined that the features of the '278 patent were included in the infringing CalAmp devices. The Jury determined that asserted claims of the '278 patent were infringed, and the Court determined the infringement was willful. The Jury Verdict evidences that products sold by CalAmp correspond to the claimed invention.

This is the pertinent portion of the Jury Verdict form:

	LMU-3000	LMU-3030	LMU-3050	VPOD	VPOD2
Claim 1	☑ Yes ☐ No	☑ Yes ☐ No	☑ Yes ☐ No	☑ Yes ☐ No	☑ Yes ☐ No
Claim 2	☑ Yes ☐ No	☑ Yes ☐ No	☑ Yes ☐ No	☑ Yes ☐ No	☑ Yes ☐ No
Claim 3	☑ Yes ☐ No	☑ Yes ☐ No	☑ Yes ☐ No	☑ Yes ☐ No	☑ Yes ☐ No
Claim 4	☑ Yes ☐ No	☑ Yes ☐ No	☑ Yes ☐ No	☑ Yes ☐ No	☑ Yes ☐ No
Claim 5	☑ Yes ☐ No	☑ Yes ☐ No	☑ Yes ☐ No	☑ Yes ☐ No	☑ Yes ☐ No
Claim 6	☑ Yes ☐ No	☑ Yes ☐ No	☑ Yes ☐ No	☑ Yes ☐ No	☑ Yes ☐ No
Claim 8	☑ Yes ☐ No	☑ Yes ☐ No	☑ Yes ☐ No	☑ Yes ☐ No	☑ Yes ☐ No
Claim 11	☑ Yes ☐ No	☑ Yes ☐ No	☑ Yes ☐ No	☑ Yes ☐ No	☑ Yes ☐ No

	LMU-3000	LMU-3030	LMU-3050	VPOD	VPOD2
Claim 12	☑ Yes ☐ No	☑ Yes ☐ No	☑ Yes ☐ No		
Claim 13	☑ Yes ☐ No	☑ Yes ☐ No	☑ Yes ☐ No	☑ Yes ☐ No	☑ Yes ☐ No
Claim 14	☑ Yes ☐ No	☑ Yes ☐ No	☑ Yes ☐ No	☑ Yes ☐ No	☑ Yes ☐ No
Claim 16	☑ Yes ☐ No	☑ Yes ☐ No	☑ Yes ☐ No	☑ Yes ☐ No	☑ Yes ☐ No
Claim 18	☑ Yes ☐ No	☑ Yes ☐ No	☑ Yes ☐ No	☑ Yes ☐ No	☑ Yes ☐ No
Claim 19	☑ Yes ☐ No	☑ Yes ☐ No	☑ Yes ☐ No	☑ Yes ☐ No	☑ Yes ☐ No
Claim 21	☑ Yes ☐ No	☑ Yes ☐ No	☑ Yes ☐ No	☑ Yes ☐ No	☑ Yes ☐ No

As noted in Mr. McAlexander's Declaration, CalAmp has sold over 466,000 units of the accused products, earning over $4.1 million in gross profits (citing to the Tregillis financial expert report).

Mr. McAlexander also notes that the '278 patent is one of three patents asserted in the related litigation providing features for multi-vehicle compatibility; and, multi-vehicle compatibility is important for the overall licensing program of the Patent Owner. Mr. McAlexander cites to Requester's own employees' trial testimony for the propositions that the multi-vehicle compatibility provides for simplified installation and avoids the need to have multiple SKUs (stock keeping units).

3. Copying by Others

Once again, the Patent Owner points to the following excerpt from the Jury Verdict form from the related litigation that establishes copying:

5. **Which of the following factors that tend to indicate nonobviousness, if any, has been established by the evidence with respect to the claimed invention (write the word "yes" in the blank below to any question that you answer "yes" to):**

YES **Did others copy the claimed invention?**

The Jury's finding of infringement of all of the asserted claims of the '278 patent (provided above) establishes that CalAmp's products correspond to the claimed invention. The Court's Final Order and Final Judgment confirm the Jury's Verdict.

4. Customer Need

The Patent Owner draws the Examiner's attention first to the Court's determination in the related litigation. In its Final Order, the Court provides:

> Rather than take a license, and choosing not to design around Omega's patents, CalaAmp elected to sell infringing products and continues to do so to this day. CalaAmp's motivation to engage in this behavior is obvious: their customers wanted this technology and CalAmp wanted to provide it. (Final Order, page 19; Emphasis added.)

The McAlexander Declaration provides that the multi-vehicle accused products in the CalAmp litigation were developed because of "customer need" for a simple installation that did not require splicing of wires. Mr. McAlexander's position is supported by the following testimony of Mr. Stephen Hall and Mr. Peter Hergesheimer, both CalAmp employees, as follows:

Testimony of Stephen Hall

Q. Can you introduce yourself for the record

A. Yes. My name is Stephen Hall. The correct spelling is S-t-e-p-h-e-n.

Q. All right, sir. And by whom are you employed?

A. I'm an employee of CalAmp Corporation.

Q. Do you have a title at CalAmp?

A. My official title is director of system engineering and technology.

Q. What does it mean to be the director of system engineering and technology at CalAmp?

A. My role is to look at the needs of our customer and market and to match them up with various technologies that are going on in the industry component level and otherwise to make sure that we have an appropriate solution. (Stephen Hall deposition, 6:8-22).

Q. All right, sir. I'm going to hand you what was previously marked as Exhibit 1 to the deposition of Mr. Hergesheimer. Can you tell me what Exhibit 1 is?

A. I'm looking at a CalAmp datasheet for the LMU-3000 product.

Q. And were you involved in the development of the LMU-3000?

A. I was.

Q. And what was your role in developing the LMU-3000?

A. My role on the 3000 was at the CRS level. I provided the requirements document for that. The various blocks within it were predefined by our existing partnerships, and so I didn't do a lot of component selection type of work, so it was really limited just to the CRS document.

Q. Was there a particular market need that you identified leading up to the creation of the CRS for the LMU-3000?

A. The 3000 was driven by a general market need that we heard from a number of customers. The primary interest was coming from a need for a *simple installation type of solution* and the opportunity to enhance the capability of the product that we could offer with certain data items coming off of the vehicle bus. (Stephen Hall deposition, 6:8-22; and 40:20-41:12; Emphasis added).

Testimony of Peter Hergesheimer

Q. You have been designated as a representative on whether CalAmp has willfully or deliberately infringed in this case. Beyond knowing about the devices and how they operate, do you know anything about CalAmp's assertions that its actions are not willful or deliberate?

A. I would say from my experience in the development of these devices that there's no willful infringement.

Q. And -- and what's that based on?

A. That's based on knowing where the -- the technology that we use came from and the fact that these were sales-driven requests and somebody had a problem to solve and we went about solving the problem.

Q. What do you mean sales-driven request?

A. Well, typically our -- typically we have a customer that says hey, I would like to do this particular -- have a product that has this feature and so CalAmp goes about designing that product.

Q. So the LMU3000 development was the result of - or was -- was undertaken because customers expressed a demand to CalAmp for these products?

A. I -- I believe that's the case. I can't say specifically for these, but that's in general how our product development works. (Peter Hergesheimer deposition, 40:6 - 41:3).

5. Limited Value for Products Without the Invention

The Examiner's attention is directed to the section above regarding Commercial Success. The Patent Owner asserts that the accused products as covered by the '278 patent would have "limited value" if it were not for multi-vehicle compatibility. CalAmp's own employee, Peter Hergesheimer, testified as follows:

Testimony of Peter Hergesheimer

Q. Can you state your name for the record.

A. Peter Hergesheimer.

Q. All right. Sir, and by whom are you employed?

A. CalAmp.

Q. Okay. And what's your position at CalAmp?

A. I'm the senior director of software and architecture in the MRM group. (Peter Hergesheimer deposition, 6:2-8).

Q. Do you know whether the LMU3000 would have any value if it didn't work on multiple vehicles?

A. It would have a limited value.

Q. You would need separate skus for each vehicle; right?

A. That would be one way of solving that problem.

Q. Is there any other way?

A. Different skus could be different software got loaded onto the same sku.

Q. Okay. So you can -- whether you have a different sku or not, you would need to -- if -- if the LMU3000 was vehicle specific, it would need software for each vehicle in which it was -- separate software for each vehicle in which it was designed to work?

A. Each vehicle type I would guess, yes.

Q. And that would be a more expensive exercise, I would think, from CalAmp's perspective?

A. Yes.

Q. And less desirable than the -- than the option you have now where the LMU is able to service multiple vehicles?

A. Yes, even though it is still pretty painful.

(Peter Hergesheimer deposition, 46:25 - 47:19; Emphasis added).

In view of the evidence of secondary considerations the Patent Owner submits that any obviousness type rejection of the pending claims is rebutted.

CONCLUSIONS

In view of the arguments presented above, and the evidence submitted in the attached Rule 132 Declaration, it is submitted that all of the claims are patentable. Accordingly, a Reexamination Certificate confirming all claims as patentable is respectfully requested in due course. Should any minor informalities need to be addressed, the Examiner is encouraged to contact the undersigned at the telephone number listed below.

The Commissioner is hereby authorized to charge or credit any discrepancies in fee amounts to Deposit Account No. 01-0484.

Respectfully submitted,

/JACK G. ABID/

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In re Patent of
Kenneth E. FLICK
Reexamination Control No. **90/013,851**
Filed: **OCTOBER 29, 2016**
_____/

CERTIFICATE OF SERVICE

Certificate of Service in compliance with 37 C.F.R. §1.530(c)

Pursuant to 37 C.F.R. §§1.530(c), 1.248, I hereby certify that on June 12, 2017, a complete copy of this Amendment is being served via First Class U.S. Mail upon Third Party Requester at the correspondence address as shown in PAIR:

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Respectfully submitted,

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IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

In re Patent of **KENNETH E. FLICK**	)	
	)	
Request for Reexamination of **U.S. PATENT NO.6,032,278**	)	
	)	
Control No. **90/013,851**	)	Attorney Docket No.: **C13-03895(58106CIP1_REX2)**
Confirmation No. **8717**	)	
	)	Examiner: **K. Reichle**
Filing Date: **OCTOBER 28, 2016**	)	
	)	Art Unit: **3992**
For: **VEHICLE TRACKING UNIT WTIH DOWNLOADABLE CODES AND ASSOCIATED METHODS**	)	

DECLARATION BY JOSEPH C. McALEXANDER, III UNDER 37 C.F.R. §1.132

I, the undersigned, hereby declare that:

I. Background

1. I am the Founder and President of McAlexander Sound, formerly IP Director of CCI and Vice President of EPI Technologies, Inc., and have 44 years of experience in microcircuit and semiconductor technologies, including: device design, fabrication, assembly, testing, and marketing, and control system design, analysis, quality, reliability, and defect/failure analysis at Texas Instruments.

2. I am a Registered Professional Engineer (#79454) in the State of Texas and hold a Bachelor of Science degree in Electrical Engineering from North Carolina State University.

3. I am an inventor on 31 U.S. patents and a number of foreign patents, and I am familiar with the patent process.

4. I have been an expert witness and technical consultant for the past 26 years in IP matters related to product/process analysis and investigation.

5. I prepared expert reports and provided trial testimony in the case of Omega Patents, LLC (the '278 Patent Owner) v. CalAmp Corp. (the Requester) that recently concluded in the Middle District of Florida (hereinafter referred to as the "CalAmp litigation"). In that CalAmp litigation, the '278 patent was asserted and determined by the jury to be not invalid, to be infringed by CalAmp, and that CalAmp acted despite an objectively high likelihood that its actions infringed a valid patent, and that this objectively high likelihood of infringement was either known or so obvious that it should have been known to CalAmp. (Jury Verdict, Exhibit 1). In the Court's Final Order of April 5, 2017 (Exhibit 2), the Court confirmed that the asserted claims were not invalid (including the claims of the '278 patent), and that CalAmp was a willful infringer. In the Court's Final Judgment (Exhibit 3), the Court awarded damages of $10,144,286.

6. I have been retained by the Patent Owner to provide technical consultation in the present reexamination of

the '278 patent, particularly with respect to addressing rejections based upon U.S. Patent No. 6,330,499 to Chou et al.

II. The '278 Patent and Current Office Action

7. I have extensively reviewed the '278 patent, along with its file history, and arguments advanced by Requester's trial expert, Mr. Andrews, as part of my work on behalf of the Patent Owner during the course of the CalAmp litigation. I have also reviewed the related litigation trial transcript and exhibits, and have reviewed the Court's Final Order of April 5, 2017, and Final Judgment of April 24, 2017.

8. I have reviewed the current Office Action dated March 29, 2017 for the reexamination of the '278 patent. In that Office Action, the claims were rejected as follows:

> Claims 1, 4-8, 11-12, 18-21 were rejected as anticipated by or, in the alternative, obvious over U.S. Patent No. 6,330,499 to Chou et al.
>
> Claims 9-10 and 22 were rejected over Chou et al. and U.S. Patent No. 6,028,537 to Suman et al.
>
> Claims 2-3 and 13-16 were rejected over Chou et al. and U.S. Patent No. 5,732,074 to Spaur et al.
>
> Claim 17 was rejected over Chou et al. and Suman et al. and Spaur et al.

9. Representative Claim 1 of the '278 patent is directed to a multi-vehicle compatible tracking unit for a

vehicle comprising a vehicle data bus extending throughout the vehicle. The multi-vehicle compatible tracking unit comprises a vehicle position determining device, a wireless communications device, and a multi-vehicle compatible controller for cooperating with the vehicle position determining device and the wireless communications device to send vehicle position information. The multi-vehicle compatible controller is to be coupled to the vehicle data bus for communication thereover with at least one vehicle device using at least one corresponding vehicle device code from among a plurality thereof for different vehicles. The multi-vehicle compatible tracking unit comprises a downloading interface for permitting downloading of enabling data related to the at least one corresponding vehicle device code for use by the multi-vehicle compatible controller. Independent Claim 13 recites that the downloading interface includes a connector for temporary connection to a downloading device. Independent Claim 18 recites that the downloading interface includes a wireless receiver for temporary connection to a downloading device.

III. The Prior Art Analysis

10. I understand that Chou et al. discloses a system including a vehicle having an in-vehicle computing system, and a client computer device to enable vehicle health checkup and remote diagnostics. A communication link is for communicating vehicle information (e.g., vehicle identification number (VIN), diagnostic data, and the like). The vehicle location is established, for example by a device (e.g., antenna

or the like) for receiving positioning information. A remote service center is also provided having a diagnostic server, a help desk and a data repository. The help desk schedules services, orders parts, and dispatches assistance through the roadside assistance unit.

11. I understand that the vehicle bus interface of Chou et al. includes the following modules: "vehicle bus adapter 120C, fault detector 120B, and diagnostic data service 120A. The fault detector 120B polls the vehicle bus 104 through the vehicle bus adapter 120C checking for fault codes reported by the vehicle ECUs 103. The vehicle bus adapter 120C translates the messages received from the vehicle bus into the language of the fault detector. It also translates messages from the fault detector into the language of the vehicle bus. The fault code specifications and protocols of the vehicle may be Original Equipment Manufacturer (OEM) and model dependent. The term 'vehicle fault codes' is meant to be synonymous with the term 'trouble code' or 'diagnostic trouble code'." (Col. 4, lines 21-32).

12. I further understand that Chou et al. discloses that a "listing of such codes may be found in the publication of the Society of Automotive Engineers, 'SAE On-Board Diagnostics for Light and Medium Duty Vehicles Standards Manual'." (Col. 4, lines 33-36).

13. I have previously studied the SAE On-Board Diagnostics for Light and Medium Duty Vehicles Standards Manual, SAE HS-3000 (1997), identified in Chou et al., as part of my studies for related reexaminations (90/013,741 and 90/013,659). The SAE HS-3000 Manual provides that: "[c]urrently there is no uniformity in these numeric Diagnostic Trouble Codes (DTC) between manufacturers, and in some cases, even within the same manufacturer across different product lines." (SAE HS-3000, 1997, page 39).

14. I understand that the Examiner has interpreted the claimed downloading interface as structure "for permitting downloading of enabling data related to the at least one corresponding vehicle device code, e.g. vehicle device code or codes, an instruction to select a code or codes from among those already stored, or the data or sequence to allow the controller to generate the vehicle device code or codes, for use by said multi-vehicle compatible controller."

15. I understand that the Examiner contends that Chou et al. discloses an interface and wireless communication link structure that "permits downloading of enabling data, e.g. instruction to gather data, vehicle parameter update/change, related to the at least one corresponding vehicle device code for use by said multi-vehicle compatible controller, e.g. steps 2-6 in Figure 5."

16. It is my opinion that one of ordinary skill in the art would recognize that Chou et al. fails to disclose the multi-vehicle compatible controller and downloading interface of the claimed vehicle tracking unit, as these claim recitations are interpreted by the Examiner.

17. It is my opinion that one of ordinary skill in the art would recognize that Chou et al. teaches away from the claimed invention. Chou et al. provides repeated disclosure that the diagnostic server at the remote service center permits multi-vehicle compatibility. See, for example, col. 5, lines 34-39; col 5, lines 53-58; col. 5, lines 61-64; col. 8, lines 19-21; and col. 9, lines 3-16.

IV. Evidence of Secondary Considerations

18. I submit that the person of ordinary skill in the art would not find it obvious to selectively modify Chou et al. Instead, it is my opinion that such a selective modification or combination would only be motivated by improper hindsight reconstruction - here about twenty years of hindsight.

19. I submit that merits of the claimed invention extend to providing multi-vehicle compatibility as described above. Accordingly, there exists evidence of secondary considerations of non-obviousness including:

a. The Jury Verdict, page 9, provides that others accepted licenses under the patents "because of the merits of the claimed invention."

b. I also understand that Omega has received in excess of $50 million in licensing revenue, much of it from the '278 patent and the other asserted patents in the CalAmp litigation. The Final Judgment adds another $10M to this amount.

c. The '278 patent is one of three patents asserted in the related litigation providing features for multi-vehicle compatibility as is important for the overall licensing program of the Patent Owner.

d. The Jury Verdict, page 9, includes the Jury's determination that the accused products were "commercially successful due to the merits of the claimed invention rather than due to advertising, promotion, salesmanship, or features of the product other than those found in the claim." And the Jury determined that the asserted claims of the '278 patent were infringed by each of the accused CalAmp devices. (Jury Verdict, Pages 5-6).

e. CalAmp's employees testified in the related litigation that the multi-vehicle compatibility provides for simplified installation in a vehicle, and avoids the need for separated stock keeping units (SKUs). Hall

deposition, 40:25 - 41:2; and Hergesheimer deposition, 43:3-16).

f. CalAmp telemetry devices have enjoyed significant commercial success having sold over 466,000 units of the accused products, earning over $4.1 million in gross profits based upon the financial Expert Report of Mr. Tregillis.

g. The Jury Verdict, on page 9, includes a finding that others copied the claimed invention.

h. The Court determined that "CalAmp was well aware of Omega's patents since at least 2010. Rather than take a license, and choosing not to design around Omega's patents, CalAmp elected to sell infringing products and continues to do so to this day. CalAmp's motivation to engage in this behavior is obvious: their customers wanted this technology, and CalAmp wanted to provide it." (Final Order, pg. 19).

i. The Accused Products in the CalAmp litigation were developed because of "customer need." (Hall deposition, 40:20-41:12; Hergesheimer deposition, 40:23-41:3.).

j. Further, the infringing CalAmp Products would have "limited value" if it were not for the multi-vehicle

compatibility. (Hergesheimer deposition, 46:25-47:169.).

20. I hereby declare further that all statements made herein are of my own knowledge and are true, and that all statements made on information and belief are believed to be true; and further that these statements were made with the knowledge that willful false statements and the like so made are punishable by fine or imprisonment, or both, under Section 1001 of Title 18 of the United States Code, and that such willful and false statements may jeopardize the validity of the application or any patent issued thereon.

Joseph C. McAlexander, III

June 12, 2017
Date

Exhibit 1

UNITED STATES DISTRICT COURT
MIDDLE DISTRICT OF FLORIDA
ORLANDO DIVISION

OMEGA PATENTS, LLC,

Plaintiff,

v. Case No: 6:13-cv-1950-Orl-40DAB

CALAMP CORP.,

Defendant.
_____/

VERDICT FORM

1. Do you find Omega has proven by a preponderance of the evidence that any of the accused CalAmp devices infringed any of the asserted claims of Omega's asserted Patents?

   ✓ Yes (for Omega) _____No (for CalAmp)

If your answer to Question 1 is "No," proceed to Question 3. If your answer to Question 1 is "Yes," for any claim(s) Omega has proven by a preponderance of the evidence that any of the accused CalAmp devices infringed, indicate a finding of infringement by marking "Yes" in the corresponding space provided in Questions 2.A through 2.D. below; for any claim(s) Omega has failed to prove by a preponderance of the evidence that any of the accused CalAmp devices infringed, indicate a finding of non-infringement by marking "No" in the corresponding space provided in Questions 2.A through 2.D. below.

2.A. U.S. Patent No. 6,346,876 B1 ("the '876 patent")

Has Omega proven by a preponderance of the evidence that any of the accused CalAmp devices infringed any of the following claims of the '876 patent?

	LMU-3000	LMU-3030	LMU-3050	VPOD	VPOD2
Claim 1	☑ Yes ☐ No	☑ Yes ~~☑ No~~	☑ Yes ☐ No	☑ Yes ☐ No	☑ Yes ☐ No
Claim 3	☑ Yes ☐ No	☑ Yes ☐ No	☑ Yes ☐ No	☑ Yes ☐ No	☑ Yes ☐ No
Claim 4	☑ Yes ☐ No	☑ Yes ☐ No	☑ Yes ☐ No	☑ Yes ☐ No	☑ Yes ☐ No
Claim 5	☑ Yes ☐ No	☑ Yes ☐ No	☑ Yes ☐ No	☑ Yes ☐ No	☑ Yes ☐ No
Claim 12	☑ Yes ☐ No	☑ Yes ☐ No	☑ Yes ☐ No	☑ Yes ☐ No	☑ Yes ☐ No
Claim 14	☑ Yes ☐ No	☑ Yes ☐ No	☑ Yes ☐ No	☑ Yes ☐ No	☑ Yes ☐ No
Claim 16	☑ Yes ☐ No	☑ Yes ☐ No	☑ Yes ☐ No	☑ Yes ☐ No	☑ Yes ☐ No

2.B. U.S. Patent No. 6,756,885 B1 ("the '885 patent")

Has Omega proven by a preponderance of the evidence that any of the accused CalAmp devices infringed any of the following claims of the '885 patent?

	LMU-3000	LMU-3030	LMU-3050	VPOD	VPOD2
Claim 1	☑ Yes ☐ No	☑ Yes ☐ No	☑ Yes ☐ No	☑ Yes ☐ No	☑ Yes ☐ No
Claim 2	☑ Yes ☐ No	☑ Yes ☐ No	☑ Yes ☐ No	☑ Yes ☐ No	☑ Yes ☐ No
Claim 3	☑ Yes ☐ No	☑ Yes ☐ No	☑ Yes ☐ No	☑ Yes ☐ No	☑ Yes ☐ No
Claim 12	☑ Yes ☐ No	☑ Yes ☐ No	☑ Yes ☐ No	☑ Yes ☐ No	☑ Yes ☐ No
Claim 14	☑ Yes ☐ No	☑ Yes ☐ No	☑ Yes ☐ No	☑ Yes ☐ No	☑ Yes ☐ No

2.C. U.S. Patent No. 7,671,727 B2 ("the '727 patent")

Has Omega proven by a preponderance of the evidence that any of the accused CalAmp devices infringed any of the following claims of the '727 patent?

	LMU-3000	LMU-3030	LMU-3050	VPOD	VPOD2
Claim 1	☑ Yes ☐ No	☑ Yes ☐ No	☑ Yes ☐ No	☑ Yes ☐ No	☑ Yes ☐ No
Claim 10	☑ Yes ☐ No	☑ Yes ☐ No	☑ Yes ☐ No	☑ Yes ☐ No	☑ Yes ☐ No
Claim 11	☑ Yes ☐ No	☑ Yes ☐ No	☑ Yes ☐ No	☑ Yes ☐ No	☑ Yes ☐ No

2.D. U.S. Patent No. 8,032,278 B2 ("the '278 patent")

Has Omega proven by a preponderance of the evidence that any of the accused CalAmp devices infringed any of the following claims of the '278 patent?

	LMU-3000	LMU-3030	LMU-3050	VPOD	VPOD2
Claim 1	☑ Yes ☐ No	☑ Yes ☐ No	☑ Yes ☐ No	☑ Yes ☐ No	☑ Yes ☐ No
Claim 2	☑ Yes ☐ No	☑ Yes ☐ No	☑ Yes ☐ No	☑ Yes ☐ No	☑ Yes ☐ No
Claim 3	☑ Yes ☐ No	☑ Yes ☐ No	☑ Yes ☐ No	☑ Yes ☐ No	☑ Yes ☐ No
Claim 4	☑ Yes ☐ No	☑ Yes ☐ No	☑ Yes ☐ No	☑ Yes ☐ No	☑ Yes ☐ No
Claim 5	☑ Yes ☐ No	☑ Yes ☐ No	☑ Yes ☐ No	☑ Yes ☐ No	☑ Yes ☐ No
Claim 6	☑ Yes ☐ No	☑ Yes ☐ No	☑ Yes ☐ No	☑ Yes ☐ No	☑ Yes ☐ No
Claim 8	☑ Yes ☐ No	☑ Yes ☐ No	☑ Yes ☐ No	☑ Yes ☐ No	☑ Yes ☐ No
Claim 11	☑ Yes ☐ No	☑ Yes ☐ No	☑ Yes ☐ No	☑ Yes ☐ No	☑ Yes ☐ No

U.S. Patent No. 8,032,278 B2 ("the '278 patent") continued from previous page

	LMU-3000	LMU-3030	LMU-3050	VPOD	VPOD2
Claim 12	☑ Yes ☐ No	☑ Yes ☐ No	☑ Yes ☐ No		
Claim 13	☑ Yes ☐ No	☑ Yes ☐ No	☑ Yes ☐ No	☑ Yes ☐ No	☑ Yes ☐ No
Claim 14	☑ Yes ☐ No	☑ Yes ☐ No	☑ Yes ☐ No	☑ Yes ☐ No	☑ Yes ☐ No
Claim 16	☑ Yes ☐ No	☑ Yes ☐ No	☑ Yes ☐ No	☑ Yes ☐ No	☑ Yes ☐ No
Claim 18	☑ Yes ☐ No	☑ Yes ☐ No	☑ Yes ☐ No	☑ Yes ☐ No	☑ Yes ☐ No
Claim 19	☑ Yes ☐ No	☑ Yes ☐ No	☑ Yes ☐ No	☑ Yes ☐ No	☑ Yes ☐ No
Claim 21	☑ Yes ☐ No	☑ Yes ☐ No	☑ Yes ☐ No	☑ Yes ☐ No	☑ Yes ☐ No

After answering Questions 2.A. through 2.D., proceed to Question 3.

3. Has CalAmp proven by clear and convincing evidence that any claim of the asserted Patents is invalid?

_____ Yes (for CalAmp) ___✓___ No (for Omega)

4. If your answer to Question 3 is "No," proceed to Question 5. If your answer to Question 3 is "Yes," answer Question 4 below by indicating with an X any claim(s) you find invalid by clear and convincing evidence and indicate the reasons for invalidity, namely, identify which prior art references disclose the elements of the claim.

PATENT CLAIM	YES, INVALID	REFERENCES DISCLOSING THE ELEMENTS OF THE CLAIM
U.S. Patent No. 6,346,876		
Claim 1		
Claim 3		
Claim 4		
Claim 5		
Claim 12		
Claim 14		
Claim 16		
U.S. Patent No. 6,756,885		
Claim 1		
Claim 2		
Claim 3		
Claim 12		

PATENT CLAIM	YES, INVALID	REFERENCES DISCLOSING THE ELEMENTS OF THE CLAIM
U.S. Patent No. 6,756,885 (continued from previous page)		
Claim 14		
U.S. Patent No. 7,671,727		
Claim 1		
Claim 10		
Claim 11		
U.S. Patent No. 8,032,278		
Claim 1		
Claim 2		
Claim 3		
Claim 4		
Claim 5		
Claim 6		
Claim 8		
Claim 11		
Claim 12		
Claim 13		
Claim 14		
Claim 16		
Claim 18		
Claim 19		
Claim 21		

After answering Question 4, answer Question 5.

5. Which of the following factors that tend to indicate nonobviousness, if any, has been established by the evidence with respect to the claimed invention (write the word "yes" in the blank below to any question that you answer "yes" to):

yes	Were accused products covered by the claim commercially successful due to the merits of the claimed invention rather than due to advertising, promotion, salesmanship, or features of the product other than those found in the claim?
X	Was there long felt need for a solution to the problem facing the inventors, which was satisfied by the claimed invention?
X	Did others try, but fail, to solve the problem solved by the claimed invention?
yes	Did others copy the claimed invention?
X	Did the claimed invention achieve unexpectedly superior results over the closest prior art?
X	Did others in the field praise the claimed invention or express surprise at the making of the claimed invention?
yes	Did others accept licenses under patents because of the merits of the claimed invention?

If your answer to Question 1 is "Yes," answer Question 6.A. If your answer to Question 1 is "No," skip all remaining questions and proceed to sign and date this Verdict Form.

6.A. Has Omega proven by clear and convincing evidence that CalAmp acted despite an objectively high likelihood that its actions infringed a valid patent?

✓ Yes _____ No

If your answer to Question 6.A. is "Yes," proceed to Question 6.B. If your answer to Question 6.A. is "No," proceed to Question 7.

6.B. Has Omega proven by clear and convincing evidence that this objectively high likelihood of infringement was either known or so obvious that it should have been known to CalAmp?

✓ Yes _____ No

Proceed to Question 7.

7. What amount of damages, if any, do you find is adequate to compensate Omega for CalAmp's infringement of any claim found to be valid and not licensed?

$ 2,975,200

After answering Question 7, sign and date this Verdict Form.

SO SAY WE ALL THIS 24th DAY OF FEBRUARY, 2016.

JURY FOREPERSON

Exhibit 2

UNITED STATES DISTRICT COURT
MIDDLE DISTRICT OF FLORIDA
ORLANDO DIVISION

OMEGA PATENTS, LLC,

Plaintiff,

v. Case No: 6:13-cv-1950-Orl-40DCI

CALAMP CORP.,

Defendant.
_____/

ORDER

This cause is before the Court on the following:

1. Plaintiff's Motion for Entry of Final Judgment, Including Entitlement to Attorneys' Fees, Enhanced Damages, and Entry of a Permanent Injunction (Doc. 148), filed March 9, 2016;
2. Plaintiff's Renewed Motion to Award Prejudgment Interest (Doc. 154) filed March 18, 2016;
3. Defendant's Response in Opposition to Plaintiff's Renewed Motion to Award Prejudgment Interest (Doc. 166), filed April 4, 2016;
4. Defendant's Opposition to Plaintiff's Motion for Entry of Final Judgment, Including Entitlement to Attorneys' Fees, Enhanced Damages, and Entry of a Permanent Injunction (Docs. 169, 170), filed April 11, 2016;
5. Plaintiff's Notice of Filing Declarations (Doc. 187), filed April 28, 2016;
6. Defendant's Notice of Filing Responsive Declarations (Doc. 188), filed April 29, 2016;

7. Defendant's Notice of Supplemental Authority regarding Response in Opposition to Plaintiff's Motion for Entry of Final Judgment (Doc. 192), filed May 17, 2016;
8. Defendant's Notice of Grant of Reexamination of '885 Patent (Doc. 193), filed June 6, 2016;
9. Plaintiff's Notice of Supplemental Authority (Doc. 194), filed June 13, 2016;
10. Defendant's Response to Plaintiff's Notice of Supplemental Authority (Doc. 195), filed June 14, 2016;
11. Plaintiff's Response to Defendant's Notice of Supplemental Authority at Docket Number 192 (Doc. 198), filed July 19, 2016;
12. Defendant's Reply to Plaintiff's Response to Notice of Supplemental Authority (Doc. 199), filed July 22, 2016;
13. Defendant's Notice of Grant of Supplemental Authority (Patent Office Action) (Docs. 200, 201), filed August 30, 2016; and
14. Defendant's Notice of Supplemental Authority (Patent Office Action) (Doc. 202), filed September 19, 2016.

Upon due consideration, and after reviewing the pleadings and the transcript of the trial (Doc. 178–184) and the transcript of the post-trial motion's hearing (Doc. 196), Plaintiff's Motions for Entry of Final Judgement, Enhanced Damages, and Reasonable Attorneys' Fees are granted, and Plaintiff's motions for Permanent Injunction is denied.

I. BACKGROUND

Omega Patents, LLC ("Omega") brought the instant action against CalAmp Corp. ("CalAmp") and contends that CalAmp infringed the claims of U.S. Patent No. 6,346,876

("the '876 Patent")[1], U.S. Patent No. 6,756,885 ("the '885 Patent")[2], U.S. Patent No. 7,671,727 ("the '727 Patent")[3], and U.S. Patent No. 8,032,278 ("the '278 Patent")[4] (collectively, the "patents-in-suit").[5] (Doc. 1). The trial of this matter commenced on February 16, 2016, and concluding on February 24, 2016, (Doc. 178–184), with the jury returning a verdict in favor of Omega in which they found that all of Omega's asserted claims were valid and had been infringed upon by CalAmp's accused devices: the LMU 3000, LMU 3030, LMU 3050, the V-Pod and the V-Pod 2. (Doc. 144, p. 1–6). The jury rejected the Defendant's invalidity contentions and made three findings for Plaintiff on secondary considerations indicating nonobviousness. (*Id.* at pp. 7–9). Finally, the jury found Plaintiff had proven by clear and convincing evidence that CalAmp acted despite an objectively high likelihood that its actions infringed a valid patent and that this high likelihood of infringement was either known or so obvious that it should have been known to CalAmp. (*Id.* at pp. 9–10). The jury awarded damages in the amount of $2,975.200. (*Id.* at p. 10).

Omega contends the Court should award reasonable attorneys' fees pursuant to 35 U.S.C. § 285, enhanced damages pursuant to § 284, and a permanent injunction pursuant to § 283. (Doc. 148). CalAmp opposes the relief requested by Omega. (Doc. 169). The Court held oral argument on the post-trial motions on May 2, 2016. (Doc. 196).

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[1] The jury found infringement of claims 1, 3, 4, 5, 12, 14, and 16. (Doc. 144, p. 2).
[2] The jury found infringement of claims 1, 2, 3, 12, and 14. (*Id.* at p. 3).
[3] The jury found infringement of claims 1, 10, and 11. (*Id.* at p. 4).
[4] The jury found infringement of claims 1–6, 8, 11–16, 18–19, and 21. (*Id.* at pp. 5–6).
[5] The patents-in-suite relate to control systems for vehicles with a "data communication bus." The term "data communication bus" has been previously construed by the Court to mean "wired connection for communication of digital messages among vehicle devises, with each message including one or more device addresses." (Doc. 50, p. 25).

The parties subsequently submitted numerous pleadings consisting of supplemental authority and notices of *ex parte* reexamination by The Patent Office of the '278 patent, the '885 patent, and the '876 patent. (Docs. 198–202).

II. STANDARD

A. Enhanced Damages

When this litigation proceeded to trial, the issue of enhanced damages was governed by the two-step inquiry announced by the Federal Circuit in *In re Seagate Tech., LLC*, 497 F.3d 1360, 1371 (Fed. Cir. 2007) (*en banc*). Following oral argument on Omega's motion for enhanced damages, the United States Supreme Court decided *Halo Elecs., Inc. v. Pulse Elecs., Inc.*, 136 S. Ct. 1923 (2016). The Court in *Halo* rejects the *Seagate* two-part test for determining when a district court my increase damages pursuant to 35 U.S.C. § 284 as being inconsistent with the plain language of the statute. *Halo*, 136 S. Ct. at 1928. Following a historical exegesis of enhanced damages under the Patent Act, the Court concluded that "although there is 'no precise rule or formula' for awarding damages under § 284, a district court's 'discretion should be exercised in light of the considerations' underlying the grant of that discretion." *Halo,* 136 S. Ct. at 1932 (quoting *Octane Fitness, LLC v. ICON Health & Fitness, Inc.*, 134 S. Ct. 1749, 1756 (2014)).

The Court in *Halo* remarked that enhanced damages under patent law "should generally be reserved for egregious cases typified by willful misconduct." *Halo*, 136 S. Ct. at 1934. The Court observed that "[t]he sort of conduct warranting enhanced damages has been variously described in our cases as willful, wanton, malicious, bad-faith, deliberate, consciously wrongful, flagrant, or—indeed—characteristic of a pirate." *Halo,*

136 S. Ct. at 1932. The Court rejected the heightened standard of proof provided for by the Federal Circuit in *Seagate* in favor of a preponderance of the evidence standard. *Halo,* 136 S. Ct. at 1934. The type of culpability that supports an award of enhanced damages is "measured against the knowledge of the actor at the time of the challenged conduct." *Halo,* 136 S. Ct. at 1933.[6] Once a jury determines that an infringer "is guilty of conduct upon which increased damages may be based [,] ... the court then determines, exercising its sound discretion, whether, and to what extent, to increase the damages award given the totality of the circumstances." *Jurgens v. CBK, Ltd.*, 80 F.3d 1566, 1570 (Fed. Cir. 1996). While a finding of willful infringement does not mandate the imposition of enhanced damages, once the finding is made "the court must explain its reasons for declining to award enhanced damages." *Carnegie Mellon Univ. v. Marvell Tech. Group, Ltd.*, No. CIV.A. 09-290, 2014 WL 1320154, at *9 (W.D. Pa. Mar. 31, 2014), *rev'd in part on other grounds*, 807 F.3d 1283 (Fed. Cir. 2015).

B. Attorney's Fees

The Supreme Court in *Octane Fitness* rejected the "more rigid and mechanical formulation" for determining when the district court may award reasonable attorney fees to the prevailing party in favor of the plain statutory text of § 285, which provides "[t]he court in exceptional cases may award reasonable attorney fees to the prevailing party." 35 U.S.C. § 285; *Octane Fitness*, 134 S. Ct. at 1755. An exceptional case is "simply one that stands out from others with respect to the substantive strength of a party's litigating

[6] The Court in *Halo* criticized, in pertinent part, the second prong of the *Seagate* test which allowed an infringer to escape enhanced damages by mustering a defense of invalidity or noninfringement at trial "even if [the infringer] did not act on the basis of the defense or was even aware of it." *Halo Elecs., Inc. v. Pulse Elecs., Inc.*, 136 S. Ct. 1923, 1933 (2016).

position (considering both the governing law and the facts of the case) or the unreasonable manner in which the case was litigated." *Octane Fitness*, 134 S. Ct. at 1756. The district court applies the preponderance of the evidence standard and considers the totality of the circumstances. The district court may consider a number of factors in determining whether to award fees, including: (1) whether the infringer deliberately copied the invention; (2) whether the infringer had a good faith basis for believing it did not infringe or that the patent was invalid; (3) the closeness of the case; (4) conduct of the part in litigation; (5) defendant's relative size and financial condition; (6) the duration of the infringement; (7) remedial action by the defendant; (8) defendant's motivation for harm, and (9) whether defendant attempted to conceal its misconduct. *Read Corp. v. Portec, Inc.*, 970 F.2d 816, 827 (Fed. Cir. 1992).[7]

C. Permanent Injunction

The Supreme Court in *eBay Inc. v. MercExchange, L.L.C.*, 126 S. Ct. 1837, 1839 (2006), held that to obtain an injunction a party "must demonstrate: (1) that is has suffered an irreparable injury; (2) that remedies available at law, such as monetary damages, are inadequate to compensate for that injury; (3) that, considering the balance of hardships between the plaintiff and defendant, a remedy in equity is warranted; and (4) that the public interest wound not be disserved by a permanent injunction." The Federal Circuit subsequently held that *eBay* eliminates a presumption of irreparable injury to the patent holder after a judgment of infringement and of no invalidity is returned. *Robert Bosch LLC v. Pylon Mfg. Corp.*, 659 F.3d 1142, 1149 (Fed. Cir. 2011). Moreover, there must be a

[7] The *Read* factors are equally applicable to the assessment of enhanced damages.

causal nexus between the irreparable injury and the patent infringement. *Apple Inc. v. Samsung Elecs. Co.*, 735 F.3d 1352, 1360 (Fed. Cir. 2013).

III. DISCUSSION

Mr. Flick, the inventor of the four patents at issue, met with representatives of CalAmp, including Mr. Gallin Chen, in 2009 at a trade show to discuss Omega's belief that CalAmp was infringing certain patents. (Doc. 179, 76:10-18). During this initial meeting, Mr. Chen expressed his view that the Omega patents were invalid, but he nonetheless requested a draft license agreement. (*Id.* at 78:1-11). Omega complied and sent CalAmp a license agreement that CalAmp rejected shortly thereafter, resulting in Omega filing suit against CalAmp on December 15, 2009.[8] (*Id.*). Once litigation had commenced, Mr. Chen agreed to meet with Mr. Flick again at a trade show scheduled for January 2010. (*Id.* at 81:14-18). During the ensuing conversation, Mr. Chen represented to Omega that CalAmp did not program their products and any alleged infringement was caused by the end-user who programs the CalAmp devices. (*Id.* at 81:24– 82:13). Based upon this representation Mr. Flick stayed the litigation against CalAmp and sued two end users: Numerex and Sky Patrol. (*Id.*). Numerex quickly settled with Omega and entered into a licensing agreement. (*Id.* at 82:14-23). Sky Patrol, however, revealed that, contrary to Mr. Chen's representation, CalAmp was responsible for programing their offending devices.[9] (*Id.* at 83:11–84:12). CalAmp subsequently settled with Omega and agreed to pay a royalty. (*Id.* at 84:13-21; Pl.'s Ex. 45).

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[8] The lawsuit filed by Omega in 2009 pertained to patents other than those at issue in the instant litigation.

[9] The deposition of CalAmp engineer, Peter Hergesheimer, was played at trial, and Mr. Hergesheimer acknowledged that CalAmp programs LMUs for approximately 75% of their customers, contradicting Mr. Chen's claim that CalAmp sold a black box. Mr.

Against this backdrop, CalAmp introduced the accused devices in late 2011 or early 2012. (Doc. 182, 53:2-5). Prior to introducing the accused products, CalAmp's counsel, Mr. David Bailey, reviewed a number of patents held by the Plaintiff, including the '885 and '727 patents at issue in this litigation. (Pl.'s Ex. 39). At the same time counsel for Omega and for CalAmp engaged in discussions concerning Omega's "extensive patent portfolio" in the area of databus applications.[10] (Pl.'s Ex. 34). It is, therefore, beyond dispute that CalAmp was fully aware of the Omega patents prior to introducing the accused products into the market.

Mr. Chen admitted on cross-examination that the LMUs and V-Pod and V-Pod2 were introduced as a direct result of consumer demand. (Doc. 182, 142:11-24). Mr. Chen explained that the LMUs connect to the vehicle data bus and read data from the bus. (*Id.* at 54:8-14). According to Mr. Chen, the LMU has a transmitter and a receiver, can read data from the vehicle data bus, can query a vehicle device for data, and can store the data received in response to the query. (*Id.* at 129:1-21). The '727 patent held by Omega, for example, claims a speed exceeded notification device for a vehicle comprising a "vehicle data communications bus" and "at least one vehicle device generating data related to vehicle speed on the" bus which determines when a vehicle's speed has exceeded a set threshold. (Joint Ex. 4, column 7, lines 4-17).

In an attempt to distinguish the LMU devices from the '727 patent, Mr. Chen testified that the LMU speed data is derived from the GPS module and not from the vehicle

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Hergesheimer also testified that software is loaded on the LMU online, because that is more cost effective than loading it at the time of manufacture.

[10] CalAmp engineer, Peter Hergesheimer, testified at trial via deposition that he did not design around the Omega patents.

bus.[11] (Doc. 182, 133:13-21). He added that the LMU has the capacity to read speed from the bus, but CalAmp does not allow this because speed data generated from GPS is more accurate. (*Id.*). However, Mr. Jerrery Eidberger, a CalAmp field application engineer, testified via deposition that a substantial percentage of customers do in fact have the LMU programmed by CalAmp to read the speed from the bus. Additionally, CalAmp responded to Omega's Frist Set of Interrogatories, wherein Omega asks CalAmp to "identify all customers for whom CalAmp has loaded scripts for geofencing or speed alerts into an Accused Product" by providing a long list of customers for whom CalAmp has loaded scripts related to speed alerts, noting that "some scripts do not cause a speed exceeded notification." (Pl.'s Ex. 16). CalAmp's acknowledgement that some scripts do not cause a speed exceeded notification means that other scripts do provide the speed exceeded notification from the vehicle bus as opposed to the GPS. Mr. Chen's testimony wherein he flatly denies the LMU reads vehicle speed from the bus is clearly contradicted by CalAmp's interrogatory answers.

Mr. Andrews, CalAmp's retained expert, echoed this misrepresentation when he testified that the CalAmp devices obtain speed data from the internal GPS sensor as opposed to obtaining speed from the bus. (Doc. 182, 248:3-5; 249:1-5). On cross-examination, Mr. Andrews admitted that if the LMU is programmed to read speed from the data bus and make the threshold determination that the speed has been exceeded, the accused device infringes the '727 patent. (Doc. 183, 172:19-22). Either Mr. Andrews ignored CalAmp's answers to Omega's interrogatories in reaching his opinion that the

[11] The '727 patent indicates that it is an object of the invention "to provide a speed exceeded notification device which may be readily used in a vehicle including a data communications bus and related methods." (Joint Ex. 4, column 2, lines 38-40).

accused products do not infringe the '727 patent because speed is derived via GPS, or CalAmp withheld this information from its expert in order to obtain a non-infringement opinion. Either way, the testimony of Mr. Chen and Mr. Andrews provide substantial support for the jury's finding of willful infringement of the '727 patent, and this Court concurs in the jury's finding of willful infringement.

Further indicia of willful infringement by CalAmp is found in an e-mail sent by Mr. Chen to outside patent counsel, Mr. David Bailey[12], and senior vice president for corporate development, Mr. Garo Sarkissian. (Doc. 182, 112:13-19). On July 30, 2013, eight months after Omega instituted this lawsuit, Mr. Chen wrote to Messrs, Bailey, and Sarkissian and asked them to look at the '278 patent. (Pl.'s Ex. 48). Referring to claim 13 of the '278 patent, Mr. Chen wrote: "13 may relate to how we program a unit at the factory so it may be harder to avoid." (*Id.*). The '278 patent has as an object of the invention to "provide a multi-vehicle compatible tracking unit which may be used to control operable vehicle devices, and/or read information therefrom via the vehicle data communications bus." (Joint Ex. 5, column 2, lines 46-49). Clearly, Mr. Chen was concerned as late as July 30, 2013, that the accused devices infringe claim 13 of the '278 patent, as the jury ultimately found. His admission in this e-mail that the units are programed at the CalAmp factory is further evidence that his trial testimony describing the LMU as a black box, programmed by the end-user, was false.

In the same e-mail, Mr. Chen predicts what will ultimately become a defense theory advanced at trial, when he writes: the '727 patent "can be avoided by using GPS speed,

[12] Mr. Bailey is an attorney practicing in the same firm as trial defense counsel. (Doc. 182, 144:20-25).

not vehicle bus received speed, for speeding alerts." (Joint Ex. 5). It is difficult to ascribe a good faith basis for persisting at trial on the theory that the LMU determines speed from the GPS, as opposed to obtaining the data from the bus, when CalAmp's supplemental response to Omega's interrogatory, in which CalAmp admits to loading scripts for speed exceeded notification, was filed March 6, 2015—more two years after Mr. Chen suggested to his counsel and his colleague that using GPS speed will allow CalAmp to avoid the '727 patent. This email is consistent with an attempt to create a plausible defense at trial, perhaps in anticipation of the then-available *Seagate* enhanced damages analysis.[13] That Mr. Chen continued to advance the GPS theory at trial and in view of CalAmp's interrogatory answer demonstrates willful copying of Omega's invention.

In an attempt to satisfy the *Seagate* two-part test at trial, Mr. Chen testified that prior to launching the accused devices, CalAmp investigated the vehicle data bus market. (Doc. 182, 55:21-24). Mr. Sarkissian directed Mr. Chen to search for prior art, resulting in Mr. Chen reviewing over 300 patents. (*Id.* at 57:12–58:2). Mr. Chen also stated that in late 2010, Mr. Sarkissian, Mr. Steven Moran (CalAmp's general counsel), and he had received verbal opinions from Mr. Bailey that the accused products did not infringe existing patents. (*Id.* at 114:7-25; 117:7-12). Mr. Chen stated that he did not request Mr. Bailey to memorialize these oral opinions in writing until after the lawsuit was commenced by Omega. (*Id.* at 145:1-3). The defense marked for identification exhibits 71–74, which are opinion letters written by Mr. Baily as to each patent-in-suit, and each opinion letter is

[13] The Supreme Court in *Halo* disapproved of the *Seagate* test in part because it allowed an infringer to "escape any comeuppance under § 284 solely on the strength of his attorney's ingenuity." *Halo*, 136 S. Ct. at 1933. Hence, opinion letters issued after-the-fact shed little light upon the infringer's culpability which must be "measured against the knowledge of the actor *at the time* of the challenged conduct." *Id.* [emphasis added].

dated June 27, 2014.[14] (Def.'s Exs. 71–74). However, it is curious—assuming Mr. Bailey had vetted the accused products against existing patents back in 2010—that in July 2013 Mr. Chen highlighted the difficulty of avoiding claim 13 of the '278 patent and suggested that the '727 patent can be avoided by focusing upon GPS speed determination. If, in fact, counsel had vetted the accused devices and the Omega patents three years earlier, there is no reason for Mr. Chen to suggest a noninfringement theory to his counsel, nor is there any reason for Mr. Chen to be concerned over claim 13 of the '278 patent. The Court does not find the testimony of Mr. Chen or of Mr. Bailey credible on the issue of whether counsel had rendered legal opinions prior to the launch of the accused products in which he opined the accused products do not offend any patent held by Omega. Mr. Chen's credibility is undermined by other evidence presented at trial[15], and it is incomprehensible that counsel would refrain from issuing a written opinion of noninfringement or invalidity to his client at or near the time that CalAmp launched the accused products. No reasonable explanation for this highly unusual practice was offered by CalAmp or Mr. Bailey.

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[14] The Court sustained Omega's objection to the admissibility of Mr. Bailey's opinion letters on the grounds that the letters—offered during Mr. Chen's testimony—constitute hearsay, and the letters confer expert testimony which was not properly disclosed by the Defense. However, the Court has considered the four opinion letters for purposes of the enhanced damages analysis. The Court is unaware of the substance of the verbal opinions allegedly offered by Mr. Bailey in 2010 prior to the launch of the accused products.

[15] Mr. Chen testified via deposition that he removed information from the CalAmp website regarding the LMU devices to make it more difficult for Omega to identify infringement. (Pl.'s Ex. 48) ("We don't want to make it easy for Omega to build their infringement case by just looking at the datasheets on our website. . . . the bigger hole is LMU 3000; it's launched, mature and broadly integrated by multiple partners. We can bury (i.e. omit) the LMU3030 for now on open website.").

The Court next considers whether this was a "close case" and whether CalAmp held a good faith belief the patents were not infringed or were invalid. CalAmp and their expert, Mr. Andrews, note that the Omega patents require the performance of a control function. (Doc. 182, p. 177:7-15; Doc. 195, p. 3). At trial Mr. Andrews defined "control function" as "a message on the bus that is going to control a device exhibiting a physical change in the device or the system." (Doc. 182, 177:7-15). The notion that control function envisions a physical change is critical to the Defendant's noninfringement arguments. Based upon the Court's review of Mr. Andrew's initial expert report, (Def.'s Ex. 38), this definition of control function does not appear in his original expert report. Mr. Andrews acknowledged on cross-examination that he did not apply the physical change qualifier to control function in his deposition. (Doc. 183, 103:10-14). Mr. Andrews explained that he had misspoken in his deposition when he failed to describe control function as requiring a physical change in the device or the system. (*Id.*). Mr. Andrews did, however, include in his rebuttal report the definition of control function as having the ability to enable a physical change in a device of the system; for example, locking a door, starting the engine, or turning on a light." (Def.'s Ex. 47, pp. 11–12). The crux of the non-infringement defense is that the LMU merely sends a "query for data" and does not control a vehicle device. (Doc. 182, p. 177:20-22). Because the LMU does not control a vehicle device, Mr. Andrews argues the accused products cannot satisfy the multi-vehicle compatible controller claim in the patents. (*Id.* at 238:9-12; 238:25–239:6; 239:14–240:6). Accordingly, Mr. Andrews' definition of control function as mandating a physical change precludes one from finding for Plaintiff Omega.

In order for Mr. Andrews' non-infringement argument to prevail, one must accept his opinion that the LMU is a passive device that uses the bus to request and receive data, but which does not "perform one or more control functions" with respect to the vehicle device. (Def.'s Ex. 47, p. 12; Doc. 182, 240:9-11). The difficulty lies in finding a basis for Mr. Andrews' interpretation of "control function." The Court construed the claim term "controller" to mean "electronic circuitry that performs one or more control functions." (Doc. 50, p. 24). The claim term "multi-vehicle compatible controller" was construed by the Court to mean "electronic circuitry that performs one or more control functions, and can operate with more than one vehicle." (*Id.*). The Court did not construe the term control function. CalAmp urged the Court to construe "function" as "[a]n operation of a vehicle device, such as remote starting the engine, remotely unlocking the vehicle doors, or changing the mode of a security system between armed and disarmed." (*Id.* at 18). But the Court observed: "The patent states the invention may be embodied in many different forms and should not be construed as limited to the illustrated embodiments set forth herein." (*Id.* at 18) (internal quotation marks and citations omitted). Accordingly, Mr. Andrews' interpretation of "control function" is not based upon the Court's claim construction. Similarly, nothing in any specification of the four patents-in-suit support Mr. Andrews' definition of "control function." (Joint Ex. 1-4; Doc. 183, 117:8-11; 118:1-6).

Mr. Andrews acknowledged that the microprocessor in the LMUs and the V-Pods sends a signal along the bus to the ECU and requests a response. (Doc. 183, 114:17–115:6). Omega's counsel engaged Mr. Andrews in the following colloquy:

> Q: Let's say the ECU responds with the device code signal—that would be controlling the ECU, wouldn't it?
>
> A: You're asking it for information. It's providing it back, yes.

Q: So that's a yes?

A: Okay.

(*Id.* at 118:9-24)

Q: And would you also agree with me ... that sending a signal and getting a response could be a control function?

A: Yes.

(*Id.* at 120:5-20)

Mr. Andrews admits that when the LMU seeks information from the ECU, the ECU must respond via the bus; however, he contends this is not a control function. (*Id.* at 143:1-6). Mr. Andrews argues that "one with ordinary skill in the art, in the automotive industry in telematics, would understand the difference between a command and a query." (*Id.* at 116:7-10). It is Mr. Andrews' contention that a command—or as he would call it a query—by the LMU that produces a mandatory response by the ECU does not meet the definition of controller and control function. The Defendant's attempt to cast a mandatory response to a query as a passive act that falls short of a control function is unsupported by the record and was conspicuously absent from Mr. Andrews' initial expert report. The emergence of this opinion late in the litigation is highly suspect, particularly when one considers that Mr. Andrews' also opined that the LMU cannot infringe the '727 patent because the LMU only generates speed data from the GPS—which is clearly contradicted by CalAmp's response to Omega's interrogatories.

Mr. Andrews and counsel for CalAmp presented other non-infringement arguments at trial. However, the Court finds that these additional grounds—all of which were rejected by the jury—do not, giving the totality of the circumstances, mitigate against an award of enhanced damages and reasonable attorneys' fees. For example, Mr.

Andrews took issue with whether signals were stored on the accused devices as required by the '885 patent. (Doc. 183, 122:6-9). However, on cross-examination, Mr. Andrews agreed that the LMU sends out signals and the ECU sends a response, "[a]nd those signals are stored on the controller." (*Id.* at 123:7–124:9). Mr. Andrews admits the signals are stored on the LMU until the device is unplugged and re-plugged at which time it starts over. (*Id.* at 125:5-9). In fact, Mr. Andrews agrees the LMU is intended to be used in a manner that would store the CAN data and can be used in multiple vehicles. (*Id.* at 162:6-13).

CalAmp also presented invalidity defenses by identifying prior art that, when considered with SAE standards, rendered the patents obvious. In supplemental filings by the parties, the Court has been made aware that CalAmp sought *ex parte* reexamination of three of the patents-in-issue. The United States Patent and Trademark Office ("USPTO") has reexamined the '278 patent[16], (Doc. 192); the '885 patent[17], (Doc. 193), and the '876 patent[18], (Doc. 201). The USPTO rejected the pertinent claims of these three patents. While the USPTO issued Office Actions in *Ex Parte* Reexamination of the '278, '885, and '876 patents and rejected the relevant claims of these patents, the finding by the USPTO does not have preclusive effect as to the verdict rendered by the jury in the instant litigation unless the final USPTO decision is affirmed by the Federal Circuit before the jury's verdict become final. *Fresenius USA, Inc. v. Baxter Inter., Inc.*, 721 F.3d 1330,

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[16] Omega's response, including declarations from Mr. Suman, (Doc. 198-2), whose patent is being considered by the examiner as prior art, and Mr. McAlexander, (Doc. 198-3), demonstrates that the examination of '278 remains in a state of flux. (Doc. 198).
[17] The USPTO rejected every claim of the '885 patent on anticipation and obviousness grounds. (Doc. 202, p. 1).
[18] The USPTO rejected every claim of the '876 patent on anticipation and obviousness grounds. (Doc. 201, p. 2).

1346 (Fed. Cri. 2017). Accordingly, the Court is not bound by the examiner's non-final conclusions when determining whether the jury's verdict is supported by substantial evidence.

The Court recognizes that CalAmp does not suggest in their notices of supplemental authority that the non-final action of the PTO is outcome determinative. Rather, CalAmp cites to the examiner's findings to support the reasonableness of their reliance upon invalidity as a defense. The Court rejects CalAmp's position for a number of reasons. CalAmp's expert, Mr. Andrews, combined certain prior art, such as the Braitberg '497 patent, (Def. Ex. 10), with the Society of Automotive Engineers ("SAE") standard J1978, to predict the Omega '876 patent. (Doc. 182, 173:14–175:23; 178:8-15; 180:22–181:19). Mr. Andrews testified that "one of ordinary skill in the art [would] look to J1978 to determine how to connect the bus." (*Id.* at 184:13–18). However, Mr. Andrews, despite numerous questions posed on cross-examination, failed to articulate the motive for one of ordinary skill in the art to combine these references.[19] The best Mr. Andrews could do in suggesting a motive to combine J1978 with Braitberg is that scan tools were being used at the relevant time; hence, one would know to combine SAE J1978 with Braitberg to make a device multi-vehicle compatible.[20] (Doc. 183, 149:21–150:3). Mr. Andrews applied the Braitberg reference to the '876 and '885 patents, (Doc. 182, p. 198:1-

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[19] "A party seeking to invalidate a patent on the basis of obviousness must demonstrate by clear and convincing evidence that a skilled artisan would have been motivated to combine the teachings of the prior art references to achieve the claimed invention, and that the skilled artisan would have had a reasonable expectation of success in doing so." *Kinetic Concepts, Inc. v. Smith & Nephew, Inc.*, 688 F.3d 1342, 1360 (Fed. Cir. 2012) (internal quotation marks omitted).

[20] Mr. Andrews admits that Braitberg does not provide multiple vehicle compatibility, a claim that is necessary to invalidate the Omega patents, so he adds SAE J1978. (Doc. 183, p. 130:6-10). Interestingly, Mr. Chen testified he was unware of J1978.

20), and he applied J1978 to all four patents-in-suit. (*Id.* 250:1–270:19). The motive to combine prior art is critical to CalAmp's invalidity defense, because Mr. Andrews could not find prior art that had all of the claims that Mr. Flick has in his patents. (*Id.* at 132:17–133:7). Mr. Andrews failed to provide more than a conclusory opinion that one of ordinary skill in the art at the relevant time would have known to look to SAE J1978 in combination with the various prior art references. In this regard, Mr. Andrews' fails to assist the Defendant in carrying its burden of proof on invalidity.

In addition, the Court in *Halo* has eliminated the ability of an accused infringer to posit reasonable invalidity defenses which were not relied upon at the time the accused products were introduced into the market. *Halo*, 136 S. Ct. at 1933. Under *Seagate*, "the ability of the infringer to muster a reasonable (even though unsuccessful) defense at the infringement trial" was dispositive of the issue of enhanced damages. *Id.* Post-*Halo*, however, "culpability is generally measured against the knowledge of the actor at the time of the challenged conduct." *Id.* There is no indication in the record that Mr. Andrews provided CalAmp his opinion on invalidity before the accused products went into production in 2011. While the opinion letters issued by Mr. Bailey as to the '885 patent refer to SAE J1978, J1979, (Def.'s Ex. 73), this letter was written in June 2014 long after infringement had begun. Thus, there is no record evidence that CalAmp had knowledge of the invalidity defense derived from the combination of prior art and SAE standards at the time of the challenged conduct.[21] Since culpability is measured against the infringer's

[21] In fact, Mr. Chen filed for patent US 2010/0158211on December 21, 2011, claiming "[s]ystems and methods in accordance with embodiments of the invention continuously collect information from vehicle devices via a vehicle data bus, store information in a database, and retrieve information from the database in response to requests from

knowledge at the time of the challenged conduct, the after-the-fact invalidity defense is of little merit in assessing enhanced damages.[22]

The next *Read* factor directs the Court to consider the Defendant's size and financial condition. According to Omega's expert, Mr. Christian Tregillis, "CalAmp has sold over 245,000 units of the Accused Products, for over $21.5 million from April 2011 through November 2014," (Pl.'s Ex. 65, p. 37), "earning over $4.1 million in gross profits." (Pl.'s Ex. 65, p. 47). CalAmp is a publicly-traded corporation with over $75 million dollars in earnings last year. (Pl.'s Ex. 65). While CalAmp argues that the accused products are low-margin products sold in an extremely competitive market, this misses the point. The overall financial health of the infringer is evaluated—not the net profit generated by the offending conduct—to "ensure that enhanced damages would not prejudice defendant's non-infringing business." *Powell v. Home Depot U.S.A., Inc.*, 715 F. Supp. 2d 1285, 1298 (S.D. Fla. May 28, 2010). The Defendant has the financial wherewithal to endure the sanction of enhanced damages and an award of reasonable attorneys' fees.

A closely related factor for the Court to consider is the duration of CalAmp's conduct. As previously discussed, CalAmp was well aware of Omega's patents since at least 2010. Rather than take a license, and choosing not to design around Omega's patents, CalAmp elected to sell infringing products and continues to do so to this day. CalAmp's motivation to engage in this behavior is obvious: their customers wanted this technology, and CalAmp wanted to provide it. Moreover, as previously discussed,

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remote devices." (Pl.'s Ex. 14, Abstract). The patent issued June 21, 2012, and Mr. Chen did not disclose the prior art relied upon to invalidate Omega's similar patents.

[22] Assuming CalAmp had knowledge of the invalidity defense at the relevant time, the Court would not reach a different conclusion, since the motive to combine the prior art with the SAE standards is deficient.

CalAmp attempted to conceal its infringement by misrepresenting to Omega that it only sold black boxes which were programmed by customers and by removing information from the CalAmp website to make discovery of infringement more difficult. These additional factors all weigh in favor of an award of enhanced damages and reasonable attorneys' fees.

Based upon the foregoing, the Court finds CalAmp willfully infringed the Omega patents-in-suit, further finding that the jury's finding of willful infringement is supported by substantial evidence. The Court independently reviewed the record evidence and finds an award of enhanced damages of threefold the actual damages and an award of reasonable attorneys' fees is supported by the evidence.[23]

The Court turns now to Omega's request for a permanent injunction. Omega quotes Chief Justice Robert's concurring opinion in *eBay* wherein he remarks that from "at least the early 19th century, courts have granted injunctive relief upon a finding of infringement in the vast majority of patent cases." *eBay*, 126 S. Ct. at 1841. However, Justice Thomas speaking for the majority clarified that "the decision whether to grant or deny injunctive relief rests within the equitable discretion of the district courts, and that such discretion must be exercised consistent with traditional principles of equity, in patent disputes no less than in other cases governed by such standards." *Id.* As Justice Kennedy elaborates in his concurrence, "trial courts should bear in mind that in many instances the nature of the patent being enforced and the economic function of the patent holder

[23] The Court notes that even if the PTO's non-final action rejecting the relevant claims of the '885 and '876 patents are affirmed by the Federal Circuit, enhanced damages and reasonable attorneys' fees are appropriate for the willful infringement of the '727 and '278 patents—assuming the '278 patent survives reexamination.

present considerations quite unlike earlier cases." *Id.* at 1842. Justice Kennedy cautions trial courts to use care in issuing permanent injunctions in the context of patent holders who primarily employ their patent to obtain licensing fees. *Id.* "When a patented invention is but a small component of the product the companies seek to produce and the threat of an injunction is employed simply for undue leverage in negotiations, legal damages may well be sufficient to compensate for infringement and an injunction many not serve the public interest." *Id.*

Mr. Flick is a patent holder who presently generates revenue by licensing his patents; he no longer manufactures products. While Omega argues that it has maintained a restrictive licensing program of the patents-in-suit and has selectively licensed only a limited number of entities in the marketplace, (Doc. 148, p. 17), it is equally true that Omega was willing to license its patents to CalAmp. While Mr. Flick testified that Omega requires most licensees to transfer rights of improvements to Omega in order to strengthen its patents, it is clear that Omega does not require every licensee to agree to this term. In fact, the License Agreement entered into between Omega and CalAmp in relation to the products sold to SKYPATROL does not provide for assignment of improvements to Omega. (Pl.'s Ex. 88).

While cognizant of Omega's contention that a compulsory licensing agreement does not make Omega whole, and recognizing the Court need not balance the hardships in cases of willful infringement[24], the Court finds that monetary damages are adequate to compensate Omega for the injury sustained by CalAmp's infringement. Moreover, as

[24] *United States v. Marine Shale Processors*, 81 F.3d 1329, 1358 (5th Cir. 1996); *see also Windsurfing Int'l v. AMF, Inc.*, 782 F.2d 995, 1003 (Fed. Cir. 1986).

indicated by the declaration of Mr. Michael Zachan, CalAmp's Senior Vice President, a number of public safety, local government, and utility providers would be placed at a considerable disadvantage in the execution of their important duties if a permanent injunction issues. The Court agrees with Omega that the logistic and financial turmoil that befalls CalAmp should an injunction be ordered is of their own design. However, the collateral impact upon important public safety functions weighs against a permanent injunction.

For the foregoing reasons, the Court denies Omega's request for a permanent injunction, finding that the payment of customary licensing fees to Omega is adequate to protect the interests of Omega.

IV. CONCLUSION

For the aforementioned reasons, it is **ORDERED AND ADJUDGED** as follows:

1. Plaintiff Omega Patents, LLC's Motion for Entry of Final Judgement (Doc. 148) is **GRANTED**.
2. Plaintiff Omega Patents, LLC's Renewed Motion to Award Prejudgment Interest (Doc. 154) is **GRANTED**.
3. Plaintiff Omega Patents, LLC's Motion for Enhanced Damages (Doc. 148) is **GRANTED** and Plaintiff is awarded treble damages in the amount of eight million, nine hundred and twenty-five thousand and six hundred dollars ($8,925,600).
4. Plaintiff Omega Patents, LLC's Motion for Entitlement to Reasonable Attorneys' Fees (Doc. 148) is **GRANTED**.

5. Plaintiff Omega Patents, LLC's Motion for Entry of a Permanent Injunction (Doc. 148) is **DENIED**.

DONE AND ORDERED in Orlando, Florida, on April 6, 2017.

PAUL G. BYRON
UNITED STATES DISTRICT JUDGE

Copies furnished to:

Counsel of Record
Unrepresented Parties

Exhibit 3

UNITED STATES DISTRICT COURT
MIDDLE DISTRICT OF FLORIDA
ORLANDO DIVISION

OMEGA PATENTS, LLC,

Plaintiff,

v. Case No: 6:13-cv-1950-Orl-40DCI

CALAMP CORP.,

Defendant.
_____/

FINAL JUDGMENT

This case was tried to a jury which returned a verdict in favor of plaintiff on February 24, 2016. On April 5, 2017, this Court granted in part and denied in part plaintiff's motion for entry of judgment but did not enter a form of judgment specifying its terms. This Final Judgment reflects the substance of that ruling.

Pursuant to Rule 58 of the Federal Rules of Civil Procedure, in accordance with the jury verdict delivered on February 24, 2016, and this Court's Orders, Final Judgment is hereby entered in favor of Plaintiff, OMEGA PATENTS, LLC, and against CALAMP CORP., as follows:

a. CALAMP CORP. willfully infringed OMEGA PATENTS, LLC's U.S. Patent No. 6,346,876, Claims 1, 3, 4, 5, 12, 14, and 16; U.S. Patent No. 6,756,885, Claims 1, 2, 3, 12, and 14; U.S. Patent No. 7,671,727, Claims 1, 10, and 11; and U.S. Patent No. 8,032,278, Claims 1, 2, 3, 4, 5, 6, 8, 11, 12, 13, 14, 16, 18, 19, and 21 (collectively, the claims of patents-in-suit);

b. The claims of the patents-in-suit have not been proven invalid or unenforceable;

c. The Court finds this to be an exceptional case and the amount of the damages awarded by the jury shall be trebled;

d. OMEGA PATENTS, LLC, shall be entitled to recover its reasonable attorneys' fees; and

e. The Court will not issue an injunction against further infringement.

Accordingly, it is hereby **ORDERED and ADJUDGED**:

1. Defendant CALAMP CORP. shall pay damages to OMEGA PATENTS, LLC, in the amount of $2,975,200.00, which shall be trebled, for a total amount of **$8,925,600.00**;
2. OMEGA PATENTS, LLC, shall be awarded prejudgment interest in the amount of $302.00 *per diem*, from the date of the verdict on February 24, 2016, to entry of this Final Judgment (393 days) for the total amount of **$118,686.00**;
3. By stipulation of the parties, the Court awards Reasonable Attorney's Fees and Costs to OMEGA PATENTS, LLC, in the amount of $**1,100,000.00**. CalAmp Corp. reserves the right to contest the amount of and/or entitlement to fees in the event that this Final Judgment is modified or overturned as a result of CalAmp Corp.'s motions for judgment as a matter of law and for a new trial, or on appeal.
4. The Court reserves jurisdiction to consider an ongoing royalty for any infringing sales after February 24, 2016. If the parties cannot agree on an appropriate procedure, the parties shall submit legal memoranda outlining any requested relief within thirty (30) days.
5. This Final Judgment incorporates all previous orders in the case. CalAmp Corp.'s agreement to the form of this Final Judgment shall not be construed as a waiver

of CalAmp Corp.'s right to appeal, or to file a renewed motion for judgment as a matter of law pursuant to Fed. R. Civ. P. 50 or a motion for new trial pursuant to Fed. R. Civ. P. 59. The time for filing such motions shall run from the date of the entry of this Final Judgment.

6. Plaintiff OMEGA PATENTS, LLC, shall be awarded Final Judgment in its favor, against Defendant CALAMP CORP., in the amount of **$10,144,286.00**.

FOR WHICH SUM, LET EXECUTION ISSUE.

DONE AND ORDERED in Orlando, Florida on April 24, 2017.

PAUL G. BYRON
UNITED STATES DISTRICT JUDGE

Copies furnished to:

Counsel of Record
Unrepresented Parties

Exhibit 4

UNITED STATES DISTRICT COURT
MIDDLE DISTRICT OF FLORIDA
ORLANDO DIVISION

OMEGA PATENTS, LLC,
a Georgia limited liability company,

Plaintiff,

v. Case No: 6:13-cv-1950-Orl-40DAB

CALAMP CORP.,
a Delaware corporation,

Defendant.

ORDER

This cause comes before the Court on the following:

1. Plaintiff's Motion for Claim Construction (Doc. 38), filed September 5, 2014;
2. Defendant Calamp Corp.'s Opening Claim Construction Brief (Doc. 39), filed September 5, 2014;
3. Plaintiff's Opposition to Calamp's Motion for Claim Construction (Doc. 40), filed October 3, 2014; and
4. Calamp Corp.'s Responsive Claim Construction Brief (Doc. 41), filed October 3, 2014.

The Court heard oral argument from the parties on November 24, 2014 (Doc. 46). At the conclusion of the hearing, the Court requested the parties to submit briefs addressing the issue of when and under what circumstances a claim should be construed by the Court. The parties filed briefs on this issue on December 12, 2014. (Docs. 48, 49). In total, the parties request the Court to construe eleven terms across five patents.[1]

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[1] The patents-in-suit include U.S. Patent Nos. 6,346,876 (the "'876 Patent"); 6,737,989

I. BACKGROUND

Plaintiff, Omega Patents, LLC ("Omega"), initiated this patent infringement lawsuit on December 20, 2013 (Doc. 1). Omega then filed a Motion for Claim Construction requesting the Court to construe two claims. (Doc. 38). Defendant Calamp Corp. ("Calamp") filed a claim construction brief requesting the Court to construe nine claims. (Doc. 39). The parties have reached agreement on the construction of the following claim terms: "Controller" and "Multi-vehicle compatible controller." (Doc. 38, p. 1). All of the patents-in-suit were invented by Mr. Kenneth E. Flick, and the technologies at issue involve control systems for vehicles with a data communications bus, which is a computer network within a vehicle, and various codes, signals, and data which monitor particular vehicle characteristics and conditions and which perform or command certain functions, including the operation of certain vehicle devices.

II. LEGAL STANDARDS FOR CLAIM CONSTRUCTION

The Court construes a patent claim as a matter of law. *Markman v. Westview Instruments, Inc.*, 517 U.S. 370, 372 (1996). To construe a claim, the Court begins with the words of the claim itself. *Vitronics Corp. v. Conceptronic, Inc.*, 90 F.3d 1576, 1582 (Fed. Cir. 1996). Generally, the Court accords the words of a claim "their ordinary and customary meaning," which is "the meaning that the term would have to a person of ordinary skill in the art in question at the time of the invention." *Phillips v. AWH Corp.*, 415 F.3d 1303, 1312–13 (Fed. Cir. 2005) (internal quotation marks omitted). Persons of ordinary skill in the art do not read the claim term in isolation, but in the context of the

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(the "'989 Patent"); 6,756,885 (the "'885 Patent"); 7,671,727 (the "'727 Patent"); and 8,032,278 (the "'278 Patent"). (Doc. 38, p. 2).

entire patent. *Id.* at 1313. If the ordinary meaning of claim language is "readily apparent even to lay judges," then claim construction requires "little more than the application of the widely accepted meaning of commonly understood words." *Id.* at 1314. But because the meaning of a claim term as understood by a person skilled in the art is often not immediately apparent, the Court looks to both intrinsic evidence (the words of the claims themselves, the specification, and the prosecution history) and extrinsic evidence (sources such as dictionaries and expert testimony). *Id.*; *Finisar Corp. v. DirecTV Grp., Inc.*, 523 F.3d 1323, 1328 (Fed. Cir. 2008).

The patent's specification is "the single best guide to the meaning of a disputed term," as it may reveal that the patentee intended a special definition to apply to a claim term that differs from its ordinary meaning or that the patentee intentionally disclaimed or disavowed the claim's scope. *Phillips*, 415 F.3d at 1315–16 (internal quotation marks omitted). The Court also considers the prosecution history, which is created by the patentee in an attempt to explain and obtain the patent. *Id.* at 1317. The prosecution history consists of the complete record of proceedings before the Patent and Trademark Office ("PTO") and the prior art cited during the examination of the patent. *Id.* Unlike the specification, which is a final product, the prosecution history is less useful in claim construction because it represents the ongoing negotiations between the PTO and applicant. *Id.*

The Court also looks at the prosecution history "to determine whether the applicant clearly and unambiguously 'disclaimed or disavowed'" an interpretation of claim scope in order to obtain the patent grant. *Middleton, Inc. v. Minn. Mining and Mfg. Co.*, 311 F.3d 1384, 1388 (Fed. Cir. 2002) (quoting *Standard Oil Co. v. Am. Cyanamid Co.*, 774 F.2d

448, 452 (Fed. Cir. 1985)). A patentee disclaims an interpretation by "clearly characterizing the invention in a way to try to overcome rejections based on prior art," as opposed to simply describing features of the prior art without distinguishing the claimed invention based on those features. *Computer Docking Station Corp. v. Dell, Inc.*, 519 F.3d 1366, 1374–75 (Fed. Cir. 2008). Thus, the Court protects the public's reliance on the definitive statements made during the prosecution by precluding the patentee from "recapturing" through claim construction an interpretation disclaimed during prosecution. *Id.* at 1374 (quoting *Omega Eng'g, Inc. v. Raytek Corp.*, 334 F.3d 1314, 1323 (Fed. Cir. 2003)). However,

> [I]f the specification expressly defines a claim term and remarks made to distinguish claims from the prior art are broader than necessary to distinguish the prior art, the full breadth of the remark is not a clear and unambiguous disavowal of claim scope as required to depart from the meaning of the term provided in the written description.

Id. at 1375 (internal quotation marks omitted) (quoting *3M Innovative Props. Co. v. Avery Dennison Corp.*, 350 F.3d 1365, 1373 (Fed. Cir. 2003)).

Extrinsic evidence, such as expert testimony and dictionary definitions, is helpful but "less significant than the intrinsic record." *Phillips*, 415 F.3d at 1317 (internal quotation marks omitted). However, expert testimony about claim terms that is conclusory, unsupported or "clearly at odds" with the intrinsic evidence is not useful. *Id.* at 1318 (internal quotation marks omitted). Moreover, while dictionaries and treatises are relevant, the Court must ensure that the dictionary definition does not contradict a definition "found in or ascertained by a reading of the patent documents." *Id.* at 1322–23 (quoting *Vitronics*, 90 F.3d at 1584 n.6). "In sum, extrinsic evidence may be useful to the court, but it is unlikely to result in a reliable interpretation of patent claim scope unless considered in the

context of the intrinsic evidence." *Phillips*, 415 F.3d at 1319. In the instant case, the parties agree that the Court need not consider extrinsic evidence to construe the claim terms in dispute, and neither party has presented extrinsic for the Court's consideration.

Several other principles guide the Court's construction of claim terms. First, the Court presumes that the same terms appearing in different portions of the claims have the same meaning, unless the specification and prosecution history clearly demonstrate otherwise. *Fin Control Sys. Pty, Ltd. v. OAM, Inc.*, 265 F.3d 1311, 1318 (Fed. Cir. 2001). While the "[i]nterpretation of a disputed claim term requires reference to the other claims," *Georgia-Pacific Corp. v. U.S. Gypsum Co.*, 195 F.3d 1322, 1331 (Fed. Cir. 1999), "the presence of a dependent claim that adds a particular limitation raises a presumption that the limitation in question is not found in the independent claim." *Liebel-Flarsheim Co. v. Medrad, Inc.*, 358 F.3d 898, 910 (Fed. Cir. 2004). Courts are further cautioned that "a construction that renders the claimed invention inoperable should be viewed with extreme skepticism." *Talbert Fuel Sys. Patents Co. v. Unocal Corp.*, 275 F.3d 1371, 1376 (Fed. Cir. 2002) (citation omitted), *vacated and remanded on other grounds*, 537 U.S. 802 (2002).

Finally, district courts have an obligation to construe terms when it is necessary to resolve a genuine and material legal dispute between the parties. *See O2 Micro Int'l Ltd. v. Beyond Innovation Tech. Co., Ltd.*, 521 F.3d 1351, 1361–62 (Fed. Cir. 2008); *E-Pass Techs., Inc. v. 3Com Corp.*, 473 F.3d 1213, 1219 (Fed. Cir. 2007) ("[A]ny articulated definition of a claim term ultimately must relate to the infringement questions that it is intended to answer."). The party requesting the Court to construe a claim term must demonstrate that the construction is both necessary and correct; that is, construction of

the claim term must be fundamental to issues of infringement or invalidity, and the Court may not issue an advisory opinion. *IP Cleaning S.p.A. v. Annovi Reverberi S.p.A.*, No. 08-cv-147-bbc, 2008 U.S. Dist. LEXIS 102312, at *3 (W.D. Wisc. Dec. 17, 2008).

III. AGREED TERMS

As previously noted, the parties have reached an agreement as to the proper construction of the following two terms:

Claim Term	Agreed Construction
Controller	Electronic circuitry that performs one or more control functions.
Multi-vehicle compatible controller	Electronic circuitry that performs one or more control functions, and can operate with more than one vehicle.

IV. DISPUTED TERMS

Omega filed the initial Motion for Claim Construction, requesting the Court to construe two terms: "transmitter" and "receiver." (Doc. 38). Accordingly, the Court will construe these two claims prior to addressing Calamp's request for construction of nine additional terms.

A. The '876 and '885 Patent Terms: "Transmitter" and "Receiver"

Claim Term	Omega's Construction	Calamp's Construction
Transmitter	Radio frequency transmitter.	Device that sends signals.
Receiver	Radio frequency receiver.	Device that receives signals.

The terms "transmitter" and "receiver" are used in asserted claims of the '876 Patent (Doc. 39-1) and the '885 Patent (Doc. 39-2). Turning first to the construction of "transmitter," Calamp contends that the patents describe the transmitter as sending

signals without restricting the specific type of signals being sent—that is, without limiting the construction to require "radio frequency." (Doc. 39, p. 21). Calamp submits that the '876 and '885 Patents do not specifically define transmitter to limit the meaning of that term as commonly understood by individuals skilled in the art.[2] (*Id.* at p. 22). Similarly, Calamp contends that "receiver" is described in the patents as receiving signals and is not restricted to radio frequency signals. (*Id.* at p. 23).[3]

Omega submits that Calamp's construction and citation to the specifications of the '876 and '885 patents fail to place the terms "transmitter" and "receiver" into the context of the invention which Omega argues envisions remote control systems for a vehicle. (Doc. 38, p. 6). Omega proposes that the Court need only consider the claims, read in light of the specification, to comprehend that the invention focuses upon a remote control system for cars. (*Id.*). Omega directs the Court to the '551 Patent, noting that both the '876 and '885 Patents claim priority back to the '551 Patent. The Court agrees with Omega that both the '876 and '885 Patents are continuations-in-part and claim priority back to the '551 Patent. (*Id.* at p. 7). The background to the '551 Patent provides:

> The concepts and features of the invention may also be desirably incorporated in a remote control system for a vehicle, such as a vehicle security system, a remote engine starter system, or a remote keyless entry system, for example. The remote control system preferably comprises a remote transmitter and a receiver within the vehicle for receiving a signal from the remote transmitter.[4]

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[2] Calamp directs the Court to the '876 Patent at 3:5–12; 3:63–4:9; 4:14–28; 4:33–36; 5:35–54; 5:55–6:2; 6:3–16; 6:17–27, and cites the '885 Patent at 3:5–12; 3:49–62; 4:5–8 4:9–24; 5:16–24; 5:35–62; 5:64–6:8. (Doc. 39, p. 22).

[3] Calamp cites the same specification language as was relied upon for its proposed construction of "transmitter."

[4] References to the column and lines within a given specification shall be denoted by the column number and line numbers. For example, column 1, lines 2–10 are denoted as 1:2–10.

(Doc. 38-3, 4:12–18).

As noted by counsel for Omega at the *Markman* hearing, Figure 1 of the '551 Patent depicts a remote transmitter/receiver, denoted as TX/RX (13), with an antenna (13a). (*Id.* at Fig. 1; 5:12–15). Similarly, Figure 2 of the '551 Patent also depicts a remote transmitter (57, 57a). (*Id.*, Fig. 2; 5:51–6:21). Figures 7, 8, and 9 of the '551 Patent also illustrate a radio frequency ("RF") transmitter and receiver and an antenna for communicating with various devices. [5] (*Id.*, Figs. 7–9, 8:1–35).

Omega next directs the Court to the abstract of the '876 Patent which describes "[a] control system [that] includes a transmitter and a receiver for receiving signals from the remote transmitter, and a multivehicle compatible controller cooperating with the transmitter and receiver." (Doc. 39-1). Similarly, the abstract of the '885 Patent describes the invention and states "[t]he approach is useful for a number of vehicle remote control functions including vehicle security, remote keyless entry and remote starting." (Doc. 39-2). While claim 1 of the '876 and '885 Patents do not describe the transmitter or receiver as remote, wireless, or receiving a RF signal, Omega correctly notes that no dependent claim in either patent limits the transmitter or receiver to a hardwired device. To the contrary, several dependent claims in the '876 and '885 Patents describe and discuss remote transmitters and receivers, including dependent claims 13–18 and 30–32 of the '876 Patent (Doc. 39-1) and claims 8, 12–15, 22–23, and 26–31 of the '885 Patent. (Doc. 39-2).

Based on the foregoing, the Court concludes that the dependent claims in the '876 and '885 Patents do not contain limitations or language requiring the Court to limit the

[5] Figures 1, 2, 7, 8, and 9 of the '551 Patent appear in Appendix A to this Order.

scope of the independent claims. Accordingly, the independent claims may properly be construed in the context of the patent specifications and in view of the '551 Patent to provide for remote control functions. Therefore, the Court construes the terms "transmitter" as **radio frequency transmitter** and the term "receiver" as **radio frequency receiver**, adopting the construction proposed by Omega.

B. The '876, '885, '727, and '278 Patent Terms: "Data Communication Bus/ Vehicle Data Communications Bus/ Vehicle Data Bus"

Claim Term	OMEGA's Construction	CALAMP's Construction
Data communication bus	*No construction needed; alternatively, it should be defined as follows:* Wired connection for communication of digital messages among vehicle devices, with each message including one or more device addresses	Wired connection for transferring data to and from vehicle devices

The term "data communication bus" is used in the '876 (Doc. 39-1) and '885 Patents (Doc. 39-2). The term "vehicle data communications bus" is used in the '727 Patent. (Doc. 39-3). The term "vehicle data bus" is found in the '278 Patent. (Doc. 39-4). Calamp asks the Court to construe these three sets of terms appearing in patents '876, '885, '727, and '278, arguing that construction is necessary to assist the jury.

Calamp contends that in all of the patents-in-suit, the data communication bus is described as a wired connection for transferring data to and from vehicle devices. (Doc. 39, p. 11). Calamp cites the '876 Patent specification which states, "Digital messages

are communicated to all modules over the data communications bus." (Doc. 39-1, 2:18–19). Calamp further refers the Court to the '885 Patent specification language which is identical to the '876 language. (Doc. 39-2, 2:18–19). Calamp also quotes the '278 Patent, which provides, "This and other objects, features, and advantages in accordance with the present invention are provided by a multi-vehicle compatible tracking unit for a vehicle comprising a *vehicle data bus extending throughout the vehicle*." (Doc. 39-4, 2:50–53) (emphasis added). Finally, Calamp cites to the '727 Patent which similarly provides for a "vehicle data bus extending throughout the vehicle."[6] (Doc. 39-3, 2:44–45).

Omega submits that Calamp incorrectly seeks a construction which requires data transfer both to and from vehicle devices, whereas the patents-in-suit do not require two-way commands transferred on the bus. (Doc. 40, p. 4). Omega directs the Court to the plain language of claim 1 of the '876 Patent which provides, in pertinent part:

> 1. A control system for a vehicle comprising a data communications bus and at least one vehicle device connected to the data communications bus, the control system comprising:
>
> . . . .
>
> a multi-vehicle compatible controller at the vehicle and cooperating with said transmitter and receiver, said multi-vehicle compatible controller *generating at least one set of command signals on the data communications bus* for at least one vehicle device . . . .

(Doc. 39-1, 11:30–42) (emphasis added). Omega reasons that the plain language of claim 1 of the '876 Patent instructs the reader that at least one signal is generated, or sent, to at least one vehicle device. (Doc. 40, p. 5). The use of the term "generating" indicates

[6] The Court notes that none of the language cited by Calamp contained within the various patents-in-suit requires two-way communication of messages along the bus.

sending a signal and does not require a signal to be both sent to a device and received from a device.

When one considers the background to the invention, as stated in the '876 Patent, it is clear that a signal may be generated or sent along the bus to a vehicle device without a return signal being sent from the device to the bus. For example, the background to the '876 Patent states that an "alarm indication may typically be a flashing of the lights and/or the sounding of the vehicle horn or a siren." (Doc. 39-1, 1:35–37). Such an alarm may consist of a signal being generated and sent to the device without the device sending a return signal along the bus. One skilled in the art need only read the description of preferred embodiments for the '885 Patent to understand that the data communications bus controls complex and simple functions within the vehicle. "In other words, the vehicle devices connected to the data bus may be considered to be relatively simple devices, such as sensors, or more complicated devices with some internal processing, such as may generally be considered as controllers." (Doc. 39-2, 6:48–52). The simple devices, such as sensors, receive a signal generated and sent to the device without sending a reply to the controller. Accordingly, giving the words of the claim(s) their ordinary and customary meaning that the term would have to those skilled in the art, and taking the term within the context of the entire patent, the terms "data communications bus," "vehicle data communications bus," and "vehicle data bus" do not envision or require the transference of data "to and from" vehicle devices.

Calamp next proposes that Omega's insertion of device "addresses" in their proposed definition of the above terms is not supported by the patents-in-suit. (Doc. 39, p. 12). Calamp argues that the term "address" is an optional feature in the systems

described in the '876 and '885 Patents. (*Id.*). Calamp cites the '885 Patent specification to support this interpretation, which reads, "Each message *may* have one or more addresses associated with it so that the devices can recognize which messages to ignore and which messages to respond to or read." (Doc. 39-2, 2:20–22) (emphasis added). However, the Court finds that this quote is taken out of context. The context is found in the following excerpt:

> With multiplexing technology, the various electronic modules or devices may be linked by a single signal wire in a bus also containing a power wire, and one or more ground wires. Digital messages are communicated to all modules over the data communications bus. Each message may have one or more addresses associated with it so that the devices can recognize which message to ignore and which message to respond to or read.

(*Id.* at 2:16–22). Therefore, the word "may" cannot reasonably be interpreted to suggest that associating an address with a message is optional. Rather, each message will have at least one and perhaps multiple addresses associated with it, depending on the number of electronic modules or devices linked by the command bus. The Court finds that the presence of at least one address is fundamental to the functioning of the invention.[7]

Based on the foregoing, the Court construes the term "data communications bus" as used in the '876 (Doc. 39-1) and '885 Patents (Doc. 39-2), "vehicle data communications bus" as used in the '727 Patent (Doc. 39-3), and "vehicle data bus" as found in the '278 Patent, collectively "data communication bus" as follows: **"wired connection for communication of digital messages among vehicle devices, with each message including one or more device addresses."**

[7] While the '727 and '278 Patents do not specifically reference an address, one skilled in the art at the time of the invention would understand a vehicle data communications bus to require one or more addresses in order to control or read a device.

C. The '876, '885, '727, '278 Patent Term: "Vehicle Device"

Claim Term	OMEGA's Construction	CALAMP's Construction
Vehicle device	No construction needed	Electrical or electronic component in a vehicle that can be controlled and/or the status thereof read

Calamp contends the term "vehicle device" should be construed by the Court because the term is broad and susceptible to many meanings. (Doc. 39, p. 13). The parties agree that claim terms should be construed by the Court when it is necessary to resolve a genuine and material legal dispute between the parties or when necessary to aid the jury in understanding claim terms. Calamp's proposed construction of the term "vehicle device" is taken verbatim from the '876 and '885 Patents, with closely analogous language found in the '727 and '278 Patents. (*Id.*). Since Calamp's proposed construction of "vehicle device" is taken from the patents-in-suit, the Court need not construe the claim term. The definition is not in dispute, nor is additional construction necessary to aid the jury in understanding the claim term. Calamp's request to construe the term "vehicle device" is denied.

D. The '876 Patent Term: "Command Signal"

Claim Term	OMEGA's Construction	CALAMP's Construction
Command signal	*No construction needed; alternatively, it should be defined as follows:* Signal generated on the data communications	Signal generated on the data communications bus for operating a vehicle device to cause a desired function to be performed at the vehicle

	bus for operating a vehicle device	

The term "command signal" appears in claims of the '876 Patent. Calamp contends the '876 Patent, when read in its entirety, supports construction of the term "command signal" as requiring that the signal causes a desired function to be performed. (Doc. 39, p. 14). Calamp notes that the specifications include the following language: "will cause an operation or response from the vehicle device." (Doc. 39-1, 3:16–20). Defendant quotes portions of the specifications which state command signals may be "for operating" a specific vehicle device. (*Id.* at 3:39, 41–45; 5:45–49).

Omega submits that claim 1 of the '876 Patent clearly states that not every command signal will cause an operation or response from a vehicle device:

> 1. A control system for a vehicle comprising a data communications bus and at least one vehicle device connected to the data communications bus, the control system comprising:
>
> . . . .
>
> a multi-vehicle compatible controller at the vehicle and cooperating with said transmitter and receiver, said multi-vehicle compatible controller generating at least one set of command signals on the data communications bus for at least one vehicle device, the at least one set of command signals comprising at least *one working and at least one non-working command signal* for a given vehicle to thereby provide command compatibility with a plurality of different vehicles.

(*Id.* at 11:30–48) (emphasis added).

The claim makes it clear that the control system uses a working and non-working command signal because "multiple signals or codes can be generated on the data communications bus, and only that code for the *given vehicle and device* will cause an operation or response from the vehicle device." (*Id.* at 3:17–20) (emphasis added). Further, "an object of the invention [is] to provide a control system and related method for

a vehicle comprising a data communications bus and at least one vehicle device connected to the data communications bus, and wherein the system is *adapted to operate with different vehicles.*" (*Id.* at 2:66–3:4) (emphasis added). Since the system is designed to operate with a variety of vehicle platforms, not every signal generated on the data communications bus will cause a function to be performed. In order for a signal to cause a function to be performed, the signal must be received by a device contained within a compatible vehicle platform.[8] Accordingly, Calamp's proposed construction incorrectly includes within the definition of the "command signal" the requirement that a signal generated on the data communication bus must always cause a desired function to be performed.

Based on the foregoing, the Court construes "command signal" as follows: **"signal generated on the data communications bus for operating a vehicle device."**

E. The '876 and '885 Patent Term: "Device Code"

Claim Term	OMEGA's Construction	CALAMP's Construction
Device codes	*No construction needed; alternatively, it should be defined as follows:* Signal to or from a vehicle device	Signal from a vehicle device read on the vehicle bus. *Amended at the Markman hearing as follows:* Signal from a vehicle device read on the vehicle bus and/or stored in the controller

Calamp asserts that the '876 and '885 Patents describe "device code" as a signal from a vehicle device that is read on the vehicle bus. (Doc. 39, p. 15). Calamp's

[8] "In other words, multiple signals or codes can be generated on the data communications bus, and only that code for the given vehicle will cause an operation or response from the vehicle device." (Doc. 39-2, 7:31–34).

proposed construction is based on select language from the '876 and '885 Patents. For example, both the '876 and '885 Patents discuss "reading a device code *from* the data communications bus." (Doc. 39-1, 9:22–23; Doc. 39-2, 3:12-13) (emphasis added). The complete text of the specification is, as always, helpful in construing the claim terms:

> More particularly, the multi-vehicle compatible controller is for storing a set of device codes for a given vehicle device for a plurality of different vehicles, for reading a device code from the data communications bus, and for determining a match between a read device code and the stored device codes to thereby provide compatibility with a plurality of different vehicles.

(Doc. 39-1, 9:19–25).

The '885 Patent further elaborates upon the manner in which the multi-vehicle compatible controller functions:

> Moreover, the multi-vehicle compatible controller is also for storing a set of device codes for a given vehicle device for a plurality of different vehicles, for reading a device code from the data communications bus, and for determining a match between a read device code and the stored device codes to thereby provide compatibility with a plurality of different vehicles.

(Doc. 39-2, 3:10–16). Both of these patents clearly state that when a device code is read, it is read "from" the data communications bus and not "on" the vehicle bus. To the extent Calamp's proposed construction describes the signal from the vehicle device as being read "on" the vehicle bus, the claims and specifications of the pertinent patents contradict this interpretation.

The next issue is whether the device codes travel "from" a vehicle device, as Calamp contends, or travels "to and from" a vehicle device, as Omega suggests. As previously discussed, the relevant specifications state: "[T]he multi-vehicle compatible controller is also for storing a set of device codes for a given vehicle device for a plurality

of different vehicles, for reading a device code from the data communications bus [and determining whether a match exists] . . . ." (*Id.*). The specifications, therefore, certainly state that device codes, or signals, are stored on the multi-vehicle compatible controller, and codes received from the data communications bus can be read to determine if the stored code matches the code received from the data communications bus. The claims and specifications do not describe any scenario wherein the device code is a signal sent "to" a vehicle device, which appears to be accomplished by command signals. Omega does not direct the Court to any intrinsic evidence to support its contention that a device code, or signal, travels both to and from a vehicle device.

Based on the foregoing, the Court agrees with Calamp that the claims and specifications of the pertinent patents-in-suit describe "device codes" as **signal from a vehicle device.** The Court, however, declines to adopt Calamp's construction to the extent it describes device codes as being "read on the vehicle bus." The description proffered by Calamp is contradicted by the clear wording of the claims and specifications, which state the signal or code is read "from" the bus and not "on" the bus. Additionally, Calamps's construction focuses on the signal being "read" and fails to address the storage of device codes and the comparison of stored codes to codes received from the communications bus. The Court finds it is not necessary to include a partial description of how device codes are utilized by the multi-vehicle compatible controller, because the ordinary meaning of the claim language relative to the uses made of the device codes is readily apparent to those skilled in the art.

Thus, the term "device codes" is construed by the Court to mean: **"signal from a vehicle device."**

F. The '885 Patent Term: "Function"

Claim Term	OMEGA's Construction	CALAMP's Construction
Function	*No construction needed; alternatively, it should be defined as follows:* An operation of a vehicle device	An operation of a vehicle device, such as remote starting the engine, remotely unlocking the vehicle doors, or changing the mode of a security system between armed and disarmed

Calamp contends that the definition of the term "function" found in claim 24 of the '885 patent should be limited to the three embodiments identified in Calamp's proposed claim construction. (Doc. 39, p. 17). Omega asserts the term "function" does not require construction because the ordinary meaning of the claim language is readily apparent to persons of ordinary skill in the art and even to lay judges. (Doc. 40, pp. 9–10). The Court agrees that the claim language is sufficiently clear and unambiguous to enable an individual of ordinary skill in the art, as well as lay judges, to apply the language in the context of this litigation.

The patent states the invention may be embodied in "many different forms and should not be construed as limited to the illustrated embodiments set forth herein." (Doc. 39-2, 4:63–65). The term "function" is self-evident from the context of the list of embodiments:

> The second transmitter/receiver pair may be used to cause a *desired function* to be performed at the vehicle, such as remote starting the engine, remotely unlocking the vehicle doors, or changing the mode of a security system between armed and disarmed modes, for example. Many other similar applications are contemplated by the present invention as will be appreciated by those skilled in the art.

(*Id.* at 5:24–31) (emphasis added). Clearly, a function is the operation of one of the vehicle devices. Accordingly, the Court declines to construe this term.

G. The '727 Patent Term: "Remote Vehicle Speed Exceeded Notification"

Claim Term	OMEGA's Construction	CALAMP's Construction
Remote vehicle speed exceeded notification	*No construction needed; alternatively, it should be defined as follows:* Notification sent when a vehicle speed exceeds a speed threshold for a first time period	A message sent from a vehicle indicating that the vehicle speed has exceeded a particular speed

The term "remote vehicle speed exceeded notification" is found in the '727 Patent. Calamp proposes a construction of the term which emphasizes that the message indicating that a preset speed has been exceeded is sent "from" the vehicle. (Doc. 39, p. 18). Calamp asserts that the patent, and Omega's proposed construction, fail to state that the message originates from within the vehicle. (*Id.*). Omega argues that no construction is required because the ordinary meaning of the claim language is readily apparent. (Do. 40, p. 11). The Court agrees with Omega and finds that the term "remote vehicle speed exceeded notification" does not require construction or clarification.

Claim 1 of the '727 Patent clearly identifies that the speed exceeded notification device includes "at least one vehicle device *generating* data related to vehicle speed." (Doc. 39-3, 7:6–7) (emphasis added). Therefore, the message is clearly sent from the vehicle, where the vehicle devices reside. The claim language further states that the

device determines "when a vehicle speed exceeds a speed threshold *for the first time period*" and sends a remote vehicle speed exceeded notification. (*Id.*) (emphasis added). That is, a device internal to the vehicle sends the notification outside of the vehicle. To the extent the patent provides for multiple speed exceeded notifications being sent from the vehicle, the claim language clearly addresses the manner in which this is accomplished. (*Id.* at 7:18–22, 27–29).

Based on the foregoing, the Court declines Calamp's request for construction of the term "remote vehicle speed exceeded notification."

H. The '278 Patent Term: "Downloading Interface"

Claim Term	OMEGA's Construction	CALAMP's Construction
Downloading interface	No construction needed	Connection that can receive data

Calamp asserts that the term "downloading interface" is unclear and may result in jurors concluding the term involves a software interface for downloading or some other type of interface. (Doc. 39, p. 19). Calamp contends that the patent describes the downloading interface as "hardware" or a connection to the tracking unit. (*Id.*). However, the plain language of the patent describes downloading interface more broadly. The patent provides the following variety of methods for data to be received from the downloading interface:

> The downloading interface may comprise either a wired or wireless signal downloading interface. The wired signal downloading interface may comprise a connector for temporary connection to a downloading device, for example. The wireless signal downloading interface may include a wireless receiver for temporary connection

> to a downloading device . . . . The downloading interface may also be for permitting downloading of at least one programming instruction for the multi-vehicle compatible controller, in some embodiments.

(Doc. 39-4, 3:4–16). The summary of the invention, cited above, tracks the language found in claims 1, 2, 4, and 8. (*Id.* at 25:63–26:39).

The ordinary meaning of "download interface" is readily apparent to persons of ordinary skill in the art. To the extent one may desire additional context for the term "downloading interface," that context is found in the background and summary of the invention. The background statement provides, "For a company with hired drivers, it may be desirable to know the driver's whereabouts during the course of the day. Similarly, a rental car agency or other fleet operator, for example, may wish to know the whereabouts of its fleet of vehicles." (*Id.* at 1:37–41). To facilitate these objectives, the summary of the invention informs the reader that, "[t]he tracking unit may also include a downloading interface for permitting downloading of enabling data related to the at least one corresponding vehicle device code . . . ." (*Id.* at 2:63–66). The embodiment section of the patent further educates the reader that data received via the downloading interface may provide a number of pieces of information regarding the vehicle, including whether the vehicle is being moved by an unauthorized driver, whether the vehicle is being broken into, whether the vehicle is being driven in excess of an authorized speed, and the like. (*Id.* at 11:36–12:10).

Accordingly, the ordinary meaning of the language of the patent, including the term downloading interface, instructs the reader, including lay judges and jurors, of the type of data transmitted from the vehicle device and the manner of its transmission: wired,

wireless, and for permitting downloading of at least one programming instruction, for example. A downloading interface is, therefore, not limited to a hardwired connection.

Based on the foregoing, the Court declines to construe the term "downloading interface."

I. The '278 Patent Term: "Enabling Data"

Claim Term	OMEGA's Construction	CALAMP's Construction
Enabling data	*No construction needed; alternatively, it should be defined as follows:* Data related to the at least one corresponding vehicle device code for use by said multi-vehicle compatible controller	A vehicle device code or codes, and instruction to select a code or codes, or the data or sequence to allow the controller to generate a vehicle device code or codes

The term "enabling data" appears in the '278 Patent. (Doc. 39-4). Calamp avers that the term lacks any common meaning or specific structure to one of ordinary skill in the art and should be construed. (Doc. 39, p. 20). Calamp acknowledges the term enabling data is referenced in several places, but submits the term is not defined other than at column 24, lines 8–12 of the '278 Patent. (*Id.*) The specification provides, in pertinent part:

> The multi-vehicle compatible tracking unit also illustratively includes a downloading interface for permitting downloading of enabling data related to the at least one corresponding vehicle device code for use by the multi-vehicle compatible controller. The enabling data may be the vehicle device code or codes, an instruction to select a code or codes from among those already stored, or the data or sequence

> to allow the controller to generate the vehicle device code or codes, for example.

(Doc. 39-4, 24:4–12). Other references to "enabling data" include references to figures within the patent, stating, "Enabling data related to at least one corresponding vehicle device code for use by the multi-vehicle compatible controller is downloaded via a downloading interface." (*Id.* at 25:14–16).

Calamp suggests that any construction of enabling data should be limited to claim 1 of the '278 Patent (Doc. 39-4, 26:13–15), which provides, in part, "[E]nabling data related to the at least one corresponding vehicle device code for use by said multi-vehicle compatible controller." (Doc. 40, p. 13). Omega objects to Calamp's inclusion of some of the preferred embodiments into their proposed definition, citing *Northern Telecom Ltd. v. Samsung Elecs. Co.*, 215 F.3d 1281, 1293 (Fed. Cir. 2000) ("This court consistently declines to construe claim terms according to the preferred embodiment."). The Court agrees that Calamp's proffered construction improperly restricts or narrows the scope of this term.

Based on the foregoing, the Court construes the term "enabling data" as follows: **data related to the at least one corresponding vehicle device code for use by said multi-vehicle compatible controller.**

J. The '278 Patent Term: "Programming Instruction"

Claim Term	OMEGA's Construction	CALAMP's Construction
Programming instructions	No construction needed	Code which instructs the controller to perform an operation

The term "programming instructions" is found in the '278 Patent. (Doc. 39-4). Calamp submits that this term should be construed by the Court because the term is susceptible to multiple meanings. (Doc. 39, p. 21). Omega advised the Court during the *Markman* hearing that it does not object to Calamp's proposed construction. The Court therefore adopts Calamp's proposed construction.

V. CONCLUSION

The Court adopts the following constructions:

CLAIM TERM	AGREED CONSTRUCTION
Controller	Electronic circuitry that performs one or more control functions.
Multi-vehicle compatible controller	Electronic circuitry that performs one or more control functions, and can operate with more than one vehicle.

[ORDER CONTINUES ON FOLLOWING PAGE]

CLAIM TERM	COURT'S CONSTRUCTION
Transmitter	Radio frequency transmitter.
Receiver	Radio frequency receiver.
Data communication bus/ vehicle data communications bus/ vehicle data bus	Wired connection for communication of digital messages among vehicle devices, with each message including one or more device addresses.
Vehicle device	Plain meaning
Command signal	Signal generated on the data communications bus for operating a vehicle device.
Device codes	Signal from a vehicle device.
Function	Plain meaning
Remote vehicle speed exceeded notification	Plain meaning
Downloading interface	Plain meaning
Enabling data	Data related to the at least one corresponding vehicle device code for use by said multi-vehicle compatible controller.
Programming instructions	Code which instructs the controller to perform an operation.

DONE AND ORDERED in Orlando, Florida on February 20, 2015.

PAUL G. BYRON
UNITED STATES DISTRICT JUDGE

Copies furnished to:

Counsel of Record

APPENDIX A

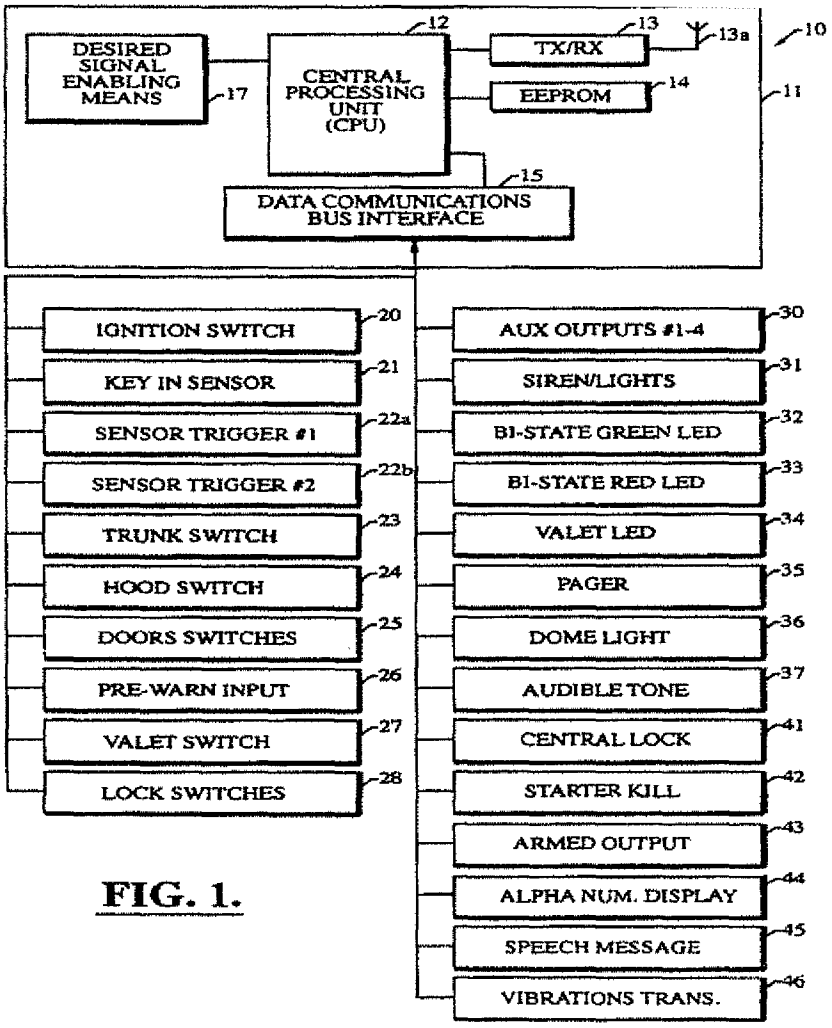


FIG. 1.

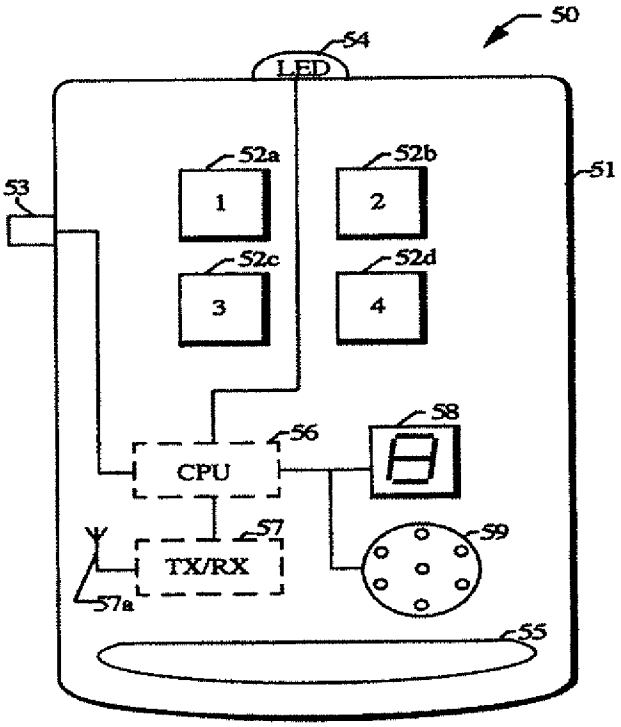

50
54
LED
52a
1
52b
2
53
51
52c
3
52d
4
58
56
CPU
57
TX/RX
57a
59
55

FIG. 2.

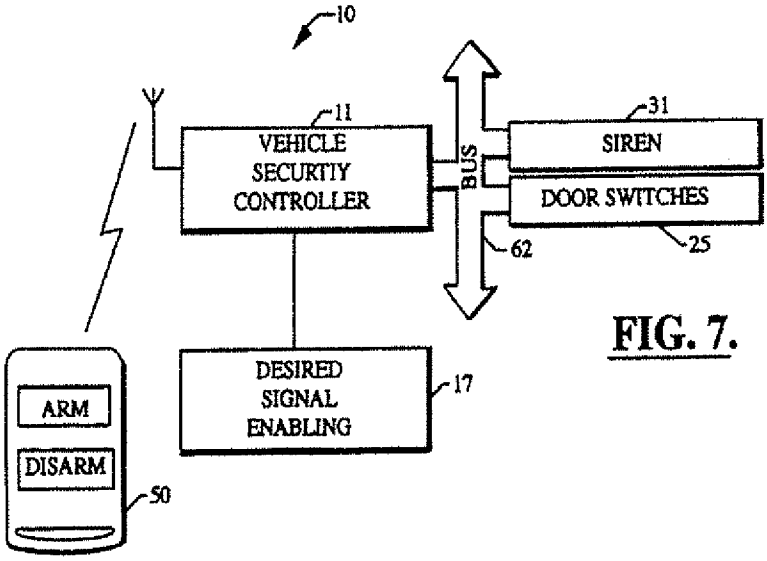

10
11
VEHICLE
SECURTIY
CONTROLLER
BUS
31
SIREN
DOOR SWITCHES
25
62
ARM
DISARM
50
DESIRED
SIGNAL
ENABLING
17

FIG. 7.

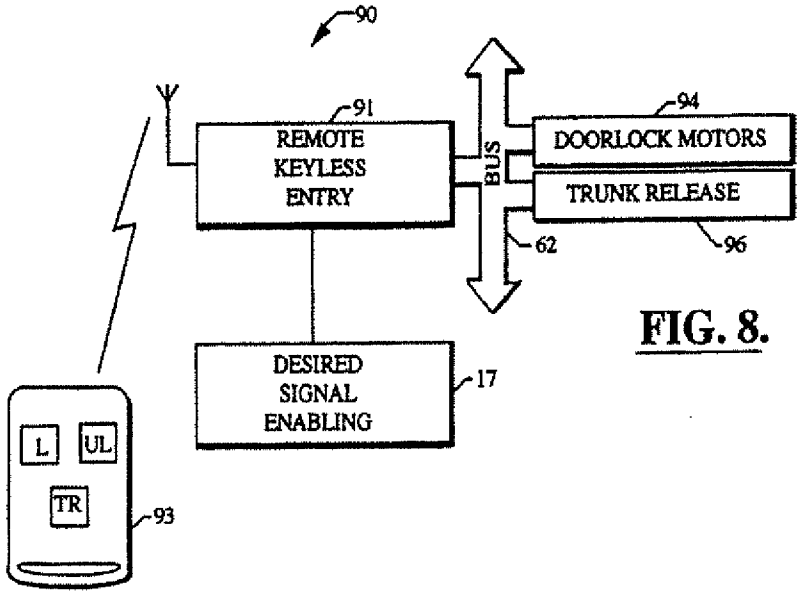

90
91
REMOTE KEYLESS ENTRY
BUS
94
DOORLOCK MOTORS
TRUNK RELEASE
62
96
DESIRED SIGNAL ENABLING
17
L
UL
TR
93

FIG. 8.

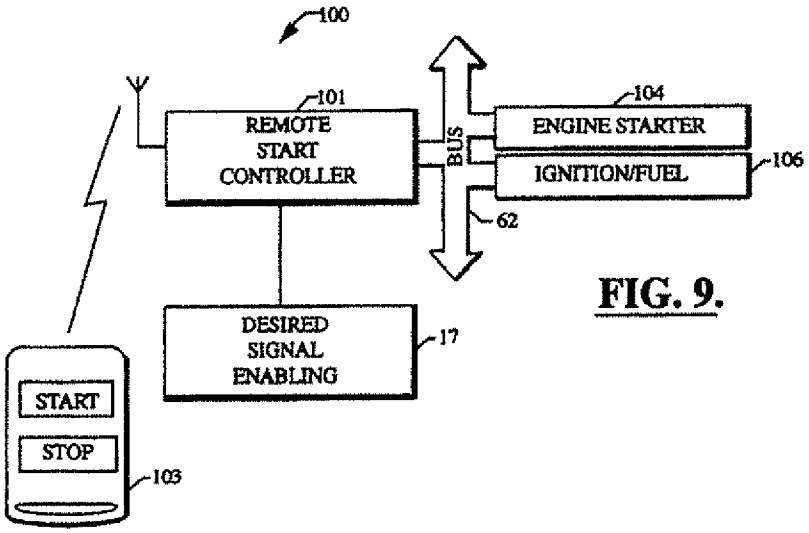

100
101
REMOTE START CONTROLLER
BUS
104
ENGINE STARTER
IGNITION/FUEL
106
62
DESIRED SIGNAL ENABLING
17
START
STOP
103

FIG. 9.

Electronic Acknowledgement Receipt

EFS ID:	29463526
Application Number:	90013851
International Application Number:	
Confirmation Number:	8717
Title of Invention:	Vehicle Tracking Unit with Downloadable Codes and Associated Methods
First Named Inventor/Applicant Name:	8032278
Correspondence Address:	CHRISTOPHER F. REGAN, ESQUIRE ALLEN, DYER, DOPPELT, MILBRATH & GILCHRIST, P.A. P. O. BOX 3791 - ORLANDO FL 32802-3791 US 407-841-2330 -
Filer:	Richard K. Warther./sheryllee scheibe
Filer Authorized By:	Richard K. Warther.
Attorney Docket Number:	C13-03896.RE2
Receipt Date:	12-JUN-2017
Filing Date:	28-OCT-2016
Time Stamp:	13:47:47
Application Type:	Reexam (Third Party)

Payment information:

Submitted with Payment	no

File Listing:

Document Number	Document Description	File Name	File Size(Bytes)/ Message Digest	Multi Part /.zip	Pages (if appl.)
1		SS58106CIP1REX2AMD.pdf	3646556 ced0184f6488341579d3479dd3c96b3e8d4f745d	yes	117

	Multipart Description/PDF files in .zip description		
	Document Description	**Start**	**End**
	Amendment/Req. Reconsideration-After Non-Final Reject	1	1
	Claims	2	7
	Applicant Arguments/Remarks Made in an Amendment	8	39
	Affidavit-traversing rejectns or objectns rule 132	40	49
	Reexam Miscellaneous Incoming Letter	50	60
	Reexam Miscellaneous Incoming Letter	61	84
	Reexam Miscellaneous Incoming Letter	85	88
	Reexam Miscellaneous Incoming Letter	89	117

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Information:

Total Files Size (in bytes):	3646556

This Acknowledgement Receipt evidences receipt on the noted date by the USPTO of the indicated documents, characterized by the applicant, and including page counts, where applicable. It serves as evidence of receipt similar to a Post Card, as described in MPEP 503.

New Applications Under 35 U.S.C. 111

If a new application is being filed and the application includes the necessary components for a filing date (see 37 CFR 1.53(b)-(d) and MPEP 506), a Filing Receipt (37 CFR 1.54) will be issued in due course and the date shown on this Acknowledgement Receipt will establish the filing date of the application.

National Stage of an International Application under 35 U.S.C. 371

If a timely submission to enter the national stage of an international application is compliant with the conditions of 35 U.S.C. 371 and other applicable requirements a Form PCT/DO/EO/903 indicating acceptance of the application as a national stage submission under 35 U.S.C. 371 will be issued in addition to the Filing Receipt, in due course.

New International Application Filed with the USPTO as a Receiving Office

If a new international application is being filed and the international application includes the necessary components for an international filing date (see PCT Article 11 and MPEP 1810), a Notification of the International Application Number and of the International Filing Date (Form PCT/RO/105) will be issued in due course, subject to prescriptions concerning national security, and the date shown on this Acknowledgement Receipt will establish the international filing date of the application.

IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

In re Patent of **KENNETH E. FLICK**	)	
	)	
Request for Reexamination of	)	
U.S. PATENT NO. 8,032,278	)	
	)	
Control No. **90/013,851**	)	Attorney Docket No.:
	)	**C13-03895(58106CIP1_REX2)**
Confirmation No. **8717**	)	
	)	Examiner: **K. Reichle**
Filing Date: **OCTOBER 28, 2016**	)	
	)	Art Unit: **3992**
For: **VEHICLE TRACKING UNIT WITH DOWNLOADABLE CODES AND ASSOCIATED METHODS**	)	

INTERVIEW SUMMARY FOR TELEPHONIC INTERVIEW OF JUNE 1, 2017

EFILE
Commissioner for Patents

The Patent Owner thanks the U.S. Patent and Trademark Office and the Examiners for extending all courtesies to the Patent Owner's Representatives during the telephonic interview of June 1, 2017.

During the telephonic interview, Examiner Karin Reichle, Examiner Woo Choi, and Examiner Jalatee Worjloh were present on behalf of the U.S. Patent and Trademark Office, and Attorney Christopher F. Regan (Reg. No. 34,906) and Attorney Jack G. Abid (Reg. No. 58,237) were present on behalf of the Patent Owner.

The Patent Owner discussed the attached agenda with the Examiners. In particular, the Patent Owner discussed the background of the invention, and the problems addressed by the claimed invention.

_____/

The Patent Owner discussed Chou et al. with respect to: "a downloading interface for permitting downloading of enabling data related to the at least one corresponding vehicle device code for use by said multi-vehicle compatible controller", as recited by independent Claim 1, for example.

The Patent Owner discussed Chou et al. with respect to: "said multi-vehicle compatible controller to be coupled to the vehicle data bus for communication thereover with at least one vehicle device using at least one corresponding vehicle device code from among a plurality thereof for different vehicles", as recited in independent Claim 1, for example.

Respectfully submitted,

/JACK G. ABID/

JACK GEORGE ABID
Reg. No. 58,237
Allen, Dyer, Doppelt, Milbrath
& Gilchrist, P.A.
255 S. Orange Avenue, Suite 1401
Post Office Box 3791
Orlando, Florida 32802
407-841-2330
407-841-2343 fax
Attorney for the Patent Owner

In re Patent of
Kenneth E. FLICK
Reexamination Control No. **90/013,851**
Filed: **OCTOBER 29, 2016**
_____/

CERTIFICATE OF SERVICE

Certificate of Service in compliance with 37 C.F.R. §1.530(c)

Pursuant to 37 C.F.R. §§1.530(c), 1.248, I hereby certify that on June 12, 2017, a complete copy of this Amendment is being served via First Class U.S. Mail upon Third Party Requester at the correspondence address as shown in PAIR:

KPPB LLP
2400 EAST KATELLA AVENUE
SUITE 1050
ANAHEIM, CA 92806

Respectfully submitted,

/JACK G. ABID/

JACK GEORGE ABID
Reg. No. 58,237
Allen, Dyer, Doppelt +
Gilchrist, P.A.
255 S. Orange Avenue, Suite 1401
Post Office Box 3791
Orlando, Florida 32802
407-841-2330
407-841-2343 fax
Attorney for the Patent Owner

REEXAMINATION 90/013,851 (8,032,278)
Interview Outline (June 1, 2017)

I. Participants

Examiners:
(1) Karin M. Reichle
(2)
(3)

Patent Owner Attendees:
Chris Regan (34,906)
Jack Abid (58,237)

II. Background

Patent Owner:
Omega Patents LLC – Ken Flick
150+ patents
Omega Research & Development sold to Audiovox

Omega v. Calamp Litigation:
Filed – 12/20/13
Actual trial date: 2/16/16 to 2/24/16 **(Reexamination filed 10/28/16)**
Verdict: all asserted claims valid, infringed, secondary considerations found
Final Order issued 4-5-17, attached (relevant portions highlighted)
Final Judgment issued 4/24/17, also attached (relevant portions highlighted), and finding willful infringement and which includes a calculation for interest, and stipulated attorneys' fees, bringing the final judgment amount to $10,144,286

Calamp's Litigation Expert:
Admitted in depo no anticipation theory for '278 patent

Prior Reexamination on '278 Patent filed by Requester
Reexamination Certificate confirming patentability of all claims issued December 28, 2016.
Current reexamination filed during pendency of the prior reexamination in an attempt to convert the *ex parte* reexamination into an *inter partes* one.

III. The '278 Patent

'278 Patent Background:

A number of patents disclose various security and control systems that address data bus interoperability. For example, U.S. Pat. No. 5,719,551, assigned to Omega Patents, LLC, the assignee of the present invention, discloses a vehicle security system for a vehicle including a data bus connecting a plurality of vehicle devices. A signal enabling circuit enables the alarm controller to operate using a set of desired signals selected from a plurality of possible sets for

different vehicles. U.S. Pat. No. 6,011,460, assigned to Omega Patents, LLC, discloses a similar system where the set of desired signals from the plurality of different sets of signals for different vehicles is obtained, such as by connection and communication with a downloading device. Additionally, U.S. Pat. No. 6,756,885, also assigned to Omega Patents, LLC, discloses a multi-vehicle control system whereby a multi-vehicle compatible controller stores a set of device codes for a given vehicle device for a plurality of different vehicles. Device codes are read from the data communications bus, and a match between a read device code and the stored device codes is determined to provide compatibility with different vehicles. (Col. 2, lines 17-37)

Unfortunately, such advanced techniques for dealing with multiple device codes for a vehicle having a data communications bus have not yet been developed for vehicle tracking units. (Col. 2, lines 38-41).

'278 Patent Detailed Description:

The multi-vehicle compatible controller 111 is coupled to the vehicle data bus 122 for communication thereover with a vehicle device 121. The controller 111 illustratively includes a central processing unit (CPU) 126 or other logic circuitry which is connected to a clock signal generator 124, a memory 125, and input/output circuitry 127 to interface with the vehicle device 121 using at least one corresponding vehicle device code from among a plurality thereof for different vehicles. (Col. 23, lines 59-67).

Further aspects of interfacing with a vehicle data communications bus are described in U.S. Pat. Nos. 5,719,551 and 6,011,460 assigned to the assignee of the present invention, the entire contents of which are incorporated herein by reference. (Col. 22, lines 3-7).

From '551:

> The security system 10 further preferably comprises desired signal enabling means 17 for enabling the alarm controller 10 to operate using a desired set of signals for a desired vehicle from among a plurality of possible sets of signals for different vehicles. As would be readily understood by those skilled in the art, the term different vehicles may include vehicles from different manufacturers, different models, or even different trim levels of the same make and model. (Col. 6, lines 33-43).

'278 Patent Claim 1:

1. A multi-vehicle compatible tracking unit for a vehicle comprising a vehicle data bus extending throughout the vehicle, the multi-vehicle compatible tracking unit comprising:

a vehicle position determining device;

a wireless communications device;

a multi-vehicle compatible controller for cooperating with said vehicle position determining device and said wireless communications device to send vehicle position information;

said multi-vehicle compatible controller to be coupled to the vehicle data bus for communication thereover with at least one vehicle device using at least one corresponding vehicle device code from among a plurality thereof for different vehicles; and

a downloading interface for permitting downloading of enabling data related to the at least one corresponding vehicle device code for use by said multi-vehicle compatible controller.

IV. Anticipation/Obviousness Rejection over Chou et al.:

Chou et al. fails to disclose or fairly suggest: "said multi-vehicle compatible controller to be coupled to the vehicle data bus for communication thereover with at least one vehicle device using at least one corresponding vehicle device code from among a plurality thereof for different vehicles".

Rather, the cited portions of Chou et al. recite:

> [t]he vehicle bus interface may support one of vehicle bus standards such as CAN (Controller Area Network) and the Society of Automotive Engineers' SAE 11850- Class B Data Communication Network Interface. Alternatively, the processor supports some or all of the functions of the vehicle bus interface and connects directly to the vehicle bus 335. The vehicle bus shown in FIG. 2 is an inherent part of all new automobiles. (Col. 3, lines 37-44).
>
> [t]he vehicle bus adapter 120C translates the messages received from the vehicle bus into the language of the fault detector. It also translates messages from the fault detector into the language of the vehicle bus. The fault code specifications and protocols of the vehicle may be Original 30 Equipment Manufacturer (OEM) and model dependent. The term "vehicle fault codes" is meant to be synonymous with the term "trouble code" or "diagnostic trouble code". (Col. 4, lines 25-32).

Although Chou et al. discloses that it can operate with a plurality of different bus types, the skilled person would appreciate that vehicle device codes are propriety to each manufacturer. Indeed, as recognized by Chou et al., "[t]he fault code specifications and protocols of the vehicle may be Original Equipment Manufacturer (OEM) and model dependent." (Col. 4, lines 28-30). As was typical at the time of filing of the present application, these tracking and monitoring devices were programmed to work with the subject vehicle. In other words, the processor of Chou et al. is capable of talking on different types of automobile data buses, but it fails to use at least one corresponding vehicle device code from among a plurality thereof for different vehicles, as recited by independent Claim 1, for example.

Chou et al. fails to disclose or fairly suggest: "a downloading interface for permitting downloading of enabling data related to the at least one corresponding vehicle device code for use by said multi-vehicle compatible controller".

In the Official Action, the Examiner stated: "such structure permits downloading of enabling data, e.g. instruction to gather data, vehicle parameter update/change, related to the at least one corresponding vehicle device code for use by said multi-vehicle compatible controller, e.g. steps 2-6 in Figure 5. Thus '499 discloses or obviously suggests "a downloading interface" and such permits downloading of enabling data related to the at least one corresponding vehicle device code for use by said multi-vehicle compatible controller." (Official Action, Page 27).

Since Chou et al. fails to disclose or fairly suggest using at least one corresponding vehicle device code from among a plurality thereof for different vehicles, as recited by independent Claim 1, for example, it also fails to disclose or fairly suggest downloading interface for permitting downloading of enabling data related to the at least one corresponding vehicle device code for use by said multi-vehicle compatible controller, as also recited by each independent claim.

In the Official Action, the Examiner cited to several portions of Chou et al., but the Examiner contended that the communication link carrying "vehicle parameter values", (Col. 7, line 35), discloses the claimed enabling data. As with the fault codes, the capability to interoperate with vehicle parameter values is predicated on the need to program the processor with software specific to the subject vehicle. Indeed, Chou et al. notes at Col.10, lines 5-10 that the vehicle parameter update/change could be performed as an additional service.

Electronic Acknowledgement Receipt

EFS ID:	29464478
Application Number:	90013851
International Application Number:	
Confirmation Number:	8717
Title of Invention:	Vehicle Tracking Unit with Downloadable Codes and Associated Methods
First Named Inventor/Applicant Name:	8032278
Correspondence Address:	CHRISTOPHER F. REGAN, ESQUIRE ALLEN, DYER, DOPPELT, MILBRATH & GILCHRIST, P.A. P. O. BOX 3791 - ORLANDO FL 32802-3791 US 407-841-2330 -
Filer:	Richard K. Warther./sheryllee scheibe
Filer Authorized By:	Richard K. Warther.
Attorney Docket Number:	C13-03896.RE2
Receipt Date:	12-JUN-2017
Filing Date:	28-OCT-2016
Time Stamp:	14:26:29
Application Type:	Reexam (Third Party)

Payment information:

Submitted with Payment	no

File Listing:

Document Number	Document Description	File Name	File Size(Bytes)/ Message Digest	Multi Part /.zip	Pages (if appl.)
1	Reexam Miscellaneous Incoming Letter	ss58106int.pdf	244175 99f39ff6ad3ccc4c5d917333f7b66445e8eaee01	no	7

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Information:

Total Files Size (in bytes):	244175

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New Applications Under 35 U.S.C. 111

If a new application is being filed and the application includes the necessary components for a filing date (see 37 CFR 1.53(b)-(d) and MPEP 506), a Filing Receipt (37 CFR 1.54) will be issued in due course and the date shown on this Acknowledgement Receipt will establish the filing date of the application.

National Stage of an International Application under 35 U.S.C. 371

If a timely submission to enter the national stage of an international application is compliant with the conditions of 35 U.S.C. 371 and other applicable requirements a Form PCT/DO/EO/903 indicating acceptance of the application as a national stage submission under 35 U.S.C. 371 will be issued in addition to the Filing Receipt, in due course.

New International Application Filed with the USPTO as a Receiving Office

If a new international application is being filed and the international application includes the necessary components for an international filing date (see PCT Article 11 and MPEP 1810), a Notification of the International Application Number and of the International Filing Date (Form PCT/RO/105) will be issued in due course, subject to prescriptions concerning national security, and the date shown on this Acknowledgement Receipt will establish the international filing date of the application.

UNITED STATES PATENT AND TRADEMARK OFFICE

UNITED STATES DEPARTMENT OF COMMERCE
United States Patent and Trademark Office
Address: COMMISSIONER FOR PATENTS
P.O. Box 1450
Alexandria, Virginia 22313-1450
www.uspto.gov

APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
90/013,851	10/28/2016	8032278	C13-03896.RE2	8717

7590 06/06/2017

CHRISTOPHER F. REGAN, ESQUIRE
ALLEN, DYER, DOPPELT, MILBRATH & GILCHRIST, P.A.
P. O. BOX 3791
ORLANDO, FL 32802-3791

EXAMINER
REICHLE, KARIN M

ART UNIT	PAPER NUMBER
3992	

MAIL DATE	DELIVERY MODE
06/06/2017	PAPER

Please find below and/or attached an Office communication concerning this application or proceeding.

The time period for reply, if any, is set in the attached communication.

UNITED STATES PATENT AND TRADEMARK OFFICE

Commissioner for Patents
United States Patent and Trademark Office
P.O. Box 1450
Alexandria, VA 22313-1450
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KPPB LLP

2400 EAST KATELLA AVENUE

SUITE 1050

ANAHEIM, CA 92806

EX PARTE REEXAMINATION COMMUNICATION TRANSMITTAL FORM

REEXAMINATION CONTROL NO. *90/013,851*.

PATENT NO. *8032278*.

ART UNIT *3992*.

Enclosed is a copy of the latest communication from the United States Patent and Trademark Office in the above identified *ex parte* reexamination proceeding (37 CFR 1.550(f)).

Where this copy is supplied after the reply by requester, 37 CFR 1.535, or the time for filing a reply has passed, no submission on behalf of the *ex parte* reexamination requester will be acknowledged or considered (37 CFR 1.550(g)).

Karin M. Reichle

PTOL-465 (Rev.07-04)

Primary Examiner

Art Unit: 3992

Ex Parte Reexamination Interview Summary	**Control No.**	**Patent Under Reexamination**
	90/013,851	8032278
	Examiner	**Art Unit**
	Karin Reichle	3992

All participants (USPTO personnel, patent owner, patent owner's representative):

(1) *Karin Reichle*	(3) *Chris Regan*
(2) *SPRS Woo Choi, Jalatee Worjloh*	(4) *Jack Abid*

Date of Interview: *01 June 2017*

Type: a)☒ Telephonic b)☐ Video Conference
c)☐ Personal (copy given to: 1)☐ patent owner 2)☐ patent owner's representative)

Exhibit shown or demonstration conducted: d)☐ Yes e)☒ No.
If Yes, brief description: _____

Agreement with respect to the claims f)☐ was reached. g)☒ was not reached. h)☐ N/A.
Any other agreement(s) are set forth below under "Description of the general nature of what was agreed to…"

Claim(s) discussed: *1*.

Identification of prior art discussed: *Chou '499*.

Description of the general nature of what was agreed to if an agreement was reached, or any other comments:
The items set forth in the Agenda-copy attached-were discussed. No agreement as to the claims was reached. PO discussed the possibility of filing expert evidence in the form of a 132 declaration.

(A fuller description, if necessary, and a copy of the amendments which the examiner agreed would render the claims patentable, if available, must be attached. Also, where no copy of the amendments that would render the claims patentable is available, a summary thereof must be attached.)

A FORMAL WRITTEN RESPONSE TO THE LAST OFFICE ACTION MUST INCLUDE PATENT OWNER'S STATEMENT OF THE SUBSTANCE OF THE INTERVIEW. (See MPEP § 2281). IF A RESPONSE TO THE LAST OFFICE ACTION HAS ALREADY BEEN FILED, THEN PATENT OWNER IS GIVEN **ONE MONTH** FROM THIS INTERVIEW DATE TO PROVIDE THE MANDATORY STATEMENT OF THE SUBSTANCE OF THE INTERVIEW (37 CFR 1.560(b)). THE REQUIREMENT FOR PATENT OWNER'S STATEMENT CAN NOT BE WAIVED. **EXTENSIONS OF TIME ARE GOVERNED BY 37 CFR 1.550(c).**

/Karin Reichle/ Primary Examiner, Art Unit 3992		

cc: Requester (if third party requester)

UNITED STATES DISTRICT COURT
MIDDLE DISTRICT OF FLORIDA
ORLANDO DIVISION

OMEGA PATENTS, LLC,

Plaintiff,

v. Case No: 6:13-cv-1950-Orl-40DCI

CALAMP CORP.,

Defendant.
_____/

ORDER

This cause is before the Court on the following:

1. Plaintiff's Motion for Entry of Final Judgment, Including Entitlement to Attorneys' Fees, Enhanced Damages, and Entry of a Permanent Injunction (Doc. 148), filed March 9, 2016;
2. Plaintiff's Renewed Motion to Award Prejudgment Interest (Doc. 154) filed March 18, 2016;
3. Defendant's Response in Opposition to Plaintiff's Renewed Motion to Award Prejudgment Interest (Doc. 166), filed April 4, 2016;
4. Defendant's Opposition to Plaintiff's Motion for Entry of Final Judgment, Including Entitlement to Attorneys' Fees, Enhanced Damages, and Entry of a Permanent Injunction (Docs. 169, 170), filed April 11, 2016;
5. Plaintiff's Notice of Filing Declarations (Doc. 187), filed April 28, 2016;
6. Defendant's Notice of Filing Responsive Declarations (Doc. 188), filed April 29, 2016;

7. Defendant's Notice of Supplemental Authority regarding Response in Opposition to Plaintiff's Motion for Entry of Final Judgment (Doc. 192), filed May 17, 2016;
8. Defendant's Notice of Grant of Reexamination of '885 Patent (Doc. 193), filed June 6, 2016;
9. Plaintiff's Notice of Supplemental Authority (Doc. 194), filed June 13, 2016;
10. Defendant's Response to Plaintiff's Notice of Supplemental Authority (Doc. 195), filed June 14, 2016;
11. Plaintiff's Response to Defendant's Notice of Supplemental Authority at Docket Number 192 (Doc. 198), filed July 19, 2016;
12. Defendant's Reply to Plaintiff's Response to Notice of Supplemental Authority (Doc. 199), filed July 22, 2016;
13. Defendant's Notice of Grant of Supplemental Authority (Patent Office Action) (Docs. 200, 201), filed August 30, 2016; and
14. Defendant's Notice of Supplemental Authority (Patent Office Action) (Doc. 202), filed September 19, 2016.

Upon due consideration, and after reviewing the pleadings and the transcript of the trial (Doc. 178–184) and the transcript of the post-trial motion's hearing (Doc. 196), Plaintiff's Motions for Entry of Final Judgement, Enhanced Damages, and Reasonable Attorneys' Fees are granted, and Plaintiff's motions for Permanent Injunction is denied.

I. BACKGROUND

Omega Patents, LLC ("Omega") brought the instant action against CalAmp Corp. ("CalAmp") and contends that CalAmp infringed the claims of U.S. Patent No. 6,346,876

("the '876 Patent")[1], U.S. Patent No. 6,756,885 ("the '885 Patent")[2], U.S. Patent No. 7,671,727 ("the '727 Patent")[3], and U.S. Patent No. 8,032,278 ("the '278 Patent")[4] (collectively, the "patents-in-suit").[5] (Doc. 1). The trial of this matter commenced on February 16, 2016, and concluding on February 24, 2016, (Doc. 178–184), with the jury returning a verdict in favor of Omega in which they found that all of Omega's asserted claims were valid and had been infringed upon by CalAmp's accused devices: the LMU 3000, LMU 3030, LMU 3050, the V-Pod and the V-Pod 2. (Doc. 144, p. 1–6). The jury rejected the Defendant's invalidity contentions and made three findings for Plaintiff on secondary considerations indicating nonobviousness. (*Id.* at pp. 7–9). Finally, the jury found Plaintiff had proven by clear and convincing evidence that CalAmp acted despite an objectively high likelihood that its actions infringed a valid patent and that this high likelihood of infringement was either known or so obvious that it should have been known to CalAmp. (*Id.* at pp. 9–10). The jury awarded damages in the amount of $2,975.200. (*Id.* at p. 10).

Omega contends the Court should award reasonable attorneys' fees pursuant to 35 U.S.C. § 285, enhanced damages pursuant to § 284, and a permanent injunction pursuant to § 283. (Doc. 148). CalAmp opposes the relief requested by Omega. (Doc. 169). The Court held oral argument on the post-trial motions on May 2, 2016. (Doc. 196).

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[1] The jury found infringement of claims 1, 3, 4, 5, 12, 14, and 16. (Doc. 144, p. 2).
[2] The jury found infringement of claims 1, 2, 3, 12, and 14. (*Id.* at p. 3).
[3] The jury found infringement of claims 1, 10, and 11. (*Id.* at p. 4).
[4] The jury found infringement of claims 1–6, 8, 11–16, 18–19, and 21. (*Id.* at pp. 5–6).
[5] The patents-in-suite relate to control systems for vehicles with a "data communication bus." The term "data communication bus" has been previously construed by the Court to mean "wired connection for communication of digital messages among vehicle devises, with each message including one or more device addresses." (Doc. 50, p. 25).

The parties subsequently submitted numerous pleadings consisting of supplemental authority and notices of *ex parte* reexamination by The Patent Office of the '278 patent, the '885 patent, and the '876 patent. (Docs. 198–202).

II. STANDARD

A. Enhanced Damages

When this litigation proceeded to trial, the issue of enhanced damages was governed by the two-step inquiry announced by the Federal Circuit in *In re Seagate Tech., LLC*, 497 F.3d 1360, 1371 (Fed. Cir. 2007) (*en banc*). Following oral argument on Omega's motion for enhanced damages, the United States Supreme Court decided *Halo Elecs., Inc. v. Pulse Elecs., Inc.*, 136 S. Ct. 1923 (2016). The Court in *Halo* rejects the *Seagate* two-part test for determining when a district court my increase damages pursuant to 35 U.S.C. § 284 as being inconsistent with the plain language of the statute. *Halo*, 136 S. Ct. at 1928. Following a historical exegesis of enhanced damages under the Patent Act, the Court concluded that "although there is 'no precise rule or formula' for awarding damages under § 284, a district court's 'discretion should be exercised in light of the considerations' underlying the grant of that discretion." *Halo,* 136 S. Ct. at 1932 (quoting *Octane Fitness, LLC v. ICON Health & Fitness, Inc.*, 134 S. Ct. 1749, 1756 (2014)).

The Court in *Halo* remarked that enhanced damages under patent law "should generally be reserved for egregious cases typified by willful misconduct." *Halo*, 136 S. Ct. at 1934. The Court observed that "[t]he sort of conduct warranting enhanced damages has been variously described in our cases as willful, wanton, malicious, bad-faith, deliberate, consciously wrongful, flagrant, or—indeed—characteristic of a pirate." *Halo,*

136 S. Ct. at 1932. The Court rejected the heightened standard of proof provided for by the Federal Circuit in *Seagate* in favor of a preponderance of the evidence standard. *Halo,* 136 S. Ct. at 1934. The type of culpability that supports an award of enhanced damages is "measured against the knowledge of the actor at the time of the challenged conduct." *Halo,* 136 S. Ct. at 1933.[6] Once a jury determines that an infringer "is guilty of conduct upon which increased damages may be based [,] … the court then determines, exercising its sound discretion, whether, and to what extent, to increase the damages award given the totality of the circumstances." *Jurgens v. CBK, Ltd.*, 80 F.3d 1566, 1570 (Fed. Cir. 1996). While a finding of willful infringement does not mandate the imposition of enhanced damages, once the finding is made "the court must explain its reasons for declining to award enhanced damages." *Carnegie Mellon Univ. v. Marvell Tech. Group, Ltd.*, No. CIV.A. 09-290, 2014 WL 1320154, at *9 (W.D. Pa. Mar. 31, 2014), *rev'd in part on other grounds*, 807 F.3d 1283 (Fed. Cir. 2015).

B. Attorney's Fees

The Supreme Court in *Octane Fitness* rejected the "more rigid and mechanical formulation" for determining when the district court may award reasonable attorney fees to the prevailing party in favor of the plain statutory text of § 285, which provides "[t]he court in exceptional cases may award reasonable attorney fees to the prevailing party." 35 U.S.C. § 285; *Octane Fitness*, 134 S. Ct. at 1755. An exceptional case is "simply one that stands out from others with respect to the substantive strength of a party's litigating

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[6] The Court in *Halo* criticized, in pertinent part, the second prong of the *Seagate* test which allowed an infringer to escape enhanced damages by mustering a defense of invalidity or noninfringement at trial "even if [the infringer] did not act on the basis of the defense or was even aware of it." *Halo Elecs., Inc. v. Pulse Elecs., Inc.*, 136 S. Ct. 1923, 1933 (2016).

position (considering both the governing law and the facts of the case) or the unreasonable manner in which the case was litigated." *Octane Fitness*, 134 S. Ct. at 1756. The district court applies the preponderance of the evidence standard and considers the totality of the circumstances. The district court may consider a number of factors in determining whether to award fees, including: (1) whether the infringer deliberately copied the invention; (2) whether the infringer had a good faith basis for believing it did not infringe or that the patent was invalid; (3) the closeness of the case; (4) conduct of the part in litigation; (5) defendant's relative size and financial condition; (6) the duration of the infringement; (7) remedial action by the defendant; (8) defendant's motivation for harm, and (9) whether defendant attempted to conceal its misconduct. *Read Corp. v. Portec, Inc.*, 970 F.2d 816, 827 (Fed. Cir. 1992).[7]

C. Permanent Injunction

The Supreme Court in *eBay Inc. v. MercExchange, L.L.C.*, 126 S. Ct. 1837, 1839 (2006), held that to obtain an injunction a party "must demonstrate: (1) that is has suffered an irreparable injury; (2) that remedies available at law, such as monetary damages, are inadequate to compensate for that injury; (3) that, considering the balance of hardships between the plaintiff and defendant, a remedy in equity is warranted; and (4) that the public interest wound not be disserved by a permanent injunction." The Federal Circuit subsequently held that *eBay* eliminates a presumption of irreparable injury to the patent holder after a judgment of infringement and of no invalidity is returned. *Robert Bosch LLC v. Pylon Mfg. Corp.*, 659 F.3d 1142, 1149 (Fed. Cir. 2011). Moreover, there must be a

[7] The *Read* factors are equally applicable to the assessment of enhanced damages.

causal nexus between the irreparable injury and the patent infringement. *Apple Inc. v. Samsung Elecs. Co.*, 735 F.3d 1352, 1360 (Fed. Cir. 2013).

III. DISCUSSION

Mr. Flick, the inventor of the four patents at issue, met with representatives of CalAmp, including Mr. Gallin Chen, in 2009 at a trade show to discuss Omega's belief that CalAmp was infringing certain patents. (Doc. 179, 76:10-18). During this initial meeting, Mr. Chen expressed his view that the Omega patents were invalid, but he nonetheless requested a draft license agreement. (*Id.* at 78:1-11). Omega complied and sent CalAmp a license agreement that CalAmp rejected shortly thereafter, resulting in Omega filing suit against CalAmp on December 15, 2009.[8] (*Id.*). Once litigation had commenced, Mr. Chen agreed to meet with Mr. Flick again at a trade show scheduled for January 2010. (*Id.* at 81:14-18). During the ensuing conversation, Mr. Chen represented to Omega that CalAmp did not program their products and any alleged infringement was caused by the end-user who programs the CalAmp devices. (*Id.* at 81:24– 82:13). Based upon this representation Mr. Flick stayed the litigation against CalAmp and sued two end users: Numerex and Sky Patrol. (*Id.*). Numerex quickly settled with Omega and entered into a licensing agreement. (*Id.* at 82:14-23). Sky Patrol, however, revealed that, contrary to Mr. Chen's representation, CalAmp was responsible for programing their offending devices.[9] (*Id.* at 83:11–84:12). CalAmp subsequently settled with Omega and agreed to pay a royalty. (*Id.* at 84:13-21; Pl.'s Ex. 45).

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[8] The lawsuit filed by Omega in 2009 pertained to patents other than those at issue in the instant litigation.

[9] The deposition of CalAmp engineer, Peter Hergesheimer, was played at trial, and Mr. Hergesheimer acknowledged that CalAmp programs LMUs for approximately 75% of their customers, contradicting Mr. Chen's claim that CalAmp sold a black box. Mr.

Against this backdrop, CalAmp introduced the accused devices in late 2011 or early 2012. (Doc. 182, 53:2-5). Prior to introducing the accused products, CalAmp's counsel, Mr. David Bailey, reviewed a number of patents held by the Plaintiff, including the '885 and '727 patents at issue in this litigation. (Pl.'s Ex. 39). At the same time counsel for Omega and for CalAmp engaged in discussions concerning Omega's "extensive patent portfolio" in the area of databus applications.[10] (Pl.'s Ex. 34). It is, therefore, beyond dispute that CalAmp was fully aware of the Omega patents prior to introducing the accused products into the market.

Mr. Chen admitted on cross-examination that the LMUs and V-Pod and V-Pod2 were introduced as a direct result of consumer demand. (Doc. 182, 142:11-24). Mr. Chen explained that the LMUs connect to the vehicle data bus and read data from the bus. (*Id.* at 54:8-14). According to Mr. Chen, the LMU has a transmitter and a receiver, can read data from the vehicle data bus, can query a vehicle device for data, and can store the data received in response to the query. (*Id.* at 129:1-21). The '727 patent held by Omega, for example, claims a speed exceeded notification device for a vehicle comprising a "vehicle data communications bus" and "at least one vehicle device generating data related to vehicle speed on the" bus which determines when a vehicle's speed has exceeded a set threshold. (Joint Ex. 4, column 7, lines 4-17).

In an attempt to distinguish the LMU devices from the '727 patent, Mr. Chen testified that the LMU speed data is derived from the GPS module and not from the vehicle

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Hergesheimer also testified that software is loaded on the LMU online, because that is more cost effective than loading it at the time of manufacture.

[10] CalAmp engineer, Peter Hergesheimer, testified at trial via deposition that he did not design around the Omega patents.

bus.[11] (Doc. 182, 133:13-21). He added that the LMU has the capacity to read speed from the bus, but CalAmp does not allow this because speed data generated from GPS is more accurate. (*Id.*). However, Mr. Jerrery Eidberger, a CalAmp field application engineer, testified via deposition that a substantial percentage of customers do in fact have the LMU programmed by CalAmp to read the speed from the bus. Additionally, CalAmp responded to Omega's Frist Set of Interrogatories, wherein Omega asks CalAmp to "identify all customers for whom CalAmp has loaded scripts for geofencing or speed alerts into an Accused Product" by providing a long list of customers for whom CalAmp has loaded scripts related to speed alerts, noting that "some scripts do not cause a speed exceeded notification." (Pl.'s Ex. 16). CalAmp's acknowledgement that some scripts do not cause a speed exceeded notification means that other scripts do provide the speed exceeded notification from the vehicle bus as opposed to the GPS. Mr. Chen's testimony wherein he flatly denies the LMU reads vehicle speed from the bus is clearly contradicted by CalAmp's interrogatory answers.

Mr. Andrews, CalAmp's retained expert, echoed this misrepresentation when he testified that the CalAmp devices obtain speed data from the internal GPS sensor as opposed to obtaining speed from the bus. (Doc. 182, 248:3-5; 249:1-5). On cross-examination, Mr. Andrews admitted that if the LMU is programmed to read speed from the data bus and make the threshold determination that the speed has been exceeded, the accused device infringes the '727 patent. (Doc. 183, 172:19-22). Either Mr. Andrews ignored CalAmp's answers to Omega's interrogatories in reaching his opinion that the

[11] The '727 patent indicates that it is an object of the invention "to provide a speed exceeded notification device which may be readily used in a vehicle including a data communications bus and related methods." (Joint Ex. 4, column 2, lines 38-40).

accused products do not infringe the '727 patent because speed is derived via GPS, or CalAmp withheld this information from its expert in order to obtain a non-infringement opinion. Either way, the testimony of Mr. Chen and Mr. Andrews provide substantial support for the jury's finding of willful infringement of the '727 patent, and this Court concurs in the jury's finding of willful infringement.

Further indicia of willful infringement by CalAmp is found in an e-mail sent by Mr. Chen to outside patent counsel, Mr. David Bailey[12], and senior vice president for corporate development, Mr. Garo Sarkissian. (Doc. 182, 112:13-19). On July 30, 2013, eight months after Omega instituted this lawsuit, Mr. Chen wrote to Messrs, Bailey, and Sarkissian and asked them to look at the '278 patent. (Pl.'s Ex. 48). Referring to claim 13 of the '278 patent, Mr. Chen wrote: "13 may relate to how we program a unit at the factory so it may be harder to avoid." (*Id.*). The '278 patent has as an object of the invention to "provide a multi-vehicle compatible tracking unit which may be used to control operable vehicle devices, and/or read information therefrom via the vehicle data communications bus." (Joint Ex. 5, column 2, lines 46-49). Clearly, Mr. Chen was concerned as late as July 30, 2013, that the accused devices infringe claim 13 of the '278 patent, as the jury ultimately found. His admission in this e-mail that the units are programed at the CalAmp factory is further evidence that his trial testimony describing the LMU as a black box, programmed by the end-user, was false.

In the same e-mail, Mr. Chen predicts what will ultimately become a defense theory advanced at trial, when he writes: the '727 patent "can be avoided by using GPS speed,

[12] Mr. Bailey is an attorney practicing in the same firm as trial defense counsel. (Doc. 182, 144:20-25).

not vehicle bus received speed, for speeding alerts." (Joint Ex. 5). It is difficult to ascribe a good faith basis for persisting at trial on the theory that the LMU determines speed from the GPS, as opposed to obtaining the data from the bus, when CalAmp's supplemental response to Omega's interrogatory, in which CalAmp admits to loading scripts for speed exceeded notification, was filed March 6, 2015—more two years after Mr. Chen suggested to his counsel and his colleague that using GPS speed will allow CalAmp to avoid the '727 patent. This email is consistent with an attempt to create a plausible defense at trial, perhaps in anticipation of the then-available *Seagate* enhanced damages analysis.[13] That Mr. Chen continued to advance the GPS theory at trial and in view of CalAmp's interrogatory answer demonstrates willful copying of Omega's invention.

In an attempt to satisfy the *Seagate* two-part test at trial, Mr. Chen testified that prior to launching the accused devices, CalAmp investigated the vehicle data bus market. (Doc. 182, 55:21-24). Mr. Sarkissian directed Mr. Chen to search for prior art, resulting in Mr. Chen reviewing over 300 patents. (*Id.* at 57:12–58:2). Mr. Chen also stated that in late 2010, Mr. Sarkissian, Mr. Steven Moran (CalAmp's general counsel), and he had received verbal opinions from Mr. Bailey that the accused products did not infringe existing patents. (*Id.* at 114:7-25; 117:7-12). Mr. Chen stated that he did not request Mr. Bailey to memorialize these oral opinions in writing until after the lawsuit was commenced by Omega. (*Id.* at 145:1-3). The defense marked for identification exhibits 71–74, which are opinion letters written by Mr. Baily as to each patent-in-suit, and each opinion letter is

[13] The Supreme Court in *Halo* disapproved of the *Seagate* test in part because it allowed an infringer to "escape any comeuppance under § 284 solely on the strength of his attorney's ingenuity." *Halo*, 136 S. Ct. at 1933. Hence, opinion letters issued after-the-fact shed little light upon the infringer's culpability which must be "measured against the knowledge of the actor *at the time* of the challenged conduct." *Id.* [emphasis added].

dated June 27, 2014.[14] (Def.'s Exs. 71–74). However, it is curious—assuming Mr. Bailey had vetted the accused products against existing patents back in 2010—that in July 2013 Mr. Chen highlighted the difficulty of avoiding claim 13 of the '278 patent and suggested that the '727 patent can be avoided by focusing upon GPS speed determination. If, in fact, counsel had vetted the accused devices and the Omega patents three years earlier, there is no reason for Mr. Chen to suggest a noninfringement theory to his counsel, nor is there any reason for Mr. Chen to be concerned over claim 13 of the '278 patent. The Court does not find the testimony of Mr. Chen or of Mr. Bailey credible on the issue of whether counsel had rendered legal opinions prior to the launch of the accused products in which he opined the accused products do not offend any patent held by Omega. Mr. Chen's credibility is undermined by other evidence presented at trial[15], and it is incomprehensible that counsel would refrain from issuing a written opinion of noninfringement or invalidity to his client at or near the time that CalAmp launched the accused products. No reasonable explanation for this highly unusual practice was offered by CalAmp or Mr. Bailey.

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[14] The Court sustained Omega's objection to the admissibility of Mr. Bailey's opinion letters on the grounds that the letters—offered during Mr. Chen's testimony—constitute hearsay, and the letters confer expert testimony which was not properly disclosed by the Defense. However, the Court has considered the four opinion letters for purposes of the enhanced damages analysis. The Court is unaware of the substance of the verbal opinions allegedly offered by Mr. Bailey in 2010 prior to the launch of the accused products.

[15] Mr. Chen testified via deposition that he removed information from the CalAmp website regarding the LMU devices to make it more difficult for Omega to identify infringement. (Pl.'s Ex. 48) ("We don't want to make it easy for Omega to build their infringement case by just looking at the datasheets on our website. . . . the bigger hole is LMU 3000; it's launched, mature and broadly integrated by multiple partners. We can bury (i.e. omit) the LMU3030 for now on open website.").

The Court next considers whether this was a "close case" and whether CalAmp held a good faith belief the patents were not infringed or were invalid. CalAmp and their expert, Mr. Andrews, note that the Omega patents require the performance of a control function. (Doc. 182, p. 177:7-15; Doc. 195, p. 3). At trial Mr. Andrews defined "control function" as "a message on the bus that is going to control a device exhibiting a physical change in the device or the system." (Doc. 182, 177:7-15). The notion that control function envisions a physical change is critical to the Defendant's noninfringement arguments. Based upon the Court's review of Mr. Andrew's initial expert report, (Def.'s Ex. 38), this definition of control function does not appear in his original expert report. Mr. Andrews acknowledged on cross-examination that he did not apply the physical change qualifier to control function in his deposition. (Doc. 183, 103:10-14). Mr. Andrews explained that he had misspoken in his deposition when he failed to describe control function as requiring a physical change in the device or the system. (*Id.*). Mr. Andrews did, however, include in his rebuttal report the definition of control function as having the ability to enable a physical change in a device of the system; for example, locking a door, starting the engine, or turning on a light." (Def.'s Ex. 47, pp. 11–12). The crux of the non-infringement defense is that the LMU merely sends a "query for data" and does not control a vehicle device. (Doc. 182, p. 177:20-22). Because the LMU does not control a vehicle device, Mr. Andrews argues the accused products cannot satisfy the multi-vehicle compatible controller claim in the patents. (*Id.* at 238:9-12; 238:25–239:6; 239:14–240:6). Accordingly, Mr. Andrews' definition of control function as mandating a physical change precludes one from finding for Plaintiff Omega.

In order for Mr. Andrews' non-infringement argument to prevail, one must accept his opinion that the LMU is a passive device that uses the bus to request and receive data, but which does not "perform one or more control functions" with respect to the vehicle device. (Def.'s Ex. 47, p. 12; Doc. 182, 240:9-11). The difficulty lies in finding a basis for Mr. Andrews' interpretation of "control function." The Court construed the claim term "controller" to mean "electronic circuitry that performs one or more control functions." (Doc. 50, p. 24). The claim term "multi-vehicle compatible controller" was construed by the Court to mean "electronic circuitry that performs one or more control functions, and can operate with more than one vehicle." (*Id.*). The Court did not construe the term control function. CalAmp urged the Court to construe "function" as "[a]n operation of a vehicle device, such as remote starting the engine, remotely unlocking the vehicle doors, or changing the mode of a security system between armed and disarmed." (*Id.* at 18). But the Court observed: "The patent states the invention may be embodied in many different forms and should not be construed as limited to the illustrated embodiments set forth herein." (*Id.* at 18) (internal quotation marks and citations omitted). Accordingly, Mr. Andrews' interpretation of "control function" is not based upon the Court's claim construction. Similarly, nothing in any specification of the four patents-in-suit support Mr. Andrews' definition of "control function." (Joint Ex. 1-4; Doc. 183, 117:8-11; 118:1-6).

Mr. Andrews acknowledged that the microprocessor in the LMUs and the V-Pods sends a signal along the bus to the ECU and requests a response. (Doc. 183, 114:17–115:6). Omega's counsel engaged Mr. Andrews in the following colloquy:

> Q: Let's say the ECU responds with the device code signal—that would be controlling the ECU, wouldn't it?
>
> A: You're asking it for information. It's providing it back, yes.

Q: So that's a yes?

A: Okay.

(*Id.* at 118:9-24)

Q: And would you also agree with me … that sending a signal and getting a response could be a control function?

A: Yes.

(*Id.* at 120:5-20)

Mr. Andrews admits that when the LMU seeks information from the ECU, the ECU must respond via the bus; however, he contends this is not a control function. (*Id.* at 143:1-6). Mr. Andrews argues that "one with ordinary skill in the art, in the automotive industry in telematics, would understand the difference between a command and a query." (*Id.* at 116:7-10). It is Mr. Andrews' contention that a command—or as he would call it a query—by the LMU that produces a mandatory response by the ECU does not meet the definition of controller and control function. The Defendant's attempt to cast a mandatory response to a query as a passive act that falls short of a control function is unsupported by the record and was conspicuously absent from Mr. Andrews' initial expert report. The emergence of this opinion late in the litigation is highly suspect, particularly when one considers that Mr. Andrews' also opined that the LMU cannot infringe the '727 patent because the LMU only generates speed data from the GPS—which is clearly contradicted by CalAmp's response to Omega's interrogatories.

Mr. Andrews and counsel for CalAmp presented other non-infringement arguments at trial. However, the Court finds that these additional grounds—all of which were rejected by the jury—do not, giving the totality of the circumstances, mitigate against an award of enhanced damages and reasonable attorneys' fees. For example, Mr.

Andrews took issue with whether signals were stored on the accused devices as required by the '885 patent. (Doc. 183, 122:6-9). However, on cross-examination, Mr. Andrews agreed that the LMU sends out signals and the ECU sends a response, "[a]nd those signals are stored on the controller." (*Id.* at 123:7–124:9). Mr. Andrews admits the signals are stored on the LMU until the device is unplugged and re-plugged at which time it starts over. (*Id.* at 125:5-9). In fact, Mr. Andrews agrees the LMU is intended to be used in a manner that would store the CAN data and can be used in multiple vehicles. (*Id.* at 162:6-13).

CalAmp also presented invalidity defenses by identifying prior art that, when considered with SAE standards, rendered the patents obvious. In supplemental filings by the parties, the Court has been made aware that CalAmp sought *ex parte* reexamination of three of the patents-in-issue. The United States Patent and Trademark Office ("USPTO") has reexamined the '278 patent[16], (Doc. 192); the '885 patent[17], (Doc. 193), and the '876 patent[18], (Doc. 201). The USPTO rejected the pertinent claims of these three patents. While the USPTO issued Office Actions in *Ex Parte* Reexamination of the '278, '885, and '876 patents and rejected the relevant claims of these patents, the finding by the USPTO does not have preclusive effect as to the verdict rendered by the jury in the instant litigation unless the final USPTO decision is affirmed by the Federal Circuit before the jury's verdict become final. *Fresenius USA, Inc. v. Baxter Inter., Inc.*, 721 F.3d 1330,

[16] Omega's response, including declarations from Mr. Suman, (Doc. 198-2), whose patent is being considered by the examiner as prior art, and Mr. McAlexander, (Doc. 198-3), demonstrates that the examination of '278 remains in a state of flux. (Doc. 198).
[17] The USPTO rejected every claim of the '885 patent on anticipation and obviousness grounds. (Doc. 202, p. 1).
[18] The USPTO rejected every claim of the '876 patent on anticipation and obviousness grounds. (Doc. 201, p. 2).

1346 (Fed. Cri. 2017). Accordingly, the Court is not bound by the examiner's non-final conclusions when determining whether the jury's verdict is supported by substantial evidence.

The Court recognizes that CalAmp does not suggest in their notices of supplemental authority that the non-final action of the PTO is outcome determinative. Rather, CalAmp cites to the examiner's findings to support the reasonableness of their reliance upon invalidity as a defense. The Court rejects CalAmp's position for a number of reasons. CalAmp's expert, Mr. Andrews, combined certain prior art, such as the Braitberg '497 patent, (Def. Ex. 10), with the Society of Automotive Engineers ("SAE") standard J1978, to predict the Omega '876 patent. (Doc. 182, 173:14–175:23; 178:8-15; 180:22–181:19). Mr. Andrews testified that "one of ordinary skill in the art [would] look to J1978 to determine how to connect the bus." (*Id.* at 184:13–18). However, Mr. Andrews, despite numerous questions posed on cross-examination, failed to articulate the motive for one of ordinary skill in the art to combine these references.[19] The best Mr. Andrews could do in suggesting a motive to combine J1978 with Braitberg is that scan tools were being used at the relevant time; hence, one would know to combine SAE J1978 with Braitberg to make a device multi-vehicle compatible.[20] (Doc. 183, 149:21–150:3). Mr. Andrews applied the Braitberg reference to the '876 and '885 patents, (Doc. 182, p. 198:1-

[19] "A party seeking to invalidate a patent on the basis of obviousness must demonstrate by clear and convincing evidence that a skilled artisan would have been motivated to combine the teachings of the prior art references to achieve the claimed invention, and that the skilled artisan would have had a reasonable expectation of success in doing so." *Kinetic Concepts, Inc. v. Smith & Nephew, Inc.*, 688 F.3d 1342, 1360 (Fed. Cir. 2012) (internal quotation marks omitted).

[20] Mr. Andrews admits that Braitberg does not provide multiple vehicle compatibility, a claim that is necessary to invalidate the Omega patents, so he adds SAE J1978. (Doc. 183, p. 130:6-10). Interestingly, Mr. Chen testified he was unware of J1978.

20), and he applied J1978 to all four patents-in-suit. (*Id.* 250:1–270:19). The motive to combine prior art is critical to CalAmp's invalidity defense, because Mr. Andrews could not find prior art that had all of the claims that Mr. Flick has in his patents. (*Id.* at 132:17–133:7). Mr. Andrews failed to provide more than a conclusory opinion that one of ordinary skill in the art at the relevant time would have known to look to SAE J1978 in combination with the various prior art references. In this regard, Mr. Andrews' fails to assist the Defendant in carrying its burden of proof on invalidity.

In addition, the Court in *Halo* has eliminated the ability of an accused infringer to posit reasonable invalidity defenses which were not relied upon at the time the accused products were introduced into the market. *Halo*, 136 S. Ct. at 1933. Under *Seagate*, "the ability of the infringer to muster a reasonable (even though unsuccessful) defense at the infringement trial" was dispositive of the issue of enhanced damages. *Id.* Post-*Halo*, however, "culpability is generally measured against the knowledge of the actor at the time of the challenged conduct." *Id.* There is no indication in the record that Mr. Andrews provided CalAmp his opinion on invalidity before the accused products went into production in 2011. While the opinion letters issued by Mr. Bailey as to the '885 patent refer to SAE J1978, J1979, (Def.'s Ex. 73), this letter was written in June 2014 long after infringement had begun. Thus, there is no record evidence that CalAmp had knowledge of the invalidity defense derived from the combination of prior art and SAE standards at the time of the challenged conduct.[21] Since culpability is measured against the infringer's

[21] In fact, Mr. Chen filed for patent US 2010/0158211on December 21, 2011, claiming "[s]ystems and methods in accordance with embodiments of the invention continuously collect information from vehicle devices via a vehicle data bus, store information in a database, and retrieve information from the database in response to requests from

knowledge at the time of the challenged conduct, the after-the-fact invalidity defense is of little merit in assessing enhanced damages.[22]

The next *Read* factor directs the Court to consider the Defendant's size and financial condition. According to Omega's expert, Mr. Christian Tregillis, "CalAmp has sold over 245,000 units of the Accused Products, for over $21.5 million from April 2011 through November 2014," (Pl.'s Ex. 65, p. 37), "earning over $4.1 million in gross profits." (Pl.'s Ex. 65, p. 47). CalAmp is a publicly-traded corporation with over $75 million dollars in earnings last year. (Pl.'s Ex. 65). While CalAmp argues that the accused products are low-margin products sold in an extremely competitive market, this misses the point. The overall financial health of the infringer is evaluated—not the net profit generated by the offending conduct—to "ensure that enhanced damages would not prejudice defendant's non-infringing business." *Powell v. Home Depot U.S.A., Inc.*, 715 F. Supp. 2d 1285, 1298 (S.D. Fla. May 28, 2010). The Defendant has the financial wherewithal to endure the sanction of enhanced damages and an award of reasonable attorneys' fees.

A closely related factor for the Court to consider is the duration of CalAmp's conduct. As previously discussed, CalAmp was well aware of Omega's patents since at least 2010. Rather than take a license, and choosing not to design around Omega's patents, CalAmp elected to sell infringing products and continues to do so to this day. CalAmp's motivation to engage in this behavior is obvious: their customers wanted this technology, and CalAmp wanted to provide it. Moreover, as previously discussed,

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remote devices." (Pl.'s Ex. 14, Abstract). The patent issued June 21, 2012, and Mr. Chen did not disclose the prior art relied upon to invalidate Omega's similar patents.

[22] Assuming CalAmp had knowledge of the invalidity defense at the relevant time, the Court would not reach a different conclusion, since the motive to combine the prior art with the SAE standards is deficient.

CalAmp attempted to conceal its infringement by misrepresenting to Omega that it only sold black boxes which were programmed by customers and by removing information from the CalAmp website to make discovery of infringement more difficult. These additional factors all weigh in favor of an award of enhanced damages and reasonable attorneys' fees.

Based upon the foregoing, the Court finds CalAmp willfully infringed the Omega patents-in-suit, further finding that the jury's finding of willful infringement is supported by substantial evidence. The Court independently reviewed the record evidence and finds an award of enhanced damages of threefold the actual damages and an award of reasonable attorneys' fees is supported by the evidence.[23]

The Court turns now to Omega's request for a permanent injunction. Omega quotes Chief Justice Robert's concurring opinion in *eBay* wherein he remarks that from "at least the early 19th century, courts have granted injunctive relief upon a finding of infringement in the vast majority of patent cases." *eBay*, 126 S. Ct. at 1841. However, Justice Thomas speaking for the majority clarified that "the decision whether to grant or deny injunctive relief rests within the equitable discretion of the district courts, and that such discretion must be exercised consistent with traditional principles of equity, in patent disputes no less than in other cases governed by such standards." *Id.* As Justice Kennedy elaborates in his concurrence, "trial courts should bear in mind that in many instances the nature of the patent being enforced and the economic function of the patent holder

[23] The Court notes that even if the PTO's non-final action rejecting the relevant claims of the '885 and '876 patents are affirmed by the Federal Circuit, enhanced damages and reasonable attorneys' fees are appropriate for the willful infringement of the '727 and '278 patents—assuming the '278 patent survives reexamination.

present considerations quite unlike earlier cases." *Id.* at 1842. Justice Kennedy cautions trial courts to use care in issuing permanent injunctions in the context of patent holders who primarily employ their patent to obtain licensing fees. *Id.* "When a patented invention is but a small component of the product the companies seek to produce and the threat of an injunction is employed simply for undue leverage in negotiations, legal damages may well be sufficient to compensate for infringement and an injunction many not serve the public interest." *Id.*

Mr. Flick is a patent holder who presently generates revenue by licensing his patents; he no longer manufactures products. While Omega argues that it has maintained a restrictive licensing program of the patents-in-suit and has selectively licensed only a limited number of entities in the marketplace, (Doc. 148, p. 17), it is equally true that Omega was willing to license its patents to CalAmp. While Mr. Flick testified that Omega requires most licensees to transfer rights of improvements to Omega in order to strengthen its patents, it is clear that Omega does not require every licensee to agree to this term. In fact, the License Agreement entered into between Omega and CalAmp in relation to the products sold to SKYPATROL does not provide for assignment of improvements to Omega. (Pl.'s Ex. 88).

While cognizant of Omega's contention that a compulsory licensing agreement does not make Omega whole, and recognizing the Court need not balance the hardships in cases of willful infringement[24], the Court finds that monetary damages are adequate to compensate Omega for the injury sustained by CalAmp's infringement. Moreover, as

[24] *United States v. Marine Shale Processors*, 81 F.3d 1329, 1358 (5th Cir. 1996); *see also Windsurfing Int'l v. AMF, Inc.*, 782 F.2d 995, 1003 (Fed. Cir. 1986).

indicated by the declaration of Mr. Michael Zachan, CalAmp's Senior Vice President, a number of public safety, local government, and utility providers would be placed at a considerable disadvantage in the execution of their important duties if a permanent injunction issues. The Court agrees with Omega that the logistic and financial turmoil that befalls CalAmp should an injunction be ordered is of their own design. However, the collateral impact upon important public safety functions weighs against a permanent injunction.

For the foregoing reasons, the Court denies Omega's request for a permanent injunction, finding that the payment of customary licensing fees to Omega is adequate to protect the interests of Omega.

IV. CONCLUSION

For the aforementioned reasons, it is **ORDERED AND ADJUDGED** as follows:

1. Plaintiff Omega Patents, LLC's Motion for Entry of Final Judgement (Doc. 148) is **GRANTED**.
2. Plaintiff Omega Patents, LLC's Renewed Motion to Award Prejudgment Interest (Doc. 154) is **GRANTED**.
3. Plaintiff Omega Patents, LLC's Motion for Enhanced Damages (Doc. 148) is **GRANTED** and Plaintiff is awarded treble damages in the amount of eight million, nine hundred and twenty-five thousand and six hundred dollars ($8,925,600).
4. Plaintiff Omega Patents, LLC's Motion for Entitlement to Reasonable Attorneys' Fees (Doc. 148) is **GRANTED**.

5. Plaintiff Omega Patents, LLC's Motion for Entry of a Permanent Injunction (Doc. 148) is **DENIED**.

DONE AND ORDERED in Orlando, Florida, on April 6, 2017.

PAUL G. BYRON
UNITED STATES DISTRICT JUDGE

Copies furnished to:

Counsel of Record
Unrepresented Parties

REEXAMINATION 90/013,851 (8,032,278)
Interview Outline (June 1, 2017)

I. Participants

Examiners:
(1) Karin M. Reichle
(2)
(3)

Patent Owner Attendees:
Chris Regan (34,906)
Jack Abid (58,237)

II. Background

Patent Owner:
Omega Patents LLC – Ken Flick
150+ patents
Omega Research & Development sold to Audiovox

Omega v. Calamp Litigation:
Filed – 12/20/13
Actual trial date: 2/16/16 to 2/24/16 (**Reexamination filed 10/28/16**)
Verdict: all asserted claims valid, infringed, secondary considerations found
Final Order issued 4-5-17, attached (relevant portions highlighted)
Final Judgment issued 4/24/17, also attached (relevant portions highlighted), and finding willful infringement and which includes a calculation for interest, and stipulated attorneys' fees, bringing the final judgment amount to $10,144,286

Calamp's Litigation Expert:
Admitted in depo no anticipation theory for '278 patent

Prior Reexamination on '278 Patent filed by Requester
Reexamination Certificate confirming patentability of all claims issued December 28, 2016.
Current reexamination filed during pendency of the prior reexamination in an attempt to convert the *ex parte* reexamination into an *inter partes* one.

III. The '278 Patent

'278 Patent Background:

A number of patents disclose various security and control systems that address data bus interoperability. For example, U.S. Pat. No. 5,719,551, assigned to Omega Patents, LLC, the assignee of the present invention, discloses a vehicle security system for a vehicle including a data bus connecting a plurality of vehicle devices. A signal enabling circuit enables the alarm controller to operate using a set of desired signals selected from a plurality of possible sets for

different vehicles. U.S. Pat. No. 6,011,460, assigned to Omega Patents, LLC, discloses a similar system where the set of desired signals from the plurality of different sets of signals for different vehicles is obtained, such as by connection and communication with a downloading device. Additionally, U.S. Pat. No. 6,756,885, also assigned to Omega Patents, LLC, discloses a multi-vehicle control system whereby a multi-vehicle compatible controller stores a set of device codes for a given vehicle device for a plurality of different vehicles. Device codes are read from the data communications bus, and a match between a read device code and the stored device codes is determined to provide compatibility with different vehicles. (Col. 2, lines 17-37)

Unfortunately, such advanced techniques for dealing with multiple device codes for a vehicle having a data communications bus have not yet been developed for vehicle tracking units. (Col. 2, lines 38-41).

'278 Patent Detailed Description:

The multi-vehicle compatible controller 111 is coupled to the vehicle data bus 122 for communication thereover with a vehicle device 121. The controller 111 illustratively includes a central processing unit (CPU) 126 or other logic circuitry which is connected to a clock signal generator 124, a memory 125, and input/output circuitry 127 to interface with the vehicle device 121 using at least one corresponding vehicle device code from among a plurality thereof for different vehicles. (Col. 23, lines 59-67).

Further aspects of interfacing with a vehicle data communications bus are described in U.S. Pat. Nos. 5,719,551 and 6,011,460 assigned to the assignee of the present invention, the entire contents of which are incorporated herein by reference. (Col. 22, lines 3-7).

From '551:

> The security system 10 further preferably comprises desired signal enabling means 17 for enabling the alarm controller 10 to operate using a desired set of signals for a desired vehicle from among a plurality of possible sets of signals for different vehicles. As would be readily understood by those skilled in the art, the term different vehicles may include vehicles from different manufacturers, different models, or even different trim levels of the same make and model. (Col. 6, lines 33-43).

'278 Patent Claim 1:

1. A multi-vehicle compatible tracking unit for a vehicle comprising a vehicle data bus extending throughout the vehicle, the multi-vehicle compatible tracking unit comprising:

a vehicle position determining device;

a wireless communications device;

a multi-vehicle compatible controller for cooperating with said vehicle position determining device and said wireless communications device to send vehicle position information;

said multi-vehicle compatible controller to be coupled to the vehicle data bus for communication thereover with at least one vehicle device using at least one corresponding vehicle device code from among a plurality thereof for different vehicles; and

a downloading interface for permitting downloading of enabling data related to the at least one corresponding vehicle device code for use by said multi-vehicle compatible controller.

IV. Anticipation/Obviousness Rejection over Chou et al.:

Chou et al. fails to disclose or fairly suggest: "said multi-vehicle compatible controller to be coupled to the vehicle data bus for communication thereover with at least one vehicle device using at least one corresponding vehicle device code from among a plurality thereof for different vehicles".

Rather, the cited portions of Chou et al. recite:

> [t]he vehicle bus interface may support one of vehicle bus standards such as CAN (Controller Area Network) and the Society of Automotive Engineers' SAE 11850- Class B Data Communication Network Interface. Alternatively, the processor supports some or all of the functions of the vehicle bus interface and connects directly to the vehicle bus 335. The vehicle bus shown in FIG. 2 is an inherent part of all new automobiles. (Col. 3, lines 37-44).

> [t]he vehicle bus adapter 120C translates the messages received from the vehicle bus into the language of the fault detector. It also translates messages from the fault detector into the language of the vehicle bus. The fault code specifications and protocols of the vehicle may be Original 30 Equipment Manufacturer (OEM) and model dependent. The term "vehicle fault codes" is meant to be synonymous with the term "trouble code" or "diagnostic trouble code". (Col. 4, lines 25-32).

Although Chou et al. discloses that it can operate with a plurality of different bus types, the skilled person would appreciate that vehicle device codes are propriety to each manufacturer. Indeed, as recognized by Chou et al., "[t]he fault code specifications and protocols of the vehicle may be Original Equipment Manufacturer (OEM) and model dependent." (Col. 4, lines 28-30). As was typical at the time of filing of the present application, these tracking and monitoring devices were programmed to work with the subject vehicle. In other words, the processor of Chou et al. is capable of talking on different types of automobile data buses, but it fails to use at least one corresponding vehicle device code from among a plurality thereof for different vehicles, as recited by independent Claim 1, for example.

Chou et al. fails to disclose or fairly suggest: "a downloading interface for permitting downloading of enabling data related to the at least one corresponding vehicle device code for use by said multi-vehicle compatible controller".

In the Official Action, the Examiner stated: "such structure permits downloading of enabling data, e.g. instruction to gather data, vehicle parameter update/change, related to the at least one corresponding vehicle device code for use by said multi-vehicle compatible controller, e.g. steps 2-6 in Figure 5. Thus '499 discloses or obviously suggests "a downloading interface" and such permits downloading of enabling data related to the at least one corresponding vehicle device code for use by said multi-vehicle compatible controller." (Official Action, Page 27).

Since Chou et al. fails to disclose or fairly suggest using at least one corresponding vehicle device code from among a plurality thereof for different vehicles, as recited by independent Claim 1, for example, it also fails to disclose or fairly suggest downloading interface for permitting downloading of enabling data related to the at least one corresponding vehicle device code for use by said multi-vehicle compatible controller, as also recited by each independent claim.

In the Official Action, the Examiner cited to several portions of Chou et al., but the Examiner contended that the communication link carrying "vehicle parameter values", (Col. 7, line 35), discloses the claimed enabling data. As with the fault codes, the capability to interoperate with vehicle parameter values is predicated on the need to program the processor with software specific to the subject vehicle. Indeed, Chou et al. notes at Col.10, lines 5-10 that the vehicle parameter update/change could be performed as an additional service.

UNITED STATES DISTRICT COURT
MIDDLE DISTRICT OF FLORIDA
ORLANDO DIVISION

OMEGA PATENTS, LLC,

Plaintiff,

v. Case No: 6:13-cv-1950-Orl-40DCI

CALAMP CORP.,

Defendant.
_____/

FINAL JUDGMENT

This case was tried to a jury which returned a verdict in favor of plaintiff on February 24, 2016. On April 5, 2017, this Court granted in part and denied in part plaintiff's motion for entry of judgment but did not enter a form of judgment specifying its terms. This Final Judgment reflects the substance of that ruling.

Pursuant to Rule 58 of the Federal Rules of Civil Procedure, in accordance with the jury verdict delivered on February 24, 2016, and this Court's Orders, Final Judgment is hereby entered in favor of Plaintiff, OMEGA PATENTS, LLC, and against CALAMP CORP., as follows:

a. CALAMP CORP. willfully infringed OMEGA PATENTS, LLC's U.S. Patent No. 6,346,876, Claims 1, 3, 4, 5, 12, 14, and 16; U.S. Patent No. 6,756,885, Claims 1, 2, 3, 12, and 14; U.S. Patent No. 7,671,727, Claims 1, 10, and 11; and U.S. Patent No. 8,032,278, Claims 1, 2, 3, 4, 5, 6, 8, 11, 12, 13, 14, 16, 18, 19, and 21 (collectively, the claims of patents-in-suit);

b. The claims of the patents-in-suit have not been proven invalid or unenforceable;

c. The Court finds this to be an exceptional case and the amount of the damages awarded by the jury shall be trebled;

d. OMEGA PATENTS, LLC, shall be entitled to recover its reasonable attorneys' fees; and

e. The Court will not issue an injunction against further infringement.

Accordingly, it is hereby **ORDERED and ADJUDGED**:

1. Defendant CALAMP CORP. shall pay damages to OMEGA PATENTS, LLC, in the amount of $2,975,200.00, which shall be trebled, for a total amount of **$8,925,600.00**;
2. OMEGA PATENTS, LLC, shall be awarded prejudgment interest in the amount of $302.00 *per diem*, from the date of the verdict on February 24, 2016, to entry of this Final Judgment (393 days) for the total amount of **$118,686.00**;
3. By stipulation of the parties, the Court awards Reasonable Attorney's Fees and Costs to OMEGA PATENTS, LLC, in the amount of $**1,100,000.00**. CalAmp Corp. reserves the right to contest the amount of and/or entitlement to fees in the event that this Final Judgment is modified or overturned as a result of CalAmp Corp.'s motions for judgment as a matter of law and for a new trial, or on appeal.
4. The Court reserves jurisdiction to consider an ongoing royalty for any infringing sales after February 24, 2016. If the parties cannot agree on an appropriate procedure, the parties shall submit legal memoranda outlining any requested relief within thirty (30) days.
5. This Final Judgment incorporates all previous orders in the case. CalAmp Corp.'s agreement to the form of this Final Judgment shall not be construed as a waiver

of CalAmp Corp.'s right to appeal, or to file a renewed motion for judgment as a matter of law pursuant to Fed. R. Civ. P. 50 or a motion for new trial pursuant to Fed. R. Civ. P. 59. The time for filing such motions shall run from the date of the entry of this Final Judgment.

6. Plaintiff OMEGA PATENTS, LLC, shall be awarded Final Judgment in its favor, against Defendant CALAMP CORP., in the amount of **$10,144,286.00**.

FOR WHICH SUM, LET EXECUTION ISSUE.

DONE AND ORDERED in Orlando, Florida on April 24, 2017.

PAUL G. BYRON
UNITED STATES DISTRICT JUDGE

Copies furnished to:

Counsel of Record
Unrepresented Parties

UNITED STATES PATENT AND TRADEMARK OFFICE

UNITED STATES DEPARTMENT OF COMMERCE
United States Patent and Trademark Office
Address: COMMISSIONER FOR PATENTS
P.O. Box 1450
Alexandria, Virginia 22313-1450
www.uspto.gov

APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
90/013,851	10/28/2016	8032278	C13-03896.RE2	8717

7590 05/23/2017

CHRISTOPHER F. REGAN, ESQUIRE
ALLEN, DYER, DOPPELT, MILBRATH & GILCHRIST, P.A.
P. O. BOX 3791
ORLANDO, FL 32802-3791

EXAMINER
REICHLE, KARIN M

ART UNIT	PAPER NUMBER
3992	

MAIL DATE	DELIVERY MODE
05/23/2017	PAPER

Please find below and/or attached an Office communication concerning this application or proceeding.

The time period for reply, if any, is set in the attached communication.

UNITED STATES PATENT AND TRADEMARK OFFICE

Commissioner for Patents
United States Patents and Trademark Office
P.O.Box 1450
Alexandria, VA 22313-1450
www.uspto.gov

THIRD PARTY REQUESTER'S CORRESPONDENCE ADDRESS

KPPB LLP
2400 EAST KATELLA AVENUE
SUITE 1050
ANAHEIM, CA 92806

Date: MAY 2 3 2017

EX PARTE REEXAMINATION COMMUNICATION TRANSMITTAL FORM

REEXAMINATION CONTROL NO. : 90013851
PATENT NO. : 8032278
ART UNIT : 3993

Enclosed is a copy of the latest communication from the United States Patent and Trademark Office in the above identified ex parte reexamination proceeding (37 CFR 1.550(f)).

Where this copy is supplied after the reply by requester, 37 CFR 1.535, or the time for filing a reply has passed, no submission on behalf of the ex parte reexamination requester will be acknowledged or considered (37 CFR 1.550(g)).

Decision on Petition for Extension of Time in Reexamination	**Application No.**	**Applicant(s)**	
	90/013,851	8,032,268	
	Examiner	**Art Unit**	
	Karin Reichle	3992	

1. THIS IS A DECISION ON THE PETITION FILED May 19, 2017.

2. THIS DECISION IS ISSUED PURSUANT TO:
   - A. ☒ 37 CFR 1.550(c) – The time for taking any action by a patent owner in a third party requested *ex parte* reexamination proceeding will be extended only for sufficient cause and for a reasonable time specified.
   - B. ☐ 37 CFR 1.550(c) – The time for taking action by a patent owner in a patent owner requested *ex parte* reexamination proceeding will only be extended for more than two months for sufficient cause and for a reasonable time specified.
   - C. ☐ 37 CFR 1.956 – The time for taking any action by a patent owner in an *inter partes* reexamination proceeding will be extended only for sufficient cause and for a reasonable time specified.

   The petition is before the Central Reexamination Unit for consideration.

3. FORMAL MATTERS

Patent owner requests that the period for responding to the Office action mailed on March 29, 2017 which set a two (2) month period for filing a response thereto, be extended by an additional two (2) weeks.

- A. Petition fee per 37 CFR §1.17(g)).
  - i. ☐ Petition includes authorization to debit a deposit account.
  - ii. ☒ Petition includes authorization to charge a credit card account.
  - iii. ☐ Other _____.
- B. ☒ Proper certificate of service was provided. (Not required in reexamination where patent owner is requester.)
- C. ☒ Petition was timely filed.
- D. ☒ Petition properly signed.

4. DECISION (See MPEP 2265 and 2665)

- A. ☒ Granted or ☐ Granted-in-part for **two (2) weeks** because petitioner provided a factual accounting that established sufficient cause. (See 37 CFR 1.550(c) and 37 CFR 1.956).
  - i. ☐ Other/comment: (See attached)
- B. ☐ Dismissed because:
  - I. ☐ Formal matters (See unchecked box(es) (A, B, C and/or D) in section 4 above).
  - ii. ☐ Petitioner failed to provide a factual accounting of reasonably diligent behavior by all those responsible for preparing a response to the outstanding Office action within the statutory time period.
  - iii. ☐ Petitioner failed to explain why, in spite of the action taken thus far, the requested additional time is needed.
  - iv. ☐ The statements provided fail to establish sufficient cause to warrant extension of the time for taking action (See attached).
  - v. ☐ The petition is moot
  - vi. ☐ Other/comment:

5. CONCLUSION: **The response to the Office action mailed March 29, 2017 is due June 12, 2017.**

6. Telephone inquiries with regard to this decision should be directed to Stephen Stein at 571-272-1544 in the CRU.

/Stephen Stein/
Supervisory Patent Reexamination Specialist
Central Reexamination Unit

IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

In re Patent of **KENNETH E. FLICK** Request for Reexamination of **U.S. PATENT NO. 8,032,278** Control No. **90/013,851** Confirmation No. **8717** Filing Date: **OCTOBER 28, 2016** For: **VEHICLE TRACKING UNIT WITH DOWNLOADABLE CODES AND ASSOCIATED METHODS**	Attorney Docket No.: **C13-03896.RE2 (58106CIP1_REX2)** Examiner: **K. REICHLE** Art Unit: **3992**

PATENT OWNER'S PETITION FOR EXTENSION OF TIME UNDER 37 C.F.R. §1.550(C)

EFILE

Commissioner For Patents

Commissioner:

Pursuant to 37 C.F.R. § 1.550(c), Omega Patents L.L.C. ("Patent Owner") hereby petitions for a two-week extension of time to reply to the Non-Final Office Action, mailed March 29, 2017, in the above-captioned case.

The current deadline with no extension is May 29, 2017, and the requested deadline for response with a two-week extension is June 12, 2017. The present petition is being filed with the petition fee specified under 37 C.F.R. § 1.17(g).

STATEMENT OF FACTS

1. On October 4, 2011, the patent at issue in this reexamination proceeding, U.S. Pat. No. 8,032,278 ('278 Patent), issued with 22 claims (Issued Claims).

2. On October 28, 2016, this reexamination proceeding was initiated by the filing in the United States Patent and Trademark Office of a 888-page Request for Ex Parte Reexamination of the '278 Patent by a third party ("Requester").

3. On December 15, 2016, the Examiner mailed a decision adopting substantial questions of patentability based on three references cited in the Request, and adopting three of the numerous combinations of references alleged in the 888-page request.

4. On March 29, 2017, the Examiner mailed a 48-page Non-Final Office Action, entering non-final rejections of all of the Issued Claims under reexamination, based on stated grounds of 35 U.S.C. § 103 and 35 U.S.C. § 102.

REMARKS

Pursuant to 37 C.F.R. § 1.550(c), Patent Owner hereby requests an extension of the time period for responding to the outstanding Non-Final Office Action.

Because this is the first request for an extension of the time period for responding to the Non-Final Office Action and because this request is not for a period of greater than one month, Patent Owner submits that a showing of an extraordinary situation is not required. (*See* MPEP §2265.) Rather, the request should be granted upon a showing of sufficient cause. (*See* 37 C.F.R. § 1.550; *see also* MPEP 2265).

Patent Owner hereby states the reasons supporting the request, as required by MPEP §2265.

(A) Statement of what action the patent owner has taken to provide a response, to date as of the date of the request for extension of time.

Patent Owner and Patent Owner's Attorneys have diligently worked, and continue to diligently work, to review the Non-Final Office Action and to prepare a response to the same. A factual accounting of Patent Owner's reasonably diligent behavior includes, but is not limited to:

engaging the services of Allen, Dyer, Doppelt & Gilchrist, P.A. in review and analysis of the Non-Final Office Action, and the references relied on therein;

engaging a technical consultant on the reexamination;

contacting the Examiner to schedule an interview;

filing an automated interview request; and

continuous and diligent efforts to prepare a response compliant with 37 C.F.R. § 1.111 in view of the rejections noted in the Non-Final Office Action and the order granting reexamination.

(B) Why, in spite of the action taken thus far, the requested additional time is needed.

Patent Owner submits that, despite reasonably diligent action taken thus far, additional time is needed to prepare a response, above and beyond the current two-month response period.

In particular, Patent Owner has attempted to schedule an interview with the Examiner on May 25, 2017, filing an automated interview request on May 16, 2017. Due to conflicting schedules of Conferees, the telephonic interview was scheduled for June 1, 2017.

Moreover, Patent Owner is coordinating efforts regarding three other Reexaminations related to the earlier judicial proceedings.

Accordingly, Patent Owner asserts that an additional 2-weeks is required to prepare a full and complete response to the issues pending in the present reexamination. In view of the above, it is respectfully submitted that the current circumstances represent sufficient cause under 37 C.F.R. § 1.550 for a two-week extension of time, extending the time period to at least June 12, 2017, for Patent Owner to prepare its response to the pending Non-Final Office Action, and such extension is hereby respectfully requested.

The Commissioner is hereby authorized to charge or credit any discrepancies in fee amounts to Deposit Account No. 01-0484.

Respectfully submitted,

/JACK GEORGE ABID/

JACK GEORGE ABID
Reg. No. 58,237
Allen, Dyer, Doppelt, Milbrath & Gilchrist, P.A.
255 S. Orange Avenue, Suite 1401
Post Office Box 3791
Orlando, Florida 32802
407-841-2330
407-841-2343 fax
Attorney for the Patent Owner

In re Patent of
Kenneth E. FLICK
Reexamination Control No. **90/013,851**
Filed: **OCTOBER 28, 2016**
_____/

CERTIFICATE OF SERVICE

Certificate of Service in compliance with 37 C.F.R. §1.530(c)

Pursuant to 37 C.F.R. §§1.530(c), 1.248, I hereby certify that on May 19, 2017, a complete copy of this Request is being served via First Class U.S. Mail upon Third Party Requester at the correspondence address as shown in PAIR:

KPPB LLP
2400 EAST KATELLA AVENUE
SUITE 1050
ANAHEIM, CA 92806

Respectfully submitted,

Sherry Leonard
Sherry Leonard

Electronic Patent Application Fee Transmittal

Application Number:	90013851
Filing Date:	28-Oct-2016
Title of Invention:	Vehicle Tracking Unit with Downloadable Codes and Associated Methods
First Named Inventor/Applicant Name:	8032278
Filer:	Christopher F. Regan/Sherry Leonard
Attorney Docket Number:	C13-03896.RE2

Filed as Large Entity

Filing Fees for ex parte reexam

Description	Fee Code	Quantity	Amount	Sub-Total in USD($)
Basic Filing:				
Pages:				
Claims:				
Miscellaneous-Filing:				
Petition:				
Patent-Appeals-and-Interference:				
Post-Allowance-and-Post-Issuance:				
Extension-of-Time:				

Description	Fee Code	Quantity	Amount	Sub-Total in USD($)
PETITION FEE- 37 CFR 1.17(G) (GROUP II)	1463	1	200	200
Miscellaneous:				
			Total in USD ($)	**200**

Electronic Acknowledgement Receipt

EFS ID:	29257702
Application Number:	90013851
International Application Number:	
Confirmation Number:	8717
Title of Invention:	Vehicle Tracking Unit with Downloadable Codes and Associated Methods
First Named Inventor/Applicant Name:	8032278
Correspondence Address:	CHRISTOPHER F. REGAN, ESQUIRE ALLEN, DYER, DOPPELT, MILBRATH & GILCHRIST, P.A. P. O. BOX 3791 - ORLANDO FL 32802-3791 US 407-841-2330 -
Filer:	Christopher F. Regan/Sherry Leonard
Filer Authorized By:	Christopher F. Regan
Attorney Docket Number:	C13-03896.RE2
Receipt Date:	19-MAY-2017
Filing Date:	28-OCT-2016
Time Stamp:	12:10:08
Application Type:	Reexam (Patent Owner)

Payment information:

Submitted with Payment	yes
Payment Type	CARD
Payment was successfully received in RAM	$200

RAM confirmation Number	051917INTEFSW12114800
Deposit Account	
Authorized User	

The Director of the USPTO is hereby authorized to charge indicated fees and credit any overpayment as follows:

File Listing:

Document Number	Document Description	File Name	File Size(Bytes)/ Message Digest	Multi Part /.zip	Pages (if appl.)
1		58106CIP1_REX2_Extension.pdf	288551 39e74e2f0fe14ac3c439481f603c32ab1747d729	yes	6

Multipart Description/PDF files in .zip description

Document Description	Start	End
Reexam Request for Extension of Time	1	5
Reexam Certificate of Service	6	6

Warnings:

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May 16 2017

This paper requesting to schedule and/or conduct an interview is appropriate because:

This submission is requested to be accepted as an authorization for this interview to communicate via the internet. Recognizing that Internet communications are not secure, I hereby authorize the USPTO to communicate with the undersigned concerning scheduling of the interview via video conference, instant messaging, or electronic mail, and to conduct the interview in accordance with office practice including video conferencing.

Name(s):
JACK ABID

S-signature:
/JACK ABID/

Registration Number:
58237

U.S. Application Number:
90013851

Confirmation Number:
8717

E-mail Address:
JABID@ALLENDYER.COM

Phone Number:
4077965056

Proposed Time of Interview:
5-25-2017 11:00 AM ET

Prefered Interview Type:
Video Conference

I am the applicant or applicant's representative for this application.

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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
90/013,851	10/28/2016	8032278	C13-03896.RE2	8717

7590 03/29/2017

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EXAMINER	
REICHLE, KARIN M	

ART UNIT	PAPER NUMBER
3992	

MAIL DATE	DELIVERY MODE
03/29/2017	PAPER

Please find below and/or attached an Office communication concerning this application or proceeding.

The time period for reply, if any, is set in the attached communication.

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EX PARTE REEXAMINATION COMMUNICATION TRANSMITTAL FORM

REEXAMINATION CONTROL NO. *90/013,851*.

PATENT NO. *8032278*.

ART UNIT *3992*.

Enclosed is a copy of the latest communication from the United States Patent and Trademark Office in the above identified *ex parte* reexamination proceeding (37 CFR 1.550(f)).

Where this copy is supplied after the reply by requester, 37 CFR 1.535, or the time for filing a reply has passed, no submission on behalf of the *ex parte* reexamination requester will be acknowledged or considered (37 CFR 1.550(g)).

Office Action in Ex Parte Reexamination	Control No. 90/013,851	Patent Under Reexamination 8032278	
	Examiner Karin Reichle	Art Unit 3992	AIA (First Inventor to File) Status No

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

a. ☒ Responsive to the communication(s) filed on *10/28/2016* .
☐ A declaration(s)/affidavit(s) under **37 CFR 1.130(b)** was/were filed on _____.

b. ☐ This action is made FINAL.

c. ☒ A statement under 37 CFR 1.530 has not been received from the patent owner.

A shortened statutory period for response to this action is set to expire *2* month(s) from the mailing date of this letter. Failure to respond within the period for response will result in termination of the proceeding and issuance of an *ex parte* reexamination certificate in accordance with this action. 37 CFR 1.550(d). **EXTENSIONS OF TIME ARE GOVERNED BY 37 CFR 1.550(c).** If the period for response specified above is less than thirty (30) days, a response within the statutory minimum of thirty (30) days will be considered timely.

Part I THE FOLLOWING ATTACHMENT(S) ARE PART OF THIS ACTION:

1. ☒ Notice of References Cited by Examiner, PTO-892.
2. ☐ Information Disclosure Statement, PTO/SB/08.
3. ☐ Interview Summary, PTO-474.
4. ☐ _____.

Part II SUMMARY OF ACTION

1a. ☒ Claims *1-22* are subject to reexamination.
1b. ☐ Claims _____ are not subject to reexamination.
2. ☐ Claims _____ have been canceled in the present reexamination proceeding.
3. ☐ Claims _____ are patentable and/or confirmed.
4. ☒ Claims *1-22* are rejected.
5. ☐ Claims _____ are objected to.
6. ☐ The drawings, filed on _____ are acceptable.
7. ☐ The proposed drawing correction, filed on _____ has been (7a) ☐ approved (7b) ☐ disapproved.
8. ☐ Acknowledgment is made of the priority claim under 35 U.S.C. § 119(a)-(d) or (f).
   a) ☐ All b) ☐ Some* c) ☐ None of the certified copies have
   1 ☐ been received.
   2 ☐ not been received.
   3 ☐ been filed in Application No. _____ .
   4 ☐ been filed in reexamination Control No. _____.
   5 ☐ been received by the International Bureau in PCT application No. _____.
   * See the attached detailed Office action for a list of the certified copies not received.
9. ☐ Since the proceeding appears to be in condition for issuance of an *ex parte* reexamination certificate except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte* Quayle, 1935 C.D. 11, 453 O.G. 213.
10. ☐ Other: _____

cc: Requester (if third party requester)

DETAILED ACTION

Introduction:

This Office Action addresses the *ex parte* reexamination of claims 1-22 of U.S. Patent No. 8,032,278 (hereinafter also referred to as '278) issued to Flick for which a Substantial New Question of Patentability has been deemed to exist. The status of the claims is as follows:

Claims 1-22 are rejected.

Patents, Non-Patent Literature, Other Evidence:

(1) U.S. Patent No. **5,732,074** to **Spaur et al**, published March 24, 1998, filed January 26, 1996 (hereinafter also referred to as '**074** or **Spaur**).

(2) U.S. Patent No. **6,028,537** to **Suman et al**, published February 22, 2000, filed June 3, 1997 (hereinafter also referred to as **'537** or **Suman**).

(3) U.S. Patent No. **6,330,499** to **Chou et al**, published December 11, 2001, filed July 21, 1999 (hereinafter also referred to as **'499** or **Chou**).

Claim Interpretation/Analysis:

Lexicographic Definitions

See MPEP § 2111.01, IV and 2163.07(a). The original specification (col. 22, first full paragraph) incorporates by reference U.S. 6,011,460 with regard to the tracking device communicating with one or more other vehicle devices via a vehicle data communication bus which '460 at col. 6, lines 14-18 sets forth "As would be readily understood by those skilled in

the art, the term different vehicles [sic] may include vehicles from different manufacturers, different models, or even different trim levels of the same make and model."

35 U.S.C. §112 Sixth Paragraph

"Means-plus function" language of a claim if meeting the 3-prong analysis set forth in MPEP 2181, I, "shall be construed to cover the corresponding structure, material, or acts described in the specification and equivalents thereof", see MPEP 2181, II. As also set forth in 2181, II, "If one employs means plus function language in a claim, one must set forth in the specification an adequate disclosure showing what is meant by that language", i.e. sets forth the structure, materials, or acts corresponding to a means- (or step-) plus-function.

Specifically:

> …examiners will apply 35 U.S.C. 112(f) or pre-AIA 35 U.S.C. 112, sixth paragraph to a claim limitation if it meets the following 3-prong analysis:
>
> (A) the claim limitation uses the term "means" or "step" or a term used as a substitute for "means" that is a generic placeholder (also called a nonce term or a non-structural term having no specific structural meaning) for performing the claimed function;
>
> (B) the term "means" or "step" or the generic placeholder is modified by functional language, typically, but not always linked by the transition word "for" (e.g., "means for") or another linking word or phrase, such as "configured to" or "so that"; and
>
> (C) the term "means" or "step" or the generic placeholder is not modified by sufficient structure, material, or acts for performing the claimed function.

The Examiner concludes that claims 1-22 include a phrase or phrases that invokes/invoke 35 U.S.C. §112, 6th paragraph. For support of the Examiners conclusion the Examiner notes the following 3-prong analyses.

"a vehicle position determining device"

Analysis of Independent Claims 1, 13 and 18

The Examiner concludes the phrase "*a vehicle position determining device*," as recited in claims 1, 13 and 18, line 5, (Functional Phrase #1) invokes 35 U.S.C § 112, 6th paragraph. To support the Examiner's conclusion, the Examiner notes the following 3-Prong analysis:

a) 3-Prong Analysis Prong (A):

As an initial matter, the Examiner finds that Functional Phrase #1 does not use the term "means." The issue arising under Prong (A) then becomes whether or not the claimed phrase "device" is a generic placeholder for 'means'. *See MPEP 2181 I ¶3 and MPEP 2181 I (C) ¶4.*

The Examiner has reviewed the specification of '278 and finds: (1) insufficient evidence that '278 Patent lexicographically defines the phrase "device" as a particular structure for performing the entire claimed function; (2) insufficient evidence that '278 indicates that the phrase "device" refers to a particular structure in the art, that a person having ordinary skill in the art (PHOSITA) would recognize as a structure known to perform the entire claimed function. *See Williamson v. Citrix Online, L.L.C.,* 115 USPQ2d 1105, 1112 (Fed. Cir. 2015).

In addition the Examiner has reviewed the prior art and finds that while the phrase "device" can be a particular structure in the art, the Examiner finds insufficient evidence that the phrase "device" infers or requires any particular structure as related to the function of Functional Phrase #1.

Accordingly based upon a review of '278 itself and the prior art, the Examiner concludes that the phrase "device" as set forth in Functional Phrase #1 is being applied as a generic term/placeholder having no particular structure associated therewith as related to the entire claimed function. Because "device" is merely a generic placeholder having no specific structure associated therewith, the Examiner concludes that Functional Phrase #1 meets invocation Prong (A).

b) 3-Prong Analysis Prong (B):

Based upon a review of claims 1, 13 and 18 in '278, the Examiner finds that the function associated with Functional Phrase #1 is: "*vehicle position determining*" ('278 Patent, Claims 1, 13 and 18, line 5). *See MPEP 2181 I (B) ¶2.*

Because Functional Phrase #1 includes the function expressly noted above, the Examiner concludes that Functional Phrase #1 meets invocation Prong (B). Additionally, the Examiner notes that because nothing in the written description contradicts the plain language describing this function, the function within Functional Phrase #1 will have its ordinary and accustomed meaning.

c) 3-Prong Analysis: Prong (C)

Based upon a review of the entire Functional Phrase #1, the Examiner finds that Functional Phrase #1 does not contain sufficient structure for performing the entire claimed function that is set forth within Functional Phrase #1. In fact, the Examiner finds that Functional Phrase #1 recites very little structure (if any) for performing the claimed function.

Because Functional Phrase #1 does not contain sufficient structure for performing the entire claimed function, the Examiner concludes that Functional Phrase #1 meets invocation Prong (C).

d) Corresponding Structure

Based upon a review of the original disclosure, the Examiner finds that the corresponding structure for Functional Phrase #1 includes a device (42 in Figure 1, 112 in Figure 10) receiving multiple signals from spaced apart satellites (38 in Figure 1), e.g. a GPS receiver, or communications with the cellular telephone network, e.g. time of arrival techniques available based upon multiple reception paths to determine position via the cellular telephone network, or other satellite transmissions ('278 at col. 5, lines 15-26 and col. 23, lines 46-47 and 51-54) . Therefore the corresponding structure for Functional Phrase #1 is a receiver of communications/transmissions from satellites or cellular telephone networks for achieving the function.

Analysis of Dependent Claim 11

The Examiner concludes that dependent claim 11 modifies and/or adds to the structure of Functional Phrase #1 forming modified Functional Phrase #1. Accordingly the Examiner finds that the corresponding structure for modified Functional Phrase #1 is a GPS receiver of communications/transmissions with satellites for determining vehicle position.

Analysis of Other Dependent Claims

The Examiner finds that the dependent claims other than claim 11 do not modify the function of nor the corresponding structure for Functional Phrase #1.

"a wireless communications device"

Analysis of Independent Claims 1, 13 and 18

The Examiner concludes the phrase "*wireless communications device*" as recited in claims 1, 13 and 18, line 6, (Functional Phrase #2) invokes 35 U.S.C § 112, 6th paragraph. To support the Examiner's conclusion, the Examiner notes the following 3-Prong analysis:

a) 3-Prong Analysis Prong (A):

As an initial matter, the Examiner finds that Functional Phrase #2 does not use the term "means." The issue arising under Prong (A) then becomes whether or not the claimed phrase "device" is a generic placeholder for 'means'. *See MPEP 2181 I ¶3 and MPEP 2181 I (C) ¶4.*

The Examiner has reviewed the specification of '278 and finds: (1) insufficient evidence that '278 lexicographically defines the phrase "device" as a particular structure for performing the entire claimed function; (2) insufficient evidence that '278 indicates that the phrase "device" refers to a particular structure in the art, that a person having ordinary skill in the art (PHOSITA) would recognize as a structure known to perform the entire claimed function. *See Williamson v. Citrix Online, L.L.C.,* 115 USPQ2d 1105, 1112 (Fed. Cir. 2015).

In addition the Examiner has reviewed the prior art and finds that while the phrase "device" can be a particular structure in the art, the Examiner finds insufficient evidence that the phrase "device" infers or requires any particular structure as related to the function of Functional Phrase #2.

Accordingly based upon a review of '278 itself and the prior art, the Examiner concludes that the phrase "device" as set forth in Functional Phrase #2 is being applied as a generic term/placeholder having no particular structure associated therewith as related to the entire claimed function. Because "device" is merely a generic placeholder having no specific structure associated therewith, the Examiner concludes that Functional Phrase #2 meets invocation Prong (A).

b) 3-Prong Analysis Prong (B):

Based upon a review of claims 1, 13 and 18 in '278, the Examiner finds that the function associated with Functional Phrase #2 is: "*wireless communications*" ('278 Patent, Claims 1, 13 and 18, line 6.) *See MPEP 2181 I (B) ¶2.*

Because Functional Phrase #2 includes the function expressly noted above, the Examiner concludes that Functional Phrase #2 meets invocation Prong (B). Additionally, the Examiner notes that because nothing in the written description contradicts the plain language describing this function, the function within Functional Phrase #2 will have its ordinary and accustomed meaning.

c) 3-Prong Analysis: Prong (C)

Based upon a review of the entire Functional Phrase #2, the Examiner finds that Functional Phrase #1 does not contain sufficient structure for performing the entire claimed function that is set forth within Functional Phrase #2. In fact, the Examiner finds that Functional Phrase #2 recites very little structure (if any) for performing the claimed function.

Because Functional Phrase #2 does not contain sufficient structure for performing the entire claimed function, the Examiner concludes that Functional Phrase #2 meets invocation Prong (C).

d) Corresponding Structure

Based upon a review of the original disclosure, the Examiner finds that the corresponding structure for Functional Phrase #2 is a device (44 in Figure 1, 113 in Figures 10 and 12) configured to wirelessly transmit/communicate in a voice band or on a control channel, e.g. cellular phone transceiver, of a cellular network, over other networks, e.g. over satellite, or via wireless internet services ('278 at col. 5, lines 31-49 and col. 23, lines 47-48 and 55-58). Therefore the corresponding structure for Functional Phrase #2 is a transceiver for wirelessly

communicating/transmitting in a voice band or on a control channel of a cellular network or over other networks, e.g. over satellite, or via wireless internet services.

Analysis of Dependent Claims

The Examiner finds that the dependent claims do not modify the function of nor the corresponding structure for Functional Phrase #2.

"a multi-vehicle compatible controller…"

Analysis of Independent Claims 1, 13 and 18

The Examiner concludes "*a multi-vehicle compatible controller for cooperating with said vehicle position determining device and said wireless communications device to send vehicle position information; said multi-vehicle compatible controller to be coupled to the vehicle data bus for communication thereover with at least one vehicle device using at least one corresponding vehicle device code from among a plurality thereof for different vehicles*"[1] as recited in claims 1, 13 and 18, lines 7-15, (Functional Phrase #3) invokes 35 U.S.C § 112, 6th paragraph. To support the Examiner's conclusion, the Examiner notes the following 3-Prong analysis:

---

[1] Again the original specification (col. 22, first full paragraph) incorporates by reference U.S. 6,011,460 with regard to the tracking device communicating with one or more other vehicle devices via a vehicle data communication bus which at col. 6, lines 14-18 sets forth "As would be readily understood by those skilled in the art, the term different vehicles [sic] may include vehicles from different manufacturers, different models, or even different trim levels of the same make and model."

a) 3-Prong Analysis Prong (A):

As an initial matter, the Examiner finds that Functional Phrase #3 does not use the term "means." The issue arising under Prong (A) then becomes whether or not the claimed phrase "device" is a generic placeholder for 'means'. *See MPEP 2181 I ¶3 and MPEP 2181 I (C) ¶4.*

The Examiner has reviewed the specification of '278 and finds: (1) insufficient evidence that '278 lexicographically defines the phrase "multi-vehicle compatible controller" as a particular structure for performing the entire claimed function; (2) insufficient evidence that '278 indicates that the phrase "multi-vehicle compatible controller" refers to a particular structure in the art, that a person having ordinary skill in the art (PHOSITA) would recognize as a structure known to perform the entire claimed function. *See Williamson v. Citrix Online, L.L.C.,* 115 USPQ2d 1105, 1112 (Fed. Cir. 2015).

In addition the Examiner has reviewed the prior art and finds that while the phrase "multi-vehicle compatible controller" can be a particular structure in the art, the Examiner finds insufficient evidence that the phrase "device" infers or requires any particular structure as related to the function of Functional Phrase #3.

Accordingly based upon a review of '278 itself and the prior art, the Examiner concludes that the phrase "multi-vehicle compatible controller" as set forth in Functional Phrase #3 is being applied as a generic term/placeholder having no particular structure associated therewith as related to the entire claimed function. Because "multi-vehicle compatible controller" is merely a generic placeholder having no specific structure associated therewith, the Examiner concludes that Functional Phrase #3 meets invocation Prong (A).

b) 3-Prong Analysis Prong (B):

Based upon a review of claims 1, 13 and 18 in '278, the Examiner finds that the function associated with Functional Phrase #3 is: "*for cooperating with said vehicle position determining device and said wireless communications device to send vehicle position information*" and "*to be coupled to the vehicle data bus for communication thereover with at least one vehicle device using at least one corresponding vehicle device code from among a plurality thereof for different vehicles*" ('278 Patent, Claims 1, 13 and 18, lines 7-15).

Because Functional Phrase #3 includes the function expressly noted above, the Examiner concludes that Functional Phrase #3 meets invocation Prong (B). Additionally, the Examiner notes that because nothing in the written description contradicts the plain language describing this function, the function within Functional Phrase #3 will have its ordinary and accustomed meaning.

c) 3-Prong Analysis: Prong (C)

Based upon a review of the entire Functional Phrase #3, the Examiner finds that Functional Phrase #3 does not contain sufficient structure for performing the entire claimed function that is set forth within Functional Phrase #3. In fact, the Examiner finds that Functional Phrase #3 recites very little structure (if any) for performing the claimed function.

Because Functional Phrase #3 does not contain sufficient structure for performing the entire claimed function, the Examiner concludes that Functional Phrase #3 meets invocation Prong (C).

d) Corresponding Structure

Based upon a review of the original disclosure, the Examiner finds that the corresponding structure for Functional Phrase #3 is a controller including a central processing unit (CPU) (126, Fig. 10) or other logic circuitry, a memory (125, Fig. 10), a clock (124, Figure 10) and input/output circuitry (127, Fig. 10). The memory may store vehicle position information, and a vehicle device code or codes ('278 at col. 6, lines 28-35, col. 11, lines 24-35, col. 22, lines 1-7 (and thereby '460 at col. 3, lines first full paragraph and lines 52-60, col. 4, line 44-col. 5, line 31, col. 5, line 66-col. 6, line 23 and col. 6, lines 36-58 and Figure1, elements 12, 15, and 17) and col. 23, line 41-col. 24, line 13). The corresponding structure for Functional Phrase #3, therefore, is a controller including CPU, operating under stored program control, or other logic circuit, a memory, a clock and input/output circuitry for cooperating with said vehicle position determining device and said wireless communications device to send vehicle position information and for coupling to a vehicle data bus for communication thereover with at least one vehicle device using at least one corresponding vehicle device code from among a plurality thereof for different vehicles.

Analysis of Dependent Claims 2-5, 8, 11-12, 16, and 21

The Examiner finds that these dependent claims do not modify the function nor the corresponding structure for Functional Phrase #3.

Analysis of Dependent claims 6-7, 14-15, and 19-20

The Examiner concludes that dependent claims 6-7, 14-15, and 19-20 modify and/or add to the function of Functional Phrase #3 forming first modified Functional Phrase #3. (See '278 at col. 23, line 67-col. 24, line 3.) Accordingly the Examiner finds that the corresponding structure for first modified Functional Phrase #3 is that same as that as for Functional Phase #3 however for the modified function of communication over the data bus with at least one vehicle device using at least one corresponding vehicle device code from among a plurality thereof for different vehicles which is for reading from (claim 6, 14, or 19) or writing to (claim 7, 15, or 20) the at least one vehicle device.

Analysis of dependent claims 9-10, 17, and 22

The Examiner concludes that dependent claims 9-10, 17, and 22 modify and/or add to both the structure and the function of Functional Phrase #3 forming second and third modified Functional Phrase #3. (See '278 at col. 23, line 67-col. 24, line 3.) Accordingly the Examiner finds that claims 9, 17 and 22 additionally require a remote transmitter (117, Figure 10) and the corresponding structure for second modified Functional Phrase #3 additionally includes a remote receiver (118, Figure 10) (See '278 at col. 24, last full paragraph) for the additional function of, responsive to the remote transmitter, performing at least one vehicle remote control function responsive to the remote transmitter and that claim 10 additionally requires a remote transmitter (117, Figure 10) and the corresponding structure for third modified Functional Phrase #3 additionally includes a remote receiver (118, Figure 10 (See '278 at col. 24, last full paragraph) for the additional function of, responsive to the remote transmitter, performing at least one

vehicle remote control function comprising at least one of a vehicle security function, a remote keyless entry function and a remote engine starting function.

"a downloading interface…"

Analysis of Independent Claim 1

The Examiner concludes the phrase "*a downloading interface for permitting downloading of enabling data related to the at least one corresponding vehicle device code for use by said multi-vehicle compatible controller.*" as recited in claim 1, lines 16-19, (Functional Phrase #4) invokes 35 U.S.C § 112, 6th paragraph. To support the Examiner's conclusion, the Examiner notes the following 3-Prong analysis:

a) 3-Prong Analysis Prong (A):

As an initial matter, the Examiner finds that Functional Phrase #4 does not use the term "means." The issue arising under Prong (A) then becomes whether or not the claimed phrase "downloading interface" is a generic placeholder for 'means'. *See MPEP 2181 I ¶3 and MPEP 2181 I (C) ¶4.*

The Examiner has reviewed the specification of '278 and finds: (1) insufficient evidence that '278 lexicographically defines the phrase "downloading interface" as a particular structure for performing the entire claimed function; (2) insufficient evidence that '278 indicates that the phrase "downloading interface" refers to a particular structure in the art, that a person having

ordinary skill in the art (PHOSITA) would recognize as a structure known to perform the entire claimed function. *See Williamson v. Citrix Online, L.L.C.,* 115 USPQ2d 1105, 1112 (Fed. Cir. 2015).

In addition the Examiner has reviewed the prior art and finds that while the phrase "downloading interface" can be a particular structure in the art, the Examiner finds insufficient evidence that the phrase "device" infers or requires any particular structure as related to the function of Functional Phrase #4.

Accordingly based upon a review of '278 itself and the prior art, the Examiner concludes that the phrase "downloading interface" as set forth in Functional Phrase #4 is being applied as a generic term/placeholder having no particular structure associated therewith as related to the entire claimed function. Because "downloading interface" is merely a generic placeholder having no specific structure associated therewith, the Examiner concludes that Functional Phrase #4 meets invocation Prong (A).

b) 3-Prong Analysis Prong (B):

Based upon a review of claim 1 in '278, the Examiner finds that the function associated with Functional Phrase #4 is: "*for permitting downloading of enabling data related to the at least one corresponding vehicle device code for use by said multi-vehicle compatible controller.*" ('278 Patent, Claim 1, lines 16-19.)

Because Functional Phrase #4 includes the function expressly noted above, the Examiner concludes that Functional Phrase #4 meets invocation Prong (B). Additionally, the Examiner notes that because nothing in the written description contradicts the plain language describing

this function, the function within Functional Phrase #4 will have its ordinary and accustomed meaning.

c) 3-Prong Analysis: Prong (C)

Based upon a review of the entire Functional Phrase #4, the Examiner finds that Functional Phrase #4 does not contain sufficient structure for performing the entire claimed function that is set forth within Functional Phrase #4. In fact, the Examiner finds that Functional Phrase #4 recites very little structure (if any) for performing the claimed function.

Because Functional Phrase #4 does not contain sufficient structure for performing the entire claimed function, the Examiner concludes that Functional Phrase #4 meets invocation Prong (C).

d) Corresponding Structure

Based upon a review of the original disclosure, the Examiner finds that the corresponding structure for Functional Phrase #4 is a downloading interface (Figure 10, 116), e.g. interface circuitry 132 (e.g. logic circuitry or other control circuitry along with switching components) for controlling communication with a downloading device, and either a wireless signal downloading interface (e.g. a wireless receiver 114, such as for temporary connection to the downloading device 115 via any one or more of a number of wireless technologies, such as cellular, satellite, IR, Bluetooth or WiFi technologies (Fig. 11) or a temporary wireless communication link with the downloading device provided by sharing the wireless communications device that sends position data (Fig. 12)) or a wired signal downloading interface (e.g. a connector 133a in the

form of a socket to accept a memory card or other data storage medium capable of transferring data or a connector 133a for temporary connection to a mating connector 133b of the downloading device (Fig. 13) wherein the downloading device can be, e.g., a laptop computer, via RS232/429 protocol, USB, FireWire, TCP/IP (Internet), or any other wired protocol.) (See '278 at col. 24, lines 14-51.) The corresponding structure for Functional Phrase #4 is therefore such a downloading interface for permitting downloading of enabling data related to the at least one corresponding vehicle device code, e.g. vehicle device code or codes, an instruction to select a code or codes from among those already stored, or the data or sequence to allow the controller to generate the vehicle device code or codes, for use by said multi-vehicle compatible controller ('278 at col. 24, lines 8-12).

Analysis of Dependent Claims 2-3 and Independent claim 13

The Examiner concludes that dependent claim 2, independent claim 13 and dependent claim 3 modify and/or add to the structure of Functional Phrase #4 forming first and second modified Functional Phrases #4. (See '278 at col. 24, second full paragraph.) Accordingly the Examiner finds that for claim 2 the corresponding structure for first modified Functional Phrase #4 additionally includes the structure of a wired signal downloading interface and that for claims 3 and 13 the corresponding structure for second modified Functional Phrase #4 additionally includes the structure of a wired signal downloading interface comprising a connector for temporary connection to a downloading device.

Analysis of Dependent Claims 4 and 5 and Independent Claim 18

The Examiner concludes that dependent claim 4, independent claim 18 and dependent claim 5 modify and/or add to the structure of Functional Phrase #4 forming third and fourth modified Functional Phrases #4. (See '278 at col. 24, second full paragraph.) Accordingly the Examiner finds that for claim 4 the corresponding structure for third modified Functional Phrase #4 additionally includes the structure of a wireless signal downloading interface and that for claims 5 and 18 the corresponding structure for fourth modified Functional Phrase #4 additionally includes the structure of a wireless signal downloading interface comprising a wireless receiver connector for temporary connection to a downloading device.

Analysis of Dependent Claims 8, 16 and 21

The Examiner concludes these dependent claims modify and/or add to the function of Functional Phrase #4 forming modified, modified second and modified fourth Functional Phrases #4, respectively. (See '278 at col. 24, lines 46-51.) Accordingly the Examiner finds that with regard to claims 8, 16 and 21 the corresponding function for the respective phrases includes permitting downloading of at least one programming instruction for said multi-vehicle compatible controller.

Conclusion

Finally, see MPEP 2258, I., G, "During reexamination, claims are given the broadest reasonable interpretation consistent with the specification and limitations in the specification are not read into the claims (*In re Yamamoto*, 740 F.2d 1569, 222 USPQ 934 (Fed. Cir. 1984)). See

also MPEP 2111, e.g. "[T]he ordinary and customary meaning of a claim term is the meaning that the term would have to a person of ordinary skill in the art in question at the time of the invention, i.e., as of the effective filing date of the patent application." *Phillips v. AWH Corp.*, 415 F.3d 1303, 1313, 75 USPQ2d 1321, 1326 (Fed. Cir. 2005) (*en banc*) and "The ordinary and customary meaning of a term may be evidenced by a variety of sources, including 'the words of the claims themselves, the remainder of the specification, the prosecution history, and extrinsic evidence concerning relevant scientific principles, the meaning of technical terms, and the state of the art." *Phillips v. AWH Corp.*, 415 F.3d at 1314, 75 USPQ2d at 1327.

Rejections based on Prior Art:

Statutory Bases

The following is a quotation of the appropriate paragraphs of pre-AIA 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

> A person shall be entitled to a patent unless –
>
> (a) the invention was known or used by others in this country, or patented or described in a printed publication in this or a foreign country, before the invention thereof by the applicant for a patent.
>
> (b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.
>
> (e) the invention was described in (1) an application for patent, published under section 122(b), by another filed in the United States before the invention by the applicant for patent or (2) a patent granted on an application for patent by another filed in the United States before the invention by the applicant for patent, except that an international application filed under the treaty defined in section 351(a) shall have the effects for purposes of this subsection of an application filed in the United States only if the international application designated the United States and was published under Article 21(2) of such treaty in the English language.
>
> (e) the invention was described in a patent granted on an application for patent by another filed in the United States before the invention thereof by the applicant for patent, or on an international application

> by another who has fulfilled the requirements of paragraphs (1), (2), and (4) of section 371(c) of this title before the invention thereof by the applicant for patent.

The changes made to 35 U.S.C. 102(e) by the American Inventors Protection Act of 1999 (AIPA) and the Intellectual Property and High Technology Technical Amendments Act of 2002 do not apply when the reference is a U.S. patent resulting directly or indirectly from an international application filed before November 29, 2000. Therefore, the prior art date of the reference is determined under 35 U.S.C. 102(e) prior to the amendment by the AIPA (pre-AIPA 35 U.S.C. 102(e)).

The following is a quotation of pre-AIA 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

> (a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negatived by the manner in which the invention was made.

The factual inquiries set forth in *Graham v. John Deere Co.*, 383 U.S. 1, 148 USPQ 459 (1966), that are applied for establishing a background for determining obviousness under pre-AIA 35 U.S.C. 103(a) are summarized as follows:

1. Determining the scope and contents of the prior art.

2. Ascertaining the differences between the prior art and the claims at issue.

3. Resolving the level of ordinary skill in the pertinent art.

4. Considering objective evidence present in the application indicating obviousness or nonobviousness.

Claim Rejections

Claim(s) 1, 4-8, 11-12, and 18-21 are rejected under pre-AIA 35 U.S.C. 102(b) as anticipated by or, in the alternative, under pre-AIA 35 U.S.C. 103(a) as obvious over U.S. Patent No. 6,330,499 to Chou et al (hereinafter also referred to as '499 or Chou).

The patent to Chou includes a/an publication/issue date more than one year prior to the effective filing date of June 3, 2007 of '278, and thus are available as prior art under 35 USC 102(b) and 35 USC 103.

Claim 1

A multi-vehicle compatible tracking unit for a vehicle comprising a vehicle data bus extending throughout the vehicle, the multi-vehicle compatible tracking unit comprising:

See '499 at, e.g., Fig. 1, elements 1000, 100 and 317, col. 2, lines 39-43, Figure 2, esp. elements 330, 335 and the dotted line therebetween, col. 3 lines 33-46 ("The processor 300 is coupled to a vehicle bus 335 through a vehicle bus interface 330. The coupling between the client computer device and the vehicle bus interface 106 of FIG. 3, may be one of RS-232, USB (Universal Serial Bus), IDB (ITS Data Bus), Ethernet, and the like. The vehicle bus interface may support one of vehicle bus standards such as CAN (Controller Area Network) and the Society of Automotive Engineers' SAE J1850 - Class B Data Communication Network Interface. Alternatively, the processor supports some or all of the functions of the vehicle bus interface and connects directly to the vehicle bus 335. The vehicle bus shown in FIG. 2 is an inherent part of all new automobiles. The dotted line is used as an indication that the vehicle bus

is built into the vehicle."), col. 3, lines 54-56, col.4, lines 2-38 (esp. "model dependent"), Fig. 3, elements 103 and 104, col. 1, lines 11-17 and col. 6, lines 39-41, col. 7, lines 32-40, and claims 2 and 7-9. Therefore '499 discloses a multi-vehicle compatible, i.e. multi-model compatible, tracking unit for a vehicle comprising a vehicle data extending throughout the vehicle.

a vehicle position determining device;

See *Claim Interpretation/Analysis* section, **"a vehicle position determining device"** *supra*, the discussion of claim 11 infra and '499 at, e.g., Figure 1, element 150A and 317, col. 2, lines 39-43, col. 3, lines 54-59 ("Optionally, the processor 300 may be coupled to a location sensing device such as a GPS receiver 317 (FIG. 1) to provide vehicle location information. The system may or may not assume the availability of the automatic vehicle position information. Location-related scenario, such as emergency help dispatch may use automatic vehicle positioning …."), col. 7, lines 32-40 and claims 1-2. Therefore '499 discloses the tracking unit comprising "a vehicle position determining device".

a wireless communications device;

See *Claim Interpretation/Analysis* section, **"a wireless communications device"** *supra* and '499 at, e.g., Figure 1, element 150, Figure 2, element 320, col. 2, lines 30-39 ("As shown in FIG. 1, the system 1000 includes a vehicle 10 with a vehicle driver or user 140, having an in-vehicle computing system 100, a client computer device 101 installed to enable vehicle health checkup and remote diagnostics, a communication link 150 (e.g., via wireless base stations

150B, or the like) for communicating vehicle information (e.g., vehicle identification number, (VIN), diagnostic data, and the like). Such a link can be interfaced with an internet 150C, the Internet 150D, or a public (or private) switch telephone network (PSTN) 150E."), col. 3, lines 15-32, Figure 3, elements 107 and 102, and col. 4, lines 39-42. Therefore '499 further discloses the tracking unit comprising "a wireless communications device".

a multi-vehicle compatible controller for cooperating with said vehicle position determining device and said wireless communications device to send vehicle position information;

See *Claim Interpretation/Analysis* section, **"a multi-vehicle compatible controller…"** and prior discussion of the preamble, "a vehicle position determining device" and "a wireless communications device". Additionally see Fig. 2, elements 300 and 350, col. 2, lines 44-52 and 55 et seq, col. 3, line 62-col. 4, line 14 and Figure 3, element 101/120. Therefore Chou discloses a CPU operating under stored program/software control, e.g. 300, 101, a memory, e.g. 350, and input/output circuitry, e.g. 330. '499 further discloses time stamping information or data, e.g. test data or fault codes ('499 at col. 5, first full paragraph and the paragraph bridging cols. 7-8 and Figure 4). Therefore Chou is also considered to either implicitly disclose or obviously suggest a clock since it discloses some structure/device for providing an indication of time. Thus, '499 further implicitly or obviously discloses a "a multi-vehicle compatible controller" and such for cooperating with said vehicle position determining device and said wireless communications device to send vehicle position information.

said multi-vehicle compatible controller to be coupled to the vehicle data bus for communication thereover with at least one vehicle device using at least one corresponding vehicle device code from among a plurality thereof for different vehicles; and

See *Claim Interpretation/Analysis* section, **"a multi-vehicle compatible controller…"**.

See also the prior discussion of the preamble, esp. col. 3 lines 33-46 ("The processor 300 is coupled to a vehicle bus 335 through a vehicle bus interface 330. The coupling between the client computer device and the vehicle bus interface 106 of FIG. 3, may be one of RS-232, USB (Universal Serial Bus), IDB (ITS Data Bus), Ethernet, and the like. The vehicle bus interface may support one of vehicle bus standards such as CAN (Controller Area Network) and the Society of Automotive Engineers' SAE J1850 - Class B Data Communication Network Interface. Alternatively, the processor supports some or all of the functions of the vehicle bus interface and connects directly to the vehicle bus 335. The vehicle bus shown in FIG. 2 is an inherent part of all new automobiles. The dotted line is used as an indication that the vehicle bus is built into the vehicle."), and col. 4, lines 15-38 ("The vehicle bus interface 120 is responsible for replying to requests for parametric data. It is also responsible for continuously monitoring the vehicle bus 104 for any fault reported by the ECUs 103, in terms of diagnostic trouble codes (DTCs). The vehicle bus interface 120 includes the following modules: vehicle bus adapter 120C, fault detector 120B, and diagnostic data service 120A. The fault detector 120B polls the vehicle bus 104 through the vehicle bus adapter 120C checking for fault codes reported by the vehicle ECUs 103. The vehicle bus adapter 120C translates the messages received from the vehicle bus into the language of the fault detector. It also translates messages from the fault detector into the language of the vehicle bus. **The fault code specifications and protocols of the vehicle may be Original Equipment Manufacturer (OEM) and model dependent.** The term

'vehicle fault codes' is meant to be synonymous with the term 'trouble code' or 'diagnostic trouble code'. A listing of such codes may be found in the publication of the Society of Automotive Engineers, 'SAE On-Board Diagnostics for Light and Medium Duty Vehicles Standards Manual'. The diagnostic data service 120A accepts request for vehicle parametric data and retrieves the data using the vehicle bus adapter." (Emphasis added).), and "**said multi-vehicle compatible controller for cooperating with said vehicle position determining device and said wireless communications device to send vehicle position information"**. Thus Chou either implicitly discloses or obviously suggests a "multi-vehicle compatible controller" and such controller is coupled to a vehicle data bus, e.g. 335, 104, for communication thereover, e.g. via 330, 120, with at least one vehicle device, e.g. 103, using at least one corresponding vehicle device code, i.e. (DTC), vehicle fault codes/protocols, which is vehicle model dependent, i.e. from among a plurality thereof for "different vehicles".

a downloading interface for permitting downloading of enabling data related to the at least one corresponding vehicle device code for use by said multi-vehicle compatible controller.

See *Claim Interpretation/Analysis* section, "**a downloading interface…**". See also, e.g., '499 at Figure 1, element 150, Figure 2, elements 320, 360, Figure 3, elements 102, 107, Figure 4, 102, NETWORK INTERFACE, arrow 7,14 and "HTTP, TCP/IP, PPP/SLIP, DIAL-UP, GSM", and Figure 5, 102, NETWORK INTERFACE, arrow 3,9, arrow 4,7, arrow 5,6 and "HTTP, TCP/IP, PPP/SLIP, DIAL-UP, GSM", col. 3, lines 49-53, col. 4, lines 15-19, and 36-46, col. 6, lines 11-14 and 37-47, col. 7, lines 32-40, col. 8, line 65-col. 10, line 11, and claim 10. See also the discussion of "a wireless communications device" limitation *supra* and claims 2-5

and 8 *infra*. '499 discloses, e.g., interface circuitry, e.g. NETWORK INTERFACE, 320, 107, docking facility, and a temporary wireless communication link, e.g. arrow 7, 14, arrow 3, 9, with the downloading device, i.e. TCP/IP(an internet/ the Internet), 201, provided by sharing the wireless communications device, e.g. 102, that sends position data, see, e.g. col. 7, lines 32-40, (see also discussion of claims 2-5) and such structure permits downloading of enabling data, e.g. instruction to gather data, vehicle parameter update/change, related to the at least one corresponding vehicle device code for use by said multi-vehicle compatible controller, e.g. steps 2-6 in Figure 5. Thus '499 discloses or obviously suggests "a downloading interface" and such permits downloading of enabling data related to the at least one corresponding vehicle device code for use by said multi-vehicle compatible controller.

Claim 4

The multi-vehicle compatible tracking unit according to claim 1 wherein said downloading interface comprises a wireless signal downloading interface.

See *Claim Interpretation/Analysis* section and discussion of claim 1 *supra*, "downloading interface for …controller" and "a wireless communications device" limitation *supra* esp. Figure 1, 150, Figure 2, elements 300, 320, Figs. 3-5, elements 107, 102, arrow 7, 14, arrow 3, 9, col. 3, lines 15-32 ("The processor is integrated with a network interface 320 to provide communication capability with the remote service center 200. Preferably, the network interface comprises a removable wireless telephone such as the Motorola i1000+ and a docking facility for the wireless phone integrated with the client computer device. Both voice and data connections can be supported by interfacing the processor 300 and the wireless phone. The telephone integration

provides basic communication functions. It establishes a data (e.g. TCP/IP) connection with a remote service center (e.g., remote service center 200). Wireless technologies such as GSM (Global System for Mobile Communications), CDMA (Code Division Multiple Access), TOMA (Time Division Multiple Access), iDEN™ (a TOMA-based Motorola technology), and AMPS (Advanced Mobile Phone System) can all be supported. The phone may also be used for wireless voice communications.". Therefore '449 discloses or obviously suggests a wireless signal downloading interface.

Claim 5

The multi-vehicle compatible tracking unit according to claim 4 wherein said wireless signal downloading interface comprises a wireless receiver for temporary connection to a downloading device.

See *Claim Interpretation/Analysis* section and discussion of claim 1, "downloading interface for …controller" limitation and "a wireless communications device" limitation, *supra* (e.g. col. 4, lines 39-43, col. 7, lines 32-40col. 9, lines 1-59, i.e. data link/connection 150, arrows 3,9, 7,14, between wireless phone 102 and server 201 opened and terminated during health checkup process). Therefore '499 teaches or obviously suggests a wireless receiver 102 of the wireless signal downloading interface for temporary connection to a downloading device.

Claim 6

The multi-vehicle compatible tracking unit according to claim 1 wherein the corresponding at least one vehicle code is for reading from the at least one vehicle device.

See *Claim Interpretation/Analysis* section and discussion of claim 1 *supra*, e.g. col. 4, lines 15-38 ("The vehicle bus interface 120 is responsible for replying to requests for parametric data. It is also responsible for continuously monitoring the vehicle bus 104 for any fault reported by the ECUs 103, in terms of diagnostic trouble codes (DTCs). The vehicle bus interface 120 includes the following modules: vehicle bus adapter 120C, fault detector 120B, and diagnostic data service 120A. The fault detector 120B polls the vehicle bus 104 through the vehicle bus adapter 120C checking for fault codes reported by the vehicle ECUs 103. The vehicle bus adapter 120C translates the messages received from the vehicle bus into the language of the fault detector. It also translates messages from the fault detector into the language of the vehicle bus. The fault code specifications and protocols of the vehicle may be Original Equipment Manufacturer (OEM) and model dependent. The term 'vehicle fault codes' is meant to be synonymous with the term 'trouble code' or 'diagnostic trouble code'. A listing of such codes may be found in the publication of the Society of Automotive Engineers, 'SAE On-Board Diagnostics for Light and Medium Duty Vehicles Standards Manual'. The diagnostic data service 120A accepts request for vehicle parametric data and retrieves the data using the vehicle bus adapter." (Emphasis added).), col. 5, lines 25-28 ("Similar to the health checkup request, the in-vehicle system collects and uploads a snapshot of vehicle data including any trouble code reported by the ECUs."), col. 6, lines 55-58 ("In such a case, for example, one or more diagnostic trouble codes, generated by the vehicles' ECUs 103, are detected in the vehicle bus interface 120 by the fault detector 120B. These trouble codes are sent to the fault monitor 420 component of the vehicle client computer device 101. The fault monitor may further process these trouble codes and finally sends them to the diagnostic client 421." (Emphasis added).), col.

8, lines col. 9, lines 35-48 ("Then in step 2, the diagnostic client 421 initiates a health checkup session with the diagnostic server 201, and in step 3, the diagnostic server instructs the diagnostic client to gather vehicle data, such as VIN, malfunction codes, and/or a snapshot of the vehicle data. Then in step 4, the diagnostic client 421 requests the data from the diagnostic data service 120A at the vehicle bus interface 120. Then, in step 5, the diagnostic data service interrogates the ECUs 103 via the vehicle bus adapter 120C for the requested data. In step 6, the ECUs 103 provide the requested data and in step 71 the data is returned to the diagnostic client 421. Then, in step 8, the data is in turn transmitted to the diagnostic server 201." (Emphasis added).) and paragraph bridging cols. 9-10.

Therefore, since '499 discloses or obviously suggests fault codes or DTC reported or generated by the at least one vehicle device, '499 discloses or obviously suggests the corresponding at least one vehicle code is for reading from the at least one vehicle device.

Claim 7

The multi-vehicle compatible tracking unit according to claim 1 wherein the corresponding at least one vehicle code is for writing to the at least one vehicle device.

See *Claim Interpretation/Analysis* section and discussion of claim 6 *supra.* Since '499 further teaches or obviously suggests the fault codes/DTCs are Original Equipment Manufacturer (OEM) and/or the interface 120 polls or interrogates the ECUS for malfunction or fault codes, '499 discloses or obviously suggest the corresponding at least one vehicle code is for writing to the at least one vehicle device.

Claim 8

The multi-vehicle compatible tracking unit according to claim 1 wherein said downloading interface is also for permitting downloading of at least one programming instruction for said multi-vehicle compatible controller.

See *Claim Interpretation/Analysis* section and discussion of claim 1 *supra,* e.g. '499 at col. 9, lines 28-62 ("Then in step 2, the diagnostic client 421 initiates a health checkup session with the diagnostic server 201, and in step 3, the diagnostic server instructs the diagnostic client to gather vehicle data, such as VIN, malfunction codes, and/or a snapshot of the vehicle data. Then in step 4, the diagnostic client 421 requests the data from the diagnostic data service 120A at the vehicle bus interface 120. Then, in step 5, the diagnostic data service interrogates the ECUs 103 via the vehicle bus adapter 120C for the requested data. In step 6, the ECUs 103 provide the requested data and in step 71 the data is returned to the diagnostic client 421. Then, in step 8, the data is in turn transmitted to the diagnostic server 201." (Emphasis added).), and Figure 5, arrow 3, 9. Note also the paragraph bridging cols. 9-10. Therefore, '499 discloses or obviously suggests the downloading interface, 107/102, receives at least one programming instruction, e.g. data gather instruction, for the controller 300/101.

Claim 11

The multi-vehicle compatible tracking unit according to claim 1 wherein said wireless position determining device comprises a Global Positioning System (GPS) receiver.

See *Claim Interpretation/Analysis* section and discussion of claim 1, preamble and "a vehicle position determining device" limitation, *supra* (e.g. Figure 1, element 317). Therefore

'499 discloses a Global Positioning System (GPS) receiver comprising the vehicle position determining device.

Claim 12

The multi-vehicle compatible tracking unit according to claim 1 further comprising a housing containing said vehicle position determining device, said wireless communications device, said multi-vehicle compatible controller, and said downloading interface.

See '499 at, e.g., elements 10, elements 317 and 101 inside box designated 100 "IN-VEHICLE SYSTEM", Figure 2, col. 2, lines 55-56, col. 3, lines 15-61, Figure 3, element 100 "IN VEHICLE SYSTEM" and col. 4, lines 5-9. Therefore, '499 discloses or obviously suggests a housing, e.g. 10, "IN VEHICLE SYSTEM", containing said vehicle position determining device, said wireless communications device, said multi-vehicle compatible controller, and said downloading interface.

Claim 18

A multi-vehicle compatible tracking unit for a vehicle comprising a vehicle data bus extending throughout the vehicle, the multi-vehicle compatible vehicle tracking unit comprising: a vehicle position determining device; a wireless communications device; a multi-vehicle compatible controller for cooperating with said vehicle position determining device and said wireless communications device to send vehicle position information; said multi-vehicle compatible controller to be coupled to the vehicle data bus for communication thereover with at least one vehicle device using at least one corresponding vehicle device code from among a plurality thereof for different vehicles; and a downloading interface for permitting downloading of enabling data related to the at least one corresponding vehicle device code for use by said multi-vehicle compatible controller; said downloading interface comprising a wireless receiver for temporary connection to a downloading device.

See discussion of claims 1 and 4-5 *supra*.

Claim 19

The multi-vehicle compatible tracking unit according to claim 18 wherein the corresponding at least one vehicle code is for reading from the at least one vehicle device.

See discussion of claim 6 *supra*.

Claim 20

The multi-vehicle compatible tracking unit according to claim 18 wherein the corresponding at least one vehicle code is for writing to the at least one vehicle device.

See discussion of claim 7 *supra*.

Claim 21

The multi-vehicle compatible tracking unit according to claim 18 wherein said downloading interface is also for permitting downloading of at least one programming instruction for said multi-vehicle compatible controller.

See discussion of claim 8 *supra*.

Claims 9-10 and 22 are rejected under pre-AIA 35 U.S.C. 103(a) as being unpatentable over U.S. Patent No. 6,330,499 to Chou et al (hereinafter also referred to as

'499 or Chou) in view of U.S. Patent No. 6,028,537 to Suman et al, (hereinafter also referred to as '537 or Suman).

The patent to Suman includes a/an publication/issue date more than one year prior to the effective filing date of June 3, 2007 of '278, and thus are available as prior art under 35 USC 102(b) and 35 USC 103.

Claim 9

The multi-vehicle compatible tracking unit according to claim 1 further comprising a remote transmitter;

See *Claim Interpretation/Analysis* section and discussion of claims 1 and 8 *supra,* '499 at, e.g., col. 3, lines col. 4, lines 39-42 ("The client computer device 101 performs several functions including communicating to the remote service center 200 by means of the network interface 107 using the cell phone 102."), col. 5, lines 1-3 ("The in-vehicle system establishes a data connection, using a cellular phone 102, with a diagnostic server at the service center 200,…), col. 7, lines 32-40 ("In this case, a data communication link is established through the network interface 320 to the service center 200, and data containing fault codes, DTCs, vehicle parameter values, and vehicle ID information, is sent to the diagnostic server 201. The size of the data stream is estimated to be on the order of 1 kilobyte. Optional information includes a callback number, GPS coordinates, etc. The exchange of information may be repeated more than once before the data link is closed."), col. 9, lines 28-62 ("Referring now to FIG. 5, a health checkup event flow is presented. The numbers of the steps refer to the numbers found in the flow, as shown in FIG. 5…. Then in step 2, the diagnostic client 421 initiates a health checkup

session with the diagnostic server 201, and in step 3, the diagnostic server instructs the diagnostic client to gather vehicle data, such as VIN, malfunction codes, and/or a snapshot of the vehicle data. Then in step 4, the diagnostic client 421 requests the data from the diagnostic data service 120A at the vehicle bus interface 120. Then, in step 5, the diagnostic data service interrogates the ECUs 103 via the vehicle bus adapter 120C for the requested data. In step 6, the ECUs 103 provide the requested data, and in step 7, the data is returned to the diagnostic client 421. Then, in step 8, the data is in turn transmitted to the diagnostic server 201.... The diagnostic server 201 prepares a report and transmits it to the client computer 101.... Thereafter, the data connection is terminated. The above-described health checkup process may be completely automated without intervention or involvement by a person at the remote service center."), Figures and claim 1 ("...a communication system, coupled to said client computer device, for providing remote communication of data including data derived from said monitoring systems of the vehicle; and a remote service center including a vehicle data store, a server computer, a diagnostic engine, and a communicator for communicating the results of analysis of vehicle information to said client computer device via said communication system, ..."). Therefore '499 discloses a remote transmitter, e.g., a communicator of the remote service center. See also the remainder of the discussion of this claim.

and wherein said multi-vehicle compatible controller also performs at least one vehicle remote control function responsive to said remote transmitter.

See discussion of this claim *supra* and, e.g., col. 9, line 63-10, line 11 ("The present invention is not limited to the scenarios and embodiments listed above, but instead may be practiced with a plurality of modifications and extensions. For example, remote health

monitoring and diagnostics shares many features with other automotive applications and services. It may be desirable to bundle the remote health monitoring and diagnostics with other services or to extend it with related application functions. For example, the remote diagnostics service could certainly be offered on top of an Emergency/Mayday service (e.g., 'OnStar'). Other applications and services that can be developed or bundled as extensions of the diagnostics services include: breakdown service, network diary, vehicle user manual update, OEM Callback Services, fleet management, theft prevention, vehicle parameter update/change, remote vehicle access, concierge services, etc."). Therefore at the very least '499 suggests the controller, i.e.in-vehicle client computer device 101 and vehicle bus connected interface 120, performing functions, e.g. requests for diagnostic data, responsive to a remote transmitter and remote health/diagnostic services may be practiced/bundled with other services or extensions such as remote vehicle access. However '537 not only teaches a diagnostic system connected to the vehicle bus for remote diagnostics to be performed on the vehicle but also providing remote control to the vehicles accessories in response to a transmitted control signal from a service center, see, e.g., col. 15, line 52-col. 16, line 15 and Fig. 4. Therefore to employ the multi-vehicle compatible controller responsive to a remote transmitter, e.g. the communicator of the remote service center, in '499, if not already, as known from '537 to in order to provide the desired remote vehicle access, e.g. door unlocking, i.e. at least one vehicle remote control function, would have been obvious to one of ordinary skill in the art. Therefore the prior art obviously teaches said multi-vehicle compatible controller also performing at least one vehicle remote control function responsive to said remote transmitter.

Claim 10

The multi-vehicle compatible tracking unit according to claim 9 wherein the at least one vehicle remote control function comprises at least one of a vehicle security function, a remote keyless entry function, and a remote engine starting function.

See discussion of claim 9 *supra*, e.g. the prior art teaches the at least one vehicle remote control function of remote keyless entry.

Claim 22

The multi-vehicle compatible tracking unit according to claim 18 further comprising a remote transmitter; and wherein said multi-vehicle compatible controller also performs at least one vehicle remote control function responsive to said remote transmitter.

See discussion of claim 9 *supra*.

Claims 2-3 and 13-16 are rejected under pre-AIA 35 U.S.C. 103(a) as being unpatentable over U.S. Patent No. 6,330,499 to Chou et al (hereinafter also referred to as '499 or Chou) in view of U.S. Patent No. 5,732,074 to Spaur et al (hereinafter also referred to as '074 or Spaur).

The patent to Spaur includes a/an publication/issue date more than one year prior to the effective filing date of June 3, 2007 of '278, and thus are available as prior art under 35 USC 102(b) and 35 USC 103.

Claim 2

The multi-vehicle compatible tracking unit according to claim 1 wherein said downloading interface comprises a wired signal downloading interface.

See discussion of "**a downloading interface…**" and *Claim Interpretation/Analysis* section *supra*, e.g. Figure 2, elements 320 and 300, col. 2, lines 59-63 ("FIG. 2 is a block diagram providing an exemplary component overview for the in-vehicle hardware. The in-vehicle hardware provides a platform for the client computer device 101 and for the system functions shown in the architectural design in FIG. 3. As shown in FIG. 2, the in-vehicle hardware includes a processor 300 coupled with memory 350, a user interface 310, a network interface 320, a vehicle interface 330, at least one persistent storage device 340, and optional external devices 360."), col. 3, lines 16-32 ("The processor is integrated with a network interface 320 to provide communication capability with the remote service center 200. Preferably, the network interface comprises a removable wireless telephone such as the Motorola i1000+ and a docking facility for the wireless phone integrated with the client computer device. Both voice and data connections can be supported by interfacing the processor 300 and the wireless phone. The telephone integration provides basic communication functions. It establishes a data (e.g. TCP/IP) connection with a remote service center (e.g., remote service center 200). Wireless technologies such as GSM (Global System for Mobile Communications), CDMA (Code Division Multiple Access), TDMA (Time Division Multiple Access), iDEN.TM. (a TDMA-based Motorola technology), and AMPS (Advanced Mobile Phone System) can all be supported. The phone may also be used for wireless voice communications."), col. 3, last paragraph, col. 4, lines 7-9, Figure 3, "NETWORK INTERFACE" 107, and col. 4, lines 39-43. This claim requires the

downloading interface comprising a wired signal downloading interface. While '499 teaches the signal downloading interface 320, 107, 102 coupled to the processor 300 and comprising a docking facility "integrated" with the computer device and a removeable cellular phone, it does specifically teach the interface being "wired". See however '074 at, e.g., Figure 2, elements 80-82, 30 and col, 7, lines 45 et seq and thereby, '177 at, e.g., Figures 4 and 7, abstract, lines 1-5, col. 1, first and third full paragraphs, col. 2, lines 4-16, col. 3, second full paragraph, col. 5, lines 60-62, i.e. a known cellular phone/controller/processor interface which is wired. Therefore it would have been obvious to one of ordinary skill in the art to substitute a wired cellular phone interface, e.g., a connector/cable to removeably attach 102 and 107, for the '499 cellular phone interface, if such is not already "wired", for the predictable result of interconnecting the cellular phone and processor/computer. Therefore the prior art obviously teaches the "downloading interface" comprises a wired signal downloading interface.

Claim 3

The multi-vehicle compatible tracking unit according to claim 2 wherein said wired signal downloading interface comprises a connector for temporary connection to a downloading device.

See *Claim Interpretation/Analysis* section and discussion of claims 1-2 *supra*, e.g., Fig. 3, elements 102 and 107, i.e. cell phone attached to network interface, and col. 3, lines 17-21 and cited portions of '074 and '177. The prior art obviously teaches a connector for temporary connection between 107 and 102 and thereby, the wired signal downloading interface comprising a connector for temporary connection to a downloading device, e.g. an internet, the Internet.

Claim 13

A multi-vehicle compatible tracking unit for a vehicle comprising a vehicle data bus extending throughout the vehicle, the multi-vehicle compatible vehicle tracking unit comprising: a vehicle position determining device; a wireless communications device; a multi-vehicle compatible controller for cooperating with said vehicle position determining device and said wireless communications device to send vehicle position information; said multi-vehicle compatible controller to be coupled to the vehicle data bus for communication thereover with at least one vehicle device using at least one corresponding vehicle device code from among a plurality thereof for different vehicles; and a downloading interface for permitting downloading of enabling data related to the at least one corresponding vehicle device code for use by said multi-vehicle compatible controller; said downloading interface comprising a connector for temporary connection to a downloading device.

See discussion of claims 1-3 *supra*.

Claim 14

The multi-vehicle compatible tracking unit according to claim 13 wherein the corresponding at least one vehicle code is for reading from the at least one vehicle device.

See discussion of claim 6 *supra*.

Claim 15

The multi-vehicle compatible tracking unit according to claim 13 wherein the corresponding at least one vehicle code is for writing to the at least one vehicle device.

See discussion of claim 7 *supra*.

Claim 16

The multi-vehicle compatible tracking unit according to claim 13 wherein said downloading interface is also for permitting downloading of at least one programming instruction for said multi-vehicle compatible controller.

See discussion of claim 8 *supra*.

Claim 17 is rejected under pre-AIA 35 U.S.C. 103(a) as being unpatentable over U.S. Patent No. 6,330,499 to Chou et al (hereinafter also referred to as '499 or Chou) in view of U.S. Patent No. 6,028,537 to Suman et al, (hereinafter also referred to as '537 or Suman) and U.S. Patent No. 5,732,074 to Spaur et al (hereinafter also referred to as '074 or Spaur).

Claim 17

The multi-vehicle compatible tracking unit according to claim 13 further comprising a remote transmitter; and wherein said multi-vehicle compatible controller also performs at least one vehicle remote control function responsive to said remote transmitter.

See discussion of claim 9 *supra*.

Prior Art

It is further noted that the 1994 edition of the SAE On-Board Diagnostics for Light and Medium Duty Vehicles Standards submitted as Exhibit G (hereinafter also referred to as 1994 SAE Manual or 94SAE) is the 1994 version of a publication of the Society of Automotive Engineers, "SAE On-Board Diagnostics for Light and Medium Duty Vehicles Standards Manual", which includes the Society of Automotive Engineers' vehicle bus standards SAE J1850 - Class B Data Communication Network Interface as referred to by '499. See 94SAE at, e.g., SAE J1850, page 159, sections 4.2-4.2.2 regarding "manufacturer-specific" fault/(DTC) codes specifications and protocols. Similarly the 1997 edition of the SAE On-Board Diagnostics for Light and Medium Duty Vehicles Standards submitted as Exhibit H (hereinafter also referred to as 1997 SAE Manual or 97SAE) is the 1997 version of a publication of the Society of Automotive Engineers, "SAE On-Board Diagnostics for Light and Medium Duty Vehicles Standards Manual", which includes the Society of Automotive Engineers' vehicle bus standards SAE J1850 - Class B Data Communication Network Interface as referred to by '499.

Conclusion

Extensions of Time

Extensions of time under 37 CFR 1.136(a) will not be permitted in these proceedings because the provisions of 37 CFR 1.136 apply only to "an applicant" and not to parties in a reexamination proceeding. Additionally, 35 U.S.C. 305 requires that reexamination proceedings

"will be conducted with special dispatch" (37 CFR 1.550(a)). Extension of time in *ex parte* reexamination proceedings are provided for in 37 CFR 1.550(c).

Notification of Concurrent Proceedings

The patent owner is reminded of the continuing responsibility under 37 CFR 1.565(a), to apprise the Office of any litigation activity, or other prior or concurrent proceeding, involving Patent No. 8,032,278 throughout the course of this reexamination proceeding. The third party requester is also reminded of the ability to similarly apprise the Office of any such activity or proceeding throughout the course of this reexamination proceeding. See MPEP §§ 2207, 2282 and 2286.

Amendment in Reexamination Proceedings

Patent owner is notified that any proposed amendment to the specification and/or claims in this reexamination proceeding must comply with 37 CFR 1.530(d)-(j), must be formally presented pursuant to 37 CFR 1.52(a) and (b), and must contain any fees required by 37 CFR 1.20(c). See MPEP § 2250(IV) for examples to assist in the preparation of proper proposed amendments in reexamination proceedings.

Submissions

In order to insure full consideration of any amendments, affidavits or declarations or other documents as evidence of patentability, such documents must be submitted in response to the first Office action on the merits (which does not result in a close of prosecution).

Submissions after the second Office action on the merits, which is intended to be a final action, will be governed by the requirements of 37 CFR 1.116, after final rejection and by 37 CFR 41.33 after appeal, which will be strictly enforced.

IDS Submissions

Regarding IDS submissions MPEP 2256 recites the following: "Where patents, publications, and other such items of information are submitted by a party (patent owner or requester) in compliance with the requirements of the rules, the requisite degree of consideration to be given to such information will be normally limited by the degree to which the party filing the information citation has explained the content and relevance of the information." Accordingly, the IDS submissions have been considered by the Examiner only with the scope required by MPEP 2256.

Service of Papers

After filing of a request for *ex parte* reexamination by a third party requester, any document filed by either the patent owner or the third party requester must be served on the other party (or parties where two or more third party requester proceedings are merged) in the reexamination proceeding in the manner provided in 37 CFR 1.248. The document must reflect service or the document may be refused consideration by the Office. See 37 CFR 1.550(f).

Correspondence

All correspondence relating to this ex parte reexamination proceeding should be directed:

By Mail to: Mail Stop *Ex Parte* Reexam
Central Reexamination Unit
Commissioner for Patents
United States Patent & Trademark Office
P.O. Box 1450
Alexandria, VA 22313-1450

By FAX to: (571) 273-9900
Central Reexamination Unit

By hand: Customer Service Window
Randolph Building
401 Dulany Street
Alexandria, VA 22314

Registered users of EFS-Web may alternatively submit such correspondence via the electronic filing system EFS-Web, at https://efs.uspto.gov/efile/myportal/efs-registered. EFS-Web offers the benefit of quick submission to the particular area of the Office that needs to act on the correspondence. Also, EFS-Web submissions are "soft scanned" (i.e., electronically uploaded) directly into the official file for the reexamination proceeding, which offers parties the opportunity to review the content of their submissions after the "soft scanning" process is complete.

Any inquiry concerning this communication should be directed to the Central Reexamination Unit at telephone number 571-272-7705.

Other useful telephone numbers:

Reexamination Practice (571) 272-7703

/Karin M. Reichle/
Examiner, CRU
Art Unit 3992

Conferees: /J. W./, Primary Examiner, Art Unit 3992

/ALEXANDER KOSOWSKI/
Supervisory Patent Examiner, Art Unit 3992

Notice of References Cited	Application/Control No. 90/013,851	Applicant(s)/Patent Under Reexamination 8032278	
	Examiner Karin Reichle	Art Unit 3992	Page 1 of 1

U.S. PATENT DOCUMENTS

*		Document Number Country Code-Number-Kind Code	Date MM-YYYY	Name	CPC Classification	US Classification
*	A	US-5,333,177 A	07-1994	Braitberg; Michael F.	H02J7/0004	379/441
	B	US-				
	C	US-				
	D	US-				
	E	US-				
	F	US-				
	G	US-				
	H	US-				
	I	US-				
	J	US-				
	K	US-				
	L	US-				
	M	US-				

FOREIGN PATENT DOCUMENTS

*		Document Number Country Code-Number-Kind Code	Date MM-YYYY	Country	Name	CPC Classification
	N					
	O					
	P					
	Q					
	R					
	S					
	T					

NON-PATENT DOCUMENTS

*		Include as applicable: Author, Title Date, Publisher, Edition or Volume, Pertinent Pages)
	U	
	V	
	W	
	X	

*A copy of this reference is not being furnished with this Office action. (See MPEP § 707.05(a).)
Dates in MM-YYYY format are publication dates. Classifications may be US or foreign.

Search Notes	Application/Control No.	Applicant(s)/Patent Under Reexamination
	90013851	8032278
	Examiner	Art Unit
	KARIN REICHLE	3992

CPC- SEARCHED		
Symbol	Date	Examiner

CPC COMBINATION SETS - SEARCHED		
Symbol	Date	Examiner

US CLASSIFICATION SEARCHED			
Class	Subclass	Date	Examiner

SEARCH NOTES		
Search Notes	Date	Examiner
Prosecution History set forth on BIB sheet reviewed. Also reviewed 90/013,659 and 90/013741 referred to in the Request.	11/16/2016, updated 3/20/2017	/KR/
Reviewed 90013832	3/20/2017	/KR/

INTERFERENCE SEARCH			
US Class/ CPC Symbol	US Subclass / CPC Group	Date	Examiner

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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
90/013,851	10/28/2016	8032278	C13-03896.RE2	8717

7590 12/15/2016

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EXAMINER	
REICHLE, KARIN M	

ART UNIT	PAPER NUMBER
3992	

MAIL DATE	DELIVERY MODE
12/15/2016	PAPER

Please find below and/or attached an Office communication concerning this application or proceeding.

The time period for reply, if any, is set in the attached communication.

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(THIRD PARTY REQUESTER'S CORRESPONDENCE ADDRESS)

KPPB LLP

2400 EAST KATELLA AVENUE

SUITE 1050

ANAHEIM, CA 92806

EX PARTE REEXAMINATION COMMUNICATION TRANSMITTAL FORM

REEXAMINATION CONTROL NO. *90/013,851*.

PATENT NO. *8032278*.

ART UNIT *3992*.

Enclosed is a copy of the latest communication from the United States Patent and Trademark Office in the above identified *ex parte* reexamination proceeding (37 CFR 1.550(f)).

Where this copy is supplied after the reply by requester, 37 CFR 1.535, or the time for filing a reply has passed, no submission on behalf of the *ex parte* reexamination requester will be acknowledged or considered (37 CFR 1.550(g)).

Karin M. Reichle

PTOL-465 (Rev.07-04)

Primary Examiner

Art Unit: 3992

Decision

Third Party requester submitted a request for reexamination with a filing date of October 28, 2016, requesting reexamination of claims 1-22 of U.S. Patent No. 8,032,278 (hereinafter also referred to as '278). A substantial new question of patentability affecting claims 1-22 of U.S. Patent No. 8,032,278 in effect at this time is raised by the request for *ex parte* reexamination. Accordingly, claims 1-22 will be reexamined.

Extensions of Time

Extensions of time under 37 CFR 1.136(a) will not be permitted in these proceedings because the provisions of 37 CFR 1.136 apply only to "an applicant" and not to parties in a reexamination proceeding. Additionally, 35 U.S.C. 305 requires that reexamination proceedings "will be conducted with special dispatch" (37 CFR 1.550(a)). Extension of time in *ex parte* reexamination proceedings are provided for in 37 CFR 1.550(c).

Notification of Concurrent Proceedings

The patent owner is reminded of the continuing responsibility under 37 CFR 1.565(a), to apprise the Office of any litigation activity, or other prior or concurrent proceeding, involving Patent No. 8,032,278 throughout the course of this reexamination proceeding. See MPEP §§ 2207, 2282 and 2286.

Amendment in Reexamination Proceedings

Patent owner is notified that any proposed amendment to the specification and/or claims in this reexamination proceeding must comply with 37 CFR 1.530(d)-(j), must be formally presented pursuant to 37 CFR 1.52(a) and (b), and must contain any fees required by 37 CFR 1.20(c).

Submissions

In order to insure full consideration of any amendments, affidavits or declarations or other documents as evidence of patentability, such documents must be submitted in response to the first Office action on the merits (which does not result in a close of prosecution). Submissions after the second Office action on the merits, which is intended to be a final action, will be governed by the requirements of 37 CFR 1.116, after final rejection and by 37 CFR 41.33 after appeal, which will be strictly enforced.

Waiver of Right to File Patent Owner Statement

In a reexamination proceeding, Patent Owner may waive the right under 37 C.F.R. 1.530 to file a Patent Owner Statement. The document needs to contain a statement that Patent Owner waives the right under 37 C.F.R. 1.530 to file a Patent Owner Statement and proof of service in the manner provided by 37 C.F.R. 1.248, if the request for reexamination was made by a third party requester, see 37 C.F.R 1.550(f). The Patent Owner may consider using the following statement in a document waiving the right to file a Patent Owner Statement:

WAIVER OF RIGHT TO FILE PATENT OWNER STATEMENT

Patent Owner waives the right under 37 C.F.R. 1.530 to file a Patent Owner Statement.

Service of Papers

After filing of a request for *ex parte* reexamination by a third party requester, any document filed by either the patent owner or the third party requester must be served on the other party (or parties where two or more third party requester proceedings are merged) in the reexamination proceeding in the manner provided in 37 CFR 1.248. The document must reflect service or the document may be refused consideration by the Office. See 37 CFR 1.550(f).

References Asserted as Raising a Substantial New Question

The asserted substantial new question of patentability (SNQP) regarding claims 1-22 of the '278 Patent is based upon the following references:

(1) U.S. Patent No. **6,009,363** to **Beckert et al**, published December 28, 1999, filed June 24, 1996, (hereinafter also referred to as **'363** or **Beckert**).

(2) U.S. Patent No. **5,732,074** to **Spaur et al**, published March 24, 1998, filed January 26, 1996 (hereinafter also referred to as '**074** or **Spaur)**.

(3) U.S. Patent No. **6,028,537** to **Suman et al**, published February 22, 2000, filed June 3, 1997 (hereinafter also referred to as **'537** or **Suman**).

(4) U.S. Patent No. **6,330,499** to **Chou et al**, published December 11, 2001, filed July 21, 1999 (hereinafter also referred to as **'499** or **Chou**).

(5) SAE HS-3000 publication, "SAE On-Board Diagnostics for Light and Medium Duty Vehicles Standards Manual" (1994 Edition), copyright 1994, (hereinafter also referred to as SAE HS-3000). [Exhibit G].

Filing Date

The earliest effective filing date the '278 patent is entitled to is July 3, 2007 (see paragraph 2 of the 5/6/2016 non-final rejection of the 90/013,587 discussed *infra*).

Availability of Asserted References as Prior Art

The patents to **Beckert , Spaur, Suman and Chou** and publication to SAE 3000 include a/an publication/issue date more than one year prior to the effective filing date of June 3, 2007 of the '278 patent, see discussion *supra*, and thus are available as prior art under 35 USC 102(b) and 35 USC 103.

Summary of Prosecution History

U.S. Application 11/773,272 was filed on July 3, 2007 (hereinafter also referred to as '272 or the '272 application). The '272 application claimed continuity-in-part from Application No. 11/076,259 filed March 9, 2005 (hereinafter also referred to as '259 or the '259 application), which issued as Patent No. 7,720,597. The '259 application itself claimed continuity from Application No. 10/383,496 filed March 7, 2003 (hereinafter also referred to as '496 or the '496 application), which issued as Patent No. 7,149,623. The '496 application itself claimed continuity from Application No. 09/859,972 filed May 17, 2001 (hereinafter also referred to as

'972 or the '972 application), which issued as Patent No. 6,606,561. The '972 application itself claimed the benefit of provisional patent application Serial Nos. 60/264,811 filed on January 29, 2001; 60/258,005, filed December 22, 2000; 60/251,552, filed December 6, 2000; 60/252,125, filed November 20, 2000; 60/236,890, filed September 29, 2000; 60/246,463, filed November 7, 2000; 60/222,777, filed August 3, 2000; and 60/205,178, filed May 17, 2000, the entire contents of each of which are incorporated herein by reference by '272.

Below are the pertinent Examiner's findings of fact relevant to this discussion:

'972 Application

U.S. Application 09/859,972 was filed on May 17, 2001. The application included a specification, claims, abstract and nine Figures. Claims 1-49 were directed to a vehicle tracking unit/system and claims 50-64 directed to a method for operating a vehicle tracking unit. On September 9, 2001, a preliminary amendment was filed including drawing modifications and a substitute specification.

A first non-final Office action was mailed by USPTO on January 23, 2001 rejecting all the claims. A PTO-892 accompanied such action cited US Patent No. **6,330,499** to **Chou et al**.

On December 13, 2002 a second FINAL rejection was mailed by the USPTO rejecting claims 1-29 and 50-50, allowing claims 30-49 and 58-64 and objecting to claims 5, 17 and 25. Claim 10 depending from claim 1 was rejected under 35 USC 103(a) as being unpatentable over Maggiora et al in view of "**Chou et al (6,330,499)**" (emphasis added) ("…Chou teaches a user interface for accepting at least one command from a user and sending at least one alert to the user (column 3, lines 5-15)").

In response an amendment after final was filed on February 7, 2003 amending claims 1, 13 and 22 and cancelling claims 5, 17, 25 and 50-57.

A Notice of Allowance indicating the allowability of claims 1-4, 6-16, 18-24, 26-49 and 58-64 was mailed by the USPTO on February 13, 2003.

The application issued as US Patent No. 6,606,561 on August 12, 2003.

'272 Application:

U.S. Application 11/773,272 was filed on July 3, 2007. The application included a specification, an abstract, thirty claims and fifteen Figures.

An Office action was mailed by USPTO on December 24, 2009. Claims 1-30 were subject to an election requirement between claims 1-22 drawn to a multi-vehicle tracking device/unit and claims 23-30 drawn to a method of using a multi-vehicle tracking device/unit.

A response to such Office Action was filed February 24, 2010. The response amended claims 13 and 18 to overcome various objections and provisionally elected claims 1-22 and withdrew claims 23-30.

A non-final Office action was mailed by USPTO on June 22, 2010. Claims 1-22 were rejected under 35 U.S.C. 103(a) as being unpatentable over Brinkmeyer et al. (US Pat. 5,940, 007).

A response to such Office Action was filed October 22, 2010. The response cancelled claims 23-30. The response also presented remarks submitting that Brinkmeyer et al. failed to disclose the multi-vehicle compatible controller being coupled to the vehicle data bus for communication thereover with at least one vehicle device using at least one corresponding

vehicle device code from among a plurality thereof for different vehicles, as recited by independent claim 1.

Another non-final Office Action was mailed by the USPTO on January 5, 2011. Claims 1-22 were rejected. The prior art combination of Monroe (US Pat. 6,253,064 B1) in view of Brinkmeyer et al. (US Pat. 5,940,007) was used to reject the claims.

A response to the Office Action was filed on April 5, 2011. The response presented remarks, i.e.:

> …the proposed prior art combination fails to disclose or fairly suggest each and every feature of the claimed invention. For example, the proposed prior art combination fails to disclose the multi-vehicle compatible controller coupled to the vehicle data bus for communication thereover with at least one vehicle device using at least one corresponding vehicle device code from among a plurality thereof for different vehicles, as recited by independent Claim 1, for example.… Furthermore, none of the applied prior art references discloses the multi-vehicle compatible tracking unit including a connector for temporary connection to a downloading device and a wireless receiver for temporary connection to a downloading device, as recited by the independent claims. Applicant notes that this claim feature enables a user to quickly download new vehicle codes into the multi-vehicle compatible tracking unit without removing and reinstalling the unit. (Emphasis original.)

A Notice of Allowance allowing claims 1-22 issued on June 28, 2011. The Notice set forth:

> Pending claims 1-22 are patentable over cited references of Monroe in view of Brinkmeyer et al., because these prior art do not make obvious a multi-vehicle compatible tracking unit for a vehicle comprising a vehicle data bus extending throughout the vehicle, the multi-vehicle compatible vehicle tracking unit comprising: a vehicle position determining device; a wireless communications device; a multi-vehicle compatible controller for cooperating with said vehicle position determining device and said wireless communications device to send vehicle position information; said multi-vehicle compatible controller to be coupled to the vehicle data bus for communication thereover with at least one vehicle device using at least one corresponding vehicle device code from among a plurality thereof for different vehicles wherein the corresponding at least one vehicle code is for writing to the at least one vehicle device; and a downloading

> interface for permitting downloading of enabling data related to the at least one corresponding vehicle device code for use by said multi-vehicle compatible controller; said downloading interface comprising a connector for temporary connection to a downloading device.

(See finally rejected claims 13 and 15).

The application issued as US Patent No. 8,032,278 on October 4, 2011.

'587 Reexam:

On September 14, 2015 a first request for *ex parte* reexamination of claims 1-22 of U.S. Patent No. 8,0320,278 was filed by a third party requester, hereinafter also referred to as TPR.

The Request at pages 10-11 in a section entitled "**V. STATEMENTS POINTING OUT EACH SUBSTANTIAL NEW QUESTION OF PATENTABILITY**" set forth:

> As explained in greater detail below, A) the *Suman '537* patent; B) the *Spaur '074* patent; and C) the Flick '876 patent, *either alone or in combination with a variety of references* published prior to the earliest claimed priority date of the Flick '278 patent, raise substantial new questions of patentability based on new teachings not previously considered or addressed in the prior examination of the Flick '278 patent.
>
> ***A. U.S. Patent No. 6,028,537***
>
> …
>
> **1. Technological Teaching: Obtaining and Transmitting Location Data using a Standard Vehicle Bus**
>
> The *Suman '537* patent teaches a vehicle communication and control system including a wireless communications device, a vehicle location determination device, and *a controller capable of communicating with a variety of vehicle devices via a standardized vehicle data bus*….

Thus, the *Suman '537* patent discloses technological teachings that the Examiner previously found to be missing from the prior art of record disclosed in the Flick 2278 patent.

…

3. **Substantial New Question of Patentability as to Claims 1 - 22 because the Suman '537 Patent Teaches all Claim Elements**

Each of claims 1- 22 require a multi-vehicle compatible controller coupled to a vehicle data bus for communication thereover with at least one vehicle device. As shown above, and in more detail in the claim charts attached as Exhibit B, the *Suman '537 patent discloses this and all other required limitations, explicitly disclosing communicating via a "vehicle data bus" and a "downloading interface."* Accordingly, it is submitted that *all aspects of claims 1 - 22 are disclosed by the Suman '537 patent* in at least as complete detail as contained in the claims. A reasonable examiner would consider the teachings important in deciding whether or not claims 1 - 22 of the Flick '278 patent are patentable. For these reasons, the *Suman '537* patent raises a substantial new question of patentability as to claims 1 - 22.

B. U.S. Patent No. 5,732,074

…

1. Technological Teaching: Obtaining and Transmitting Location Data using a Standard Vehicle Bus

The *Spaur '074* patent teaches *a controller* having a wireless device, a direct communications port, and *a connection to a vehicle standardized network* that can be utilized to read data from vehicle devices and transmit that data via the wireless device.…

Thus, *the Spaur '074* patent discloses technological teachings that the Examiner previously found to be missing from the prior art of record disclosed in the Flick '278 patent.

…

3. Substantial New Question of Patentability as to Claims 1-22 Because Spaur '074 Teaches all Claim Elements

> Each of claims 1-22 require a multi-vehicle compatible controller coupled to a vehicle data bus for communication thereover with at least one vehicle device. As shown above, and in more detail in the claim charts attached as Exhibit C, *the Spaur '074 patent discloses this and all other required limitations, explicitly disclosing communicating via a "vehicle data bus" and a "downloading interface."* Accordingly, it would have been obvious to one skilled in the art *that all aspect of claims 1-22 are disclosed by the Spaur '074 patent.* A reasonable examiner would consider the teachings important in deciding whether or not claims 1-22 of the Flick '278 patent are patentable. For these reasons, the *Spaur '074* patent raises a substantial new question of patentability as to claims 1 - 22. (Bold original, underlined italics added.)

On November 10, 2015, an Order Granting the Request for *ex parte* reexamination was mailed by the USPTO. The Order set forth:

> *Key to each of these claims is the reaction [sic] of a "vehicle data bus" and a "downloading interface for permitting downloading of enabling data".*
>
> *Suman teaches a vehicle data bus - an SAE standard J1850* [sic] See col. 37, lines 15 - 17. In addition Suman teaches a downloading interface for permitting downloading of enabling data. In particular, Suman teaches at col. 36, lines 31-52: "To achieve these aspects and other advantages, the vehicle accessory control system of the present invention includes a plurality of electrically-operated vehicle accessories, a receiver to be mounted in a vehicle *for receiving RF signals* from a land-based transmitter, and a control circuit coupled to the receiver and to the vehicle accessories *for controlling the operation of the vehicle accessories in accordance with a control program.* The RF signals include an address uniquely identifying the vehicle and a reprogramming signal for reprogramming the operation of at least one of the vehicle accessories. The control circuit includes an input interface for receiving information regarding a plurality of sensed conditions, control means for controlling the operation of the vehicle accessories in accordance with the control program and in response to sensed conditions received from the input interface. *The control circuit further includes reprogramming means for selectively reprogramming the control program in response to the detection of an RF signa*l including an address identifying the vehicle and the reprogramming signal, to selectively change the manner in which the control means controls the operation of at least one of the vehicle accessories."
>
> There is a substantial likelihood that a reasonable examiner would have considered these teachings in Suman to be important in the determination of

patentability of claims 1-22 of Flick '278. Accordingly, Suman raises a substantial new question of patentability, which question has not been previously raised.

Spaur teaches a vehicle data bus 46 and teaches that a wireless communications device can be utilized to download enabling data in a variety of forms including received information associated with vehicle devices and executable software downloaded from a remote site: "since bi-directional communications involving a vehicle are conducted wirelessly for at least a portion of the communications link, it is necessary for the Internet to communicate with an appropriate interface or network that wirelessly links with the vehicle. In one embodiment, the cellular digitized packet data (CDPD) network provides the desired link including arrangement of information being communicated and where the destination site, namely the particular vehicle, is found in the network." (See col. 2, lines 37 - 46).

Spaur also notes that a "combination of controller related components are containable in a vehicle for responding to requests from remote sites, obtaining and storing information associated with vehicle devices and running executable software that may be available in the program memory of the controller or downloaded from the remote site, while handling and configuring information including data that is communicative with the remote site over an established network, such as the Internet." (See col. 4, line 64 - col. 5, line 5).

Furthermore, Spaur teaches that "the controller in the vehicle is also associated with an interface for communication with one or more available systems, such as an RS232 connection, an Ethernet connection and/or a PCMCIA unit. In a related embodiment, the controller includes a direct communications port for receiving and sending information without requiring the wireless device and the Internet connection to the wireless device." (See col. 4, lines 38 - 45).

There is a substantial likelihood that a reasonable examiner would have considered these teachings in Spaur to be important in the determination of patentability of claims 1-22 of Flick '278. Accordingly, Spaur raises a substantial new question of patentability, which question has not been previously raised. (Underlined italics emphasis added.)

On January 8, 2016 the Patent Owner (hereinafter also referred to as PO) filed a statement asserting Suman '537 had already been considered in the parent '278 while Spaur '074

was similar to a co-assigned reference 7,366,892 which had also been considered in the parent '278. Furthermore, PO asserted:

> A. The Claims Are Patentable Over the Suman et al. '537 Patent
>
> The Suman et al. '537 patent is directed to vehicle personalization to be remotely effected by a service provider using a radio frequency (RF) system such as a paging or cellular system. A vehicle owner, wishing to reprogram a vehicle, calls the service provider who effects reprogramming of an option control by transmitting RF control signals to the vehicle from a land-based transmitter to a receiver mounted in the vehicle. Thus, because the service provider effects vehicle personalization, the vehicle owner need not have any technical knowledge as to how to operate the vehicle programming system. Vehicle personalization may also be provided for each person who may operate the vehicle.
>
> To achieve these aspects, the vehicle accessory control system includes a plurality of electrically-operated vehicle accessories, a receiver to be mounted in a vehicle for receiving RF signals from a land-based transmitter, and a control circuit coupled to the receiver and to the vehicle accessories for controlling the operation of the vehicle accessories in accordance with a control program. The RF signals include an address uniquely identifying the vehicle and a reprogramming signal for reprogramming the operation of at least one of the vehicle accessories. The control circuit includes an input interface for receiving information regarding a plurality of sensed conditions, control means for controlling the operation of the vehicle accessories in accordance with the control program and in response to sensed conditions received from the input interface. The control circuit further includes reprogramming means for selectively reprogramming the control program in response to the detection of an RF signal including an address identifying the vehicle and the reprogramming signal, to selectively change the manner in which the control means controls the operation of at least one of the vehicle accessories.
>
> The Patent Owner respectfully submits that the Suman et al. '537 patent fails to disclose, as recited in Claim 1, for example, a multi-vehicle compatible tracking unit for a vehicle comprising a vehicle data bus extending throughout the vehicle. More particularly, the Suman et al. '537 patent fails to disclose a multi-vehicle compatible controller for cooperating with a vehicle position determining device and a wireless communications device to send vehicle position information, wherein the multi-vehicle compatible controller is to be coupled to the vehicle data bus for communication thereover with at least one vehicle device using at least one corresponding vehicle device code from among a plurality thereof for different vehicles, and wherein a downloading interface permits downloading of enabling data related to the at least one corresponding vehicle device code for use

by the multi-vehicle compatible controller. Along these lines, the Suman et al. '537 patent fails to disclose these features with the downloading interface comprising a connector for the temporary connection to a downloading device as recited in independent Claim 13, or a wireless receiver as recited in independent Claim 18.

None of the other references identified by the Examiner supply the deficiencies of the Suman et al. '537 patent. Accordingly, independent Claims 1, 13 and 18 are patentable. Their dependent claims, which recite further distinguishing features, are also patentable and require no further discussion herein.

B. The Claims Are Patentable Over the Spaur et al. '074 Patent

The Spaur et al. '074 patent discloses communication to and from a controller at the vehicle. As helpfully pointed out by the Examiner, the reference discloses an interface for the controller, such as an RS-232 connection, an Ethernet connection, a Personal Computer Memory Card International Association (PCMCIA) unit, or a direct communications port. Moreover, as noted at col. 4, lines 51-57, the Spaur et al. '074 patent recites:

> "[] each vehicle device on the CAN has its own IP designation or address so that the remote user can utilize this designation or address for communication with the selected vehicle device having that designation or address. The controller uses the received IP address or designation for the particular device and acts as a link or bridge for the remote user to the particular device".

In other words, the Spaur et al. '074 patent fails to disclose, as recited in Claim 1, a multi-vehicle compatible tracking unit for a vehicle comprising a vehicle data bus extending throughout the vehicle. The Spaur et al. '074 patent fails to disclose a multi-vehicle compatible controller for cooperating with a vehicle position determining device and a wireless communications device to send vehicle position information, wherein the multi-vehicle compatible controller is to be coupled to the vehicle data bus for communication thereover with at least one vehicle device using at least one corresponding vehicle device code from among a plurality thereof for different vehicles, and wherein a downloading interface permits downloading of enabling data related to the at least one corresponding vehicle device code for use by the multi-vehicle compatible controller. The Spaur et al. '074 patent fails to disclose these features with the downloading interface comprising a connector for the temporary connection to a downloading device, as recited in independent Claim 13, or a wireless receiver, as recited in independent Claim 18.

> None of the other references identified by the Examiner supply the deficiencies of the Spaur et al. '074 patent. Accordingly, the Patent Owner submits that independent Claims 1, 13 and 18 are patentable, and the dependent claims, which recite further distinguishing features, are also patentable and require no further discussion herein.
>
> The Patent Owner also respectfully submits that the Spaur et al. '074 patent adds nothing to the deficiencies of the Suman et al. '537 patent - its respective deficiencies being pointed out above.

On March 8, 2016 TPR filed a reply to PO's statement. TPR reasserted that both the Spaur '074 and Suman '537 patents were not previously considered by the Examiner during the prosecution of the '278 and the Order's conclusion that these patents raised a substantial new question of patentability was correct. TPR continues:

> Furthermore, under the broadest reasonable interpretation, a multi-vehicle compatible tracking unit as recited in claims 1 - 22 of the Flick '278 patent could be compatible with ***multiple vehicles of the same year, make, and/or model***…
>
> …*the SAE standard J1850 bus referenced in the Suman et al. '537 patent is "universally used in the automotive industry" (Suman et al. publication, column 37 lines 15 - 17) and therefore is used in many different vehicle year, makes, and models….*
>
> …
>
> …The above referenced portion of the Spaur et al. '074 [col. 4, lines 51-57] teaches connecting the disclosed multi-vehicle compatible controller to a CAN bus. *However the Spaur et al. '074 reference is not limited to disclosing CAN buses and teaches that the multi-vehicle compatible controller can connect with any of a variety of standardized buses*: "[o]ther available networks could be utilized instead of the CAN, such as Arcnet, which has a protocol similar to CAN". (Spaur et al. '074 patent, column 4, lines 5 - 7). *Standardized vehicle data buses include the CAN bus standard published by the CAN in Automation group. Standardized vehicle data buses also include the SAE J1850 bus standard published by the Society of Automotive Engineers.*
>
> …

> …Requester further notes that, since 1991, the CAN specification has required support for two message formats that can be present on any given vehicle's CAN bus (i.e. the CAN 11-bit message format and CAN 29-bit message 16 format). Therefore, communication via the CAN bus requires support for a plurality of different message formats for the different vehicle devices that may be present on any of the myriad of year, make, and model of vehicles that support the CAN bus, which includes a significant percentage of the vehicles sold in the U.S. dating back to 1991 and almost every passenger vehicle sold in the U.S. since 2008 due to Federal mandate.
> (Underlined italics emphasis added.)

TPR also cited pertinent and applicable additional prior art believed to have bearing on patentability, i.e. 1) the *Beckert '363* patent; 2) the Gelvin '008 patent; and 3) the Razavi et al. publication, raise substantial new questions of patentability based on new teachings not previously considered or addressed in the prior examination of the Flick '278 patent. Specifically:

> **1. U.S. Patent No. 5,794,164**
>
> ….
>
> **a) Technological Teaching: Transmitting Location Data, Communicating Via One of the OBD II vehicle Data Bus Protocols and Downloading Means Downloading Enabling Data**
>
> The Beckert et al. '363 patent teaches a vehicle computer system including a wireless communications device, a vehicle location determination device, a downloading interface, and a controller capable of communicating with a variety of vehicle devices *via the OBD II standardized vehicle data bus mandated for inclusion in 1996 or later model vehicles. By way of background, at the time of the filing of the Beckert et al. '363 patent, federal mandate required all vehicles to conform to California Code of Regulations (CCR) 1968.1. CCR 1968.1 permitted vehicles to implement three different on-board to off-board network*

communications protocols:

> (1.6) Either SAE Recommended Practice J1850, "Class B Data Communication Network Interface", July, 1995, or ISO 9141-2, "Road vehicles - Diagnostic Systems - CARB Requirements for Interchange of Digital Information," February, 1994, or ISO 14230-4, "Road vehicles - Diagnostic systems - KWP 2000 requirements for Emission-related systems," April, 1996, which are incorporated by reference, shall be used as the on-board to off-board network communications protocol. All SAE J1979 emission related messages sent to the J1978 scan tool over a J1850 data link shall use the Cyclic Redundancy Check and the three byte header, and shall not use inter-byte separation or checksums.

(1968.1 Malfunction and Diagnostic System Requirements--1994 and Subsequent Model-Year Passenger Cars, Light-Duty Trucks, and Medium Duty Vehicles and Engines, p 36, Exhibit U).

…

The Beckert et al. '363 patent also incorporates by reference the disclosure of U.S. Patent 5,794,164 to Beckert et al. (the Beckert et al. '164 patent) in its entirety at col. 7, lines 44-51. The Beckert et al. '164 patent provides additional detail concerning the modules of the vehicle computer system disclosed in the Beckert et al. '363 patent and specific detail concerning the OBD interpreter and APIs that are exposed to remote devices by the vehicle computer system, which include a diagnostic API (amongst others). Thus, the Beckert et al. '363 patent discloses technological teachings that the Examiner previously found to be missing from the prior art of record disclosed in the Flick '278 patent.

c) Substantial New Question of Patentability as to Claims 1-22 because the Beckert et al, '363 Patent Teaches all Claim Elements

Each of claims 1-22 require a multi-vehicle compatible controller coupled to a vehicle data bus for communication thereover with at least one vehicle device. As shown above, and in more detail in the claim charts attached as Exhibit R, the Beckert et al. '363 patent discloses this and all other required limitations, explicitly disclosing communicating via a "vehicle data bus" and a "downloading interface." Accordingly, it is submitted that all aspects of claims 1 - 22 are disclosed by the Beckert et al. '363 patent in at least as complete detail as contained in the claims. A reasonable examiner would consider the teachings important in deciding whether or not claims 1 - 22 of the Flick '278 patent are patentable. For these reasons, the Beckert et al. '363 patent raises a substantial new question of patentability as to claims 1-22.
(Bold emphasis original, underlined italics added.)

A non-final action was mailed by the USPTO on May 6, 2016. Such action determined the earliest effective filing date for Flick '278 to be July 3, 2007. The action also determined that the '363, '008 and '225 references each taught a vehicle computer system including a wireless communications device, a vehicle location determination device, a downloading interface, and a controller capable of communicating with a variety of vehicle devices and therefore, there was a substantial likelihood that a reasonable examiner would have considered these teachings in *Beckert*, Gelvin and Razavi to be important in the determination of patentability of claims 1 -22 of Flick '278. Accordingly, *Beckert*, Gelvin and Razavi were determined to each raise a substantial new question of patentability, which question has not been previously raised. The action also included rejections of claims 1-22 under pre-AIA 35 U.S.C. 102(b) as being anticipated by *Suman* or *Beckert* and under pre-AIA 35 U.S.C. 103(a) as being unpatentable over *Spaur* in view of other references used for the teaching of location detection. Finally the action concluded with the Examiner finding the PO'S remarks regarding the art being previously considered and the claim features not being shown thereby not persuasive.

> On June 16, 2016 a personal interview was held. The PTOL-404 Summary set forth:
>
> Description of the general nature of what was agreed to if an agreement was reached, or any other comments: Spaur and Suman references were discussed. Examiner agreed to drop the 102 rejection based upon Beckert. *Examiner suggested that the Patent Owner provide evidence relating to the use of device codes in vehicles at the time of the invention in relation to their inherent use in Suman and Spaur.* The scope of the claims was also discussed. Patent Owner's representative provided the attached agenda and various documents pertaining to related court proceedings.
> (Emphasis added.)

while the PO Summary of July 6, 2016 set forth, e.g.:

While discussing Suman et al., the Patent Owner contended that Suman et al. failed to disclose: "said multivehicle compatible controller to be coupled to the vehicle data bus for communication thereover with at least one vehicle device using at least one corresponding vehicle device code from among a plurality thereof for different vehicles", as recited in independent Claim 1, for example.

In reply, the Examiners cited Col. 2, lines 3-11 of Suman et al. as teaching the "multi-vehicle compatible controller" of the claimed invention. The Patent Owner contended that this was a mischaracterization of the teachings of Suman et al. The Examiner's invited the Patent Owner to submit evidence supporting this contention.

The Patent Owner also contended that Suman et al. fails to disclose: "a downloading interface for permitting downloading of enabling data related to the at least one corresponding vehicle device code for use by said multi-vehicle compatible controller", as recited by independent Claim 1, for example.

The Examiners noted that Col. 24, lines 8-13 of the present application recite: "[t]he enabling data may be the vehicle device code or codes, an instruction to select a code or codes from among those already stored, or the data or sequence to allow the controller 111 to generate the vehicle device code or codes, for example". The Examiners also correctly noted that Suman et al. fails to disclose the downloading interface for permitting downloading of vehicle device codes. While discussing Spaur et al., the Patent Owner contended that Spaur et al. failed to disclose: "said multivehicle compatible controller to be coupled to the vehicle data bus for communication thereover with at least one vehicle device using at least one corresponding vehicle device code from among a plurality thereof for different vehicles", as recited in independent Claim 1, for example.

In reply, the Examiners contended similarly that since Spaur et al. discusses potential application in different vehicles, therefore Spaur et al. discloses the multi-vehicle compatible controller of the claims. The Patent Owner contended that this was a mischaracterization of the teachings of Spaur et al. The Examiner's invited the Patent Owner to submit evidence supporting this contention. The Examiners also correctly noted that Spaur et al. fails to disclose the downloading interface for permitting downloading of vehicle device codes.

Additionally, while discussing Spaur et al., the Patent Owner noted that Spaur et al. discloses a vehicle position determining device. Accordingly, for purposes of clarity, the Patent Owner agreed to also discuss the Spaur et al. patent with regards to its failure to anticipate the claimed invention.

> The Examiners determined that the rejection over Beckert et al. was withdrawn. (Emphasis added.)

The Agenda attached to the Summary indicated that PO intended to argue that the references or combination of references used to reject the claims did not teach the features of a multi-vehicle compatible controller nor a downloading interface.

A response to the non-final Office Action was also filed on July 6, 2016. The response included remarks and a Rule 132 declaration by Michael J. Suman and a Rule 132 declaration by Joseph C. McAlexander, III.

On December 1, 2016, a Notice of Intent to Issue Ex Parte Reexamination Certificate (NIRC) was issued by the USPTO. The Statement of Reasons for Patentability and/or Confirmation set forth:

> The following is an examiner's statement of reasons for patentability and/or confirmation of the claims found patentable in this reexamination proceeding: the Examiner agrees that the declarations by Suman and McAlexander provide sufficient evidence that Suman and Spaur each fail to disclose the multi-vehicle compatible controller as recited in independent claims 1,13 and 18. Claims 2-12, 14-17 and 19-22 are considered to be patentable due to their dependency on claims 1, 13 and 18, respectively.

The Suman declaration provided:

> 12. …The embodiments contemplated by me at the time of my '537 patent, the disclosure in my '537 patent, and the related commercial developments within my work responsibilities were not directed to a multi-vehicle compatible controller … as in the '278 patent claims. The embodiments contemplated by me at the time of my '537 patent did not include multi-vehicle compatibility, and at the time I left Johnson Controls in 2002 I had never contemplated or worked with any multi-vehicle compatible controller as described in the '278 patent. I point out that at

the time of my '537 patent, the vehicle device codes were proprietary to different manufacturers, and even different model lines offered by manufacturers. Moreover, the device codes were not made freely available, and were quite difficult to obtain.

13. …Based upon my knowledge and experience, the reprogramming means [of 537] is not related to vehicle codes or to providing a downloading interface for permitting downloading of enabling data related to the at least one corresponding vehicle device code for use by the multi-vehicle compatible controller, as in the '278 patent claims. Instead, the reprogramming means is for vehicle personalization and was not capable of making communications level changes that would be necessary to provide multi-vehicle compatibility.

14. I would also like to clarify that the following passage from my '537 patent does not support the contention that my patent discloses a multi-vehicle compatible controller and downloading interface as in the '278 patent claims: …(Col. 2, lines 3-10).
It was expected that the vehicles in a given fleet would be the same type vehicle having the same device codes.

15. … It is my position, based upon my knowledge and experience, that none of the cited portions of my '537 patent supply these teachings relating to a wired or wireless interface. Indeed, I was simply not working on the problem of multi-vehicle compatibility, and there was no project to develop any software to give the connector the functions as contended in the Official Action. Moreover, the embodiments conceived and described in the '537 patent were not capable of modifying the communications level to allow for multi-vehicle compatibility. Along these lines, there is also no disclosure in my 537 patent of using the telephone to provide a wireless interface as in the '278 patent.

The McAlexander declaration provided:

10. I have also reviewed the Rule 132 Declaration being submitted concurrently herewith by Michael J. Suman, the lead inventor on U.S. Patent No. 6,028,537, i.e., another reference being cited in the Official Action. In that Declaration, Mr. Suman confirms my understanding that at the time of the Spaur et al. patent (filed about six months before the filing of the provisional application leading to the Suman et al. patent), the vehicle device codes were proprietary to different manufacturers, and even different model lines offered by manufacturers; and that the device codes were not made freely available, and were quite difficult to obtain.

…

19. The Official Action incorporates by reference a listing of how Spaur et al. (and Johnson et al.) relates to the claims of the '278 patent from Requester's Exhibit F. From Exhibit F, the following sections of Spaur et al. are asserted as disclosing a multi-vehicle controller using at least one corresponding device code from among a plurality thereof for different vehicles:

… (Col. 6, lines 31-50) .

… (Col. 10, lines 15-29).

… (Col. 10, lines 55-64. [sic]

Based upon my knowledge, experience and analysis, I do not believe that these cited portions of Spaur et al. disclose the multi-vehicle compatible controller as in the claims of the '278 patent. In addition, I also believe that, based upon these portions of Spaur et al., or any other portions of Spaur et al., there is no inherent teaching of the multi-vehicle compatible controller as in the '278 patent claims. In other words, it does not necessarily flow that Spaur et al. would have a multivehicle compatible controller using the device codes as in the '278 patent claims.

20. I also point out that Exhibits 14 and 15 from Requester's technical trial expert, Mr. Andrews, and describing the actual CellPort Labs products as disclosed in Spaur et al., also fail to have any express or inherent teaching of the multivehicle compatible controller as in the '278 patent claims….

21. The Official Action also cites to the following language from col. 4, lines 38-45 of Spaur et al. for the alleged teaching of the downloading interface as recited in the '278 patent claims…

Again, based upon my knowledge, experience and analysis, I do not believe that these cited portions of Spaur et al., or any other portions of Spaur et al., disclose (either directly or through inherency) a downloading interface for permitting downloading of enabling data related to the at least one corresponding vehicle device code for use by the multi-vehicle compatible controller as found in the claims of the '278 patent. Spaur et al. does disclose an interface in combination with a controller; however, Spaur et al. fails to disclose the multivehicle compatible controller and the downloading interface as recited in the claims of the '278 patent. In addition, there is nothing in the description of the corresponding CellPort Labs actual products (Exhibits 14 and 15) that discloses the multivehicle compatible controller and the downloading interface as recited in the claims of the '278 patent.

Instant '851 Request for Reexam:

The instant '851 Request, hereinafter also referred to as the '851 Request, was filed October 28, 2016 by the same TPR which filed the '587 reexam.

SNQP/Reference Analysis

Attention is directed to MPEP 2216, i.e.:

> Under 35 U.S.C. 304, the Office must determine whether "a substantial new question of patentability" affecting any claim of the patent has been raised. 37 CFR 1.510(b)(1) requires that a request for ex parte reexamination include "a statement pointing out each substantial new question of patentability based on prior patents and printed publications." If such a new question is found, an order for ex parte reexamination of the patent is issued. **It is therefore important that the request clearly set forth in detail what the requester considers the "substantial new question of patentability" to be in view of prior patents and printed publications. The request must point out how any questions of patentability raised are substantially different from those raised in the previous examination of the patent before the Office.**
>
> It is not sufficient that a request for reexamination merely proposes one or more rejections of a patent claim or claims as a basis for reexamination. It must first be demonstrated that a patent or printed publication that is relied upon in a proposed rejection presents **a new, non-cumulative technological teaching** that was **not previously considered and discussed on the record during the prosecution of the application** that resulted in the patent for which reexamination is requested, **and during the prosecution of any other prior proceeding involving the patent for which reexamination is requested**. See also MPEP § 2242.
>
> The legal standard for ordering ex parte reexamination, as set forth in 35 U.S.C.303(a), requires a substantial new question of patentability. The substantial new question of patentability may be based on art previously considered by the Office **if** the reference is presented in a **new light or a different way that escaped review during earlier examination**.
>
> ....
>
> After the enactment of the Patent and Trademark Office Authorization Act of 2002 ("the 2002 Act"), a substantial new question of patentability can be raised by patents and printed publications "previously cited by or to the Office or

> considered by the Office" ("old art"). The 2002 Act did not negate the statutory requirement for a substantial new question of patentability that requires raising new questions about pre-existing technology. In the implementation of the 2002 Act, MPEP § 2242, subsection II.A. was revised. The revision permits raising a substantial new question of patentability based solely on old art, **but only if** the old art is "**presented/viewed in a new light, or in a different way, as compared with its use in the earlier concluded examination(s), in view of a material new argument or interpretation presented in the request**." Thus, a request may properly raise a substantial new question of patentability by raising a material new analysis of previously considered reference(s) under the rationales authorized by KSR.
>
> **Questions relating to grounds of rejection other than those based on prior art patents or printed publications should not be included in the request and will not be considered by the examiner if included**. Examples of such questions that will not be considered are public use, on sale, and conduct by parties. (Emphasis added.)

Attention is also invited to MPEP 2242, I., i.e.:

> The presence or absence of "a substantial new question of patentability" determines whether or not reexamination is ordered. The meaning and scope of the term "a substantial new question of patentability" is not defined in the statute and must be developed to some extent on a case-by-case basis, using the case law to provide guidance as will be discussed in this section.
>
> If the prior art patents and printed publications raise a substantial question of patentability of at least one claim of the patent, then a substantial new question of patentability is present, **unless the same question of patentability has already been decided** by (A) a final holding of invalidity, after all appeals, or (B) by the Office in a previous examination or pending reexamination of the patent. A "previous examination" of the patent is: (A) the original examination of the application which matured into the patent; (B) the examination of the patent in a reissue application that has resulted in a reissue of the patent; or (C) the examination of the patent in an earlier pending or concluded reexamination. ….
>
> A prior art patent or printed publication raises a substantial question of patentability where there is a substantial likelihood that a reasonable examiner would consider the prior art patent or printed publication important in deciding whether or not the claim is patentable. If the prior art patents and/or publications would be considered important, then the examiner should find "a substantial new question of patentability" **unless the same question of patentability has already been decided as to the claim** in a final holding of invalidity by the Federal court

> system or **by the Office in a previous examination.** For example, the same question of patentability may have already been decided by the Office where the examiner finds the additional (newly provided) prior art patents or printed publications *are merely cumulative to* ***similar*** *prior art* already fully considered by the Office in a previous examination of the claim.
>
> For "a substantial new question of patentability" to be present, it is only necessary that: (A) the prior art patents and/or printed publications raise a substantial question of patentability regarding at least one claim, i.e., the teaching of the (prior art) patents and printed publications is such that a reasonable examiner would consider the teaching to be important in deciding whether or not the claim is patentable; **and** (B) the same question of patentability as to the claim has not been decided by the Office in a previous examination or pending reexamination of the patent or in a final holding of invalidity by the Federal Courts in a decision on the merits involving the claim. It is not necessary that a "prima facie" case of unpatentability exist as to the claim in order for "a substantial new question of patentability" to be present as to the claim.…
> (Emphasis added.)

Attention is also invited to 2258.01:

> …For purposes of reexamination, a cumulative reference that is repetitive is one that substantially reiterates verbatim the teachings of a reference that was either previously relied upon or discussed in a prior Office proceeding even though the title or the citation of the reference may be different….

Finally, see also MPEP 2247.

Suman '537:

Requester asserts **Suman '537** alone or in combination with SAE HS-3000, raises a substantial new question of patentability as to claims 1-22 of the '278 patent. See, e.g., page 7 of the Request.

The prosecution history indicates that SAE HS-3000 was not of record during the prosecution of any application to which the benefit of priority is claimed. Accordingly, such references is not precluded from raising a substantial new question of patentability.

Suman '537 however was not only cited but applied by the examiner during the prosecution of at least '587 reexam.

Accordingly, at least the **Suman '537** reference/evidence is "old art". However, as set forth *supra*, e.g., MPEP 2242 states:

> *"for example, a substantial new question of patentability may be based solely on old art where the old art is being presented viewed in a new light, or in a different way, as compared with its use in the earlier examination(s), in view of a material new argument or interpretation presented in the request."*

In this instance, Requester, see, e.g., Sections V (pages 3-7) and VI, C. (pages 18-23) of the Request, asserts the combination of **'537 (**previously before/considered by the Examiner during the examination/prosecution of the '587 reexam) with SAE HS-3000, see *supra*, a combination which was not considered during prosecution since the reference to, e.g., SAE HS-3000 was not even cited during prosecution. Accordingly, such combination is not precluded from raising a substantial new question of patentability.

During prosecution of the '272 application that led to the issuance of the '278 patent and the confirmation of patentability in the 90/013,587 reexam, the independent claims were allowed for reasons set forth by Examiner, see summary of prosecution history *supra*.

See the Request at, e.g., Sections V (pages 3-7) and VI, C. (pages 18-23) and Exhibit C, e.g., bridging pages 2-3 and page 8. Such sections of the instant Request set forth:

> **V. CITATION OF PERTINENT AND APPLICABLE PRIOR ART BELIEVED TO HAVE BEARING ON PATENTABILITY**
>
> …

Requester notes that these references were not previously considered during the original prosecution of the Flick '278 patent, but that *the Beckert '363 patent, the Spaur '074 patent and the Suman '537 patent are being considered in the pending Flick '587 Reexam. However, these references are being presented in a new light in this Request.* In particular, the Examiner in the Flick '587 Reexam had requested "evidence relating to the use of device codes" as related to their inherent use in the Spaur '074 patent and the Suman '537 patent. … Accordingly, Requester is *submitting this material prior art evidence in the form of the SAE HS- 3000 Manual published in 1994*.

The SAE HS-3000 Manual is one of numerous publications published by the Society of Automotive Engineers ("SAE") that *set forth the standards for communicating with vehicle devices via a vehicle data bus using various device codes*, as was used in the Spaur '074 patent, the Suman '537 patent, and the Beckert '363 patent in order to communicate with the vehicle devices. *Requester also notes that these communications standards have been federally mandated for all new vehicles sold in the United States since 1996.*

As detailed in the accompanying claim charts, *the SAE HS-3000 Manual provides details regarding hundreds of device codes*, or "PRN"" device codes, for communicating with vehicle devices, including standard codes and up to seven manufacturer specified vehicle device codes. *For example, SAE J2178/2, which starts on page 211 of the SAE HS-3000 Manual, provides the "Standardized Parameter Definitions" for standardized messages on SAE J1850 Class B networks. SAE J2178/2 sets out respective sets of device codes for a host of vehicle devices that may be present on a given vehicle.* For example, Table 2 on page 215, partially reproduced below, provides the address map of the SAE standard and reserved manufacturer specific (Reserved MFG) subgroups of messages for different classes of vehicle devices.

…

SAE J2178/2 provides *the details of device codes for hundreds of different vehicle devices* within the address map ranges indicated in the above table. Section 4 of SAE J2178/2 on page 213 specifies that three bits are used to define eight different device codes for a given vehicle device including a SAE standard device code for the specific type of vehicle device and seven manufacturer reserved device codes for that particular vehicle device.

Furthermore, the SAE HS-3000 Manual teaches a bus discovery procedure that can be used by systems interfacing with a vehicle bus, which involves communicating with vehicle devices using at least one vehicle device code from among a plurality thereof for different vehicles. In particular, the bus discovery procedure sends a plurality of device codes, referred to as "mode 1 PID 0

response message" in a manner appropriate for each of the SAE J1850 41.6 Kbps PWM bus, SAE J1850 10.4 Kbps VPW, and ISO 9141-2 in order to determine a type of bus used in a vehicle. (See SAE HS-3000 Manual section 6.5.1 on page 37).

Accordingly, the Beckert '363 patent, Spaur '074 patent, and the Suman '537 patent are each being presented in a new light in view of the SAE HS-3000 Manual and continue to raise substantial new questions of patentability with respect to the Flick '278 patent. Requester also notes that *the Chou '499 patent* was not previously considered in either the original prosecution of the Flick '278 patent or the currently pending Fick '587 Reexam and that this prior art reference *presents a substantial new question of patentability* with respect to the Flick '278 patent.

VI. STATEMENTS POINTING OUT EACH SUBSTANTIAL NEW QUESTION OF PATENTABI LITY

…as explained in greater detail below, *A) the Beckert '363 patent; B) the Spaur '074 patent; C) the Suman '537 patent; and D) the Chou '499 patent either alone or in combination with the SAE HS-3000 Manual,* all of which were published more than a year prior to the earliest priority date to which the Flick '278 patent is entitled to, *raise substantial new questions of patentability with respect to the Flick '278 patent.*

…

C. U.S. Patent No. 6,028,537 to Suman (inherently disclosing the SAE HS-3000 Manual)

The Suman '537 patent issued February 22, 2000 and the SAE HS-3000 Manual published in 1994 and therefore are prior art to the Flick '278 patent under 35 U.S.C. §§102(a), 102(b) and 102(e). These references were not considered during the original prosecution of the Flick '278 patent, but the Suman '537 patent is currently being considered in the Flick '587 Reexam. Furthermore, as noted above …, the Examiner in the Flick '587 Reexam had requested evidence related to the use of device codes as related to the Suman '537 patent, … Accordingly, Requester is submitting material prior art, in particular, the SAE HS-3000 Manual which provides material evidence related to the use of device codes as related to the Suman '537 patent. Accordingly, the Suman '537 patent is being presented in a new light in view of the SAE HS-3000 Manual and continues to raise a substantial new question of patentability.

1. Technological Teaching: Obtaining and Transmitting Location Data using

a Standard Vehicle Bus and Multi-Vehicle Compatibility

The Suman '537 patent teaches a vehicle communication and control system including a wireless communications device, a vehicle location determination device, and a controller capable of communicating with a variety of vehicle devices via a standardized vehicle data bus….

…

The Suman '537 patent notes that the multiplexing scheme (e.g., item 744 illustrated in Fig. 44 above) is set forth in *SAE standard J1850* and *"is universally used in the automotive industry." The SAE HS-3000 Manual* is a publication that *provides details regarding the SAE J1850 standard*, and provides implementation *details for communicating with vehicle devices on a plurality of different makes and models of vehicles via an SAE J1850 bus*.

Accordingly, a vehicle controller (as illustrated in Fig. 44 above) implemented *according to the SAE J1850 standard* would communicate with a plurality of vehicle devices using the SAE messaging protocols defined in *SAE J2178 (Class B Data Communication Network Messages) as required by the SAE J1850 standard, which provides details of the various device codes* that may be utilized to communicate with hundreds of vehicle devices, …

…

…As noted above, *vehicle data busses, such as those described by the SAE HS-3000 Manual have been federally mandated for inclusion in all vehicles sold in the United States since at least 1996.*

Thus, the Suman '537 patent is being presented in a new light in view of the SAE HS- 3000 Manual that raises a substantial new question of patentability with respect to the Flick '278 patent.

…

3. Substantial New Question of Patentability as to Claims 1 - 22 because the Suman '537 patent, including the SAE HS-3000 Manual, Teaches all Claim Elements

Each of claims 1 - 22 require a multi-vehicle compatible controller coupled to a vehicle data bus for communication thereover with at least one vehicle device. As shown above, and in more detail in the claim charts attached as Exhibit D [sic], *the Suman '537 patent, which inherently discloses communicating with vehicle devices in accordance with the manner disclosed in the SAE HS-3000 Manual, discloses this and all other required limitations*, explicitly disclosing

> communicating via a 'vehicle data bus', 'using at least one corresponding device code from among a plurality thereof for different vehicles', and 'downloading interface'. *In particular, the manner in which the Suman '537 patent's disclosure requires "using at least one corresponding vehicle device code from among a plurality thereof for different vehicles" can be appreciated by reviewing the details of the disclosed processes as set out in the SAE HS-3000 Manual*, which provides the implementation requirements for the multiplexing communication circuit 744 described in the Suman '537 patent. *Accordingly, it is submitted that all aspects of claims 1 - 22 are disclosed by the Suman '537 patent, which inherently discloses use of the processes required by the standards contained in the SAE HS-3000 Manual,* in at least as complete detail as contained in the claims. A reasonable examiner would consider the teachings important in deciding whether or not claims 1 - 22 of the Flick '278 patent are patentable. For these reasons, the Suman '537 patent in view of the SAE HS-3000 Manual raises a substantial new question of patentability as to claims 1 - 22.
> (Underlined italics added.)

Therefore, Suman '537 (e.g. "The multiplexing scheme is set forth in SAE standard J1850 and is universally used in the automotive industry) is being presented viewed in a new light, or in a different way, as compared with its use in the earlier examination(s), in view of a material new argument or interpretation presented in the request (e.g. the details/vehicle device codes/implementations constituting the SAE standard J1850 provided in the form of SAE HS-3000 Manual) raising a substantial new question of patentability with respect to "the multi-vehicle compatible controller as recited in independent claims 1,13 and 18 , i.e. "said multi-vehicle compatible controller to be coupled to the vehicle data bus for communication thereover with at least one vehicle device using at least one corresponding vehicle device code from among a plurality thereof for different vehicles".

Given the teachings of the combination of Suman '537 and SAE HS-3000, a reasonable examiner would consider these teachings important in evaluating the patentability of the

independent claims of the '278 patent. This art was not applied/so combined during a previous examination of US Patent No. 8,032,278, and the claims at issue are not the subject of a final holding by a Federal Court. Accordingly, prior art patents and printed publications asserted by the Request raise a substantial question of patentability with respect to at least one claim, e.g. claim 1, of the '278 patent.

Spaur '074:

Requester asserts **Spaur '074** alone or in combination with SAE HS-3000, raises a substantial new question of patentability as to claims 1-22 of the '278 patent. See, e.g., page 7 of the Request.

The prosecution history indicates that SAE HS-3000 was not of record during the prosecution of any application to which the benefit of priority is claimed. Accordingly, such references is not precluded from raising a substantial new question of patentability.

Spaur '074 however was not only cited but applied by the examiner during the prosecution of at least '587 reexam.

Accordingly, at least the **Spaur '074** reference/evidence is "old art". However, as set forth *supra*, e.g., MPEP 2242 states:

> *"for example, a substantial new question of patentability may be based solely on old art where the old art is being presented viewed in a new light, or in a different way, as compared with its use in the earlier examination(s), in view of a material new argument or interpretation presented in the request."*

In this instance, Requester, see, e.g., Sections V (pages 3-7) and VI, B. (pages 14-18) of the Request, asserts the combination of **'074** (previously before/considered by the Examiner

during the examination/prosecution of the '587 reexam) with SAE HS-3000, see *supra*, a combination which was not considered during prosecution since the reference to, e.g., SAE HS-3000 was not even cited during prosecution. Accordingly, such combination is not precluded from raising a substantial new question of patentability.

During prosecution of the '272 application that led to the issuance of the '278 patent and the confirmation of patentability in the 90/013,587 reexam, the independent claims were allowed for reasons set forth by Examiner, see Summary of Prosecution History *supra*.

Finally, see the Request at, e.g., Sections V (pages 3-7), and VI, B. (pages 14-18) and Exhibit D, e.g., bridging pages 4-5 and page 9-10. Such section V of the instant Request is set forth *supra* and section VI, B. sets forth:

> VI. **STATEMENTS POINTING OUT EACH SUBSTANTIAL NEW QUESTION OF PATENTABI LITY**
>
> …as explained in greater detail below, *A) the Beckert '363 patent; B) the Spaur '074 patent; C) the Suman '537 patent; and D) the Chou '499 patent either alone or in combination with the SAE HS-3000 Manual,* all of which were published more than a year prior to the earliest priority date to which the Flick '278 patent is entitled to, *raise substantial new questions of patentability with respect to the Flick '278 patent.*
>
> …
>
> **B. *U.S. Patent No. 5, 732,074 to Spaur in view of the SAE HS-3000 Manual***
>
> …Furthermore, as noted above…, the Examiner in the Flick '587 Reexam had requested evidence related to the use of device codes as related to the Spaur '074 patent, … Accordingly, Requester is submitting the SAE HS-3000 Manual which provides material evidence related to the use of device codes as related to the Spaur '074 patent. Accordingly, the Spaur '074 patent is being presented in a new

light in view of the SAE HS-3000 Manual and continues to raise a substantial new question of patentability.

1. Technological Teaching: Obtaining and Transmitting Location Data using a Standard Vehicle Bus and Vehicle Device Codes for Different Vehicles

The Spaur '074 patent teaches a controller having a wireless device, a direct communications port, and a connection to a vehicle standardized network that can be utilized to read data from vehicle devices and transmit that data via the wireless device….

…

The Spaur '074 patent teaches communicating with vehicle devices via a "standardized network ... commonly used in a number of makes and models of vehicles" (Spaur '074 patent, col. 10, lines 18-21). *The SAE standards, and in particular the SAE HS-3000 Manual, were published for the specific purpose of teaching people of ordinary skill in the art how to communicate with vehicle devices via one of the "standardized networks" present within a vehicle.*

In particular, *the SAE HS-3000 manual provides details of communicating with a plurality of vehicle devices* using the SAE messaging protocols defined in SAE J2178 (Class B Data Communication Network Messages), ….

…

Accordingly, it would have been obvious to utilize *the teachings described in the SAE HS-3000 Manual because the Spaur '074 patent expressly directs using standards, such as the SAE standards as described by the SAE HS-3000 Manual, for the purpose for which the standards were created*. Thus, the Spaur '074 patent in view of the SAE HS-3000 Manual disclose technological teachings that the Examiner previously found to be missing from the prior art of record disclosed in the Flick '278 patent.

…

3. Substantial New Question of Patentability as to Claims 1 - 22 Because Spaur '074 in view of the SAE HS-3000 Manual Teaches all Claim Elements

Each of claims 1 - 22 require a multi-vehicle compatible controller coupled to a vehicle data bus for communication thereover with at least one vehicle device. As shown above, and in more detail in the claim charts attached as Exhibit D, *the Spaur '074 patent in view of the SAE HS-3000 Manual discloses this and all other required limitations*, explicitly disclosing communicating via a "vehicle data bus", "using at least one corresponding device code from among a plurality thereof for different vehicles", and "downloading interface". In particular, the

> limitation "using at least one corresponding vehicle device code from among a plurality thereof for different vehicles" *is discussed in greater detail in the SAE HS-3000 Manual, which provides the implementation details for communicating via the standardized vehicle network* described in the Spaur '074 patent.
>
> Accordingly, it would have been obvious to one skilled in the art that all aspect of claims 1 - 22 are disclosed by the Spaur '074 patent in view of the SAE HS-3000 Manual. A reasonable examiner would consider the teachings important in deciding whether or not claims 1 - 22 of the Flick '278 patent are patentable. For these reasons, the Spaur '074 patent in view of the SAE HS-3000 Manual raises a substantial new question of patentability as to claims 1 - 22.
> (Underlined italics added.)

Therefore, Spaur '074 (e.g. "The vehicle standardized network…includes a controller unit…that provides appropriate message and data handling functions associated with sending and receiving information including data from each of a plurality of physical vehicle devices…that are operatively connected to a bus…of the vehicle standardized network…the vehicle standardized network is an established and previously developed network that interfaces with components in a vehicle…in order to provide desired or requested data concerning operations or status of these components", "…this further standardized network is a network that has been previously devised and is commonly used in a number of makes and models of vehicles") is being presented viewed in a new light, or in a different way, as compared with its use in the earlier examination(s), in view of a material new argument or interpretation presented in the request (e.g. the details/vehicle device codes/implementations constituting a previously established and developed vehicle standardized network that provides appropriate message and data handling functions associated with sending and receiving information including data from each of a plurality of physical vehicle devices that are operatively connected to a bus and used in

a number of makes and models of vehicles, e.g. the SAE standards, e.g. J1850, provided in the form of SAE HS-3000 Manual) raising a substantial new question of patentability with respect to "the multi-vehicle compatible controller as recited in independent claims 1,13 and 18 , i.e. "said multi-vehicle compatible controller to be coupled to the vehicle data bus for communication thereover with at least one vehicle device using at least one corresponding vehicle device code from among a plurality thereof for different vehicles".

Given the teachings of the combination of Spaur '074 and SAE HS-3000, a reasonable examiner would consider these teachings important in evaluating the patentability of the independent claims of the '278 patent. This art was not applied/so combined during a previous examination of US Patent No. 8,032,278, and the claims at issue are not the subject of a final holding by a Federal Court. Accordingly, prior art patents and printed publications asserted by the Request raise a substantial question of patentability with respect to at least one claim, e.g. claim 1, of the '278 patent.

Beckert '363:

Requester asserts **Beckert '363** alone or in combination with SAE HS-3000, raises a substantial new question of patentability as to claims 1-22 of the '278 patent. See, e.g., page 7 of the Request.

The prosecution history indicates that SAE HS-3000 was not of record during the prosecution of any application to which the benefit of priority is claimed. Accordingly, such references is not precluded from raising a substantial new question of patentability.

Beckert '363 however was not only cited but applied by the examiner during the prosecution of at least '587 reexam.

Accordingly, at least the **Beckart '363** reference/evidence is "old art". However, as set forth *supra*, e.g., MPEP 2242 states:

> *"for example, a substantial new question of patentability may be based solely on old art where the old art is being presented viewed in a new light, or in a different way, as compared with its use in the earlier examination(s), in view of a material new argument or interpretation presented in the request."*

In this instance, Requester, see, e.g., Sections V (pages 3-7) and VI, A. (pages 7-14) of the Request, asserts the combination of **'363** (previously before/considered by the Examiner during the examination/prosecution of the '587 reexam) with SAE HS-3000, see *supra*, a combination which was not considered during prosecution since the reference to, e.g., SAE HS-3000 was not even cited during prosecution. Accordingly, such combination is not precluded from raising a substantial new question of patentability.

During prosecution of the '272 application that led to the issuance of the '278 patent and the confirmation of patentability in the 90/013,587 reexam, the independent claims were allowed for reasons set forth by Examiner, see Summary of Prosecution History *supra*. Note also the June 2016 and July 2016 Interview Summaries with regard to '363 in Summary of Prosecution History *supra.*

Finally, see the Request at, e.g., Sections V (pages 3-7), and VI, A. (pages 7-14) and Exhibit B, e.g., bridging pages 4-6 and page 11-12. Such section V of the instant Request is set forth *supra* and section VI, A. sets forth:

VI. STATEMENTS POINTING OUT EACH SUBSTANTIAL NEW QUESTION OF PATENTABI LITY

…as explained in greater detail below, *A) the Beckert '363 patent; B) the Spaur '074 patent; C) the Suman '537 patent; and D) the Chou '499 patent either alone or in combination with the SAE HS-3000 Manual,* all of which were published more than a year prior to the earliest priority date to which the Flick '278 patent is entitled to, *raise substantial new questions of patentability with respect to the Flick '278 patent.*

A. U.S. Patent No. 6,009,363 to Beckert (inherently disclosing the SAE HS-3000 Manual)

…These references were not considered during the original prosecution of the Flick '278 patent. However, the Beckert '363 patent was considered during the Flick '587 Reexam, but was inexplicably withdrawn from the Flick '587 Reexam with no reasons being made on the record as to why this rejection was being withdrawn. Accordingly, Requester is again resubmitting this reference for at least the following reasons:

1. No Reasons Provided Why Beckert '363 Patent Withdrawn From Rejection in the Flick '587 Reexam --- Examiner Interview Summary filed 6-21- 2016 in the Flick '587 Reexam

…

Accordingly, Requester is re-submitting the Beckert '363 patent, *including the SAE HS- 3000 Manual which is inherently disclosed by the OBD II interface being used in the Beckert '363 patent* (see e.g., Beckert '363 col. 1, lines 32 - 35 stating: "Most late model vehicles are also constructed with a diagnostic system that analyzes performance of the vehicle's engine, transmission and fuel system, and other components (1996 or later for OBD II, 1993 or later for OBD I)..."…. These references provide new technological teachings that raise a substantial new question of patentability with respect to the Flick '278 patent.

2. Technological Teaching: Transmitting Location Data, Communicating Via an OBD II Vehicle Data Bus, and Downloading Means Downloading Enabling Data

The Beckert '363 patent teaches a vehicle computer system including a wireless communications device, a vehicle location determination device, a downloading interface, and a controller capable of communicating with a variety of vehicle

devices via the OBD II standardized vehicle data bus mandated for inclusion in 1996 or later model vehicles. …

The Beckert '363 patent also incorporated by reference the disclosure of U.S. Patent 5,794,164 to Beckert et al. (the Beckert '164 patent) in its entirety at col. 7, lines 44-51. The Beckert '164 patent provides additional detail concerning the modules of the vehicle computer system disclosed in the Beckert '363 patent and specific detail concerning the OBD interpreter and APIs that are exposed to remote devices by the vehicle computer system, including a diagnostic API (amongst others). *The SAE standards, and in particular the SAE HS-3000 Manual, were published for the specific purpose of teaching people of ordinary skill in the art how to communicate with vehicle devices via the OBD II interface.* In particular, the SAE HS- 3000 Manual teaches a bus discovery procedure that can be used by systems interfacing with a vehicle bus via an OBD II diagnostic connector, which involves communicating with vehicle devices using at least one vehicle device code from among a plurality thereof for different vehicles. …

Accordingly, the Beckert '363 patent teaches that the modules inherently disclose the use of the bus discovery protocols that involve sending *a plurality of device codes for different vehicles required by the SAE standards as that specify the implementation details for the OBD II interface*. Furthermore, it would have been obvious to utilize the teachings described in the SAE HS-3000 Manual because the Beckert '363 patent expressly directs communicating with the OBD system built into the vehicle using the OBD interface. Thus, the Beckert '363 patent is being presented in a new light in view of the SAE HS-3000 Manual that raises a substantial new question of patentability.

…

4. Substantial New Question of Patentability as to Claims 1 - 22 because the Beckert '363 Patent in view of the SAE HS-3000 Manual Teaches all Claim Elements

Each of claims 1 - 22 require a multi-vehicle compatible controller coupled to a vehicle data bus for communication thereover with at least one vehicle device. As shown above, and in more detail in the claim charts attached as Exhibit B, *the Beckert '363 patent in view of the SAE HS-3000 Manual disclose this and all other required limitations*, explicitly disclosing communicating via a "vehicle data bus" and a "downloading interface". Accordingly, all aspects of claims 1-22 are disclosed by the Beckert '363 patent and the SAE HS-3000 Manual. A reasonable examiner would consider the teachings important in deciding whether or not claims 1-22 of the Flick '278 patent are patentable. For these reasons, the Beckert '363 patent, including the SAE HS-3000 Manual, raises a substantial new question of patentability as to claims 1-22.

(Underlined italics added.)

Therefore, Beckart '363 (e.g. "Most late model vehicles are also constructed with a diagnostic system that analyzes performance of the vehicle's engine, transmission and fuel system, and other components (1996 or later for OBD II, 1993 or later for OBD I). The diagnostic system can be coupled to an external computer to download or monitor diagnostic information that is useful to a vehicle mechanic during servicing of the vehicle.", "…the vehicle computer system…can be used to integrate multiple vehicle-related systems onto one open platform hardware and software architecture. For instance, the vehicle computer system…can serve as, a navigation system, a communications system, a security system, and a diagnostics system. …FIG. 2 shows the computer 22 according to one implementation of the invention. Computer 22 has three primary modules: a faceplate module 60, a support module 62, and a computer module 64. The computer module 64 is operatively connected to the support module 62 via a multi-bit bus 66. In FIG. 2, the support module 62 is also connected to a universal serial bus (USB) hub 70 via a multi-bit connector 72 (e.g., 8 bits). The USB hub 70 provides connections to many peripheral devices (e.g., 128 devices). Example peripheral devices include the OBD (On Board Diagnostic) system 28, the security system 26, navigation system 74, a wireless link 76 to the Internet, a CD-ROM changer 78, a TV tuner 80, and user I/O devices such as a joystick, keyboard or a mouse 82. This USB hub could be separate as shown in FIG. 2 or it could be integrated into one or more of the USB peripherals.", "A more detailed explanation of the three modules in the vehicle computer system is provided in …U.S. Pat. No. 5,794,164 … incorporated herein by reference" and thereby, "The computer module 64 has a navigation

system 112 which includes both a GPS (global positioning system) receiver and a map application, such as Automap.TM., a program produced by Microsoft Corporation. A security system 114 is provided in the computer module 64 to manage vehicle security. The security system 114 monitors the security sensors 26 (FIG. 1) for any potential threat of theft or vandalism. The security system 114 is connected to actuators which lock/unlock doors and windows, and to an alarm which can be activated upon detection of unwanted tampering. An OBD (On Board Diagnostic) interpreter 116 is provided in the computer module to communicate with the OBD system built into the vehicle by the manufacturer. The OBD interpreter 116 interprets the status data received and provides performance related information from the vehicle's OBD system to the microprocessor 100. Also, commands can be provided to the interpreter which allows non-critical car systems to be controlled.") is being presented viewed in a new light, or in a different way, as compared with its use in the earlier examination(s), in view of a material new argument or interpretation presented in the request (e.g. the details/vehicle device codes/implementations constituting On Board Diagnostics for Light and Medium Duty Vehicle standards , e.g. the SAE standard J1850, provided in the form of SAE HS-3000 Manual) raising a substantial new question of patentability with respect to "the multi-vehicle compatible controller as recited in independent claims 1,13 and 18 , i.e. "said multi-vehicle compatible controller to be coupled to the vehicle data bus for communication thereover with at least one vehicle device using at least one corresponding vehicle device code from among a plurality thereof for different vehicles".

Given the teachings of the combination of Beckart '363 and SAE HS-3000, a reasonable examiner would consider these teachings important in evaluating the patentability of the

independent claims of the '278 patent. This art was not applied/so combined during a previous examination of US Patent No. 8,032,278, and the claims at issue are not the subject of a final holding by a Federal Court. Accordingly, prior art patents and printed publications asserted by the Request raise a substantial question of patentability with respect to at least one claim, e.g. claim 1, of the '278 patent.

Chou'499:

Requester asserts that **Chou '499** either alone or in combination with SAE HS-3000, raises a substantial new question of patentability as to claims 1-22 of the '278 patent. See, e.g., page 7 of the Request.

The prosecution history indicates that SAE HS-3000 was not of record during the prosecution of any application to which the benefit of priority is claimed. Accordingly, such reference is not precluded from raising a substantial new question of patentability.

Chou '499 was not explicitly cited and discussed during the prosecution of the '278 patent or the '587 Reexam. However '499 was cited and discussed during the prosecution of the '972 application, see Summary of Prosecution History *supra*

Accordingly, at least the **Chou '499** reference/evidence is "old art". However, as set forth *supra*, e.g., MPEP 2242 states:

> *"for example, a substantial new question of patentability may be based solely on old art where the old art is being presented viewed in a new light, or in a different way, as compared with its use in the earlier examination(s), in view of a material new argument or interpretation presented in the request."*

In this instance, Requester, see, e.g., Sections V (pages 3-7) and VI, D. (pages 23-25) of the Request, asserts **'499** (previously before/considered by the Examiner during

examination/prosecution of the '972 application) alone or in combination of '363 with SAE HS-3000, see *supra*, a combination which was not considered during prosecution since the reference to, e.g., SAE HS-3000 was not even cited during prosecution. Accordingly, such combination is not precluded from raising a substantial new question of patentability.

During prosecution of the '272 application that led to the issuance of the '278 patent and the confirmation of patentability in the 90/013,587 reexam, the independent claims were allowed for reasons set forth by Examiner, see Summary of Prosecution History *supra*.

Finally, see the Request at, e.g., Sections V (pages 3-7), and VI, D. (pages 23-25) and Exhibit B, e.g., bridging pages 4-5. Such section V of the instant Request is set forth *supra* and section VI, D. sets forth:

> VI. **STATEMENTS POINTING OUT EACH SUBSTANTIAL NEW QUESTION OF PATENTABI LITY**
>
> …as explained in greater detail below, *A) the Beckert '363 patent; B) the Spaur '074 patent; C) the Suman '537 patent; and D) the Chou '499 patent either alone or in combination with the SAE HS-3000 Manual,* all of which were published more than a year prior to the earliest priority date to which the Flick '278 patent is entitled to, *raise substantial new questions of patentability with respect to the Flick '278 patent.*
>
> …
>
> ***D. U.S. Patent No. 6,330,499 to Chou et al.***
>
> The Chou '499 patent issued December 11, 2001 and therefore is prior art to the Flick '278 patent under 35 U.S.C. §§ 102(a), 102(b), and 102(e). This reference was not considered during the prosecution of the Flick '278 patent or the currently pending Flick '587 Reexam. This reference provides a new technological teaching that raises a substantial new question of patentability.

1. Technological Teaching: Obtaining and Transmitting Location Data using a Standard Vehicle Bus and using model dependent codes

The Chou '499 patent teaches a vehicle information system including a wireless communication device, a vehicle location determining device, and a controller capable of communicating with a variety of vehicle devices *via a standardized vehicle data bus using a vehicle bus interface that may support different vehicle bus standards such as CAN (Controller Area Network) and the Society of Automotive Engineers' SAE J1850 - Class B Data Communications Network Interface.* (Chou, col. 3, lines 33-40)….

…

The Chou '499 patent further teaches multi-vehicle compatibility, whereby a vehicle bus adaptor (120C) "translates messages from the fault detector into the language of the vehicle bus. The fault code specifications and protocols of the vehicle may be ***Original Equipment Manufacturer (OEM) and model dependent*** .... A listing of such codes may be found in the publication of the *Society of Automotive Engineers, "SAE On-Board Diagnostics for Light and Medium Duty Vehicle Standards Manual"*. (Chou, col. 4, lines 25-35, [bold original] emphasis added).

Thus, the Chou '499 patent *discloses technological teaching that the Examiner previously found to be missing from the prior art of record disclosed in the Flick '278 patent.*

…

3. Substantial New Question of Patentability as to Claims 1 - 22 because the Chou '499 Patent Teaches all Claim Elements

Each of claims 1 - 22 require a multi-vehicle compatible controller coupled to a vehicle data bus for communication thereover with at least one vehicle device. As shown above, and in more detail in the claim charts attached as Exhibit E, *the Chou '499 patent discloses this and all other required limitations,* explicitly disclosing communicating via a "vehicle data bus", translating "messages from the fault detector into the language of the vehicle bus" where the fault code specifications may be "Original Equipment Manufacturer (OEM) and model dependent" and a downloading interface for permitting downloading of enabling data.

Accordingly, it is submitted that all aspect of claims 1 - 22 are disclosed by the Chou '499 patent. A reasonable examiner would consider the teachings important in deciding whether or not claims 1 - 22 of the Flick '278 patent are patentable.

> For these reasons, the Chou '499 patent raises a substantial new question of patentability as to claims 1 - 22.
> (Underlined italics added.)

Therefore, Chou '499 (e.g. "The processor 300 is coupled to a vehicle bus 335 through a vehicle bus interface 330....The vehicle bus interface may support one of vehicle bus standards such as CAN (Controller Area Network) and the Society of Automotive Engineers' SAE J1850 - Class B Data Communication Network Interface. Alternatively, the processor supports some or all of the functions of the vehicle bus interface and connects directly to the vehicle bus 335. The vehicle bus shown in FIG. 2 is an inherent part of all new automobiles. The dotted line is used as an indication that the vehicle bus is built into the vehicle." or "The vehicle bus interface 120 includes the following modules: vehicle bus adapter 120C, fault detector 120B, and diagnostic data service 120A. The fault detector 120B polls the vehicle bus 104 through the vehicle bus adapter 120C checking for fault codes reported by the vehicle ECUs 103. The vehicle bus adapter 120C translates the messages received from the vehicle bus into the language of the fault detector. It also translates messages from the fault detector into the language of the vehicle bus. The fault code specifications and protocols of the vehicle may be Original Equipment Manufacturer (OEM) and model dependent. The term 'vehicle fault codes' is meant to be synonymous with the term 'trouble code' or 'diagnostic trouble code'. A listing of such codes may be found in the publication of the Society of Automotive Engineers, 'SAE On-Board Diagnostics for Light and Medium Duty Vehicles Standards Manual'. The diagnostic data service 120A accepts request for vehicle parametric data and retrieves the data using the vehicle bus adapter.", "The remote service center 200 of FIG. 3 comprises a diagnostic server 201 that has access to data related to the vehicle such as as-built, history, diagnostics, warranty, service

information and failure mode data. The diagnosis server 201 is linked to the data repository 203 via a TCP/IP link, LAN, or the like", "…remote health monitoring and diagnostics shares many features with other automotive applications and services. It may be desirable to bundle the remote health monitoring and diagnostics with other services or to extend it with related application functions. For example, the remote diagnostics service could certainly be offered on top of an Emergency/Mayday service (e.g., 'OnStar'). Other applications and services that can be developed or bundled as extensions of the diagnostics services include: breakdown service, network diary, vehicle user manual update, OEM Callback Services, fleet management, theft prevention, vehicle parameter update/change, remote vehicle access, concierge services, etc.") is being presented viewed in a new light, or in a different way, as compared with its use in the earlier examination(s), in view of a material new argument or interpretation presented in the request (e.g. the details/vehicle device codes/implementations constituting On Board Diagnostics for Light and Medium Duty Vehicle standards, e.g. the SAE standard J1850-Class B Data Communications Network Interface beginning on page 146, provided in the form of SAE HS-3000 Manual or being presented other than for its teachings of "…a user interface for accepting at least one command from a user and sending at least one alert to the user (column 3, lines 5-15)") raising a substantial new question of patentability with respect to "the multi-vehicle compatible controller as recited in independent claims 1,13 and 18 , i.e. "said multi-vehicle compatible controller to be coupled to the vehicle data bus for communication thereover with at least one vehicle device using at least one corresponding vehicle device code from among a plurality thereof for different vehicles".

Given the teachings of the combination of Chou '499 and SAE HS-3000, a reasonable examiner would consider these teachings important in evaluating the patentability of the independent claims of the '278 patent. This art was not applied/so combined during a previous examination of US Patent No. 8,032,278, and the claims at issue are not the subject of a final holding by a Federal Court. Accordingly, prior art patents and printed publications asserted by the Request raise a substantial question of patentability with respect to at least one claim, e.g. claim 1, of the '278 patent.

Conclusion

Accordingly, as a substantial new question of patentability is present, reexamination is granted, see MPEP 2242. Claims 1-22 of '278 **will be** reexamined.

Correspondence

8. **All** correspondence relating to this ex parte reexamination proceeding should be directed:

By Mail to: Mail Stop *Ex Parte* Reexam
Central Reexamination Unit
Commissioner for Patents
United States Patent & Trademark Office

P.O. Box 1450
Alexandria, VA 22313-1450

By FAX to: (571) 273-9900
Central Reexamination Unit

By hand: Customer Service Window
Randolph Building
401 Dulany Street
Alexandria, VA 22314

Registered users of EFS-Web may alternatively submit such correspondence via the electronic filing system EFS-Web, at https://efs.uspto.gov/efile/my portal/efs-registered. EFS-Web offers the benefit of quick submission to the particular area of the Office that needs to act on the correspondence. Also, EFS-Web submissions are "soft scanned" (i.e., electronically uploaded) directly into the official file for the reexamination proceeding, which offers parties the opportunity to review the content of their submissions after the "soft scanning" process is complete.

Any inquiry concerning this communication should be directed to the Central Reexamination Unit at telephone number 571-272-7705.

Other useful telephone numbers:

Reexamination Practice (571) 272-7703

Reexamination Facsimile Transmission No. (571) 273-9900

/Karin M. Reichle/
Examiner, CRU
Art Unit 3992

Conferees:
/J. W./
Primary Examiner, Art Unit 3992

/WHC/
SPRS, Art Unit 3992

Order Granting Request For Ex Parte Reexamination	Control No.	Patent Under Reexamination
	90/013,851	8032278
	Examiner	Art Unit
	Karin Reichle	3992

--The MAILING DATE of this communication appears on the cover sheet with the correspondence address--

The request for *ex parte* reexamination filed *28 October 2016* has been considered and a determination has been made. An identification of the claims, the references relied upon, and the rationale supporting the determination are attached.

Attachments: a)☐ PTO-892, b)☒ PTO/SB/08, c)☐ Other: _____

1. ☒ The request for *ex parte* reexamination is GRANTED.

RESPONSE TIMES ARE SET AS FOLLOWS:

For Patent Owner's Statement (Optional): TWO MONTHS from the mailing date of this communication (37 CFR 1.530 (b)). **EXTENSIONS OF TIME ARE GOVERNED BY 37 CFR 1.550(c).**

For Requester's Reply (optional): TWO MONTHS from the **date of service** of any timely filed Patent Owner's Statement (37 CFR 1.535). **NO EXTENSION OF THIS TIME PERIOD IS PERMITTED.** If Patent Owner does not file a timely statement under 37 CFR 1.530(b), then no reply by requester is permitted.

/Karin Reichle/ Primary Examiner, Art Unit 3992	/J. W./ Primary Examiner, Art Unit 3992	

cc:Requester (if third party requester)

Search Notes	Application/Control No.	Applicant(s)/Patent Under Reexamination
	90013851	8032278
	Examiner	Art Unit
	KARIN REICHLE	3992

CPC- SEARCHED		
Symbol	Date	Examiner

CPC COMBINATION SETS - SEARCHED		
Symbol	Date	Examiner

US CLASSIFICATION SEARCHED			
Class	Subclass	Date	Examiner

SEARCH NOTES		
Search Notes	Date	Examiner
Prosecution History set forth on BIB sheet reviewed. Also reviewed 90/013,659 and 90/013741 referred to in the Request.	11/16/2016	/KR/

INTERFERENCE SEARCH			
US Class/ CPC Symbol	US Subclass / CPC Group	Date	Examiner

PTO/SB/08a (07-09)
Approved for use through 07/31/2016. OMB 0651-0031
U.S. Patent and Trademark Office; U.S. DEPARTMENT OF COMMERCE
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Substitute for form 1449/PTO

INFORMATION DISCLOSURE STATEMENT BY APPLICANT

(Use as many sheets as necessary)

Sheet 1 of 2

Complete if Known	
Application Number	11/773,272
Filing Date	July 3, 2007
First Named Inventor	Kenneth E. Flick
Art Unit	3661
Examiner Name	Cuong H. Nguyen
Attorney Docket Number	C13-03896.RE2

U. S. PATENT DOCUMENTS

Examiner Initials*	Cite No.[1]	Document Number Number-Kind Code[2] *(if known)*	Publication Date MM-DD-YYYY	Name of Patentee or Applicant of Cited Document	Pages, Columns, Lines, Where Relevant Passages or Relevant Figures Appear
		US- 5,732,074	03-24-1998	Spaur et al.	
		US- 5,794,164	08-11-1998	Beckert et al.	
		US- 6,009,363	12-28-1999	Beckert et al.	
		US- 6,028,537	02-22-2000	Suman et al.	
		US- 6,330,499	12-11-2001	Chou et al	
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FOREIGN PATENT DOCUMENTS

Examiner Initials*	Cite No.[1]	Foreign Patent Document Country Code[3]-Number[4]-Kind Code[5] *(if known)*	Publication Date MM-DD-YYYY	Name of Patentee or Applicant of Cited Document	Pages, Columns, Lines, Where Relevant Passages Or Relevant Figures Appear	T[6]

Examiner Signature	/Karin Reichle/	Date Considered	11/16/2016

*EXAMINER: Initial if reference considered, whether or not citation is in conformance with MPEP 609. Draw line through citation if not in conformance and not considered. Include copy of this form with next communication to applicant. [1]Applicant's unique citation designation number (optional). [2]See Kinds Codes of USPTO Patent Documents at www.uspto.gov or MPEP 901.04. [3]Enter Office that issued the document, by the two-letter code (WIPO Standard ST.3). [4]For Japanese patent documents, the indication of the year of the reign of the Emperor must precede the serial number of the patent document. [5]Kind of document by the appropriate symbols as indicated on the document under WIPO Standard ST.16 if possible. [6]Applicant is to place a check mark here if English language Translation is attached.

This collection of information is required by 37 CFR 1.97 and 1.98. The information is required to obtain or retain a benefit by the public which is to file (and by the USPTO to process) an application. Confidentiality is governed by 35 U.S.C. 122 and 37 CFR 1.14. This collection is estimated to take 2 hours to complete, including gathering, preparing, and submitting the completed application form to the USPTO. Time will vary depending upon the individual case. Any comments on the amount of time you require to complete this form and/or suggestions for reducing this burden, should be sent to the Chief Information Officer, U.S. Patent and Trademark Office, P.O. Box 1450, Alexandria, VA 22313-1450. DO NOT SEND FEES OR COMPLETED FORMS TO THIS ADDRESS. **SEND TO: Commissioner for Patents, P.O. Box 1450, Alexandria, VA 22313-1450.**

If you need assistance in completing the form, call 1-800-PTO-9199 (1-800-786-9199) and select option 2.

ALL REFERENCES CONSIDERED EXCEPT WHERE LINED THROUGH. /KR/

PTO/SB/08b (07-09)
Approved for use through 07/31/2016. OMB 0651-0031
U.S. Patent and Trademark Office; U.S. DEPARTMENT OF COMMERCE
Under the Paperwork Reduction Act of 1995, no persons are required to respond to a collection of information unless it contains a valid OMB control number.

Substitute for form 1449/PTO

INFORMATION DISCLOSURE STATEMENT BY APPLICANT

(Use as many sheets as necessary)

Sheet 2 of 2

Complete if Known	
Application Number	11/773,272
Filing Date	July 3, 2007
First Named Inventor	Kenneth E. Flick
Art Unit	3661
Examiner Name	Cuong H. Nguyen
Attorney Docket Number	C13-03896.RE2

NON PATENT LITERATURE DOCUMENTS

Examiner Initials*	Cite No.[1]	Include name of the author (in CAPITAL LETTERS), title of the article (when appropriate), title of the item (book, magazine, journal, serial, symposium, catalog, etc.), date, page(s), volume-issue number(s), publisher, city and/or country where published.	T[2]
		SAE On-Board Diagnostics for Light and Medium Duty Vehicles Standards Manual, SAE HS-3000, Society of Automotive Engineers, Inc., 1994 Edition.	
		SAE On-Board Diagnostics for Light and Medium Duty Vehicles Standards Manual, SAE HS-3000, Society of Automotive Engineers, Inc., 1997 Edition.	

Examiner Signature	/Karin Reichle/	Date Considered	11/16/2016

*EXAMINER: Initial if reference considered, whether or not citation is in conformance with MPEP 609. Draw line through citation if not in conformance and not considered. Include copy of this form with next communication to applicant.

1 Applicant's unique citation designation number (optional). 2 Applicant is to place a check mark here if English language Translation is attached.

This collection of information is required by 37 CFR 1.98. The information is required to obtain or retain a benefit by the public which is to file (and by the USPTO to process) an application. Confidentiality is governed by 35 U.S.C. 122 and 37 CFR 1.14. This collection is estimated to take 2 hours to complete, including gathering, preparing, and submitting the completed application form to the USPTO. Time will vary depending upon the individual case. Any comments on the amount of time you require to complete this form and/or suggestions for reducing this burden, should be sent to the Chief Information Officer, U.S. Patent and Trademark Office, P.O. Box 1450, Alexandria, VA 22313-1450. DO NOT SEND FEES OR COMPLETED FORMS TO THIS ADDRESS. **SEND TO: Commissioner for Patents, P.O. Box 1450, Alexandria, VA 22313-1450.**

If you need assistance in completing the form, call 1-800-PTO-9199 (1-800-786-9199) and select option 2.

ALL REFERENCES CONSIDERED EXCEPT WHERE LINED THROUGH. /KR/

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UNITED STATES DEPARTMENT OF COMMERCE
United States Patent and Trademark Office
Address: COMMISSIONER FOR PATENTS
P.O. Box 1450
Alexandria, Virginia 22313-1450
www.uspto.gov

BIB DATA SHEET

CONFIRMATION NO. 8717

SERIAL NUMBER	FILING or 371(c) DATE	CLASS	GROUP ART UNIT	ATTORNEY DOCKET NO.
90/013,851	10/28/2016 RULE	701	3992	C13-03896.RE2

APPLICANTS

INVENTORS

8032278, Residence Not Provided;
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DAVID H. KAVEH (3RD PTY REQ.), ANAHEIM, CA;
KPPB LLP, ANAHEIM, CA

**** CONTINUING DATA ***************************

This application is a REX of 11/773,272 07/03/2007 PAT 8032278
which is a CIP of 11/076,259 03/09/2005 PAT 7720597
which is a CON of 10/383,496 03/07/2003 PAT 7149623
which is a CON of 09/859,972 05/17/2001 PAT 6606561
which claims benefit of 60/264,811 01/29/2001
and claims benefit of 60/258,005 12/22/2000
and claims benefit of 60/251,552 12/06/2000
and claims benefit of 60/252,125 11/20/2000
and claims benefit of 60/236,890 09/29/2000
and claims benefit of 60/246,463 11/07/2000
and claims benefit of 60/222,777 08/03/2000
and claims benefit of 60/205,178 05/17/2000

**** FOREIGN APPLICATIONS ***************************

**** IF REQUIRED, FOREIGN FILING LICENSE GRANTED ****

Foreign Priority claimed ☐ Yes ☑ No 35 USC 119(a-d) conditions met ☐ Yes ☑ No Verified and Acknowledged /KARIN M REICHLE/ Examiner's Signature	☐ Met after Allowance Initials	STATE OR COUNTRY	SHEETS DRAWINGS	TOTAL CLAIMS	INDEPENDENT CLAIMS
				22	3

ADDRESS

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ALLEN, DYER, DOPPELT, MILBRATH & GILCHRIST, P.A.
P. O. BOX 3791
ORLANDO, FL 32802-3791
UNITED STATES

TITLE

Vehicle Tracking Unit with Downloadable Codes and Associated Methods

FILING FEE RECEIVED		
12000	FEES: Authority has been given in Paper No._____ to charge/credit DEPOSIT ACCOUNT No._____ for following:	☐ All Fees ☐ 1.16 Fees (Filing) ☐ 1.17 Fees (Processing Ext. of time) ☐ 1.18 Fees (Issue) ☐ Other _____

BIB (Rev. 05/07).

Reexamination	**Application/Control No.** 90013851	**Applicant(s)/Patent Under Reexamination** 8032278
	Certificate Date	**Certificate Number**

Requester Correspondence Address: ☐ **Patent Owner** ☒ **Third Party**
KPPB LLP 2400 EAST KATELLA AVENUE SUITE 1050 ANAHEIM, CA 92806

LITIGATION REVIEW ☒	/KR/ (examiner initials)	11/16/2016 (date)
Case Name		Director Initials
Omega Patents, LLC v. Enfora, Inc., Northern District of Geor		
Omega Patents, LLC v. CalAmp Corp., Middle District of Florid		

COPENDING OFFICE PROCEEDINGS	
TYPE OF PROCEEDING	**NUMBER**
1.	

	/K.R./ Primary Examiner.Art Unit 3992

UNITED STATES PATENT AND TRADEMARK OFFICE

UNITED STATES DEPARTMENT OF COMMERCE
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www.uspto.gov

APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
90/013,851	10/28/2016	8032278	C13-03896.RE2	8717

7590 11/14/2016

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P. O. BOX 3791
ORLANDO, FL 32802-3791

EXAMINER	
REICHLE, KARIN M	

ART UNIT	PAPER NUMBER
3992	

MAIL DATE	DELIVERY MODE
11/14/2016	PAPER

Please find below and/or attached an Office communication concerning this application or proceeding.

The time period for reply, if any, is set in the attached communication.

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(THIRD PARTY REQUESTER'S CORRESPONDENCE ADDRESS)

KPPB LLP
2400 EAST KATELLA AVENUE
SUITE 1050
ANAHEIM, CA 92806

EX PARTE REEXAMINATION COMMUNICATION TRANSMITTAL FORM

REEXAMINATION CONTROL NO. *90/013,851*.

PATENT NO. *8032278*.

ART UNIT *3992*.

Enclosed is a copy of the latest communication from the United States Patent and Trademark Office in the above identified *ex parte* reexamination proceeding (37 CFR 1.550(f)).

Where this copy is supplied after the reply by requester, 37 CFR 1.535, or the time for filing a reply has passed, no submission on behalf of the *ex parte* reexamination requester will be acknowledged or considered (37 CFR 1.550(g)).

Ex Parte Reexamination Interview Summary – Pilot Program for Waiver of Patent Owner's Statement	**Control No.** 90/013,851	**Patent Under Reexamination is Requested** 8032278
	Examiner KARIN REICHLE	**Art Unit** 3992

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address. --

All participants (USPTO official and patent owner):

(1) PATRICIA VOLPE, OCRU (3)

(2) JACK ABID, 58237 (4)

Date of Telephonic Interview:11/07/2016.

A. The USPTO official requested waiver of the patent owner's statement pursuant to the pilot program for waiver of patent owner's statement in *ex parte* reexamination proceedings.*

☐ The patent owner **agreed** to waive its right to file a patent owner's statement under 35 U.S.C. 304 in the event reexamination is ordered for the above-identified patent.

☒ The patent owner **did not agree** to waive its right to file a patent owner's statement under 35 U.S.C. 304 at this time.

☐ USPTO personnel were unable to reach the patent owner.**

B. The Patent Owner of record telephoned the Office and indicated they would like to participate in the pilot program for waiver of patent owner's statement in *ex parte* reexamination proceedings.*

☐ The Patent owner of record telephoned the Office and **agreed** to waive its right to file a patent owner's statement under 35 U.S.C. 304 in the event reexamination is ordered for the above-identified patent.

The patent owner is not required to file a written statement of this telephone communication under 37 CFR 1.560(b) or otherwise. However, any disagreement as to this interview summary must be brought to the immediate attention of the USPTO, and no later than one month from the mailing date of this interview summary. Extensions of time are governed by 37 CFR 1.550(c).

*For more information regarding this pilot program, see *Pilot Program for Waiver of Patent Owner's Statement in Ex Parte Reexamination Proceedings*, 75 *Fed. Reg.* 47269 (August 5, 2010), available on the USPTO Web site at http://www.uspto.gov/patents/law/notices/2010.jsp.

**The patent owner may contact the USPTO personnel at (571) 272-7705 or at the telephone number provided below if the patent owner decides to waive the right to file a patent owner's statement under 35 U.S.C. 304.

/PATRICIA VOLPE/ (571)272-6825

Signature and telephone number of the USPTO official, who contacted, was contacted by, or attempted to contact the patent owner.

cc: Requester (if third party requester)

Litigation Search Report CRU 3999

Ex Parte Reexamination: 90/013,851

TO: Karin Reichle Location: CRU Art Unit: 3993 Date: 11/01/2016	From: Paralegal Name Location: CRU 3999 MDE 4B21 Phone: (571) 272-6825 patricia.volpe@uspto.gov

Search Notes

Litigation search for U.S. Patent Number: **8,032,278**

OPEN - Omega Patents, Llc V. Calamp Corp.	6:13cv1950
CLOSED - Omega Patents, Llc V. Enfora, Inc.	1:13cv646

1) I performed a KeyCite Search in Westlaw, which retrieves all history on the patent including any litigation.

2) I performed a search on the patent in Lexis CourtLink for any open dockets or closed cases.

3) I performed a search in Lexis in the Federal Courts and Administrative Materials databases for any cases found.

4) I performed a search in Lexis in the IP Journal and Periodicals database for any articles on the patent.

5) I performed a search in Lexis in the news databases for any articles about the patent or any articles about litigation on this patent.

773272 (11) 8032278 October 4, 2011

UNITED STATES PATENT AND TRADEMARK OFFICE GRANTED PATENT

8032278

Get Drawing Sheet 1 of 13
Access PDF of Official Patent *
Order Patent File History / Wrapper from REEDFAX®
Link to Claims Section

October 4, 2011

Vehicle tracking unit with downloadable codes and associated methods

REEXAM-LITIGATE:

Reexamination requested September 14, 2015 by Samuel P. Richey, KPPB, LLP., Anaheim, CA, Reexamination No. 90/013,587 (O.G. November 10, 2015) Ex. Gp.: 3993 September 14, 2015

NOTICE OF LITIGATION

Omega Patents, LLC v. Enfora, Inc., Filed February 28, 2013, D.C. N.D. Georgia, Doc. No. 1:13cv646

NOTICE OF LITIGATION

Omega Patents, LLC v. Calamp Corp., Filed December 20, 2013, D.C. M.D. Florida, Doc. No. 6:13cv1950

INVENTOR: Flick, Kenneth E. - Douglasville, Georgia, United States of America (US), United States of America ()

APPL-NO: 773272 (11)

FILED-DATE: July 3, 2007

GRANTED-DATE: October 4, 2011

ASSIGNEE-PRE-ISSUE:
July 3, 2007 - ASSIGNMENT OF ASSIGNORS INTEREST (SEE DOCUMENT FOR DETAILS)., OMEGA PATENTS, L.L.C., 5326 PRESLEY PLACE, DOUGLASVILLE, GEORGIA, UNITED STATES OF AMERICA (US), 30135, Reel and Frame Number: 019515/0350

ASSIGNEE-AT-ISSUE:
Omega Patents, L.L.C., Douglasville, Georgia, United States of America (US), United States company or corporation (02)

LEGAL-STATUS:

July 3, 2007 - ASSIGNMENT
July 3, 2007 - ASSIGNMENT
March 18, 2015 - FEE PAYMENT
November 10, 2015 - REQUEST FOR REEXAMINATION FILED

March 18, 2015 - Payment of Maintenance Fee, 4th Year, Large Entity.

PRIM-EXMR: Nguyen, Cuong H

CORE TERMS: controller, alert, tracking, user, monitoring, message, wire, station, battery, alarm, downloading, compatible, send, interface, multi-vehicle, wireless communications, remote, volt, voltage, ignition, telephone, transmission, tracker, minute, indicator, activate, warning, starter, horn, cell

ENGLISH-ABST:

A multi-vehicle compatible tracking unit is for a vehicle including a vehicle data bus extending throughout the vehicle. The vehicle tracking unit may include a vehicle position determining device, a wireless communications device, and a multi-vehicle compatible controller for cooperating with the vehicle position determining device and the wireless communications device to send vehicle position information. The multi-vehicle compatible controller may be coupled to the vehicle data bus for communication thereover with at least one vehicle device using at least one corresponding vehicle device code from among a plurality thereof for different vehicles. A downloading interface may be included for permitting downloading of enabling data related to the at least one corresponding vehicle device code for use by the multi-vehicle compatible controller.

NO-OF-CLAIMS: 22

PARENT-PAT-INFO:

RELATED APPLICATIONS

[0001]The present application is a continuation-in-part of U.S. patent application Ser. No. 11/076,259 filed Mar. 9, 2005 now U.S. Pat. No. 7,720,597, which is a continuation of U.S. patent application Ser. No. 10/383,496 filed Mar. 7, 2003 now U.S. Pat. No. 7,149,623, which is a continuation of U.S. patent application Ser. No. 09/859,972 filed on May 17, 2001 now U.S. Pat. No. 6,606,561 which, in turn, was based upon provisional patent application Ser. Nos. 60/264,811 filed on Jan. 29, 2001; 60/258,005, filed Dec. 22, 2000; 60/251,552, filed Dec. 6, 2000; 60/252,125, filed Nov. 20, 2000; 60/236,890, filed Sep. 29, 2000; 60/246,463, filed Nov. 7, 2000; 60/222,777, filed Aug. 3, 2000; and 60/205,178, filed May 17, 2000, the entire contents of each of which are incorporated herein by reference.

Source: **Legal > / . . . / > Utility, Design and Plant Patents**
Terms: **PATNO=8032278** (Suggest Terms for My Search)
View: Custom
Segments: Abst, Appl-no, Assignee, Cert-correction, Date, Exmr, Expiration-date, Filed, Filed-date, Inventor, Legal-status, Lit-reex, No-of-claims, Parent-pat-info, Patno, Prim-exmr, Reexam-litigate, Ref-date, Ref-patno, Reissue, Reissue-comment, Rel-patno, Title
Date/Time: Wednesday, November 2, 2016 - 3:51 PM EDT

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RELX Group™

US District Court Civil Docket

U.S. District - Georgia Northern
(Atlanta)

1:13cv646

Omega Patents, Llc v. Enfora, Inc.

This case was retrieved from the court on Thursday, October 13, 2016

Date Filed:	**02/28/2013**		
Assigned To:	**Judge Thomas W. Thrash, Jr**	Class Code:	**CLOSED**
Referred To:		Closed:	**06/20/2013**
Nature of suit:	**Patent (830)**	Statute:	**28:1338**
Cause:	**Patent Infringement**	Jury Demand:	**Plaintiff**
Lead Docket:	**None**	Demand Amount:	**$0**
Other Docket:	**None**	NOS Description:	**Patent**
Jurisdiction:	**Federal Question**		

Litigants	Attorneys
Omega Patents, Llc a Georgia limited liability company Plaintiff	Cynthia Jeannette Lee LEAD ATTORNEY;ATTORNEY TO BE NOTICED Thomas Horstemeyer, LLP Suite 1500 400 Interstate North Parkway Atlanta , GA 30339 USA 770-933-9500 Email:Cynthia.Lee@thomashorstemeyer.Com Dan Robert Gresham LEAD ATTORNEY;ATTORNEY TO BE NOTICED Thomas Horstemeyer, LLP Suite 1500 400 Interstate North Parkway, Se Atlanta , GA 30339 USA 770-933-9500 Email:Dan.Gresham@thomashorstemeyer.Com
Enfora, Inc. a Delaware Corporation Defendant	
Novatel Wireless, Inc. Defendant	

Date	#	Proceeding Text	Source
02/28/2013	1		

		COMPLAINT with Jury Demand, filed by Omega Patents, LLC. Consent form to proceed before U.S. Magistrate and pretrial instructions provided. (Filing fee $ 350.00 receipt number 113E-4436675.) (Attachments: # 1 Exhibit A - '876, # 2 Exhibit B - '727, # 3 Exhibit C -'278, # 4 Exhibit D - '886, # 5 Civil Cover Sheet)(eop) Please visit our website at http://www.gand.uscourts.gov to obtain Pretrial Instructions. (Entered: 02/28/2013)
02/28/2013	2	Electronic Summons Issued as to Enfora, Inc.. (eop) (Entered: 02/28/2013)
02/28/2013	3	Certificate of Interested Persons by Omega Patents, LLC. (eop) (Entered: 02/28/2013)
02/28/2013	4	AO Form 120 forwarded to Commissioner. (eop) (Entered: 02/28/2013)
03/01/2013		Clerks Notation re 3 Certificate of Interested Persons, OK per TWT. (ss) (Entered: 03/01/2013)
03/07/2013	5	First AMENDED COMPLAINT against Enfora, Inc., Novatel Wireless, Inc.with Jury Demand, filed by Omega Patents, LLC. (Attachments: # 1 Exhibit A - '876 Patent, # 2 Exhibit B - '727 Patent, # 3 Exhibit C - '278 Patent, # 4 Exhibit D - '886 Patent, # 5 Summons Novatel Wireless, Inc.) (Gresham, Dan) Please visit our website at http://www.gand.uscourts.gov to obtain Pretrial Instructions. (Entered: 03/07/2013)
03/07/2013	6	Supplemental Certificate of Interested Persons and Corporate Disclosure Statement by Omega Patents, LLC identifying Other Affiliate Kenneth Flick for Omega Patents, LLC. (Gresham, Dan) (Entered: 03/07/2013)
06/19/2013	7	NOTICE of Voluntary Dismissal Without Prejudice filed by Omega Patents, LLC (Gresham, Dan) (Entered: 06/19/2013)
06/20/2013		Clerk's Entry of Dismissal APPROVING 7 Notice of Voluntary Dismissal pursuant to Fed.R.Civ.P.41(a)(1)(i) (dr) (Entered: 06/20/2013)
06/20/2013		Civil Case Terminated. (dr) (Entered: 06/20/2013)
06/20/2013	8	AO Form 120 forwarded to Commissioner. (dr) (Entered: 06/20/2013)

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US District Court Civil Docket

U.S. District - Florida Middle
(Orlando)

6:13cv1950

Omega Patents, Llc v. Calamp Corp.

This case was retrieved from the court on Thursday, October 13, 2016

Date Filed:	**12/20/2013**
Assigned To:	**Judge Paul G. Byron**
Referred To:	**Magistrate Judge Daniel C. Irick**
Nature of suit:	**Patent (830)**
Cause:	**Patent Infringement**
Lead Docket:	**None**
Other Docket:	**None**
Jurisdiction:	**Federal Question**
Class Code:	**OPEN**
Closed:	
Statute:	**35:271**
Jury Demand:	**Both**
Demand Amount:	**$0**
NOS Description:	**Patent**

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Counter Defendant

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Date	#	Proceeding Text	Source
12/20/2013	1	COMPLAINT Injunctive Relief Requested against Calamp Corp. with Jury Demand (Filing fee $ 400 receipt number Orl-030433) filed by Omega Patents, LLC. (Attachments: # 1 Civil Cover Sheet, # 2 Exhibit A-C, # 3 Exhibit D-F)(JEV) (Entered: 12/20/2013)	
12/20/2013	2	SUMMONS issued as to Calamp Corp. (JEV) (Entered: 12/20/2013)	
12/20/2013	3	Patent Report sent to Alexandria, VA. (Attachments: # 1 Complaint, # 2 Exhibit A-C, # 3 Exhibit D-F) (JEV) (Entered: 12/20/2013)	
12/30/2013	4	RELATED CASE ORDER AND NOTICE of designation under Local Rule 3.05 - track 2. Notice of pendency of other actions due by 1/13/2014. Signed by Judge Gregory A. Presnell on 12/30/2013. Copies mailed.(LAM) (Entered: 12/30/2013)	
12/30/2013	5	INTERESTED PERSONS ORDER. Certificate of interested persons and corporate disclosure statement due by 1/13/2014. Signed by Judge Gregory A. Presnell on 12/30/2013. Copies mailed.(LAM) (Entered: 12/30/2013)	
01/14/2014	6	NOTICE of pendency of related cases re 4 Related case order and track 2 notice per Local Rule 1.04(d) by Omega Patents, LLC. Related case(s): Yes. (Santurri, Ryan) Modified on 1/15/2014 (JEV). (Entered: 01/14/2014)	
01/14/2014	7	CERTIFICATE of interested persons and corporate disclosure statement re 5 Interested persons order by Omega Patents, LLC. (Santurri, Ryan) (Entered: 01/14/2014)	
01/15/2014	8	NOTICE of Appearance by Christopher S. Carver on behalf of Calamp Corp. (Carver, Christopher) (Entered: 01/15/2014)	
01/15/2014	9	NOTICE of pendency of related cases re 4 Related Case Order per Local Rule 1.04(d) by Calamp Corp. Related case(s): yes (Carver, Christopher) Modified on 1/16/2014 (JET). (Entered: 01/15/2014)	
01/15/2014	10	ANSWER and affirmative defenses to 1 Complaint with Jury Demand , COUNTERCLAIM against Omega Patents, LLC by Calamp Corp. (Carver, Christopher) Modified on 1/16/2014 (JET). (Entered: 01/15/2014)	
01/15/2014	11		

		CERTIFICATE of interested persons and corporate disclosure statement re 5 Interested persons order by Calamp Corp.. (Carver, Christopher) (Entered: 01/15/2014)
01/15/2014	12	***PRO HAC VICE FEES paid and Special Admission Attorney Certification Form filed by attorney Joel A. Kauth, appearing on behalf of Calamp Corp. (Filing fee $10 receipt number ORL31013) re 22 MOTION for Joel A. Kauth to appear pro hac vice by Calamp Corp. (JET) (JET). Modified on 3/4/2014 (IGC). (Entered: 01/15/2014)
01/16/2014	13	NOTICE to counsel Joel A. Kauth of Local Rule 2.02 (signed by deputy clerk). (JET) (Entered: 01/16/2014)
01/17/2014	14	NOTICE to counsel Christopher S. Carver of Local Rule 2.01 (signed by deputy clerk). (JET) (Entered: 01/17/2014)
01/17/2014	15	NOTICE of Appearance by Peter A. Chiabotti on behalf of Calamp Corp. (Chiabotti, Peter) (Entered: 01/17/2014)
01/29/2014	16	CERTIFICATE of compliance re: Service of documents 4 , 5 , 6 and 7 on Defendant by Omega Patents, LLC. (Gilchrist, Brian) Modified on 1/30/2014 (JET). (Entered: 01/29/2014)
02/05/2014	17	MOTION to Dismiss Counterclaims and Memorandum in Support by Omega Patents, LLC. (Santurri, Ryan) (Entered: 02/05/2014)
02/06/2014	18	Unopposed MOTION to Appear Telephonically at Case Management Conference by Calamp Corp. (Carver, Christopher) Modified on 2/7/2014 (JET). (Entered: 02/06/2014)
02/07/2014	19	ORDER granting 18 Motion to attend case management conference by phone. Signed by Judge Gregory A. Presnell on 2/7/2014. (TKW) (Entered: 02/07/2014)
02/24/2014	20	Amended COUNTERCLAIM -- CalAmp Corp.'s First Amended Counterclaim against Omega Patents, LLC filed by Calamp Corp..(Carver, Christopher) (Entered: 02/24/2014)
02/26/2014	21	ORDER denying as moot 17 motion to dismiss original counterclaim. Signed by Judge Gregory A. Presnell on 2/26/2014. (TKW) (Entered: 02/26/2014)
03/03/2014	22	MOTION for Joel A. Kauth to appear pro hac vice by Calamp Corp.. (Attachments: # 1 Exhibit A - (proposed) Order Granting Motion to Appeal Pro Hac Vice of Attorney Joel A. Kauth)(Carver, Christopher) Motions referred to Magistrate Judge David A. Baker. (Entered: 03/03/2014)
03/03/2014	23	Written designation and consent to act by Christopher S. Carver on behalf of Calamp Corp.. Local Counsel: Christopher S. Carver. Non-Resident Counsel: Joel A. Kauth. (Carver, Christopher) (Entered: 03/03/2014)
03/04/2014	24	ENDORSED ORDER granting 22 motion to appear pro hac vice. Provided, all counsel shall register for and use the electronic filing system as adopted by the Court. After this Order, the Clerk will no longer send copies of docket entries by U.S. Mail to counsel in this case. Appearance and participation by more than one attorney at any hearing or trial is subject to the discretion of the presiding judge. Signed by Magistrate Judge David A. Baker on 3/4/2014. (Baker, David) (Entered: 03/04/2014)
03/11/2014	25	REPLY to 20 Counterclaim by Omega Patents, LLC.(Santurri, Ryan) (Entered: 03/11/2014)
03/11/2014	26	CASE MANAGEMENT REPORT. (Gilchrist, Brian) (Entered: 03/11/2014)
03/12/2014	27	ORDER of recusal. Signed by Judge Gregory A. Presnell on 3/12/2014. (TKW) (Entered: 03/12/2014)
03/12/2014	28	Case Reassigned to Judge Charlene Edwards Honeywell. New case number: 6:13-cv-1950-Orl-36DAB. Judge Gregory A. Presnell no longer assigned to the case. (IGC) (Entered: 03/12/2014)

03/14/2014	29	CASE MANAGEMENT AND SCHEDULING ORDER: Amended Pleadings due by 4/18/2014, Joinder of Parties due by 4/18/2014, Discovery due by 6/1/2015, Dispositive motions due by 7/1/2015, Pretrial statement due by 9/15/2015, Conduct mediation hearing by 6/16/2015. Lead counsel to coordinate dates. Claim Construction Hearing set for 11/24/2014 at 10:00 AM in Orlando Courtroom 5 B before Judge Charlene Edwards Honeywell. Final Pretrial Conference set for 10/20/2015 at 01:30 PM in Orlando Courtroom 5 B before Judge Charlene Edwards Honeywell, Jury Trial set for 11/2/2015 term in Orlando Courtroom 5 B before Judge Charlene Edwards Honeywell. Signed by Judge Charlene Edwards Honeywell on 3/14/2014. (NBL) (Entered: 03/14/2014)
03/14/2014	30	CASE REFERRED to Mediation. (MAA) (Entered: 03/19/2014)
03/27/2014	31	NOTICE of mediation conference/hearing to be held on 11/10/2014 at 9:30 a.m. before Emery H. Rosenbluth, Jr., Esq..(Santurri, Ryan) (Entered: 03/27/2014)
04/16/2014	32	***PRO HAC VICE FEES paid and Special Admission Attorney Certification Form filed by attorney Eugene K. Chong, appearing on behalf of Calamp Corp. (Filing fee $10 receipt number ORL-33338). (MAA) (MAA). (Entered: 04/16/2014)
05/07/2014	33	MOTION for Eugene Chong to appear pro hac vice by Calamp Corp.. (Attachments: # 1 Exhibit A - (proposed) Order Granting Motion to Appear Pro Hace Vice)(Carver, Christopher) Motions referred to Magistrate Judge David A. Baker. (Entered: 05/07/2014)
05/07/2014	34	ENDORSED ORDER granting 33 motion to appear pro hac vice. Provided, all counsel shall register for and use the electronic filing system as adopted by the Court. After this Order, the Clerk will no longer send copies of docket entries by U.S. Mail to counsel in this case. Signed by Magistrate Judge David A. Baker on 5/7/2014. (Baker, David) (Entered: 05/07/2014)
07/02/2014	35	Case Reassigned to Judge Paul G. Byron. New case number: 6:13-cv-1950-Orl-40-DAB. Judge Charlene Edwards Honeywell no longer assigned to the case. (SC) (Entered: 07/02/2014)
07/03/2014	36	AMENDED NOTICE of Claim Construction Hearing: Claim Construction Hearing set for 11/24/2014 at 10:00 AM in Orlando Courtroom 4 B before Judge Paul G. Byron, U.S. District Court, 401 West Central Blvd., Orlando, Florida. (NBL) copies e-mailed (Entered: 07/03/2014)
07/07/2014	37	AMENDED NOTICE of hearing: Final Pretrial Conference set for 10/20/2015 at 1:30 PM in Orlando Courtroom 4 B before Judge Paul G. Byron, Jury Trial set for the November 2015 Trial term, term commencing 11/2/2015 at 09:00 AM in Orlando Courtroom 4 B before Judge Paul G. Byron. (NBL) copies e-mailed (Entered: 07/07/2014)
09/05/2014	38	MOTION for miscellaneous relief, specifically Motion for Claim Construction by Omega Patents, LLC. (Attachments: # 1 Exhibit A - U.S. Patent 6,346,876, # 2 Exhibit B - U.S. Patent 6,756,885, # 3 Exhibit C - U.S. Patent 5,719,551)(Santurri, Ryan) (Entered: 09/05/2014)
09/05/2014	39	DEFENDANT'S Opening Claim Construction Brief re 29 Case management and scheduling orderSet Hearings filed by Calamp Corp.. (Attachments: # 1 Exhibit A, # 2 Exhibit B, # 3 Exhibit C, # 4 Exhibit D)(Kauth, Joel) Modified on 9/8/2014 (MAA). (Entered: 09/05/2014)
10/03/2014	40	RESPONSE in opposition to 39 Motion for Claim Construction filed by Omega Patents, LLC. (Santurri, Ryan) Modified on 10/6/2014 (LAK). (Entered: 10/03/2014)
10/03/2014	41	RESPONSIVE Claim Construction brief filed by Calamp Corp. (Kauth, Joel) Modified on 10/6/2014 (LAK). (Entered: 10/03/2014)
10/30/2014	42	ORDER re: Claim Construction Hearing. Signed by Judge Paul G. Byron on 10/30/2014. (RML) (Entered: 10/30/2014)

11/11/2014	43	MEDIATION report Hearing held on 111014. Hearing outcome: Impasse.. (Rosenbluth, Emery) (Entered: 11/11/2014)
11/17/2014	44	RESPONSE re 42 Order pdf -- Joint Pre-Hearing Statement filed by Omega Patents, LLC. (Gilchrist, Brian) (Entered: 11/17/2014)
11/21/2014	45	NOTICE of Appearance by Carrie Ann Wozniak on behalf of Calamp Corp. (Wozniak, Carrie) (Entered: 11/21/2014)
11/24/2014	46	Minute Entry (CLAIM CONSTRUCTION HEARING) Proceedings held before Judge Paul G. Byron on 11/24/2014. Written Order to issue. Court Reporter: Koretta Stanford (NBL) (Entered: 11/24/2014)
11/28/2014	47	NOTICE RESCHEDULING FINAL PRETRIAL CONFERENCE (TIME ONLY): Final Pretrial Conference reset for 10/20/2015 at 3:00 PM in Orlando Courtroom 4 B before Judge Paul G. Byron, U.S. District Court, 401 West Central Blvd., Orlando, Florida. *(previously noticed for 1:30 p.m.) (NBL) copies mailed/e-mailed (Entered: 11/28/2014)
12/12/2014	48	PLAINTIFF'S BRIEF/Memorandum of Law on Markman Issues re 46 Miscellaneous Hearing filed by Omega Patents, LLC. (Santurri, Ryan) Text modified on 12/15/2014 (RDO). (Entered: 12/12/2014)
12/12/2014	49	SUPPLEMENTAL BRIEF on Claim Construction re 46 Miscellaneous Hearing filed by Calamp Corp.. (Kauth, Joel) Text modified on 12/15/2014 (RDO). (Entered: 12/12/2014)
02/20/2015	50	ORDER ON CLAIM CONSTRUCTION re: 38 , 39 . Signed by Judge Paul G. Byron on 2/20/2015. (RML) (Entered: 02/20/2015)
03/23/2015	51	Joint MOTION for Extension of Time to Complete Discovery to June 15, 2015 by Calamp Corp.. (Kauth, Joel) Motions referred to Magistrate Judge David A. Baker. (Entered: 03/23/2015)
03/24/2015	52	ENDORSED ORDER granting 51 Motion for Extension of Time to Complete Discovery. Provided, however, this extension in no way relieves the parties of other obligations and deadlines set forth in the Scheduling Order. Further, this extension shall not be the basis for seeking relief from that Order. Provided further, this extension assumes that there will be no disputes regarding discovery within this extended period, and the Court will not entertain any motions pertaining to such disputes. In particular, the parties are reminded that the deadline for filing of dispositive motions is NOT extended. Signed by Magistrate Judge David A. Baker on 3/24/2015. (Baker, David) (Entered: 03/24/2015)
03/25/2015		Set/reset scheduling order deadlines: Discovery due by 6/15/2015 (RDO) (Entered: 03/25/2015)
07/01/2015	53	Joint MOTION for leave to file Exhibits Under Seal in Connection with Daubert and Dispositive Motions by Omega Patents, LLC. (Santurri, Ryan) (Entered: 07/01/2015)
07/01/2015	54	MOTION for summary judgment as to Validity, Infringement, Enforceability, and Unfair Competition by Omega Patents, LLC. (Santurri, Ryan) (Entered: 07/01/2015)
07/01/2015	55	MOTION for miscellaneous relief, specifically Motion and Memorandum of Law to Exclude the Testimony of Defendant's Expert Eric Andrews by Omega Patents, LLC. (Santurri, Ryan) (Entered: 07/01/2015)
07/01/2015	56	MOTION for miscellaneous relief, specifically Motion and Memorandum to Exclude the Testimony of Defendant's Expert on Damages, DeForest McDuff, Ph.D. by Omega Patents, LLC. (Santurri, Ryan) (Entered: 07/01/2015)
07/01/2015	57	APPENDIX re 56 MOTION for miscellaneous relief, specifically Motion and Memorandum to Exclude the Testimony of Defendant's Expert on Damages, DeForest McDuff, Ph.D. , 54 MOTION for summary judgment as to Validity, Infringement, Enforceability, and Unfair Competition, 55 MOTION for miscellaneous relief, specifically Motion and Memorandum of

		Law to Exclude the Testimony of Defendant's Expert Eric Andrews by Omega Patents, LLC. (Attachments: # 1 Exhibit 1, # 2 Exhibit 2, # 3 Exhibit 3, # 4 Exhibit 4, # 5 Exhibit 5, # 6 Exhibit 6, # 7 Exhibit 7, # 8 Exhibit 8, # 9 Exhibit 9, # 10 Exhibit 10, # 11 Exhibit 11, # 12 Exhibit 12) (Santurri, Ryan) (Entered: 07/01/2015)
07/01/2015	58	(** STRICKEN per 77 Order **) MOTION for summary judgment of invalidity by Calamp Corp. (Kauth, Joel) Modified on 7/22/2015 (SWT). (Entered: 07/01/2015)
07/01/2015	59	DECLARATION of Eric Andrews by Calamp Corp. in support of 58 Motion for Summary Judgment. (Attachments: # 1 Exhibit A, # 2 Exhibit B, # 3 Exhibit C, # 4 Exhibit D, # 5 Exhibit E, # 6 Exhibit F, # 7 Exhibit G, # 8 Exhibit H, # 9 Exhibit I, # 10 Exhibit J, # 11 Exhibit K, # 12 Exhibit L, # 13 Exhibit M, # 14 Exhibit N)(Kauth, Joel) Modified on 7/2/2015 (RDO). (Entered: 07/01/2015)
07/01/2015	60	(** STRICKEN per 77 Order **) MOTION for summary judgment of noninfringement by Calamp Corp. (Kauth, Joel) Modified on 7/22/2015 (SWT). (Entered: 07/02/2015)
07/02/2015	61	DECLARATION of Eric Andrews by Calamp Corp.in support of 60 Motion for Summary Judgment. (Attachments: # 1 Exhibit A)(Kauth, Joel) Modified on 7/2/2015 (RDO). (Entered: 07/02/2015)
07/02/2015	62	ENDORSED ORDER granting 53 Joint Motion for Leave to File Exhibits Under Seal in Connection with Daubert and Dispositive Motions. Signed by Judge Paul G. Byron on 7/2/2015. (MMW) (Entered: 07/02/2015)
07/02/2015	63	APPENDIX re 61 Declaration of Eric Andrews in Support of Motion for Summary Judgment of Noninfringement by Calamp Corp.. (Attachments: # 1 Exhibit B-1, # 2 Exhibit B-2, # 3 Exhibit C-1, # 4 Exhibit C-2, # 5 Exhibit D-1, # 6 Exhibit D-2, # 7 Exhibit E-1, # 8 Exhibit E-2, # 9 Exhibit F-1, # 10 Exhibit F-2, # 11 Exhibit F-3)(Kauth, Joel) (Entered: 07/02/2015)
07/02/2015	64	MOTION to Strike 60 MOTION for summary judgment of noninfringement in Exceedence of CMSO Limitation on Motions for Summary Judgment by Omega Patents, LLC. (Santurri, Ryan) Motions referred to Magistrate Judge David A. Baker. (Entered: 07/02/2015)
07/06/2015	65	SUMMARY JUDGMENT NOTICE re 58 MOTION for summary judgment of invalidity, 54 MOTION for summary judgment as to Validity, Infringement, Enforceability, and Unfair Competition, 60 MOTION for summary judgment of noninfringement. Unless the Court notifies the parties otherwise, there will not be a hearing on this motion. (NBL) copies e-mailed (Entered: 07/06/2015)
07/06/2015		Sealed Document S-66. (MAA) (Entered: 07/08/2015)
07/08/2015	67	Unopposed MOTION for Extension of Time to File Response to Document 60 Pending Ruling on Plaintiff's Motion to Strike by Omega Patents, LLC. (Santurri, Ryan) (Entered: 07/08/2015)
07/09/2015	68	ENDORSED ORDER granting 67 Motion for Extension of Time to File. Signed by Judge Paul G. Byron on 7/9/2015. (MMW) (Entered: 07/09/2015)
07/09/2015	69	AMENDED CASE MANAGEMENT AND SCHEDULING ORDER. Signed by Judge Paul G. Byron on 7/9/2015. (MMW) (Entered: 07/09/2015)
07/10/2015		Set/reset scheduling order deadlines: Pretrial statement due by 9/22/2015, All other motions due by 9/29/2015, Final Pretrial Conference set for 10/20/2015 at 03:00 PM in Orlando Courtroom 4 B before Judge Paul G. Byron, Jury Trial set for trial term beginning on 11/2/2015 at 09:00 AM in Orlando Courtroom 4 B before Judge Paul G. Byron. (RDO) (Entered: 07/10/2015)
07/20/2015	70	

		RESPONSE in Opposition re 58 MOTION for summary judgment of invalidity filed by Omega Patents, LLC. (Attachments: # 1 Exhibit 13) (Santurri, Ryan) (Entered: 07/20/2015)
07/20/2015	71	STIPULATION of Undisputed Facts; re 54 MOTION for summary judgment as to Validity, Infringement, Enforceability, and Unfair Competition by Omega Patents, LLC. (Santurri, Ryan) Modified on 7/21/2015 (SWT). (Entered: 07/20/2015)
07/20/2015	72	RESPONSE in Opposition re 64 MOTION to Strike 60 MOTION for summary judgment of noninfringement in Exceedence of CMSO Limitation on Motions for Summary Judgment filed by Calamp Corp.. (Kauth, Joel) (Entered: 07/20/2015)
07/20/2015	73	Joint STIPULATION of Agreed Material Facts; re 58 MOTION for summary judgment of invalidity by Calamp Corp. (Kauth, Joel) Modified on 7/21/2015 (SWT). (Entered: 07/20/2015)
07/20/2015	74	RESPONSE in Opposition re 56 MOTION for miscellaneous relief, specifically Motion and Memorandum to Exclude the Testimony of Defendant's Expert on Damages, DeForest McDuff, Ph.D. filed by Calamp Corp.. (Kauth, Joel) (Entered: 07/20/2015)
07/20/2015	75	RESPONSE in Opposition re 55 MOTION for miscellaneous relief, specifically Motion and Memorandum of Law to Exclude the Testimony of Defendant's Expert Eric Andrews filed by Calamp Corp.. (Kauth, Joel) (Entered: 07/20/2015)
07/20/2015	76	RESPONSE in Opposition re 54 MOTION for summary judgment as to Validity, Infringement, Enforceability, and Unfair Competition filed by Calamp Corp.. (Attachments: # 1 Appendix, # 2 Exhibit 1, # 3 Exhibit 2, # 4 Exhibit 3, # 5 Exhibit 4, # 6 Exhibit 5, # 7 Exhibit 6, # 8 Exhibit 7, # 9 Exhibit 8, # 10 Exhibit 9, # 11 Exhibit 10, # 12 Exhibit 11, # 13 Exhibit 12)(Kauth, Joel) (Entered: 07/21/2015)
07/21/2015	77	ORDER granting in part 64 Motion to strike 58 MOTION for summary judgment and 60 MOTION for summary judgment. Defendant shall have until Monday, July 27, 2015, in which to file a single compliant motion for summary judgment. Signed by Magistrate Judge David A. Baker on 7/21/2015. (LAK) (Entered: 07/21/2015)
07/27/2015	78	MOTION for summary judgment and memorandum of law regarding invalidity and noninfringement by Calamp Corp.. (Kauth, Joel) (Entered: 07/27/2015)
08/03/2015	79	REPLY to Response to Motion re 54 MOTION for summary judgment as to Validity, Infringement, Enforceability, and Unfair Competition filed by Omega Patents, LLC. (Santurri, Ryan) (Entered: 08/03/2015)
08/04/2015	80	SUMMARY JUDGMENT NOTICE re 78 MOTION for summary judgment and memorandum of law regarding invalidity and noninfringement. Unless the Court notifies the parties otherwise, there will not be a hearing on this motion. (NBL) copies e-mailed (Entered: 08/04/2015)
08/06/2015	81	RESPONSE in Opposition re 78 MOTION for summary judgment and memorandum of law regarding invalidity and noninfringement filed by Omega Patents, LLC. (Attachments: # 1 Exhibit 13)(Santurri, Ryan) (Entered: 08/06/2015)
08/06/2015	82	REQUEST for oral argument re 56 MOTION for miscellaneous relief, specifically Motion and Memorandum to Exclude the Testimony of Defendant's Expert on Damages, DeForest McDuff, Ph.D. , 54 MOTION for summary judgment as to Validity, Infringement, Enforceability, and Unfair Competition, 55 MOTION for miscellaneous relief, specifically Motion and Memorandum of Law to Exclude the Testimony of Defendant's Expert Eric Andrews by Omega Patents, LLC. (Santurri, Ryan) (Entered: 08/06/2015)
08/24/2015	83	

		REPLY in support of 78 MOTION for summary judgment and memorandum of law regarding invalidity and noninfringement filed by Calamp Corp.. (Kauth, Joel) Text modified on 8/25/2015 (RDO). (Entered: 08/24/2015)
08/27/2015	84	UNOPPOSED MOTION for miscellaneous relief, specifically For Lead Counsel To Attend Meeting to Prepare Joint Final Pretrial Statement by Video Conference by Calamp Corp.. (Kauth, Joel) Text modified on 8/28/2015 (RDO). (Entered: 08/27/2015)
08/28/2015	85	ENDORSED ORDER granting 84 Unopposed Motion for Lead Counsel to Attend Meeting to Prepare Joint Final Pretrial Statement by Video Conference. Signed by Judge Paul G. Byron on 8/28/2015. (MMW) (Entered: 08/28/2015)
09/08/2015	86	MOTION for Charles Halloran to appear pro hac vice by Calamp Corp.. (Wozniak, Carrie) Motions referred to Magistrate Judge David A. Baker. (Entered: 09/08/2015)
09/09/2015	87	ENDORSED ORDER granting 86 motion to appear pro hac vice. Signed by Magistrate Judge David A. Baker on 9/9/2015. (Baker, David) (Entered: 09/09/2015)
09/09/2015	88	***PRO HAC VICE FEES paid and Special Admission Attorney Certification Form filed by attorney Charles Halloran, appearing on behalf of Calamp Corp. (Filing fee $150 receipt number ORL-46938.) Related document: 86 MOTION for Charles Halloran to appear pro hac vice. (MAA) (MAA). (Entered: 09/09/2015)
09/17/2015	89	SUPPLEMENT re 54 MOTION for summary judgment as to Validity, Infringement, Enforceability, and Unfair Competition by Omega Patents, LLC. (Attachments: # 1 Exhibit Exhibit A)(Santurri, Ryan) (Entered: 09/17/2015)
09/22/2015	90	Joint PRETRIAL statement by Omega Patents, LLC and Calamp Corp. (Attachments: # 1 Exhibit A - Plaintiff's Exhibit List, # 2 Exhibit B - Defendant's Exhibit List, # 3 Exhibit C - Plaintiff's Witness List, # 4 Exhibit D - Defendant's Witness List, # 5 Exhibit E - Plaintiff's Deposition Designations, # 6 Exhibit F - Defendant's Deposition Designations, # 7 Exhibit G - Plaintiff's Proposed Voir Dire, # 8 Exhibit H - Defendant's Proposed Voir Dire, # 9 Exhibit I - Jury Instructions, # 10 Exhibit J - Plaintiff's Proposed Verdict Form, # 11 Exhibit K - Defendant's Proposed Verdict Form)(Santurri, Ryan) Modified on 9/23/2015 (SWT). (Entered: 09/22/2015)
09/23/2015	91	NOTICE OF CONTINUANCE OF TRIAL TERM and FINAL PRETRIAL CONFERENCE: Final Pretrial Conference is rescheduled for 11/17/2015 at 3:00 PM in Orlando Courtroom 4 B before Judge Paul G. Byron. Jury Trial set for the DECEMBER 2015 TRIAL TERM, term commencing 12/1/2015 in Orlando Courtroom 4 B before Judge Paul G. Byron. (NBL) copies e-mailed (Entered: 09/23/2015)
09/24/2015	92	NOTICE by Calamp Corp. of Conflict with Trial Docket (Wozniak, Carrie) (Entered: 09/24/2015)
09/29/2015	93	MOTION to Bifurcate Issues of Inequitable Conduct and Prosecution Laches by Omega Patents, LLC. (Santurri, Ryan) (Entered: 09/29/2015)
09/29/2015	94	MOTION in limine by Omega Patents, LLC. (Attachments: # 1 Exhibit A, # 2 Exhibit B, # 3 Exhibit C, # 4 Exhibit D, # 5 Exhibit E, # 6 Exhibit F) (Santurri, Ryan) (Entered: 09/29/2015)
09/29/2015	95	MOTION for miscellaneous relief, specifically That U.S. Patent Nos. 6,346,876 B1, 6,756,885 B1, 7,671,727 B2, and 8,032,278 B2 are not entitled to any priority date earlier than their actual filing dates by Calamp Corp.. (Attachments: # 1 Exhibit A, # 2 Exhibit B, # 3 Exhibit C, # 4 Exhibit D, # 5 Exhibit E, # 6 Exhibit F, # 7 Exhibit G, # 8 Exhibit H, # 9 Exhibit I, # 10 Exhibit J)(Kauth, Joel) (Entered: 09/29/2015)
09/29/2015	96	

		MOTION in limine by Calamp Corp.. (Attachments: # 1 Exhibit A, # 2 Exhibit B)(Kauth, Joel) (Entered: 09/29/2015)
10/13/2015	97	RESPONSE in Opposition re 95 MOTION for miscellaneous relief, specifically That U.S. Patent Nos. 6,346,876 B1, 6,756,885 B1, 7,671,727 B2, and 8,032,278 B2 are not entitled to any priority date earlier than their actual filing dates filed by Omega Patents, LLC. (Santurri, Ryan) (Entered: 10/13/2015)
10/13/2015	98	RESPONSE in Opposition re 96 MOTION in limine filed by Omega Patents, LLC. (Santurri, Ryan) (Entered: 10/13/2015)
10/13/2015	99	TRIAL BRIEF by Calamp Corp.. (Kauth, Joel) (Entered: 10/13/2015)
10/16/2015	100	RESPONSE in Opposition re 93 MOTION to Bifurcate Issues of Inequitable Conduct and Prosecution Laches filed by Calamp Corp.. (Attachments: # 1 Exhibit, # 2 Exhibit, # 3 Exhibit, # 4 Exhibit, # 5 Exhibit, # 6 Exhibit) (Kauth, Joel) (Entered: 10/16/2015)
10/16/2015	101	RESPONSE in Opposition re 94 MOTION in limine filed by Calamp Corp.. (Attachments: # 1 Exhibit, # 2 Exhibit, # 3 Exhibit, # 4 Exhibit, # 5 Exhibit, # 6 Exhibit, # 7 Exhibit)(Kauth, Joel) (Entered: 10/16/2015)
11/02/2015	102	NOTICE RESCHEDULING FINAL PRETRIAL CONFERENCE (TIME ONLY): Final Pretrial Conference is reset for 11/17/2015 at 1:30 PM in Orlando Courtroom 4 B before Judge Paul G. Byron, U.S. District Court, 401 West Central Blvd., Orlando, Florida. *(previously noticed for 3:00 pm) (NBL) copies e-mailed (Entered: 11/02/2015)
11/13/2015	103	ENDORSED ORDER re 102 Notice of Hearing. All counsel may appear by telephone for the final pretrial conference. This case will not be on the December trial term, therefore another final pretrial conference will be noticed for the month prior to the start of the new trial term. Signed by Judge Paul G. Byron on 11/13/2015. (MMW) (Entered: 11/13/2015)
11/16/2015	104	NOTICE TO COUNSEL REGARDING TELEPHONIC FINAL PRETRIAL CONFERENCE: Counsel shall appear by calling into the Toll Free Meeting Number: 1-888-363-4735, Access Code: 3126210 and Security Code: 111715. (NBL) copies e-mailed (Entered: 11/16/2015)
11/17/2015	105	Minute Entry. (PRETRIAL CONFERENCE) Proceedings held before Judge Paul G. Byron on 11/17/2015. Court Reporter: Koretta Stanford (NBL) (Entered: 11/17/2015)
11/17/2015	106	NOTICE of Daubert Hearing (Oral Argument) re 56 MOTION to Exclude the Testimony of Defendant's Expert on Damages, DeForest McDuff, Ph.D. Daubert Hearing is set for 12/8/2015 at 1:30 PM in Orlando Courtroom 4 B before Judge Paul G. Byron. The Court has set aside (30) minutes per side. (NBL) copies e-mailed (Entered: 11/17/2015)
11/17/2015	107	NOTICE OF DATE CERTAIN JURY TRIAL: Jury Trial shall commence on Tuesday, 2/16/2016 at 9:00 AM in Orlando Courtroom 4 B before Judge Paul G. Byron,U.S. District Court, 401 West Central Blvd., Orlando, Florida. Trial is estimated at (5)days. (NBL) copies e-mailed (Entered: 11/17/2015)
11/17/2015	108	NOTICE OF FINAL PRETRIAL CONFERENCE: Final Pretrial Conference is set for 1/20/2016 at 3:00 PM in Orlando Courtroom 4 B before Judge Paul G. Byron, U.S. District Court, 401 West Central Blvd., Orlando, Florida. (NBL) copies emailed (Entered: 11/17/2015)
11/17/2015	109	NOTICE Regarding Summary Judgment Exhibits by Omega Patents, LLC re 54 MOTION for summary judgment as to Validity, Infringement, Enforceability, and Unfair Competition (Attachments: # 1 Exhibit PX5) (Santurri, Ryan) Text modified on 11/18/2015 (RDO). (Entered: 11/17/2015)
11/19/2015	110	NOTICE RESCHEDULING DAUBERT HEARING: re 56 Motion and Memorandum to Exclude the Testimony of Defendant's Expert on

		Damages, DeForest McDuff, Ph.D. The Daubert Hearing is rescheduled for Friday, 12/11/2015 at 1:00 PM in Orlando Courtroom 4 B before Judge Paul G. Byron, U.S. District Court, 401 West Central Blvd., Orlando, Florida. The Court has set aside (30) minutes per side. (NBL) copies e-mailed (Entered: 11/19/2015)
11/19/2015	111	NOTICE TO COUNSEL: The Daubert Hearing scheduled for December 11, 2015 at 1:00 pm will be Oral Argument, (30) minutes per side. (NBL) copies e-mailed (Entered: 11/19/2015)
11/19/2015	112	NOTICE of Appearance as Additional Counsel Appearance by Thomas R. Yaegers on behalf of Calamp Corp. (Yaegers, Thomas) (Entered: 11/19/2015)
11/30/2015	113	NOTICE by Omega Patents, LLC Regarding Accused Products (Santurri, Ryan) (Entered: 11/30/2015)
11/30/2015	114	NOTICE by Calamp Corp. Regarding Accused Devices (Attachments: # 1 Exhibit 1, # 2 Exhibit 2)(Kauth, Joel) (Entered: 11/30/2015)
12/11/2015	115	Minute Entry (DAUBERT HEARING) Proceedings held before Judge Paul G. Byron re 56 MOTION to Exclude the Testimony of Defendant's Expert on Damages, DeForest McDuff, Ph.D. Court takes motion under advisement. Court Reporter: Koretta Stanford (NBL) (Entered: 12/11/2015)
12/22/2015	116	NOTICE RESCHEDULING FINAL PRETRIAL CONFERENCE (TIME ONLY): Final Pretrial Conference is reset for 1/20/2016 at 4:00 PM in Orlando Courtroom 4 B before Judge Paul G. Byron, U.S. District Court, 401 West Central Blvd., Orlando, Florida. *(previously noticed for 3:00 pm) (NBL) copies e-mailed (Entered: 12/22/2015)
12/23/2015	117	ORDER granting in part and denying in part 55 Plaintiff's Motion and Memorandum of Law to Exclude the Testimony of Defendant's Expert Eric Andrews; granting 56 Plaintiff's Motion and Memorandum of Law to Exclude the Testimony of Defendant's Expert on Damages. Signed by Judge Paul G. Byron on 12/23/2015. (RML) (Entered: 12/23/2015)
12/23/2015	118	ORDER granting in part and denying in part 54 Plaintiff's Motion and Memorandum for Summary Judgment as to Validity, Infringement, Enforceability and Unfair Competition; denying 78 Defendant CalAmp Corp.'s Motion for Summary Judgment and Memorandum of Law Regarding Invalidity and Noninfringement. Signed by Judge Paul G. Byron on 12/23/2015. (RML) (Entered: 12/23/2015)
01/05/2016	119	ORDER granting in part and denying in part 93 Plaintiff's Motion to Bifurcate Issues of Inequitable Conduct and Prosecution Laches. Signed by Judge Paul G. Byron on 1/5/2016. (RML) (Entered: 01/05/2016)
01/07/2016	120	ENDORSED ORDER directing the parties to file with the Court all full deposition transcripts which they intend to designate for use at trial. Transcripts must be filed by 5:00 P.M. on January 11, 2016. Signed by Judge Paul G. Byron on 1/7/2016. (MMW) (Entered: 01/07/2016)
01/13/2016	121	ORDER denying without prejudice as premature 95 Defendant CalAmp Corp.'s Motion That U.S. Patent Nos. '876, '885, '727, and '278 Are Not Entitled To Any Priority Date Earlier Than Their Actual Filing Dates. Signed by Judge Paul G. Byron on 1/13/2016. (RML) (Entered: 01/13/2016)
01/19/2016	122	ORDER granting in part and denying in part 94 Plaintiff Omega Patents, LLC's Motion in Limine. Signed by Judge Paul G. Byron on 1/19/2016. (RML) (Entered: 01/19/2016)
01/20/2016	123	Minute Entry (FINAL PRETRIAL CONFERENCE) Proceedings held before Judge Paul G. Byron on 1/20/2016. Court Reporter: Diane Peede (NBL) (Entered: 01/21/2016)
01/21/2016	124	FEBRIARY 2016 TRIAL CALENDAR for United States District Judge Paul G. Byron.(NBL) copies e-mailed (Entered: 01/21/2016)
01/22/2016	125	

		CIVIL PRETRIAL ORDER and ORDER denying 96 Defendant CalAmp Corp.'s Motion in Limine. Signed by Judge Paul G. Byron on 1/22/2016. (RML) (Entered: 01/22/2016)
02/01/2016	126	ORDER re: [90-5] [90-6] the parties' objections to deposition designations and counter-designations. Signed by Judge Paul G. Byron on 2/1/2016. (RML) (Entered: 02/01/2016)
02/12/2016	127	Exhibit List by Calamp Corp.. (Kauth, Joel) (Entered: 02/12/2016)
02/12/2016	128	Witness List by Calamp Corp.. (Kauth, Joel) (Entered: 02/12/2016)
02/15/2016	129	Exhibit List (Corrected) by Calamp Corp.. (Kauth, Joel) (Entered: 02/15/2016)
02/16/2016	130	Minute Entry (JURY TRIAL DAY 1) Proceedings held before Judge Paul G. Byron on 2/16/2016. Court Reporter: Koretta Stanford (NBL) (Entered: 02/17/2016)
02/17/2016	131	Minute Entry (JURY TRIAL DAY 2) Proceedings held before Judge Paul G. Byron on 2/17/2016. Court Reporter: Koretta Stanford (NBL) (Entered: 02/17/2016)
02/18/2016	132	Minute Entry (JURY TRIAL DAY 3) Proceedings held before Judge Paul G. Byron on 2/18/2016. Court Reporter: Koretta Stanford (NBL) (Entered: 02/18/2016)
02/19/2016	133	Minute Entry (JURY TRIAL DAY 4) Proceedings held before Judge Paul G. Byron on 2/19/2016. Court Reporter: Koretta Stanford (NBL) (Entered: 02/19/2016)
02/22/2016	134	Minute Entry (JURY TRIAL DAY 5) Proceedings held before Judge Paul G. Byron on 2/22/2016. Court Reporter: Koretta Stanford (NBL) (Entered: 02/23/2016)
02/22/2016	135	ORAL MOTION for judgment as a matter of law by Calamp Corp. (NBL) (Entered: 02/23/2016)
02/22/2016	136	ORAL ORDER denying for the reasons stated on the record 135 Defendant's Oral Motion for Judgment as a Matter of Law. Rendered in Open Court by Judge Paul G. Byron on 2/22/2016. (NBL) (Entered: 02/23/2016)
02/23/2016	137	Minute Entry (JURY TRIAL DAY 6) Proceedings held before Judge Paul G. Byron on 2/23/2016. Court Reporter: Koretta Stanford (NBL) (Entered: 02/23/2016)
02/23/2016	138	ORAL MOTION for judgment as a matter of law on the issues of Obviousness, Written Description and Infringement by Omega Patents, LLC. (NBL) (Entered: 02/23/2016)
02/23/2016	139	ORAL ORDER re: 138 Plaintiff's Oral Motion for Judgment as a Matter of Law. For the reasons stated on the record, the Court WITHHOLDS as to the issue of Obviousness, GRANTS as to Written Description and DENIES as to Infringement. Rendered in Open Court by Judge Paul G. Byron on 2/23/2016. (NBL) Modified on 2/23/2016 (NBL). (Entered: 02/23/2016)
02/23/2016	140	ORAL MOTION for judgment as a matter of law as to the issues of Obviousness, Willful Infringement and Notice Date by Calamp Corp. (NBL) (Entered: 02/23/2016)
02/23/2016	141	ORAL ORDER denying for the reasons stated on the record 140 Defendant's Oral Motion for Judgment as a Matter of Law as to Obviousness, Willful Infringement and Notice Date. Rendered in Open Court by Judge Paul G. Byron on 2/23/2016. (NBL) (Entered: 02/23/2016)
02/24/2016	142	Minute Entry(JURY TRIAL DAY 7) Proceedings held before Judge Paul G. Byron on 2/24/2016. Jury Verdict for the Plaintiff. Court Reporter: Koretta Stanford (NBL) (Entered: 02/24/2016)
02/24/2016	143	COURT'S INSTRUCTIONS to the Jury (NBL) (Entered: 02/24/2016)

02/24/2016	144	JURY VERDICT in favor of the Plaintiff.(NBL) (Entered: 02/24/2016)
02/25/2016	145	PLAINTIFF and JOINT Exhibit List (Trial) by Omega Patents, LLC. (NBL) (Entered: 02/25/2016)
02/25/2016	146	DEFENDANT Exhibit List (Trial) by CalAmp Corp.(NBL) (Entered: 02/25/2016)
02/25/2016	147	COURT'S EXHIBIT LIST (Trial)(NBL) (Entered: 02/25/2016)
03/09/2016	148	MOTION and Memorandum for Entry of Final Judgment, Including Entitlement to Attorneys' Fees, Enhanced Damages, and Entry of a Permanent Injunction judgment by Omega Patents, LLC. (Gilchrist, Brian) Text modified on 3/10/2016 (RDO). (Entered: 03/09/2016)
03/09/2016	149	PROPOSED BILL OF COSTS by Omega Patents, LLC. (Attachments: # 1 Exhibit 1, # 2 Exhibit 2, # 3 Exhibit 3, # 4 Exhibit 4, # 5 Exhibit 5) (Gilchrist, Brian) (Entered: 03/09/2016)
03/14/2016	150	UNOPPOSED MOTION for Leave to File a Motion in Excess of Twenty-Five Pages by Calamp Corp.. (Kauth, Joel) Text modified on 3/15/2016 (RDO). (Entered: 03/14/2016)
03/15/2016	151	ENDORSED ORDER granting in part 150 Motion for Leave to File Excess Pages. Defendant may file a post-trial motion with a page limit of 35 pages and Plaintiff may file a response with a page limit of 30 pages. Signed by Judge Paul G. Byron on 3/15/2016. (MMW) (Entered: 03/15/2016)
03/16/2016	152	MOTION and Memorandum for miscellaneous relief, specifically to Award Prejudgment Interest by Omega Patents, LLC. (Attachments: # 1 Exhibit A)(Gilchrist, Brian) Text modified on 3/17/2016 (RDO). (Entered: 03/16/2016)
03/18/2016	153	ENDORSED ORDER denying without prejudice for failure to comply with Local Rule 3.01(g) 152 Motion to Award Prejudgment Interest. Signed by Judge Paul G. Byron on 3/18/2016. (MMW) (Entered: 03/18/2016)
03/18/2016	154	MOTION for miscellaneous relief, specifically Renewed Motion to Award Prejudgment Interest by Omega Patents, LLC. (Attachments: # 1 Exhibit A)(Gilchrist, Brian) (Entered: 03/18/2016)
03/22/2016	155	MOTION for Extension of Time to File and Enlargement of the Page Limitation for its Response to 148 MOTION for Final Judgment, Including Entitlement to Attorneys' Fees, Enhanced Damages, and Entry of a Permanent Injunction judgment by Calamp Corp.. (Kauth, Joel) Motions referred to Magistrate Judge David A. Baker. Text modified on 3/23/2016 (RDO). (Entered: 03/22/2016)
03/24/2016	156	MOTION for Charles R. Halloran to withdraw as attorney by Calamp Corp.. (Halloran, Charles) Motions referred to Magistrate Judge David A. Baker. (Entered: 03/24/2016)
03/24/2016	157	MOTION for Eugene K. Chong to withdraw as attorney by Calamp Corp.. (Chong, Eugene) Motions referred to Magistrate Judge David A. Baker. (Entered: 03/24/2016)
03/25/2016	158	ENDORSED ORDER granting 156 Motion to Withdraw as Attorney Attorney Eugene Chong and Charles R. Halloran terminated; granting 157 Motion to Withdraw as Attorney. Signed by Magistrate Judge David A. Baker on 3/25/2016. (Baker, David) (Entered: 03/25/2016)
03/25/2016	159	RESPONSE in Opposition re 155 MOTION for Extension of Time to File Response/Reply as to 148 MOTION for Final Judgment, Including Entitlement to Attorneys' Fees, Enhanced Damages, and Entry of a Permanent Injunction judgment filed by Omega Patents, LLC. (Gilchrist, Brian) (Entered: 03/25/2016)
03/28/2016	160	

		MOTION for Stephanie P. Koh to appear pro hac vice by Calamp Corp.. (Wozniak, Carrie) Motions referred to Magistrate Judge David A. Baker. (Entered: 03/28/2016)
03/28/2016	161	MOTION for Thomas D. Rein to appear pro hac vice by Calamp Corp.. (Wozniak, Carrie) Motions referred to Magistrate Judge David A. Baker. (Entered: 03/28/2016)
03/28/2016	162	MOTION for Constantine L. Trela, Jr. to appear pro hac vice by Calamp Corp.. (Wozniak, Carrie) Motions referred to Magistrate Judge David A. Baker. (Entered: 03/28/2016)
03/28/2016		***PRO HAC VICE FEES paid and Special Admission Attorney Certification Form filed by attorney Constantine L. Trela, appearing on behalf of Calamp Corp. (Filing fee $150 receipt number ORL052203.) Related document: 162 MOTION for Constantine L. Trela, Jr. to appear pro hac vice. (RDO) (Entered: 03/28/2016)
03/28/2016		***PRO HAC VICE FEES paid and Special Admission Attorney Certification Form filed by attorney Thomas D. Rein, appearing on behalf of Calamp Corp. (Filing fee $150 receipt number ORL052202.) Related document: 161 MOTION for Thomas D. Rein to appear pro hac vice. (RDO) (Entered: 03/28/2016)
03/28/2016		***PRO HAC VICE FEES paid and Special Admission Attorney Certification Form filed by attorney Stephanie P. Koh, appearing on behalf of Calamp Corp. (Filing fee $150 receipt number ORL052205.) Related document: 160 MOTION for Stephanie P. Koh to appear pro hac vice. (RDO) (Entered: 03/28/2016)
03/28/2016	163	ENDORSED ORDER granting in part and denying in part 155 Defendant Calamp Corp.'s Motion for Extension of Time to File and Enlargement of the Page Limitation for its Response to Plaintiff's Motion for Entry of Judgment. Calamp shall file its response to Plaintiff's Motion and Memorandum for Entry of Final Judgment, Including Entitlement to Attorneys' Fees, Enhanced Damages, and Entry of a Permanent Injunction on or before April 11, 2016. The response shall not exceed thirty (30) pages in length. Signed by Judge Paul G. Byron on 3/28/2016. (RML) (Entered: 03/28/2016)
03/29/2016		Set/reset deadlines as to 148 MOTION for Final Judgment, Including Entitlement to Attorneys' Fees, Enhanced Damages, and Entry of a Permanent Injunction judgment . Responses due by 4/11/2016 (RDO) (Entered: 03/29/2016)
03/30/2016	164	ENDORSED ORDER granting 160 motion to appear pro hac vice; granting 161 motion to appear pro hac vice; granting 162 motion to appear pro hac vice. Provided, all counsel shall register for and use the electronic filing system as adopted by the Court. After this Order, the Clerk will no longer send copies of docket entries by U.S. Mail to counsel in this case. Appearance and participation by more than one attorney at any hearing or trial is subject to the discretion of the presiding judge. Signed by Magistrate Judge David A. Baker on 3/30/2016. (Baker, David) (Entered: 03/30/2016)
03/31/2016	165	MOTION for Bryan C. Mulder to appear pro hac vice by Calamp Corp.. (Wozniak, Carrie) Motions referred to Magistrate Judge David A. Baker. (Entered: 03/31/2016)
03/31/2016		***PRO HAC VICE FEES paid and Special Admission Attorney Certification Form filed by attorney Bryan C. Mulder, appearing on behalf of Calamp Corp. (Filing fee $150 receipt number ORL052334.) Related document: 165 MOTION for Bryan C. Mulder to appear pro hac vice. (RDO) (Entered: 03/31/2016)
04/04/2016	166	RESPONSE in Opposition re 154 MOTION for miscellaneous relief, specifically Renewed Motion to Award Prejudgment Interest filed by Calamp Corp.. (Kauth, Joel) (Entered: 04/04/2016)

04/05/2016	167	ENDORSED ORDER granting 165 motion to appear pro hac vice. Provided, all counsel shall register for and use the electronic filing system as adopted by the Court. After this Order, the Clerk will no longer send copies of docket entries by U.S. Mail to counsel in this case. Appearance and participation by more than one attorney at any hearing or trial is subject to the discretion of the presiding judge. Signed by Magistrate Judge David A. Baker on 4/5/2016. (Baker, David) (Entered: 04/05/2016)
04/08/2016	168	MOTION to Review 149 Bill of Costs (filed as Response in Opposition/Objection) filed by Calamp Corp. (Kauth, Joel) Modified on 4/25/2016 (LMM). Motions referred to Magistrate Judge David A. Baker. (Entered: 04/08/2016)
04/11/2016	169	RESPONSE in Opposition re 148 MOTION for Final Judgment, Including Entitlement to Attorneys' Fees, Enhanced Damages, and Entry of a Permanent Injunction judgment filed by Calamp Corp.. (Kauth, Joel) (Entered: 04/11/2016)
04/11/2016	170	APPENDIX re 169 Response in Opposition to Motion by Calamp Corp.. (Attachments: # 1 Exhibit 1, # 2 Exhibit 2, # 3 Exhibit 3, # 4 Exhibit 4, # 5 Exhibit 5, # 6 Exhibit 6, # 7 Exhibit 7, # 8 Exhibit 8, # 9 Exhibit 9, # 10 Exhibit 10, # 11 Exhibit 11, # 12 Exhibit 12, # 13 Exhibit 13, # 14 Exhibit 14, # 15 Exhibit 15, # 16 Exhibit 16, # 17 Exhibit 17, # 18 Exhibit 18, # 19 Exhibit 19, # 20 Exhibit 20, # 21 Exhibit 21, # 22 Exhibit 22, # 23 Exhibit 23, # 24 Exhibit 24)(Kauth, Joel) (Entered: 04/11/2016)
04/11/2016	171	MOTION for miscellaneous relief, specifically Request for Hearing re 148 Motion for Entry of Final Judgment by Calamp Corp.. (Kauth, Joel) Modified on 4/12/2016 (RDO). (Entered: 04/11/2016)
04/14/2016	172	ENDORSED ORDER granting 171 Defendant's Motion for Hearing Regarding Plaintiff's Motion for Entry of Final Judgment, Including Entitlement to Attorney's Fees, Enhanced Damages, and Entry of a Permanent Injunction. A separate Notice of Hearing will follow. Signed by Judge Paul G. Byron on 4/14/2016. (RML) (Entered: 04/14/2016)
04/14/2016	173	NOTICE OF MOTION HEARING: re 148 MOTION for Final Judgment, Including Entitlement to Attorneys' Fees, Enhanced Damages, and Entry of a Permanent Injunction judgment. Motion Hearing is set for Tuesday, 4/26/2016 at 2:00 PM in Orlando Courtroom 4 B before Judge Paul G. Byron, U.S. District Court, 401 West Central Blvd., Orlando, Florida. The Court has set aside (3) hours for this hearing. (NBL) copies e-mailed (Entered: 04/14/2016)
04/18/2016	174	Unopposed MOTION for miscellaneous relief, specifically Reschedule Hearing (Currently Scheduled for April 26, 2016) by Omega Patents, LLC. (Santurri, Ryan) (Entered: 04/18/2016)
04/19/2016	175	ENDORSED ORDER granting 174 Plaintiff's Unopposed Motion to Reschedule Hearing. A separate Notice of Hearing will follow. Signed by Judge Paul G. Byron on 4/19/2016. (RML) (Entered: 04/19/2016)
04/19/2016	176	NOTICE RESCHEDULING MOTION HEARING re 148 MOTION for Final Judgment, Including Entitlement to Attorneys' Fees, Enhanced Damages, and Entry of a Permanent Injunction judgment. Motion Hearing is rescheduled for 5/2/2016 at 1:30 PM in Orlando Courtroom 4 B before Judge Paul G. Byron, U.S. District Court, 401 West Central Blvd., Orlando, Florida. The Court has set aside (3) hours for this hearing. *(previously set for 4/26/16)(NBL) copies e-mailed (Entered: 04/19/2016)
04/22/2016	177	RESPONSE in opposition to 168 Motion to Review Bill of Costs filed by Omega Patents, LLC. (Attachments: # 1 Exhibit A, # 2 Exhibit B)(Santurri, Ryan) Modified on 4/25/2016 (LMM). Modified on 4/25/2016 (LMM). (Entered: 04/22/2016)
04/25/2016	178	TRANSCRIPT of Civil Jury Trial - Day 1 held on 2/16/16 before Judge Paul G. Byron. Court Reporter/Transcriber Koretta Stanford, Telephone number 407-872-1715 or skoretta@bellsouth.net. Transcript may be viewed at the

court public terminal or purchased through the Court Reporter/Transcriber before the deadline for Release of Transcript Restriction. After that date it may be obtained through PACER or purchased through the Court Reporter. Redaction Request due 5/16/2016, Redacted Transcript Deadline set for 5/26/2016, Release of Transcript Restriction set for 7/25/2016. (KS) (Entered: 04/25/2016)

04/25/2016 179 TRANSCRIPT of Civil Jury Trial - Day 2 held on 02/17/16 before Judge Paul G. Byron. Court Reporter/Transcriber Koretta Stanford, Telephone number 407-872-1715. Transcript may be viewed at the court public terminal or purchased through the Court Reporter/Transcriber before the deadline for Release of Transcript Restriction. After that date it may be obtained through PACER or purchased through the Court Reporter. Redaction Request due 5/16/2016, Redacted Transcript Deadline set for 5/26/2016, Release of Transcript Restriction set for 7/25/2016. (KS) (Entered: 04/25/2016)

04/25/2016 180 TRANSCRIPT of Civil Jury Trial - Day 3 held on 02/18/16 before Judge Paul G. Byron. Court Reporter/Transcriber Koretta Stanford,Telephone number 407-872-1715. Transcript may be viewed at the court public terminal or purchased through the Court Reporter/Transcriber before the deadline for Release of Transcript Restriction. After that date it may be obtained through PACER or purchased through the Court Reporter. Redaction Request due 5/16/2016, Redacted Transcript Deadline set for 5/26/2016, Release of Transcript Restriction set for 7/25/2016. (KS) (Entered: 04/25/2016)

04/25/2016 181 TRANSCRIPT of Civil Jury Trial - Day 4 held on 2/19/16 before Judge Paul G. Byron. Court Reporter/Transcriber Koretta Stanford,Telephone number 407-872-1715. Transcript may be viewed at the court public terminal or purchased through the Court Reporter/Transcriber before the deadline for Release of Transcript Restriction. After that date it may be obtained through PACER or purchased through the Court Reporter. Redaction Request due 5/16/2016, Redacted Transcript Deadline set for 5/26/2016, Release of Transcript Restriction set for 7/25/2016. (KS) (Entered: 04/25/2016)

04/25/2016 182 TRANSCRIPT of Civil Jury Trial - Day 5 held on 2/22/16 before Judge Paul G. Byron. Court Reporter/Transcriber Koretta Stanford, Telephone number 407-872-1715. Transcript may be viewed at the court public terminal or purchased through the Court Reporter/Transcriber before the deadline for Release of Transcript Restriction. After that date it may be obtained through PACER or purchased through the Court Reporter. Redaction Request due 5/16/2016, Redacted Transcript Deadline set for 5/26/2016, Release of Transcript Restriction set for 7/25/2016. (KS) (Entered: 04/25/2016)

04/25/2016 183 TRANSCRIPT of Civil Jury Trial - Day 6 held on 2/23/16 before Judge Paul G. Byron. Court Reporter/Transcriber Koretta Stanford,Telephone number 407-872-1715. Transcript may be viewed at the court public terminal or purchased through the Court Reporter/Transcriber before the deadline for Release of Transcript Restriction. After that date it may be obtained through PACER or purchased through the Court Reporter. Redaction Request due 5/16/2016, Redacted Transcript Deadline set for 5/26/2016, Release of Transcript Restriction set for 7/25/2016. (KS) (Entered: 04/25/2016)

04/25/2016 184 TRANSCRIPT of Civil Jury Trial - Day 7 held on 2/24/16 before Judge Paul G. Byron. Court Reporter/Transcriber Koretta Stanford,Telephone number 407-872-1715. Transcript may be viewed at the court public terminal or purchased through the Court Reporter/Transcriber before the deadline for Release of Transcript Restriction. After that date it may be obtained through PACER or purchased through the Court Reporter. Redaction Request due 5/16/2016, Redacted Transcript Deadline set for 5/26/2016,

Release of Transcript Restriction set for 7/25/2016. (KS) (Entered: 04/25/2016)

04/25/2016 185 NOTICE to counsel of filing of OFFICIAL TRANSCRIPT, Doc 178 through 184. The parties have seven (7) calendar days to file with the court a Notice of Intent to Request Redaction of this transcript. If no such Notice is filed, the transcript may be made remotely electronically available to the public without redaction after 90 calendar days. Any party needing a copy of the transcript to review for redaction purposes may purchase a copy from the court reporter or view the document at the clerk's office public terminal. Court Reporter: Koretta Stanford. (KS) (Entered: 04/25/2016)

04/26/2016 186 ORDER denying without prejudice 168 Motion to review bill of costs. Signed by Magistrate Judge David A. Baker on 4/26/2016. (SWT) (Entered: 04/26/2016)

04/28/2016 187 NOTICE by Omega Patents, LLC of Filing Declarations (Attachments: # 1 Exhibit Declaration of Robert Leale II, # 2 Exhibit Declaration of Thomas Malone)(Santurri, Ryan) (Entered: 04/28/2016)

04/29/2016 188 NOTICE by Calamp Corp. re 187 Notice (Other) of Filing Responsive Declarations (Attachments: # 1 Exhibit Declaration of Wade Files, # 2 Exhibit Declaration of Wade Huber)(Kauth, Joel) (Entered: 04/29/2016)

05/02/2016 189 Minute Entry (MOTION HEARING) Proceedings held before Judge Paul G. Byron on 5/2/2016 re 148 MOTION for Final Judgment, Including Entitlement to Attorneys' Fees, Enhanced Damages, and Entry of a Permanent Injunction judgment filed by Omega Patents, LLC. Written Order to issue.Court Reporter: Koretta Stanford (NBL) (Entered: 05/03/2016)

05/12/2016 190 TRANSCRIPT of the final pretrial conference held on 1/20/16 before Judge Paul G. Byron. Court Reporter/Transcriber Diane Peede, FlaDiane@att.net, telephone number 407-615-0305. Transcript may be viewed at the court public terminal or purchased through the Court Reporter/Transcriber before the deadline for Release of Transcript Restriction. After that date it may be obtained through PACER or purchased through the Court Reporter.. Redaction Request due 6/2/2016, Redacted Transcript Deadline set for 6/13/2016, Release of Transcript Restriction set for 8/10/2016. (DP) (Entered: 05/12/2016)

05/12/2016 191 NOTICE to counsel of filing of OFFICIAL TRANSCRIPT (Doc. No. 190). The parties have seven (7) calendar days to file with the court a Notice of Intent to Request Redaction of this transcript. If no such Notice is filed, the transcript may be made remotely electronically available to the public without redaction after 90 calendar days. Any party needing a copy of the transcript to review for redaction purposes may purchase a copy from the court reporter or view the document at the clerk's office public terminal. Court Reporter: Diane Peede. (DP) (Entered: 05/12/2016)

05/17/2016 192 NOTICE of supplemental authority re 169 Response in Opposition to 148 Motion for entry of Judgment by Calamp Corp.. (Attachments: # 1 Exhibit 1)(Kauth, Joel) Modified on 5/18/2016 (RDO). (Entered: 05/17/2016)

06/06/2016 193 NOTICE of Grant of Reexamination of '885 Patent re 169 Response in Opposition to Motion by Calamp Corp.. (Attachments: # 1 Exhibit 1) (Kauth, Joel) Text modified on 6/7/2016 (RDO). (Entered: 06/06/2016)

06/13/2016 194 NOTICE of supplemental authority re 148 MOTION for Final Judgment, Including Entitlement to Attorneys' Fees, Enhanced Damages, and Entry of a Permanent Injunction judgment by Omega Patents, LLC. (Attachments: # 1 Exhibit A)(Gilchrist, Brian) (Entered: 06/13/2016)

06/14/2016 195 RESPONSE re 194 Notice of filing supplemental authority by Calamp Corp.. (Wozniak, Carrie) (Entered: 06/14/2016)

06/22/2016 196 TRANSCRIPT of Motion Hearing held on 05/02/16 before Judge Paul G. Byron. Court Reporter/Transcriber Koretta Stanford, Telephone number

		407-872-1715 or skoretta@bellsouth.net. Transcript may be viewed at the court public terminal or purchased through the Court Reporter/Transcriber before the deadline for Release of Transcript Restriction. After that date it may be obtained through PACER or purchased through the Court Reporter. Redaction Request due 7/13/2016, Redacted Transcript Deadline set for 7/25/2016, Release of Transcript Restriction set for 9/20/2016. (KS) (Entered: 06/22/2016)	
06/22/2016	197	NOTICE to counsel of filing of OFFICIAL TRANSCRIPT, Doc. 196. The parties have seven (7) calendar days to file with the court a Notice of Intent to Request Redaction of this transcript. If no such Notice is filed, the transcript may be made remotely electronically available to the public without redaction after 90 calendar days. Any party needing a copy of the transcript to review for redaction purposes may purchase a copy from the court reporter or view the document at the clerk's office public terminal. Court Reporter: Koretta Stanford. (KS) (Entered: 06/22/2016)	
07/19/2016	198	RESPONSE re 192 Notice of filing supplemental authority filed by Omega Patents, LLC. (Attachments: # 1 Exhibit 1, # 2 Exhibit 2, # 3 Exhibit 3) (Gilchrist, Brian) (Entered: 07/19/2016)	
07/22/2016	199	REPLY to 198 Response filed by Calamp Corp.. (Attachments: # 1 Exhibit 1, Beckert, # 2 Exhibit 2, Suman, # 3 Exhibit 3, J1850, # 4 Exhibit 4, J2178, # 5 Exhibit 5, 876 Claim Chart)(Mulder, Bryan) Text modified on 7/25/2016 (RDO). (Entered: 07/22/2016)	
08/30/2016	200	NOTICE of supplemental authority re 169 Response in Opposition to Motion by Calamp Corp.. (Wozniak, Carrie) (Entered: 08/30/2016)	
08/30/2016	201	NOTICE of supplemental authority re 169 Response in Opposition to Motion by Calamp Corp.. (Attachments: # 1 Exhibit 1)(Wozniak, Carrie) (Entered: 08/30/2016)	
09/19/2016	202	NOTICE of supplemental authority re 169 Response in Opposition to Motion for Entry of Final Judgment by Calamp Corp.. (Attachments: # 1 Exhibit 1)(Wozniak, Carrie) (Entered: 09/19/2016)	
10/03/2016	203	Case Reassigned to Magistrate Judge Daniel C. Irick. New case number: 6:13-cv-1950-ORL-40-DCI. Magistrate Judge David A. Baker no longer assigned to the case. (EJS) (Entered: 10/03/2016)	
10/21/2016	204	ENDORSED ORDER: The Court has taken the various notices of supplemental authority and related declarations and exhibits under advisement and is currently drafting its opinion. Prior to submitting any additional material relating to the post trial motions, the proponent SHALL seek leave of Court. Signed by Judge Paul G. Byron on 10/21/2016. (MMW) (Entered: 10/21/2016)	Events since last full update

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*** THIS DATA IS FOR INFORMATIONAL PURPOSES ONLY ***

Citing References (28)

Treatment	Title	Date	Type	Depth	Headnote(s)
Examined by	**1. Plaintiff's Reply in Support of Its Motion for Summary Judgment as to Validity, Infringement, Enforceability, and Unfair Competition** Out Of Plan OMEGA PATENTS, LLC, a Georgia limited liability company, Plaintiff, v. CALAMP CORP., a Delaware corporation, Defendant. 2015 WL 10478030, *1+ , M.D.Fla. (Trial Motion, Memorandum and Affidavit)	Aug. 03, 2015	Motion		—
Examined by	**2. Plaintiff's Motion and Memorandum for Summary Judgment As to Validity, Infringement, Enforceability and Unfair Competition** Out Of Plan OMEGA PATENTS, LLC, a Georgia limited liability company, Plaintiff, v. CALAMP CORP., a Delaware corporation, Defendant. 2015 WL 7687819, *1+ , M.D.Fla. (Trial Motion, Memorandum and Affidavit)	July 01, 2015	Motion		—
Examined by	**3. Defendant CalAmp Corp.'s Opening Claim Construction Brief** Out Of Plan OMEGA PATENTS, LLC, a Georgia Limited Liability Company, Plaintiff, v. CALAMP CORP., a Delaware Corporation, Defendant. 2014 WL 7691270, *1+ , M.D.Fla. (Trial Motion, Memorandum and Affidavit)	Sep. 05, 2014	Motion		—
Discussed by	**4. Calamp Corp.'s First Amended Counterclaim** Out Of Plan OMEGA PATENTS, LLC, a Georgia limited liability company, Plaintiff/Counterdefendant, v. CALAMP CORP., a Delaware corporation, Defendant/ Counterplainti... 2014 WL 11209166, *1+ , M.D.Fla. (Trial Pleading)	Feb. 24, 2014	Petition		—
Discussed by	**5. Defendant Calamp Corp.'s Motion for Summary Judgment of Noninfringement** Out Of Plan OMEGA PATENTS, LLC, a Georgia limited liability company, Plaintiff, v. CALAMP CORP., a Delaware corporation, Defendant. 2015 WL 10477983, *1+ , M.D.Fla. (Trial Motion, Memorandum and Affidavit)	July 01, 2015	Motion		—
Discussed by	**6. Verdict Form** Out Of Plan OMEGA PATENTS, LLC, Plaintiff, v. CALAMP CORP., Defendant. 2016 WL 1287121, *1+ , M.D.Fla. (Verdict, Agreement and Settlement)	Feb. 24, 2016	Jury Verdict		—
Cited by	**7. Defendant Calamp Corp.'s Answer to Plaintiff's Complaint, Counterclaim, and Jury Demand** Out Of Plan OMEGA PATENTS, LLC, a Georgia limited liability company, Plaintiff, v. CALAMP CORP., a Delaware corporation, Defendant. 2014 WL 11621847, *1+ , M.D.Fla. (Trial Pleading)	Jan. 15, 2014	Petition		—

Treatment	Title	Date	Type	Depth	Headnote(s)
Cited by	**8.** Defendant Calamp Corp.'s Motion for Summary Judgment of Invalidity Out Of Plan OMEGA PATENTS, LLC, a Georgia limited liability company, Plaintiff, v. CALAMP CORP., a Delaware corporation, Defendant. 2015 WL 10478022, *1 , M.D.Fla. (Trial Motion, Memorandum and Affidavit)	July 01, 2015	Motion		—
Cited by	**9.** Joint Pretrial Statement Out Of Plan OMEGA PATENTS, LLC, a Georgia limited liability company, Plaintiff, v. CALAMP CORP., a Delaware corporation, Defendant. 2015 WL 10477832, *1+ , M.D.Fla. (Trial Filing)	Sep. 22, 2015	Filing		—
Mentioned by	**10.** Multi-vehicle compatible control system generating command signals on a data bus and associated methods LitAlert P2013-52-29	Dec. 20, 2013	Lit Alert		—
Mentioned by	**11.** Omega Patents, Llc's Motion and Memorandum to Dismiss Counterclaims Out Of Plan OMEGA PATENTS, LLC, a Georgia limited liability company, Plaintiff, v. CALAMP CORP., a Delaware corporation, Defendant. 2014 WL 11209189, *1 , M.D.Fla. (Trial Motion, Memorandum and Affidavit)	Feb. 05, 2014	Motion		—
Mentioned by	**12.** Omega Patents, LLC's Motion and Memorandum to Dismiss Counterclaims Out Of Plan OMEGA PATENTS, LLC, a Georgia limited liability company, Plaintiff, v. CALAMP CORP., a Delaware corporation, Defendant. 2014 WL 11621911, *1 , M.D.Fla. (Trial Motion, Memorandum and Affidavit)	Feb. 05, 2014	Motion		—
—	**13.** MULTI VEHICLE COMPATIBLE TRACKING UNIT FOR VEHICLES HAS DOWNLOADING INTERFACE, WHICH ENABLES DOWNLOADING OF ENABLING DATA RELATED TO AT LEAST ONE CORRESPONDING VEHICLE DEVICE CODE TO BE USED BY MULTI-VEHICLE COMPATIBLE CONTROLLER Out Of Plan DWPI 2008-A15683	May 17, 2000	DWPI	—	—
—	**14.** RF 019515/0350 Out Of Plan	July 03, 2007	Assignments	—	—
—	**15.** PatStat 8032278	Nov. 10, 2015	Patent Status Files	—	—
—	**16.** OMEGA PATENTS, LLC v. CALAMP CORP	Dec. 20, 2013	Docket Summaries	—	—
—	**17.** OMEGA PATENTS, LLC v. ENFORA, INC	Feb. 28, 2013	Docket Summaries	—	—

Treatment	Title	Date	Type	Depth	Headnote(s)
—	**18.** SYSTEMS AND METHODS FOR COLLECTING INFORMATION FROM VEHICLE DEVICES VIA A VEHICLE DATA BUS Out Of Plan US PAT 9171460 , U.S. PTO Utility Systems and methods in accordance with embodiments of the invention continuously collecting information via a vehicle data bus, store the information in a database, and retrieve...	Oct. 27, 2015	Patents	—	—
—	**19.** SYSTEM INCLUDING VEHICLE LOCATION ALERT BASED COMMUNICATION WITH A VEHICLE AUDIO ENTERTAINMENT SYSTEM AND RELATED METHODS Out Of Plan US PAT 9159233+ , U.S. PTO Utility A system for a vehicle having a data communications bus extending throughout the vehicle, and an audio entertainment system coupled to the data communications bus may include a...	Oct. 13, 2015	Patents	—	—
—	**20.** VEHICLE WITH AT LEAST ONE ENVIRONMENT DETECTION SYSTEM Out Of Plan US PAT 9111452 , U.S. PTO Utility A vehicle is equipped with at least one environment detection system, a communication system which transmits information by remote transmission to receivers external to the...	Aug. 18, 2015	Patents	—	—
—	**21.** COMMUNICATION DEVICE AND CAR FINDER SYSTEM Out Of Plan US PAT 9037081 , U.S. PTO Utility A car finder system has a portable terminal that receives a preset operation performed thereon for wirelessly transmitting a preset car finder instruction. A communication device...	May 19, 2015	Patents	—	—
—	**22.** SYSTEM INCLUDING VEHICLE SPEED ALERT BASED COMMUNICATION WITH A VEHICLE AUDIO ENTERTAINMENT SYSTEM AND RELATED METHODS Out Of Plan US PAT 9031546+ , U.S. PTO Utility A system for a vehicle having a data communications bus extending throughout the vehicle, and an audio entertainment system coupled to the data communications bus may include a...	May 12, 2015	Patents	—	—
—	**23.** SYSTEMS AND METHODS FOR COLLECTING INFORMATION FROM VEHICLE DEVICES VIA A VEHICLE DATA BUS Out Of Plan US PAT 8812173 , U.S. PTO Utility Systems and methods in accordance with embodiments of the invention continuously collect information from vehicle devices via a vehicle data bus, store information in a database,...	Aug. 19, 2014	Patents	—	—

Treatment	Title	Date	Type	Depth	Headnote(s)
—	**24.** REMOTE FUNCTION CONTROL SYSTEM FOR A VEHICLE HAVING A DATA COMMUNICATIONS BUS AND RELATED METHODS Out Of Plan US PAT APP 20150291109 , U.S. PTO Application A remote function control system is for a vehicle including a data communications bus extending throughout the vehicle and coupled to a plurality of vehicle devices, and a wired...	Oct. 15, 2015	Patents	—	—
—	**25.** REMOTE FUNCTION CONTROL SYSTEM FOR A VEHICLE HAVING A DATA COMMUNICATIONS BUS AND RELATED METHODS Out Of Plan US PAT APP 20150246658 , U.S. PTO Application A remote function control system is for a vehicle including a data communications bus extending throughout the vehicle and coupled to a plurality of vehicle devices, and a wired...	Sep. 03, 2015	Patents	—	—
—	**26.** SYSTEM INCLUDING VEHICLE LOCATION ALERT BASED COMMUNICATION WITH A VEHICLE AUDIO ENTERTAINMENT SYSTEM AND RELATED METHODS Out Of Plan US PAT APP 20140266811 , U.S. PTO Application A system for a vehicle having a data communications bus extending throughout the vehicle, and an audio entertainment system coupled to the data communications bus may include a...	Sep. 18, 2014	Patents	—	—
—	**27.** SYSTEM INCLUDING VEHICLE SPEED ALERT BASED COMMUNICATION WITH A VEHICLE AUDIO ENTERTAINMENT SYSTEM AND RELATED METHODS Out Of Plan US PAT APP 20140274012 , U.S. PTO Application A system for a vehicle having a data communications bus extending throughout the vehicle, and an audio entertainment system coupled to the data communications bus may include a...	Sep. 18, 2014	Patents	—	—
—	**28.** REMOTE FUNCTION CONTROL SYSTEM FOR A VEHICLE HAVING A DATA COMMUNICATIONS BUS AND RELATED METHODS Out Of Plan US PAT APP 20140277838 , U.S. PTO Application A remote function control system for a vehicle including a data communications bus extending throughout the vehicle and coupled to vehicle devices may include a wireless data bus...	Sep. 18, 2014	Patents	—	—

UNITED STATES PATENT AND TRADEMARK OFFICE

UNITED STATES DEPARTMENT OF COMMERCE
United States Patent and Trademark Office
Address: COMMISSIONER FOR PATENTS
P.O. Box 1450
Alexandria, Virginia 22313-1450
www.uspto.gov

REEXAM CONTROL NUMBER	FILING OR 371 (c) DATE	PATENT NUMBER
90/013,851	10/28/2016	8032278

CONFIRMATION NO. 8717

REEXAM ASSIGNMENT NOTICE

CHRISTOPHER F. REGAN, ESQUIRE
ALLEN, DYER, DOPPELT, MILBRATH & GILCHRIST, P.A.
P. O. BOX 3791
ORLANDO, FL 32802-3791

OC000000086898951

Date Mailed: 11/01/2016

NOTICE OF ASSIGNMENT OF REEXAMINATION REQUEST

The above-identified request for reexamination has been assigned to Art Unit 3993. All future correspondence to the proceeding should be identified by the control number listed above and directed to the assigned Art Unit.

A copy of this Notice is being sent to the latest attorney or agent of record in the patent file or to all owners of record. (See 37 CFR 1.33(c)). If the addressee is not, or does not represent, the current owner, he or she is required to forward all communications regarding this proceeding to the current owner(s). An attorney or agent receiving this communication who does not represent the current owner(s) may wish to seek to withdraw pursuant to 37 CFR 1.36 in order to avoid receiving future communications. If the address of the current owner(s) is unknown, this communication should be returned within the request to withdraw pursuant to Section 1.36.

NOTICE OF USPTO EX PARTE REEXAMINATION PATENT OWNER STATEMENT WAIVER PROGRAM

The USPTO has implemented a pilot program where, after a reexamination proceeding has been granted a filing date and before the examiner begins his or her review, the patent owner may orally waive the right to file a patent owner's statement. See *"Pilot Program for Waiver of Patent Owner's Statement in Ex Parte Reexamination Proceedings,"* 75 FR 47269 (August 5, 2010). One goal of the pilot program is to reduce the pendency of reexamination proceedings and improve the efficiency of the reexamination process.

Ordinarily when ex parte reexamination is ordered, the USPTO must wait until after the receipt of the patent owner's statement and the third party requester's reply, or after the expiration of the time period for filing the statement and reply (a period that can be as long as 5 to 6 months), before mailing a first determination of patentability. The USPTO's first determination of patentability is usually a first Office action on the merits or a Notice of Intent to Issue Reexamination Certificate (NIRC).

Under the pilot program, the patent owner's oral waiver allows the USPTO to act on the first determination of patentability immediately after determining that reexamination will be ordered, and in a suitable case issue the reexamination order and the first determination of patentability (which could be a NIRC if the claims under reexamination are confirmed) at the same time.

Benefits to the Patent Owner for participating in this pilot program include reduction in pendency.

To participate in this pilot program, Patent Owners may contact the USPTO's Central Reexamination Unit (CRU) at 571-272-7705. The USPTO will make the oral waiver of record in the reexamination file in an interview summary and a copy will be mailed to the patent owner and any third party requester.

cc: Third Party Requester(if any)
KPPB LLP
2400 EAST KATELLA AVENUE
SUITE 1050
ANAHEIM, CA 92806

/abjones/

Legal Instruments Examiner
Central Reexamination Unit 571-272-7705; FAX No. 571-273-9900

UNITED STATES PATENT AND TRADEMARK OFFICE

UNITED STATES DEPARTMENT OF COMMERCE
United States Patent and Trademark Office
Address: COMMISSIONER FOR PATENTS
P.O. Box 1450
Alexandria, Virginia 22313-1450
www.uspto.gov

REEXAM CONTROL NUMBER	FILING OR 371 (c) DATE	PATENT NUMBER
90/013,851	10/28/2016	8032278

CONFIRMATION NO. 8717

REEXAMINATION REQUEST NOTICE

KPPB LLP
2400 EAST KATELLA AVENUE
SUITE 1050
ANAHEIM, CA 92806

OC000000086898949

Date Mailed: 11/01/2016

NOTICE OF REEXAMINATION REQUEST FILING DATE

(Third Party Requester)

Requester is hereby notified that the filing date of the request for reexamination is 10/28/2016, the date that the filing requirements of 37 CFR § 1.510 were received.

A decision on the request for reexamination will be mailed within three months from the filing date of the request for reexamination. (See 37 CFR 1.515(a)).

A copy of the Notice is being sent to the person identified by the requester as the patent owner. Further patent owner correspondence will be the latest attorney or agent of record in the patent file. (See 37 CFR 1.33). Any paper filed should include a reference to the present request for reexamination (by Reexamination Control Number).

cc: Patent Owner
CHRISTOPHER F. REGAN, ESQUIRE
ALLEN, DYER, DOPPELT, MILBRATH & GILCHRIST, P.A.
P. O. BOX 3791
ORLANDO, FL 32802-3791

/abjones/

Legal Instruments Examiner
Central Reexamination Unit 571-272-7705; FAX No. 571-273-9900

Patent Assignment Abstract of Title

Total Assignments: 1

Application #: 11773272 **Filing Dt:** 07/03/2007 **Patent #:** 8032278 **Issue Dt:** 10/04/2011
PCT #: NONE **Intl Reg #:** **Publication #:** US20070279283 **Pub Dt:** 12/06/2007
Inventor: Kenneth E. Flick
Title: VEHICLE TRACKING UNIT WITH DOWNLOADABLE CODES AND ASSOCIATED METHODS

Assignment: 1

Reel/Frame: 019515 / 0350 **Received:** 07/03/2007 **Recorded:** 07/03/2007 **Mailed:** 07/03/2007 **Pages:** 3
Conveyance: ASSIGNMENT OF ASSIGNORS INTEREST (SEE DOCUMENT FOR DETAILS).
Assignor: FLICK, KENNETH E., MR. **Exec Dt:** 07/02/2007
Assignee: OMEGA PATENTS, L.L.C.
5326 PRESLEY PLACE
DOUGLASVILLE, GEORGIA 30135
Correspondent: CHRISTOPHER F. REGAN
255 S. ORANGE AVENUE
SUITE 1401
ORLANDO, FL 32801

Search Results as of: 10/31/2016 05:01 PM

If you have any comments or questions concerning the data displayed, contact PRD / Assignments at 571-272-3350. v.2.5
Web interface last modified: Aug 20, 2015 v.2.5

PTO/SB/57 (09-16)
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(Also referred to as FORM PTO-1465)

REQUEST FOR *EX PARTE* REEXAMINATION TRANSMITTAL FORM

Address to:
Mail Stop *Ex Parte* Reexam
Commissioner for Patents
P.O. Box 1450
Alexandria, VA 22313-1450

Attorney Docket No.: C13-03896.RE2

Date: October 28, 2016

1. ☑ This is a request for *ex parte* reexamination pursuant to 37 CFR 1.510 of patent number 8,032,278 issued October 4, 2011. The request is made by:
   ☐ patent owner. ☑ third party requester.
2. ☑ The name and address of the person requesting reexamination is:
   David H. Kaveh, KPPB LLP
   2400 E. Katella Avenue, Suite 1050
   Anaheim, CA 92806
3. Requester asserts ☐ small entity status (37 CFR 1.27) or ☐ certifies micro entity status (37 CFR 1.29). Only a patent owner requester can certify micro entity status. Form PTO/SB/15A or B must be attached to certify micro entity status.
4. ☐ a. A check in the amount of $_____ is enclosed to cover the reexamination fee, 37 CFR 1.20(c)(1);
   ☐ b. The Director is hereby authorized to charge the fee as set forth in 37 CFR 1.20(c)(1) to Deposit Account No. _____;
   ☐ c. Payment by credit card. Form PTO-2038 is attached; **or**
   ☑ d. Payment made via EFS-Web.
5. ☑ Any refund should be made by ☐ check or ☑ credit to Deposit Account No. 50-4407. 37 CFR 1.26(c). If payment is made by credit card, refund must be to credit card account.
6. ☑ A copy of the patent to be reexamined having a double column format on one side of a separate paper is enclosed. 37 CFR 1.510(b)(4).
7. ☐ CD-ROM or CD-R in duplicate, Computer Program (Appendix) or large table
   ☐ Landscape Table on CD
8. ☐ Nucleotide and/or Amino Acid Sequence Submission
   If applicable, items a. – c. are required.
   a. ☐ Computer Readable Form (CRF)
   b. Specification Sequence Listing on:
      i. ☐ CD-ROM (2 copies) or CD-R (2 copies); **or**
      ii. ☐ paper
   c. ☐ Statements verifying identity of above copies
9. ☐ A copy of any disclaimer, certificate of correction or reexamination certificate issued in the patent is included.
10. ☑ Reexamination of claim(s) 1-22 is requested.
11. ☑ A copy of every patent or printed publication relied upon is submitted herewith including a listing thereof on Form PTO/SB/08, PTO-1449, or equivalent.
12. ☐ An English language translation of all necessary and pertinent non-English language patents and/or printed publications is included.

This collection of information is required by 37 CFR 1.510. The information is required to obtain or retain a benefit by the public which is to file (and by the USPTO to process) a request for reexamination. Confidentiality is governed by 35 U.S.C. 122 and 37 CFR 1.11 and 1.14. This collection is estimated to take 18 minutes to complete, including gathering, preparing, and submitting the completed application form to the USPTO. Time will vary depending upon the individual case. Any comments on the amount of time you require to complete this form and/or suggestions for reducing this burden, should be sent to the Chief Information Officer, U.S. Patent and Trademark Office, U.S. Department of Commerce, P.O. Box 1450, Alexandria, VA 22313-1450. DO NOT SEND FEES OR COMPLETED FORMS TO THIS ADDRESS. **SEND TO: Mail Stop *Ex Parte* Reexam, Commissioner for Patents, P.O. Box 1450, Alexandria, VA 22313-1450.**
If you need assistance in completing the form, call 1-800-PTO-9199 and select option 2.

13. ☑ The attached detailed request includes at least the following items:

a. A statement identifying each substantial new question of patentability based on prior patents and printed publications. 37 CFR 1.510(b)(1).

b. An identification of every claim for which reexamination is requested, and a detailed explanation of the pertinency and manner of applying the cited art to every claim for which reexamination is requested. 37 CFR 1.510(b)(2).

14. ☐ A proposed amendment is included (only where the patent owner is the requester). 37 CFR 1.510(e).

15. ☑ It is certified that the statutory estoppel provisions of 35 U.S.C. 315(e)(1) or 35 U.S.C. 325(e)(1) do not prohibit requester from filing this *ex parte* reexamination request. 37 CFR 1.510(b)(6).

16. ☑ a. It is certified that a copy of this request (if filed by other than the patent owner) has been served in its entirety on the patent owner as provided in 37 CFR 1.33(c).

The name and address of the party served and the date of service are:

ALLEN, DYER, DOPPELT, MILBRATH & GILCHRIST, P.A.

P.O. Box 3791, Orlando FL 32802-3791

Date of Service: October 28, 2016; **or**

☐ b. A duplicate copy is enclosed since service on patent owner was not possible. An explanation of the efforts made to serve patent owner **is attached**. See MPEP 2220.

17. Correspondence Address: Direct all communication about the reexamination to:

☑ The address associated with Customer Number: 71897

OR

☐ Firm or Individual Name

Address

City	State	Zip
Country		
Telephone	Email	

18. ☑ The patent is currently the subject of the following concurrent proceeding(s):

☐ a. Copending reissue Application No.

☑ b. Copending reexamination Control No. 90/013,587

☐ c. Copending Interference No.

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INFORMATION DISCLOSURE STATEMENT BY APPLICANT

(Use as many sheets as necessary)

Sheet 1 of 2

Complete if Known	
Application Number	11/773,272
Filing Date	July 3, 2007
First Named Inventor	Kenneth E. Flick
Art Unit	3661
Examiner Name	Cuong H. Nguyen
Attorney Docket Number	C13-03896.RE2

U. S. PATENT DOCUMENTS

Examiner Initials*	Cite No.[1]	Document Number Number-Kind Code[2] *(if known)*	Publication Date MM-DD-YYYY	Name of Patentee or Applicant of Cited Document	Pages, Columns, Lines, Where Relevant Passages or Relevant Figures Appear
		US- 5,732,074	03-24-1998	Spaur et al.	
		US- 5,794,164	08-11-1998	Beckert et al.	
		US- 6,009,363	12-28-1999	Beckert et al.	
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FOREIGN PATENT DOCUMENTS

Examiner Initials*	Cite No.[1]	Foreign Patent Document Country Code[3]–Number[4]–Kind Code[5] *(if known)*	Publication Date MM-DD-YYYY	Name of Patentee or Applicant of Cited Document	Pages, Columns, Lines, Where Relevant Passages Or Relevant Figures Appear	T[6]

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Sheet 2 of 2

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NON PATENT LITERATURE DOCUMENTS

Examiner Initials*	Cite No.[1]	Include name of the author (in CAPITAL LETTERS), title of the article (when appropriate), title of the item (book, magazine, journal, serial, symposium, catalog, etc.), date, page(s), volume-issue number(s), publisher, city and/or country where published.	T[2]
		SAE On-Board Diagnostics for Light and Medium Duty Vehicles Standards Manual, SAE HS-3000, Society of Automotive Engineers, Inc., 1994 Edition.	
		SAE On-Board Diagnostics for Light and Medium Duty Vehicles Standards Manual, SAE HS-3000, Society of Automotive Engineers, Inc., 1997 Edition.	

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US005732074A

United States Patent [19]

Spaur et al.

[11] Patent Number: 5,732,074

[45] Date of Patent: Mar. 24, 1998

[54] **MOBILE PORTABLE WIRELESS COMMUNICATION SYSTEM**

[75] Inventors: **Charles W. Spaur; Michael F. Braitberg; Patrick J. Kennedy; Lester B. Hatcher**, all of Boulder, Colo.

[73] Assignee: **CellPort Labs, Inc.**, Boulder, Colo.

[21] Appl. No.: **586,602**

[22] Filed: **Jan. 16, 1996**

[51] **Int. Cl.**[6] **H04M 11/00**

[52] **U.S. Cl.** **370/313**; 370/401; 455/457

[58] **Field of Search** 370/310, 313, 370/328, 401; 455/33.1, 49.1, 53.1, 54.1, 99, 457, 404, 577, 563; 379/58, 59, 63

[56] **References Cited**

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Primary Examiner—Chau Nguyen

Attorney, Agent, or Firm—Sheridan Ross P.C.

[57] **ABSTRACT**

Communication of information including data between a remote computer and a vehicle is managed and facilitated using an apparatus compatible with standardized network communication links. In one embodiment, the standardized network communication links include the Internet and a controller area network used in vehicles. The apparatus preferably includes a controller contained in the vehicle. The controller is comprised of a number of hardware and software elements including a processor. A TCP/IP stack is part of the controller for providing the necessary control in checking for communicating information, such as requests and data, over the Internet. A web server communicates with the TCP/IP stack for servicing information related requests in http format including obtaining or sending information in operative communication with the TCP/IP stack. A CGI-bin (common gateway interface-binary) communicates with the web server and acts as a link to executable software stored in program memory that is responsive to user requests. A data memory is also available for storing data in html that is accessible by the web server. A real time operating system (RTOS) is involved in task and memory management as part of the responding to requests for information. The controller is able to receive requests using a wireless device when it is in the vehicle and through a communications port when the wireless device is not in the vehicle. In another embodiment, each of the plurality of vehicle devices has an Internet address or designation associated with it.

21 Claims, 4 Drawing Sheets

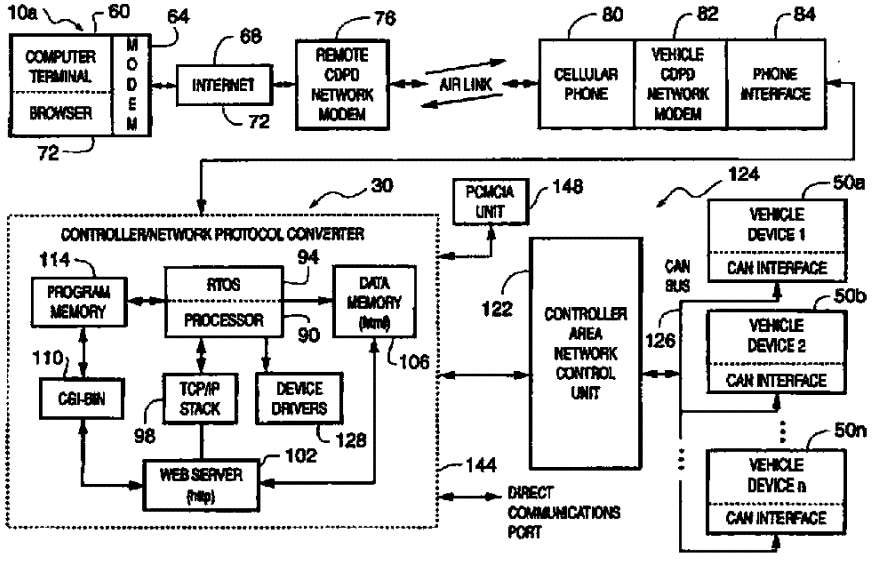


Fig. 1

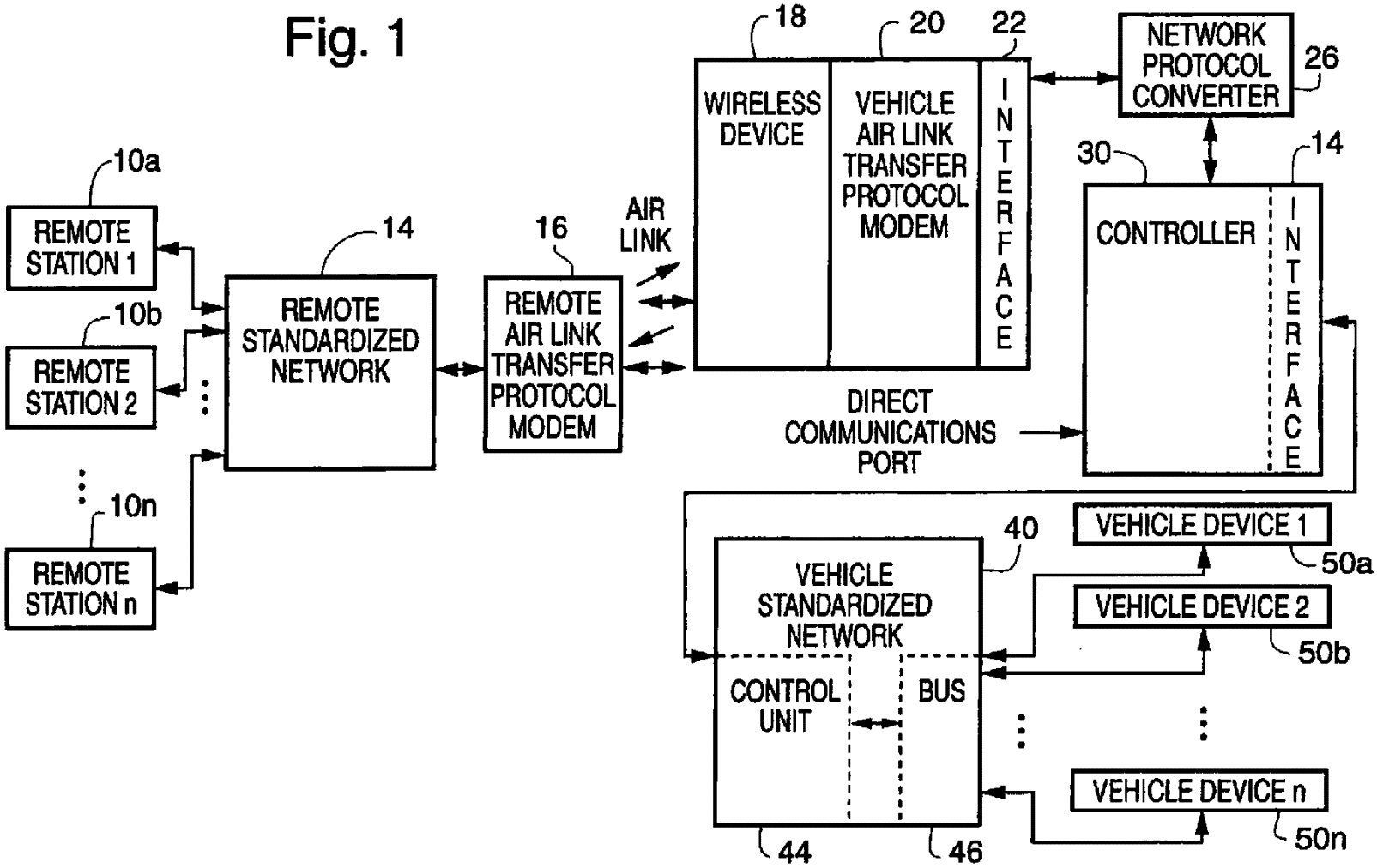
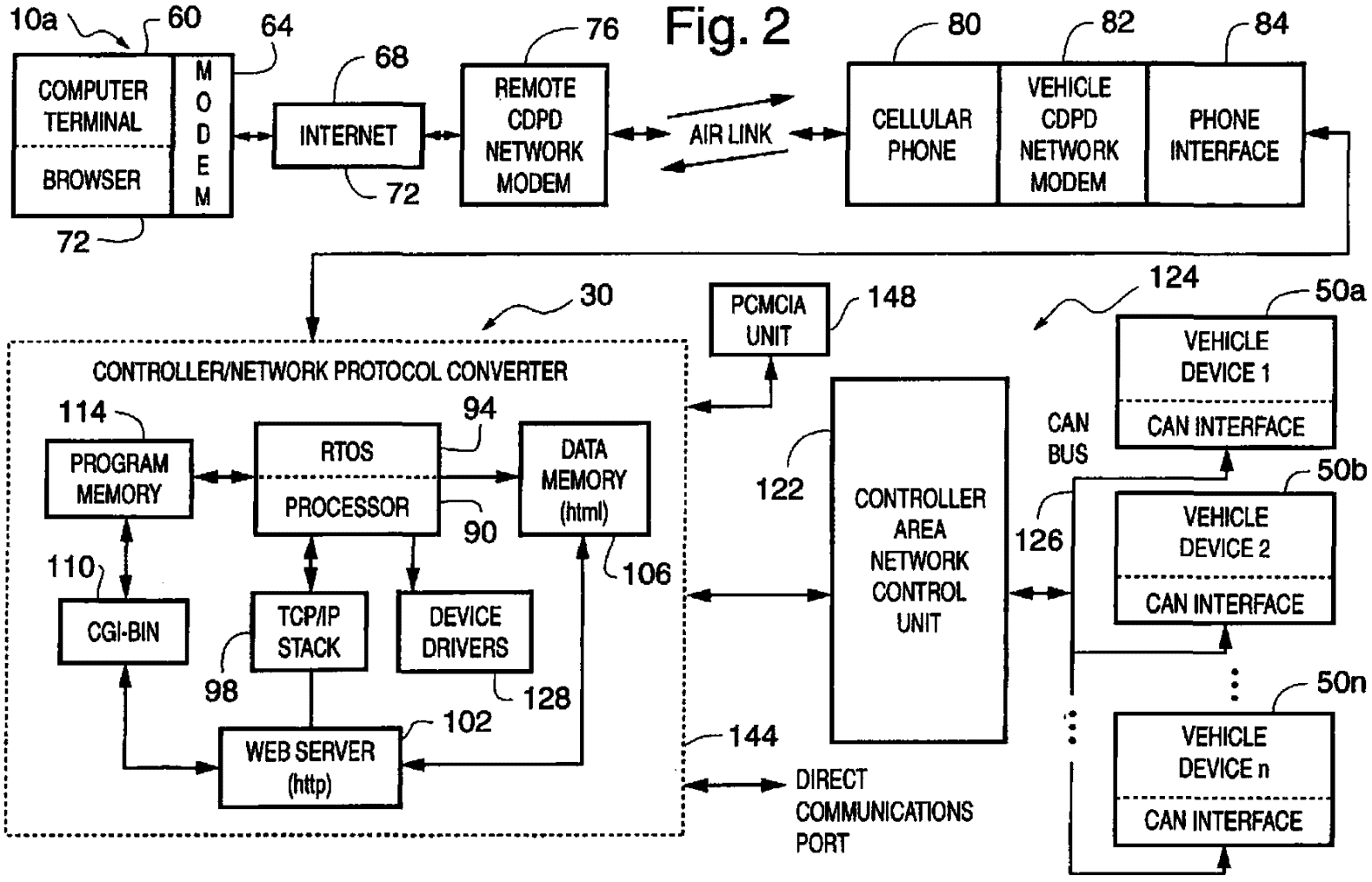

10a
REMOTE STATION 1
10b
REMOTE STATION 2
10n
REMOTE STATION n
14
REMOTE STANDARDIZED NETWORK
16
REMOTE AIR LINK TRANSFER PROTOCOL MODEM
AIR LINK
18
WIRELESS DEVICE
20
VEHICLE AIR LINK TRANSFER PROTOCOL MODEM
22
INTERFACE
NETWORK PROTOCOL CONVERTER
26
30
CONTROLLER
14
INTERFACE
DIRECT COMMUNICATIONS PORT
40
VEHICLE STANDARDIZED NETWORK
CONTROL UNIT
BUS
44
46
VEHICLE DEVICE 1
50a
VEHICLE DEVICE 2
50b
VEHICLE DEVICE n
50n

Fig. 2


10a
60
64
68
76
80
82
84
COMPUTER TERMINAL
BROWSER
MODEM
INTERNET
REMOTE CDPD NETWORK MODEM
AIR LINK
CELLULAR PHONE
VEHICLE CDPD NETWORK MODEM
PHONE INTERFACE
72
72
30
CONTROLLER/NETWORK PROTOCOL CONVERTER
114
PROGRAM MEMORY
RTOS
PROCESSOR
94
90
DATA MEMORY (html)
106
110
CGI-BIN
TCP/IP STACK
98
DEVICE DRIVERS
128
102
WEB SERVER (http)
PCMCIA UNIT
148
124
50a
VEHICLE DEVICE 1
CAN INTERFACE
CAN BUS
122
CONTROLLER AREA NETWORK CONTROL UNIT
126
50b
VEHICLE DEVICE 2
CAN INTERFACE
50n
VEHICLE DEVICE n
CAN INTERFACE
144
DIRECT COMMUNICATIONS PORT

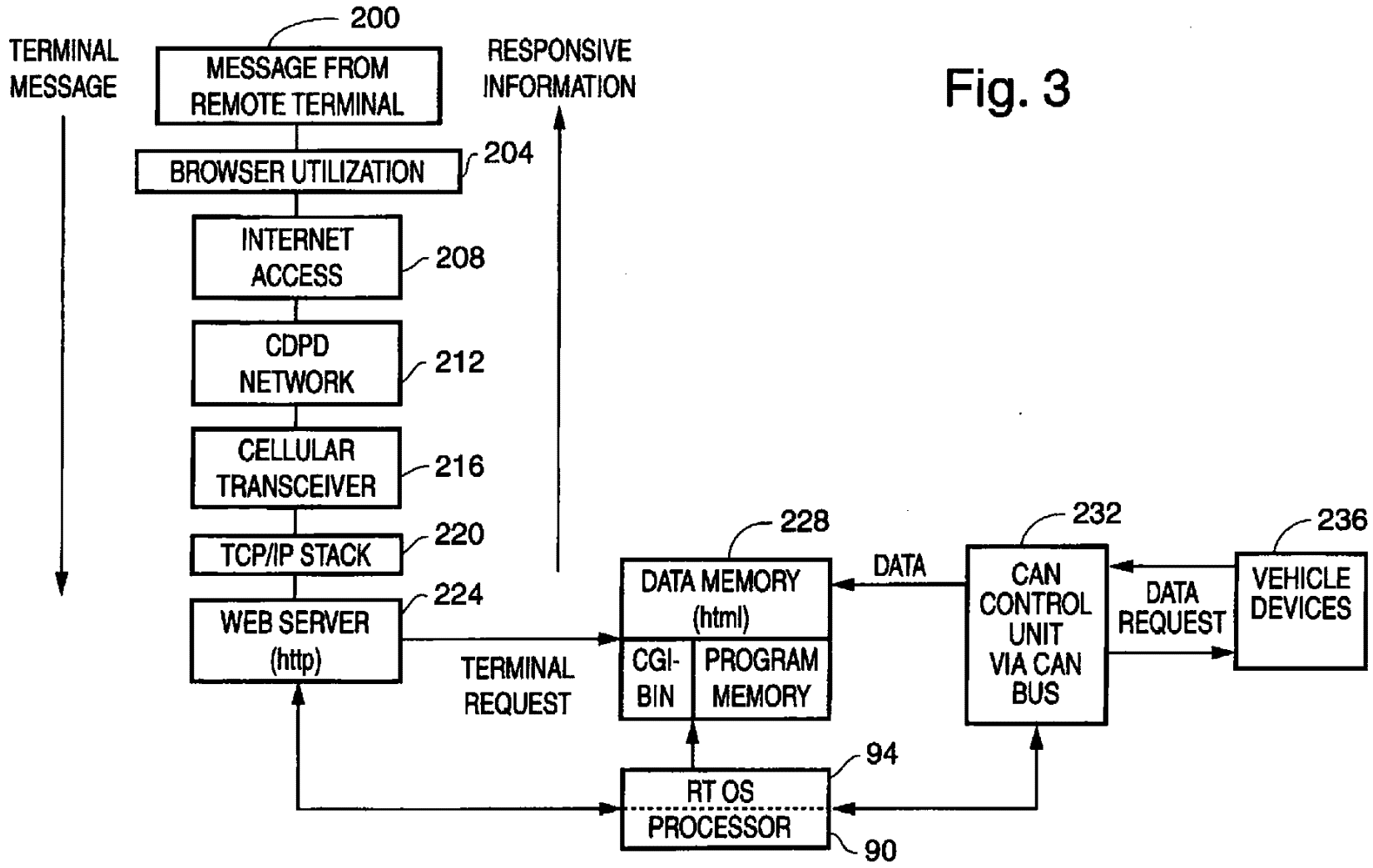
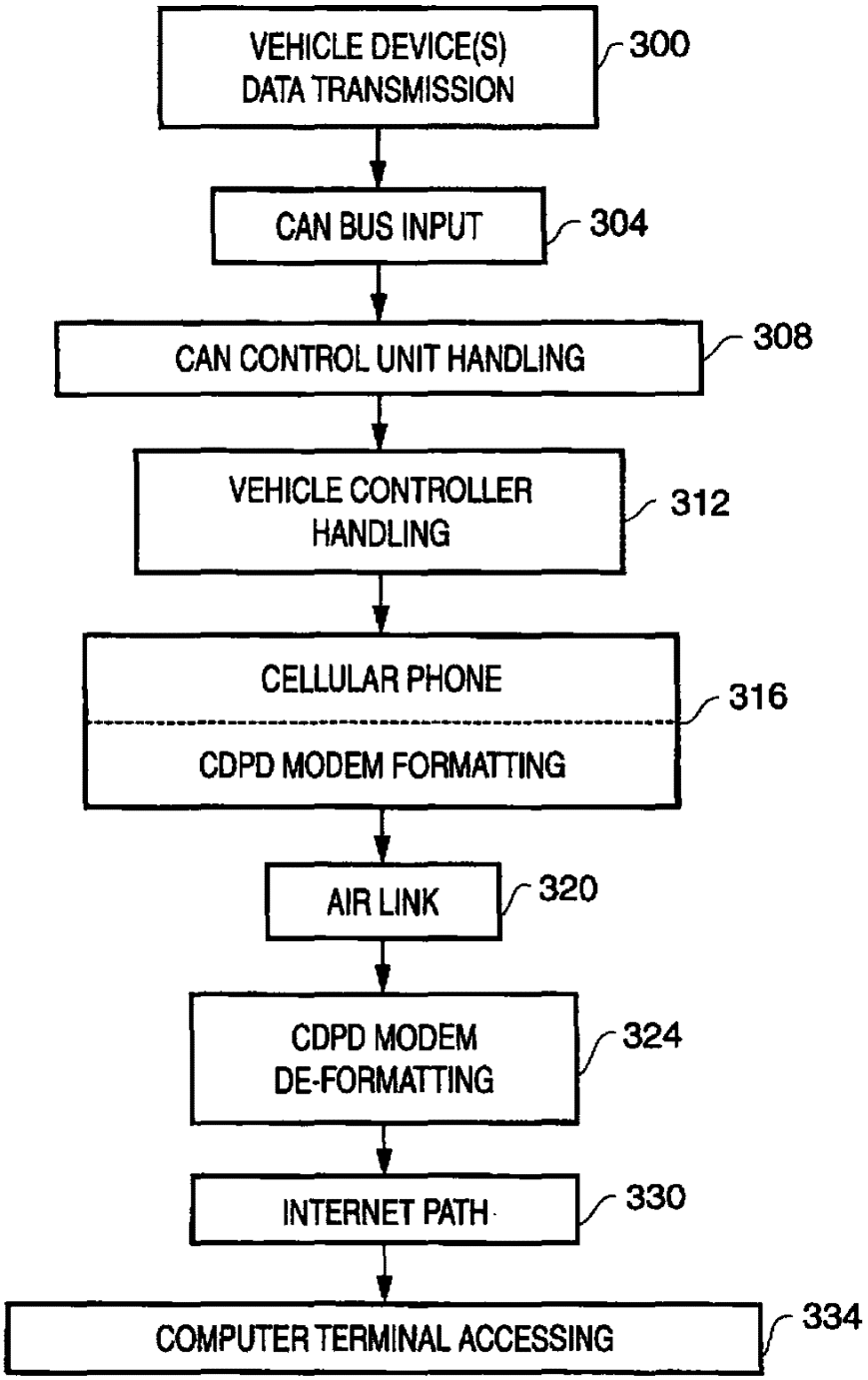

TERMINAL MESSAGE
200
MESSAGE FROM REMOTE TERMINAL
RESPONSIVE INFORMATION
BROWSER UTILIZATION
204
INTERNET ACCESS
208
CDPD NETWORK
212
CELLULAR TRANSCEIVER
216
TCP/IP STACK
220
WEB SERVER (http)
224
TERMINAL REQUEST
228
DATA MEMORY (html)
CGI-BIN
PROGRAM MEMORY
DATA
232
CAN CONTROL UNIT VIA CAN BUS
DATA REQUEST
236
VEHICLE DEVICES
94
RT OS
PROCESSOR
90

Fig. 3

Fig. 4


VEHICLE DEVICE(S) DATA TRANSMISSION
300
CAN BUS INPUT
304
CAN CONTROL UNIT HANDLING
308
VEHICLE CONTROLLER HANDLING
312
CELLULAR PHONE
CDPD MODEM FORMATTING
316
AIR LINK
320
CDPD MODEM DE-FORMATTING
324
INTERNET PATH
330
COMPUTER TERMINAL ACCESSING
334

MOBILE PORTABLE WIRELESS COMMUNICATION SYSTEM

FIELD OF THE INVENTION

The present invention relates to bi-directional communications over an airlink and, in particular, information transfers between a vehicle and one or more remote stations using an established network, such as the Internet.

BACKGROUND OF THE INVENTION

Establishing communications with vehicles that are commonly found at different locations or are in transit between locations has become increasingly more important. It is often desirable to know the location of a particular vehicle at a given time. Such a vehicle may be transporting goods that the recipient is waiting for and wishes to know the current location of the vehicle transporting the goods. It may also be useful to monitor conditions of the goods, such as the temperature of refrigerated loads. In addition to goods carried by the vehicles, the vehicles themselves can be monitored for certain conditions, such as engine or other parameters. Such information can be utilized in insuring that the vehicles are properly maintained to avoid vehicle downtime or the necessity of road service. Other applications involving communications with vehicles might involve safety and security considerations. A monitored vehicle can include an emergency vehicle that transports a patient who is connected to monitoring equipment in the vehicle that continuously or periodically gathers patient data. During transport of the patient, such patient data can be communicated to medical personnel at a remote location, such as a hospital, to prepare for the arrival of the patient. When the patient arrives, this data has been evaluated and decisions reached as to how best to care for the patient. Other security or safety checks might include: whether a vehicle door was unlocked, initiation of an alarm by activating a switch, automatic indication of an airbag detonation and automatic generation of a signal when an expected input has not been received for a certain amount of time.

With regard to requesting and obtaining such data from vehicles in connection with different vehicle related applications, substantial impediments are encountered. Specifically, no universal system or package is available that is configured to operate with vehicles from which information may be sought by multiple users having different objectives or applications. Typically, users have different computer hardware and telecommunications equipment, as well as software for their particular jobs or applications. With respect to the vehicle itself, and depending upon the desired applications of a particular user, data to be gathered has to be obtainable from a potentially large number of physical devices. Given such a broad spectrum of actual and potential applications and available devices and equipment, an appropriate and effective linkage must be provided to enable accurate and efficient communication to occur between the remote station and the vehicle. In light of the mobile nature of the vehicle, part of the communication must occur wirelessly over an airlink. Achieving desired communications with vehicles also requires the flexibility to adapt to changing applications associated with vehicle related information being sought, including physical devices that might be modified or added at later times, as well as accommodating new users with different physical devices that may have different information gathering requirements and parameters. Relatedly, multiple users must be able to simultaneously access different information that may require

multiple tasks to be performed in the vehicle before such information can be gathered and sent to the remote site. With all these requirements and objectives, the implementation of such a communication system cannot be burdensome, nor be prohibitively costly. Importantly, the communications system and processing capability must be portable and practical for the vehicle environment, as well as involving protocols that a variety and large number of users are familiar with.

SUMMARY OF THE INVENTION

In accordance with the present invention, a system is provided in which communication of information, including requests, commands and data, is achieved between vehicle having physical vehicle devices and one or more sites that are remote from the vehicle. The information communication is implemented using certain standardized network communication links that enable multiple users, either simultaneously or at separate times, with different communications and processing hardware, software and different applications and requiring information from different vehicle devices, to obtain the desired information while avoiding design complexities in interfacing the remote site with the vehicle devices.

The system includes, at the remote site, a computer terminal which can be a conventional PC with a modem. The computer terminal is able to communicate with a first standard communications network link, such as the Internet, through its modem. An internet or a world wide web browser, for example, that is available to the computer terminal is accessed. The computer terminal supplies the browser with an IP (Internet protocol) address. This IP address is associated with a particular vehicle including communications related hardware contained in the vehicle. Typically, the IP address is accompanied by a request or command for information or data that is available from the particular vehicle. In addition to this first standardized communications network, since bi-directional communications involving a vehicle are conducted wirelessly for at least a portion of the communications link, it is necessary for the Internet to communicate with an appropriate interface or network that wirelessly links with the vehicle. In one embodiment, the cellular digitized packet data (CDPD) network provides the desired link including arrangement of information being communicated and where the destination site, namely the particular vehicle, is found in the network. If a channel is available to the particular vehicle, the CDPD link can proceed to transmit the Internet packets to the vehicle of interest. Instead of the CDPD network as the link, a communications interface could be employed that involves data only, such as a two way paging interface with the vehicle.

With respect to handling requests, commands and information including data transfers relative to the vehicle, particularly involving data from vehicle devices, certain hardware and software is contained in the vehicle. For receiving information from the Internet, a wireless device, such as a cellular phone, having the appropriate hardware and channels acts as a receiver for such information in combination with an appropriate airlink modem, such as a CDPD network modem. The wireless device is contained within the vehicle and communicates with a controller through a phone interface. The phone interface provides the necessary electrical signal connections between the output lines or channels from the wireless device and the controller inputs.

The controller is also found in the vehicle and is a key unit of the apparatus and includes a number of hardware and

software elements. Specifically, a TCP/IP (transmission control protocol/Internet protocol) stack acts on a received request or command by performing a number of functions. The received request has a IP address associated with it and a check is made as to whether or not the request has the correct address. Further, the formatted data is checked for accuracy. The TCP is responsible for controlling the structure and flow of the received information. In that regard, the TCP/IP stack is associated with a number of sockets that it communicates with or links to, with the selected socket being dependent upon the content of the received information. In that regard, among the sockets available to the TCP/IP stack is a server. In conjunction with effectively communicating over the Internet, an http (hypertext transmission protocol) web server is utilized. The web server operates in accordance with world wide web protocol and services information related requests in http format including obtaining or getting information based on a received request or command and sending or posting information in response to received requests or commands. The controller also includes data memory for storing data in html (hypertext markup language) format, with such data being frequently previously collected from vehicle devices and stored in the data memory. In response to a request, for example, the web server accesses the data memory to obtain desired data and encapsulates it in accordance with http format for transmission from the controller through the wireless device using an appropriate airlink modem to a destination site (remote station).

The web server also communicates with a CGI-bin (common gateway interface-binary), which is also part of the controller. The CGI-bin is useful in linking the web server with a number of executable programs stored in a program memory. These executable programs can be utilized in obtaining or providing data or other information associated with the vehicle devices. In one embodiment, one or more executable programs are run to obtain data which is then stored in data memory in html format for later access and use, including transmitting such data to a remote site. The controller also has a real time operating system (RTOS) that typically is involved with managing a number of services associated with conducting one or more applications oriented tasks. For example, the RTOS works with the applications software during execution for managing tasks that are run by the applications software and management of data stored in the file memory. Especially in the context of a vehicle, the executable software might include a variety of applications including: the present location of the vehicle; vehicle maintenance monitoring parameters, such as status conditions associated with the engine, coolant status, oil pressure and battery life; cargo conditions including status of delivery of cargo and relevant cargo conditions, such as temperature; alarm conditions that apprise others of certain predetermined events associated with the vehicle, such as airbag detonation; and, in the case of a vehicle transporting a patient, monitoring data associated with patient vital signs.

With regard to obtaining information or data from these vehicle devices for appropriate processing using, for example, one or more executable programs in the program memory, the controller communicates with a second standardized network in the form of a network that is commercially available and used in vehicles, such as the previously devised controller area network (CAN). The CAN is operatively connected to each of a plurality of vehicle devices that transmit, receive, or both transmit and receive desired data. For example, the vehicle devices include transducers or other physical devices that detect and provide information useful to applications software for processing to obtain information that is then transmitted, for storing in memory for later transmission, or even for immediate transmission without processing, upon receipt of the proper request or command. Other available networks could be utilized, instead of the CAN, such as Arcnet, which has a protocol similar to CAN.

More specifically, with respect to transmission of information from the controller through the wireless device to a remote site, after receipt of a request as previously described and in accordance with one procedure, the web server interprets the transmitted request and determines that certain data stored in the data memory is being requested by a user at the remote site. The stored data is accessed and prepared by the web server in accordance with http format for transmission over the Internet. The http formatted information is subject to the operation of the TCP/IP stack for regulating the transmission of the requested information including associating a destination IP address with the information being sent. Once the information is properly prepared using the TCP/IP stack, it can be sent over the airlink via the wireless device to the Internet connection using appropriate airlink modems.

In a variation of this operation, instead of a request starting from the remote station, the sending of information including data might be initiated in the vehicle. By way of example, it may be necessary or desirable that certain data parameters be periodically transmitted to a remote station for analysis or other considerations. In still another operation variation, an additional information transmission can be received from another user located at a different remote site during the time that a first request for information is being processed by the controller. In such a case, the TCP/IP stack, in conjunction with the operating system, enables multiple tasks to be performed in a controlled manner so that more than one user is able to communicate with the controller at the same time.

Preferably, the controller in the vehicle is also associated with an interface for communication with one or more available systems, such as an RS232 connection, an Ethernet connection and/or a PCMCIA unit. In a related embodiment, the controller includes a direct communications port for receiving and sending information without requiring the wireless device and the Internet connection to the wireless device. In this embodiment, the direct communications port receives information or data using another source contained in the vehicle, such as the vehicle's radio. Subcarrier information is transmitted to the radio and decoded for input to the direct communications port for subsequent analysis or use by the CAN. In yet a further variation of controller operation, each vehicle device on the CAN has its own IP designation or address so that the remote user can utilize this designation or address for communication with the selected vehicle device having that designation or address. The controller uses the received IP address or designation for the particular device and acts as a link or bridge for the remote user to the particular device.

Based on the foregoing summary, a number of salient features of the present invention can be readily identified including the substantial elimination or avoidance of numerous, different and complex hardware and software for communicating information involving physical devices located in a vehicle and one or more computers located at one or more remote sites. A combination of controller related components are containable in a vehicle for responding to requests from remote sites, obtaining and storing information associated with vehicle devices and running executable

software that may be available in the program memory of the controller or downloaded from the remote site, while handling and configuring information including data that is communicative with the remote site over an established network, such as the Internet. Furthermore, the controller efficiently communicates with another standard network found in a vehicle, such as the controller area network, to obtain data from the vehicle devices and, when appropriate, send messages or information to the vehicle devices. The controller elements are important in communicatively linking together previously incompatible remote and vehicle networks to achieve a functional mobile communication system. The overall system including the standardized networks effectively enables, either substantially simultaneously or separately, a variety of applications to be performed by multiple users and which applications utilize one or more of a large number of selectable and different vehicle devices, while not requiring substantial allocated memory in the vehicle.

Additional advantages of the present invention will be readily understood from the following discussion, particularly when taken together with the accompanying drawing figures.

BRIEF DESCRIPTION OF THE DRAWINGS

FIG. **1** is a block diagram illustrating the general components of the apparatus for information communication between one or more remote stations and a vehicle;

FIG. **2** is a more detailed block diagram illustrating major elements of the controller;

FIG. **3** is a flow diagram illustrating major steps that are involved in the bi-directional communications between one or more remote stations and a vehicle having the controller in which a message is initiated from the remote station; and

FIG. **4** is a flow diagram illustrating major steps that are involved in a communication initiated by the vehicle to a remote station.

DETAILED DESCRIPTION

With reference to FIG. **1**, an apparatus is illustrated in the block diagram for hi-directional communication between one or more remote stations **10***a*–**10***n* and a vehicle. The bi-directional communication has the capability of involving multiple users and a number and variety of applications that are germane to the vehicle. Each remote station can include communications and processing related hardware and software that is different from that of the other remote stations. To avoid extensive and customized hardware and software in order to achieve the desired bi-directional communications, a standardized remote network communications link **14** is utilized. That is, each user who wishes to communicate with the vehicle, need not develop and establish the necessary interfacing networks and protocols for communication with the vehicle. Each user, including users who operate independently of other users, is able to access the vehicle through the same standardized remote network communications link **14**, regardless of the particular application or applications that the user has for implementation or operation in conjunction with hardware and software associated with the vehicle. In a preferred embodiment, the remote network communications link **14** is the Internet. With respect to communication with a vehicle, the information being communicated must be configured or formatted in a way that achieves proper communication over an airlink to the vehicle. This is accomplished using a suitable switching station identified generally as a remote airlink transfer protocol modem **16**. In one embodiment, the communication information is formatted in accordance with a CDPD (cellular digitized packet data) configuration. At the vehicle, this information is received by a wireless device **18** that is able to transmit and receive information via the airlink. The wireless device **18** is operatively associated with a vehicle airlink transfer protocol modem **20** for the proper handling of the airlink formatted transmission. In one embodiment, the wireless device **18** includes a cellular phone that is selected from a plurality of conventional or commercially available cellular phones. The wireless device **18** bi-directionally communicates with a controller **30** contained in the vehicle through a network protocol converter **26** using a wireless device interface **22**. The wireless device interface **22** establishes the necessary signal compatibilities and connections from the wireless device **18**. The network protocol converter **26** removes or otherwise converts the inputted information to a form that is acceptable to the controller **30** or, alternatively, information is made compatible with the remote airlink transfer protocol modem **16** when such information is sent through the airlink using the network protocol converter **26**. In conjunction with the FIG. **1** illustration, the network protocol converter **26** is essentially part of the wireless device **18** and physically separated from the controller **30** but electrically connected thereto so that no network protocol converter is required in the controller **30**. In the embodiment to be described in greater detail herein, the network protocol converter **26** includes a TCP/IP stack which can be part of the controller **30** so that the controller **30** is also definable or can be referred to as a controller/network protocol converter **30**. The controller **30** is responsible for a number of functions related to understanding and acting on information received from one or more remote stations **10**, obtaining and responding to requested information and operatively functioning with information including data available from other elements in the vehicle. In that regard, the controller **30** communicates with a controller interface **34** that electrically links the controller **30** with a vehicle standardized network **40**. The vehicle standardized network **40** includes a controller unit **44** that provides appropriate message and data handling functions associated with sending and receiving information including data from each of a plurality of physical vehicle devices **50** that are operatively connected to a bus **46** of the vehicle standardized network **40**. Like the remote standardized network **14**, the vehicle standardized network **40** is an established and previously developed network that interfaces with components in a vehicle, such as engine related components in order to provide desired or requested data concerning the operations or status of these components. An important aspect of the apparatus of the present invention involves the enabling of communications between two mutually incompatible and highly dissimilar standardized networks. More specifically, full communication capabilities are achieved among numerous remote stations via a global or remote standardized network and vehicle devices via a localized standardized network, either at different or at the same times, using the apparatus even though the global and localized networks are configured substantially differently and involve significant protocol and environmental differences. That is, the remote standardized network **14**, such as the Internet, is configured as an information communications system having no geographic boundaries. The vehicle or localized standardized network **40** is designed to function properly in the electrically noisy and otherwise hostile vehicle environment. The diverse design objectives and problems faced by these two different standardized networks

therefore requires a communications related apparatus that is able to effectively enable these two networks to bi-directionally communicate with each other, as well as other hardware and software that is operably connected to the two standardized networks. In accordance with the present invention, the vehicle devices **50** might include a large number of diverse devices, including common vehicle parts or components, for providing and receiving information including data, as well as, in some cases, acting on such information by analyzing or processing such information. With regard to providing information to a remote station **10**, a substantially symmetrical relationship exists among the elements of FIG. **1**. That is, the controller **30** is able to prepare information for sending to a remote station **10**, including data or other information available from one or more of the vehicle devices **50** using the vehicle standardized network **40**. Such information is sent to the wireless device **18** through its interface **22** for transmission using the vehicle airlink transfer protocol modem **20** over the airlink to the remote station **10** by way of the remote standardized network **14** in combination with the remote airlink transfer protocol modem **16**.

With reference now to FIG. **2**, greater details of the apparatus of FIG. **1** are illustrated, particularly key elements of the controller **30** contained in the vehicle. As shown in FIG. **2**, remote station **10***a* is illustrated and it includes a computer terminal **60**. In one embodiment, the computer terminal **60** is a conventional PC having the usual hardware and software components and capabilities including input and output devices, such as a keyboard, mouse and terminal display screen. The computer terminal **60** communicates with a modem **64** in order that the information from and to the computer terminal **60** can be sent over conventional communication lines, such as telephone lines. In the preferred embodiment, the modem **64** enables the computer terminal **60** to communicate with Internet **68**. In one embodiment, the computer terminal **60** has one or more browsers **72** available to it, which is used in requesting or responding to information communications involving a particular vehicle. The Internet **68** operatively communicates with a standardized network transmission protocol that permits information to be bi-directionally communicated over the airlink and, in one embodiment, includes a remote CDPD network modem **76** which prepares the information in a conventionally acceptable manner for transmission and communication with a cellular phone **80** which is contained in the vehicle. The cellular phone **80** can be any selected one of a number of conventional cellular phones that have the capability of properly communicating with the desired formatted or arranged information. In the illustrated embodiment of FIG. **2**, the cellular phone **80** is operatively associated with a vehicle CDPD network modem **82** that demodulates the received information so that it is acceptable for further handling or processing. A phone interface **84** links the cellular phone **80** with the controller **30** and is, preferably, configured to work with a variety of cellular phones having differing output connections and/or arrangements of output connections. In that regard, the phone interface **84** is useful in providing a proper battery charging function for the cellular phone **80**, assisting in the identification of the particular cellular phone **80** that is being utilized, and establishing the correct electrical connections for passage or communication of the signals between the cellular phone **80** and the controller **30**. An appropriate phone interface **84**, or at least portions thereof, is disclosed in U.S. Pat. No. 5,333,177 issued Jul. 26, 1994 and entitled "Universal Connection for Cellular Telephone Interface."

As also seen in FIG. **2**, the controller **30** includes a number of elements for handling the functions and responsibilities associated with responding to messages, such as requests or commands, from one or more of the remote stations **10**, running executable software and obtaining data, as well as achieving the necessary communications protocols with the Internet **68**. The controller **30** includes a processor **90** for performing processing operations including running of executable program code, including in the context of utilizing or incorporating data that the controller **30** has access to. Preferably, the processor **90** is a single microprocessor that performs multiple tasks, in conjunction with a real time operating system (RTOS) **94**. That is, the RTOS **94** manages a number of services associated with conducting one or more applications oriented tasks. Preferably, the RTOS **94** includes a kernel that is involved in performing real time multi-tasking including: task management, intertask communication, memory management, message management, timing, I/O management and error management. In the context of applications associated with the vehicle, the RTOS **94** works with applications software in a multi-task scheme to respond to requests for vehicle related information including data.

The controller **30** also includes a TCP/IP (transmission control protocol/internet protocol) stack **98** for providing necessary communication protocols in association with the Internet. The TCP regulates the flow and structure of data or other information including an operative communication with a web server **102**. The IP is responsible for recognizing source and destination addresses in connection with insuring receipt at the proper location, as well as checking for the accuracy of data packets received from the airlink. The TCP/IP stack **98** is invoked initially when information is received by the controller **30** and is invoked when information including data is to be outputted from the controller **30** to the phone interface **84**. Preferably, the TCP/IP stack **98** is a commercially available portable unit for an embedded system that provides a single threaded stack for supporting multiple sockets including sockets associated with the web server **102**. The web server **102** services information related requests in http (hyper text transmission protocol) format. These requests include obtaining or getting information, as requested, and the sending or posting of information, as requested. The web server **102** is also a commercially available Internet related product. With respect to getting information, the controller **30** further includes a data storage unit or data memory **106**. Generally, the data memory **106** stores data that has been generated and is expected to be useful in handling requests or commands. Such data may be data obtained from monitoring a physical device associated with a vehicle and/or may include data useful in running executable software that is intended to provide further information or data useful to a requestor. The data in the data memory **106** is preferably configured in html (hyper text markup language). In this configuration, the web server **102** is able to access the data memory **106** and obtain such configured data for encapsulation or incorporation in the http format for communication over the Internet **68**. In addition to communication with the data memory **106**, the web server **102** is operatively linked to a CGI-bin (common gateway interface-binary) **110**. The CGI-bin **110** acts as a link or a gate to a number of typically short executable programs stored in program memory **114**. Such stored executable software may encompass a variety of applications associated with the vehicle. Generally, such software is useful in processing, analyzing or otherwise acting on data available in the vehicle, including acting on the data in real time, such

as acting on available data in real time that is used for transmission to a remote station, where such transmission is initiated in the vehicle. A representative listing of applications is as follows:

(a) monitoring of vehicle locations and status;
(b) tracking of deliveries of packages by the vehicle;
(c) monitoring cargo conditions in the vehicle, such as the temperature of the cargo and checking equipment related to maintaining a desired temperature;
(d) vehicle parameter monitoring for maintaining the vehicle such as checking engine conditions including possibility of overheating and operating mileage (odometer reading);
(e) displaying of directions and/or dispatch instructions; and
(f) communication of short messages between a user at the remote site and the operator of the vehicle.

In addition to application software that might be involved with such functions, the short programs in the program memory **114** may include software related to safety and security considerations, including:

(a) monitoring a patient's vital signs who is being transported by the vehicle;
(b) providing information as to whether or not a roving security vehicle has periodically checked in with a home base; and
(c) providing an indication of key or alarm related events, such as when roadside assistance is required, the vehicle or the driver of the vehicle faces a threatening situation, an unauthorized vehicle door unlocking and/or initiating an automatic call for assistance in light of an airbag detonation.

With regard to representative operations, the data memory **106** may store page information that is accessible by the web server **102**. Upon receipt of a command or request, this page information may be accessed and updated with current data or other information for transmission to a user at a remote station **10**. For example, page information may require that data, which is collected from the vehicle devices **50**, be inserted or be included therein. In a variation of this operation, all or substantially all of the page information is generated after receiving a request for information that is associated with the page. In generating the page information, data already stored in the data memory **106** may be utilized or, alternatively, data may be obtained upon receipt of the request from the physical devices associated with the vehicle. In a further and related variation, information or executable software may be downloaded from the remote station to the controller **30** for execution as part of responding to an accompanying or future request, which software may be executed in conjunction with the operation of an applet that is stored as part of the controller **30**. In such a variation or with other variations, it may be appropriate to maintain memory storage space at a reduced level in the controller **30** so as to keep within defined vehicle cost and space requirements. In a related embodiment, the appropriate information or executable software is already part of the controller **30** and is part of the short programs accessible using the CGI-bin **110**.

With continued reference to FIG. **2**, a more detailed discussion related to the vehicle devices **50** is provided. Each of the vehicle devices **50***a*–**50***n* is able to receive information such as data, send information, or is able to both receive and send information. Generally, the vehicle devices **50** can include a variety of monitoring, detecting, inputting or other information communication related devices. In conjunction with the aforedescribed short executable programs that might be available in or to the controller **30**, such vehicle devices **50** can include sensors, transducers or other equipment for providing or receiving information. By way of example only, the vehicle devices **50***a*–**50***n* can include one or more of the following: GPS (global positioning system), dead reckoning sensors, facsimile machine, PDA (personal digital assistant), laptop computer, printer, display unit, modem, CD-ROM unit, storage device, medical condition sensors, vehicle condition sensors, vehicle cargo sensors, airbag sensor and general alarm sensors related to unlocking the vehicle or unwanted intrusion into the vehicle.

In order to provide the necessary communications protocol between the controller **30** and the vehicle devices **50***a*–**50***n*, another standardized network communications link is provided, which is different from the first standardized network communications link, such as the Internet **68**. This further standardized communications network is responsible for handling the communication exchange functions associated with sending and receiving information relative to the vehicle devices **50**. In a preferred embodiment, this further standardized network is a network that has been previously devised and is commonly used in a number of makes and models of vehicles. This communications network is defined as the controller area network (CAN) **124**. Although the CAN **124** has previously commonly been used in operative association with automotive electronics including engine control elements, sensors, lamps, electric windows etc., the present invention also enables the CAN **124** to be used with a variety of other devices contained in the vehicle, such as the previously described devices. An apparatus that utilizes processing capability in a vehicle with a number of peripheral devices in communication therewith over a common bus is disclosed in U.S. Pat. No. 5,479,479 issued Dec. 26, 1995 and entitled "Method and Apparatus for Transmission of and Receiving Signals Having Digital Information Using an Air Link," and which is assigned to the same assignee as the present application.

Generally, the CAN**124** is definable as being comprised of an object layer and a transfer layer that constitute a CAN control unit **122**, and a physical layer. The object layer is responsible for message filtering, and message and status handling. The transfer layer is responsible for confinement of faults, error detection and signaling, message validation, acknowledgements, bus contention, arbitration among information, message framing and transfer rate and timing. The physical layer is the transmission medium itself as well as the signal level and bit representations that are transmitted along the transmission medium. The transmission medium is essentially a multi-conductor bus **126** that has electrical conductors electrically connected to each of the vehicle devices **50** that are on the CAN **124**. In operatively connecting the CAN bus **126** to each vehicle device **50***a*–**50***n*, each of these vehicle devices is operatively associated with a CAN interface. In one embodiment, each of the CAN interfaces is connected in "daisy-chain" fashion as part of the bus **126** configuration. In interfacing with the CAN **124**, the controller **30** also has device drivers **128** that are useful in achieving desired communications in both directions between the CAN **124** and the controller **30**. For example, the processor **90** is able to obtain data or other information from the vehicle devices **50***a*–**50***n* using the device drivers **128** and which information can be used by the processor **90** including, for example, storing data in the data memory **106** for subsequent access and transmission to a remote station **10**.

As also illustrated in FIG. **2**, information can be communicated to the apparatus without passing through the cellular phone **80**. A direct communications port **144** is operatively

associated with the device driver assembly **128** for communication through the CAN **124** to one or more of the vehicle devices **50***a*–**50***n*. The direct communications port **144** has particular utility when the cellular phone **80** or other wireless device is not in the vehicle. In that situation, information is communicated using another device or unit in the vehicle. For example, the vehicle radio receives a transmission having a subcarrier signal that conveys information useful to and understood by the hardware associated with the direct communications port **144**. The data stream that is inputted to the port **144** was previously obtained or decoded to provide the information in a format compatible with the port **144**. Conversely, the port **144** enables information carrying signals to be outputted therefrom for transmission outside of the vehicle, such as again using the vehicle's radio.

In addition to vehicle devices **50** that communicate through the CAN **124**, further peripheral devices can be connected directly to the controller **30**, instead of communicating through the CAN **124**. For example, a PCMCIA (personal computer memory card interface association) unit **148** is electrically connected to the device driver assembly **128**. The unit **148** might include a storage device with a disk drive for storing desired information or data. Another such unit **148** might include a modem for providing communication capability directly between the controller **30** and another device or unit in the vehicle.

The description so far has been directed to an embodiment in which the vehicle or the controller **30** is associated with an address that the Internet **68** utilizes in connection with sending information to the vehicle. In another embodiment, each of the vehicle devices **50***a*–**50***n* has its own IP (internet protocol) address or designation. A user at a remote station **10** that wishes to send or receive information relative to a particular vehicle device **50***a*–**50***n*, utilizes the IP address or designation of the vehicle device in order to achieve the information transfer relative to the particular vehicle device **50**. In this case, the controller **30** and its operation are essentially transparent to a user at a remote site and each vehicle device **50** appears or acts as if it is a TCP/IP device. An example of operation, in accordance with this embodiment, might involve a vehicle device **50**, such as a CD-ROM unit. Specifically, the user or accessor of the CD-ROM unit provides an IP address for this device and it is received by the vehicle having the CD-ROM unit. The controller **30** recognizes this IP address and is able to provide the requested link to the CD-ROM unit through the CAN **124**. As a possible variation or addition to such an operation, the controller **30** can include an applet that is associated with this IP address. When this IP address for the CD-ROM unit is recognized by the controller **30**, the controller **30** sends the applet to the user accessing the Internet **68**, where the applet is received by the browser **72**. The browser **72** uses the applet to bring up a display using the computer terminal **60**. The display might include, for example, buttons that represent CD-ROM unit controls that the user can "click on" to cause certain operations associated with the CD-ROM unit.

In further related methods of operation when an http request is received by the web server **102**, the controller **30** is able to respond in a dynamic manner to reflect the current status or conditions of vehicle devices **50**. By way of example, as just noted, when all vehicle devices are properly functioning and providing data, an html page including one or applets could be downloaded to handle such data from the controller **30**. However, if one or more vehicle devices are not producing accurate data, a determination might be made to modify the content or number of applets that are usually downloaded in connection with such data when it is accurate. This reduces the magnitude and time of transmission, which results in a decrease in the cost of the wireless transmission, especially where there is a substantial amount of data, a large number of vehicles and/or an expected transmission on a very regular basis. As an additional example, the controller **30** might utilize information including data from a group of vehicle devices that is to be served to an applet embedded in a page. In a case in which one or more vehicle devices are not properly functioning or not functioning at all, the quality of information produced by the embedded application varies and is not reliable. Thus, it would be useful to be able to alter the presentation of this information in a dynamic manner. That is, such a presentation should reflect accurate data and the controller **30** is able to make a determination as to what information or data should be presented when such situations arise.

In yet a further related method of operation, the controller **30** is able to provide information by way of one or more notifications to one or more stations when a particular event or condition occurs such as at a predetermined time interval after the event or condition arises. In one embodiment, a worldwide web browser operably connected to the web server **102** selects the events or conditions to which the predetermined actions are to be taken by the web server **102**. For example, a user may request a notification message when the vehicle reaches a certain location, when a sensor in the vehicle measures a value relative to a predetermined threshold value and upon the occurrence of other predetermined events or conditions. Such request for notifications may be formulated via a point-and-click worldwide web browser interface and notifications can be made to frames on a web page, or other appropriate ways specified by the user. The user could also specify in the request that the notifications are to be sent to a third party by way of E-mail or http/html messages. By such techniques, notifications can be sent to a list of locations in electronic format suited for each individual location.

With reference to FIG. **3**, the operation of the present invention is further described in the context of a flow diagram illustrating steps for transmitting and receiving information between a computer terminal **60** and a vehicle of interest. In particular, the user inputs a message at the computer terminal **60**, in accordance with block **200**. The message includes at least an IP address and a request for information that is obtainable from the subject vehicle. The message is transmitted via the modem **64** connected to the computer terminal **60** utilizing the browser **72** at block **204** to direct or route the host message in accordance with the IP address. At block **208** the Internet **68** is accessed for carrying the message. As part of the message transmission, the remote CDPD network modem **76** is employed at block **212** to packetize the data message so that it can be properly transmitted over the airlink. At block **216**, the CDPD transmitted message is received by the cellular phone **80** or other transceiver and the output thereof is gated to the controller **30** having the TCP/IP stack **98** at block **220** after the message is demodulated by the vehicle CDPD network modem **82**. The IP checks the accuracy of the identified address and other information in the message. The TCP coordinates the flow of the message and prepares it for transmission to the http web server **102** at block **224**. The web server **102** under the control and process functioning of the RTOS **94**/processor **90**, services the information related request in http format. In accordance with one example, the message includes a request for vehicle information related to engine and/or other vehicle component operations or con-

ditions. In one application, for example, the requested vehicle conditions might have to be obtained from data that is processed or analyzed using executable software or a program stored in the program memory **114**. In such a case, a request based on the message is applied to the CGI-bin **110** at block **228**. This link enables the desired program to be selected and run under the processing/control of the processor **90**/RTOS **94**. As part of that execution, it may be necessary to obtain previously stored information including data from the data memory **106** Additionally, or alternatively, it may be necessary to obtain current or other data that is available from a particular vehicle device itself. In that context, the processor **90**/RTOS **94** obtains such information through the CAN controller unit **122** via the CAN bus **126** at block **232**. The CAN protocol is utilized to request and obtain the data from the selected vehicle device at block **236**. The data obtained by the CAN **124** is utilized by the processor **90** in connection with the execution of the selected program that is being executed. In one embodiment, with the requested data related to the vehicle component conditions having been obtained by processing, or from one or more vehicle devices **50**, or by both methods, such data can then be included in page information. Portions of the page information could be stored in the data memory **106**, with the obtained data being included in the appropriate parts of the page. Once this is completed, the page information is handled by the web server **102** for sending the page information in http format. The TCP/IP stack **98** is involved in the control of the transmission of this page information, as well as checking the destination address. The page information is transmitted through the cellular phone **80** including being packeted for a CDPD network transmission, using the vehicle CDPD network modem **82** for transmission over the Internet **68** to the requesting computer terminal **60**. The page information can then be displayed on the display unit of the computer terminal **60**.

With regard to operation variations, with respect to one or more alarm conditions, when a particular vehicle device **50** detects or is involved with an alarm event, this is reported by the CAN **124** to the processor **90** using the device drivers **128**. The processor **90** and the TCP/IP stack **98** cooperate to send a signal through the cellular phone **80** indicative of this alarm condition, without the need to utilize the web server **102**. The signal representative of the alarm condition is properly directed to a predetermined IP address over the Internet **68**. Relatedly, the processor **90** is able to execute an appropriate interrupt routine in order to delay or interrupt a response that is being performed due to a currently existing request to the controller **30** in order to process the detected alarm condition. After such processing, the processor **90** can continue with responding to the request that was present prior to the interrupt. Additionally, the controller **30** is able to be responsive to more than one request from different users at different remote stations. The processor **90** and the RTOS **94** cooperate to perform multiple tasks in a coordinated fashion in response to requests from multiple users.

Previous discussions of the operation of the apparatus have primarily been directed to operations in which the sending of information is initiated by a remote computer terminal **60**. With reference to the flow diagram of FIG. **4**, a further related description of the operation of the present invention involves a case in which information is transmitted upon initiation of the controller **30** in the vehicle. In accordance with such an operation, data or other information from one or more vehicle devices **50***a*–**50***n* is provided over the airlink to one or more remote stations **10***a*–**10***n* on a predetermined or determinable time basis. For example, each vehicle in a fleet of vehicles might be required to report its location on a periodic basis to a remote station **10**. The steps of FIG. **4** are next described in the context of such an example. At block **300**, vehicle positioning data is available from one of the vehicle devices **50**, which might be a GPS. On a requested or regular input scheme, such vehicle device data is sent to the CAN bus **126** at block **304**. The CAN controller **122** is responsible for controlling the receipt and transmitting of such data to the controller **30** at block **308**. The vehicle data that is to be transmitted over the wire link, in accordance with the predetermined or determinable procedure, is appropriately processed, analyzed or otherwise acted on using the controller **30** at block **312**. In one embodiment, vehicle device data, such as GPS data, do not rely on the web server **102** but may utilize a different communications pathway, such as E-mail. In any event, the controller **30** gates the vehicle location data to the cellular phone having the vehicle airlink transfer protocol modem **20**, such as a CDPD network modem **82**, at block **316**. The vehicle location data is properly formatted and transmitted through the cellular phone over the airlink at block **320**. In receiving such data from the airlink, a remote airlink transfer protocol modem **16**, such as a remote CDPD network modem **76**, collects such data at block **324** and subsequently passes the vehicle data to the Internet **68** at block **330**. The desired computer terminal **60** receives the vehicle positioning data from the Internet **68** at block **334**. In accordance with desired embodiments, such data can be further processed by the computer terminal **60**, displayed on a display unit thereof in a pre-established way, or otherwise handled to achieved desired use of the received data. In a related variation of this embodiment, after processing such data, the computer terminal **60** may initiate further actions in the way of sending information to the vehicle for adjusting or otherwise affecting the vehicle device that provided the data for analysis. That is, based on the data received and analyzed by the computer terminal **60**, a determination is made that a desired or feedback input needs to be provided in real time to this vehicle device.

The foregoing discussion of the invention has been presented for purposes of illustration and description. Further, the description is not intended to limit the invention to the form disclosed herein. Consequently, variations and modifications commensurate with the above teachings, within the skill and knowledge of the relevant art, are within the scope of the present invention. The embodiments discussed herein above are further intended to explain the best mode known of practicing the invention and to enable others skilled in the art to utilize the invention in such, or in other, embodiments and with the various modifications required by their particular application or uses of the invention. It is intended that the appended claims be construed to include alternative embodiments to the extent permitted by the prior art.

What is claimed is:

1. An apparatus for information transmission involving one or more remote stations and a vehicle, comprising:

at least a first remote station including computer means located at a distance from a vehicle;

a wireless device for location in the vehicle for use in sending and receiving information including data relative to said first remote station over an airlink;

a plurality of different vehicle devices associated with the vehicle and with each of said vehicle devices for at least one of receiving and sending said information;

controller means including processing means in the vehicle for controlling the sending and receiving of said information using said wireless device between said

first remote station and the vehicle, said controller means further including first standard network communication means for use in presenting information for transmission over the airlink in a first format that is acceptable to a first standardized network that includes the airlink, wherein said first network communication means enables said information to be provided to multiple users that utilize different makes of communication equipment, different processing hardware and different applications software executable by said processing means of said controller means, said first standard network communication means including a web server in the vehicle for responding to a plurality of service related requests and providing said information in said first format for transmission to said computer means at said first remote station using said wireless device; and

a second standard network communication means, different from said first standard network communication means, in communication with said controller means for presenting information in a second format that is acceptable to a second standardized network, with said second standardized network communication means communicating with said vehicle devices for sending and receiving said information relative thereto and in which said controller means enables said information to be properly communicated between said first and second standardized networks.

2. An apparatus, as claimed in claim 1, wherein:

said first standard network communication means includes first means for communicating with said wireless device for receiving a request for said information obtainable from at least one of said vehicle devices, said first means including means for checking source address information associated with said request in determining that said request is to be responded to by said controller means.

3. An apparatus for information transmission involving one or more remote stations in a vehicle, comprising:

at least a first remote station including computer means located at a distance from a vehicle;

a wireless device for location in the vehicle for use in sending and receiving information including data relative to said first remote station over an airlink;

a plurality of different vehicle devices associated with the vehicle and with each of said vehicle devices for at least one of receiving and sending said information;

controller means including processing means in the vehicle for controlling the sending and receiving of said information using said wireless device between said first remote station and the vehicle, said controller means further including first standard network communication means for use in presenting said information for transmission over the airlink in a first format that is acceptable to a first standardized network that includes the airlink, wherein said first network communication means enables said information to be provided to multiple users that utilize different makes of communication equipment, different processing hardware and different applications software executable by said processing means of said controller means, said first standard network communication means including a web server in the vehicle for responding to a plurality of service related requests and also including transmission control protocol means in communication with said web server for regulating flow and ordering of said information related to said vehicle devices to said web server; and

a second standard network communication means, different from said first standard network communication means, in communication with said controller means for presenting information in a second format that is acceptable to a second standardized network, with said second standardized network communication means communicating with said vehicle devices for sending and receiving said information relative thereto and in which said controller means enables said information to be properly communicated between said first and second standardized networks.

4. An apparatus for information transmission involving one or more remote stations in a vehicle, comprising:

at least a first remote station including computer means located at a distance from a vehicle;

a wireless device for location in the vehicle for use in sending and receiving said information including data relative to said first remote station over an airlink;

a plurality of different vehicle devices associated with the vehicle and with each of said vehicle devices for at least one of receiving and sending said information;

controller means including processing means in the vehicle for controlling the sending and receiving of said information using said wireless device between said first remote station and the vehicle, said controller means further including first standard network communication means for use in presenting said information for transmission over the airlink in a first format that is acceptable to a first standardized network that includes the airlink, wherein said first network communication means enables said information to be provided to multiple users that utilize different makes of communication equipment, different processing hardware and different applications software executable by said processing means of said controller means, said first standard network communication means including a web server in the vehicle for responding to a plurality of service related requests and also including a CGI-bin communicating with said web server and in which said CGI-bin links said web server with a number of executable programs useful in obtaining said information related to said vehicle devices; and

a second standard network communication means, different from said first standard network communication means, in communication with said controller means for presenting information in a second format that is acceptable to a second standardized network, with said second standardized network communication means communicating with said vehicle devices for sending and receiving said information relative thereto and in which said controller means enables said information to be properly communicated between said first and second standardized networks.

5. An apparatus for information transmission involving one or more remote stations in a vehicle, comprising:

at least a first remote station including computer means located at a distance from a vehicle;

a wireless device for location in the vehicle for use in sending and receiving information including data relative to said first remote station over an airlink;

a plurality of different vehicle devices associated with the vehicle and with each of said vehicle devices for at least one of receiving and sending said information;

controller means including processing means in the vehicle for controlling the sending and receiving of said information using said wireless device between said

remote station and the vehicle, said controller means further including first standard network communication means for use in presenting said information for transmission over the airlink in a first format that is acceptable to a first standardized network that includes the airlink, wherein said first network communication means enables said information to be provided to multiple users that utilize different makes of communication equipment, different processing hardware and different applications software executable by said processing means of said controller means, said first standard network communication means including a web server in the vehicle for responding to a plurality of service related requests received using said wireless device, with said web server in communication with program memory for storing said executable software in connection with obtaining said information from said vehicle devices and in which said first standard network communication means further includes an operating system for managing a number of services associated with conducting applications oriented tasks in conjunction with said executable software; and

a second standard network communication means, different from said first standard network communication means in communication with said controller means for presenting information in any second format that is acceptable to a second standardized network, with said second standardized network communication means communicating with said vehicle devices for sending and receiving said information relative thereto and in which said controller means enables said information to be properly communicated between said first and second standardized networks.

6. An apparatus, as claimed in claim 1, wherein:

said first standardized network communication means includes the Internet and said second standardized network includes a bus having predetermined protocol that permits controlled communications relative to said vehicle devices and in which said executable software includes a plurality of the following: software for providing the location of the vehicle; software for providing data related to the vehicle conditions; software for providing data related to conditions of cargo contained in the vehicle; software for providing data related to medical conditions of a patient carried by the vehicle; and software for providing predetermined alarm conditions and in which said software utilizes said information from said vehicle devices.

7. An apparatus for information transmission involving one or more remote stations in a vehicle, comprising:

at least a first remote station including computer means located at a distance from a vehicle

a wireless device for location in the vehicle for use in sending and receiving information including data relative to said first remote station over an airlink:

a plurality of different vehicle devices associated with the vehicle and which each of said vehicle devices for at least one of receiving and sending said information;

controller means including processing means in the vehicle for controlling the sending and receiving of said information using said wireless device between said first remote station and the vehicle, said controller means further including first standard network communication means for use in presenting said information for transmission over the airlink in a first format that is acceptable to a first standardized network that includes the airlink, wherein said first network communication means enables said information to be provided to multiple users that utilize different makes of communication equipment, different processing hardware and different applications software executable by said processing means of said controller means, said first standard network communication means including a web server in the vehicle that responds to a plurality of service related requests and provides said information in said first format and a data memory that communicates with said web server for storing data in html that is obtainable using said web server and in which said web server provides said data in said first format, with said first format being http; and

a second standard network communication means, different from said first standard network communication means, in communication with said controller means for presenting said information in a second format that is acceptable to a second standardized network, with said second standardized network communication means communicating with said vehicle devices for sending and receiving said information relative thereto and in which said controller means enables said information to be properly communicated between said first and second standardized networks.

8. An apparatus as claimed in claim 1, wherein:

said controller means includes a communications port for receiving communications port information separately from said wireless device, with said communications port information being useful in providing an input to one of said plurality of vehicle devices through said second standard network communication means.

9. An apparatus, as claimed in claim 1, wherein:

each of said plurality of vehicle devices has a separate designation known to said controller means, with information being requested from a first vehicle device by said computer means by selecting a designation associated with said first vehicle device and said first vehicle device designation being acceptable to said first standardized network.

10. An apparatus, as claimed in claim 1, wherein:

said computer means includes display means and said controller means responds to a request from said computer means by controlling the sending of software to said computer means for use in displaying information on said display means, with said software being related to operation of one of said vehicle devices.

11. An apparatus, as claimed in claim 1, wherein:

said controller means initiates a transfer of information to said first remote station based on occurrence of at least one predetermined event.

12. A method for using at least a first standardized network for communicating information between a remote station and a vehicle, comprising:

providing a wireless device in the vehicle;

sending a message including a request for information and an address using a computer at the remote station;

formatting said message so that it is acceptable to the first standardized network;

configuring said message to communicate said message over an airlink;

receiving said message in the vehicle using said wireless device;

coordinating said request for information including checking for an address;

sending said request for information to a server;

obtaining information based on management by said server of said request for information, said obtained information being provided in accordance with a predetermined language arrangement, said obtaining step including accessing data memory for storing data defined in html using said server;

formatting said obtained information using said server;

transmitting said obtained information over said airlink using said wireless device; and receiving said information by said computer.

13. A method, as claimed in claim 12, wherein:

said obtaining step includes using a second standardized network that communicates with a number of vehicle devices, each of said vehicle devices for at least one of sending and receiving data and in which said data is sent in response to said request for information.

14. A method, as claimed in claim 13, further including:

initiating a signal by a first of said vehicle devices in response to detection of a first condition and in which responding to said request for information is delayed while sending data related to said first condition.

15. A method, as claimed in claim 13, wherein:

said obtaining step includes receiving said request for information separately from said wireless device using a communications port associated with controller means that communicates with said wireless device when said wireless device is not in the vehicle.

16. A method for using at least a first standardized network for communicating information between a remote station and a vehicle, comprising:

providing a wireless device in the vehicle;

sending a message including a request for information and an address using a computer at the remote station;

formatting said message so that it is acceptable to the first standardized network;

configuring said message to communicate said message over an airlink;

receiving said message in the vehicle using said wireless device;

coordinating said request for information including checking for an address;

sending said request for information to a server;

obtaining information based on management by said server of said request for information; said obtained information being provided in accordance with a predetermined language format, said obtaining step includes invoking an applications program using a CGI-bin in communication with said server and subsequently executing said applications program using processing means in the vehicle;

formatting said obtained information using said server;

transmitting said obtained information over said airlink using said wireless device; and

receiving said information by said computer.

17. A method, as claimed in claim 16, wherein:

said executing step includes using data obtained from at least one of said plurality of vehicle devices.

18. A method, as claimed in claim 17, wherein:

said executing step includes using operating system software for managing a number of services associated with conducting one or more applications-oriented tasks and in which said operating system is involved in interrupting said request for information when a predetermined alarm condition is detected by a predetermined one of said vehicle devices.

19. A method, as claimed in claim 18, wherein:

said executing step includes performing multiple tasks using said operating system.

20. A method, as claimed in claim 12, further including:

initiating a transfer of information by controller means contained in the vehicle based on the occurrence of a predetermined condition.

21. A method for communicating information between a computer at a remote site and a vehicle having a plurality of vehicle devices for sending and receiving information including data, comprising:

providing a wireless device in the vehicle;

requesting data from a first of said vehicle devices using said computer;

formatting said request so that it is acceptable to a first standardized network, with said request including a first address associated with said first vehicle device, said step of formatting said request includes using a http web server and said first standardized network includes the Internet;

configuring said request to communicate said request over an airlink;

receiving said request in the vehicle using said wireless device;

managing said request including where said data is to be obtained with reliance on said first address of said first vehicle device;

obtaining said data after said managing step using a second standardized network, different from said first standardized network, said second standardized network includes a controller area network for providing communications protocol for a number of different vehicle devices;

formatting said data so that it is acceptable to said first standardized network;

transmitting said data over said airlink using said wireless device; and

receiving said data associated with said first vehicle device by said computer.

* * * * *

US005794164A

United States Patent [19]

Beckert et al.

[11] Patent Number: 5,794,164

[45] Date of Patent: Aug. 11, 1998

[54] **VEHICLE COMPUTER SYSTEM**

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[73] Assignee: **Microsoft Corporation**, Redmond, Wash.

[21] Appl. No.: **564,586**

[22] Filed: **Nov. 29, 1995**

[51] **Int. Cl.**[6] **G06F 19/00**

[52] **U.S. Cl.** **701/1**; 701/36

[58] **Field of Search** 364/424.045, 423.098; 455/345, 346; 701/36, 1

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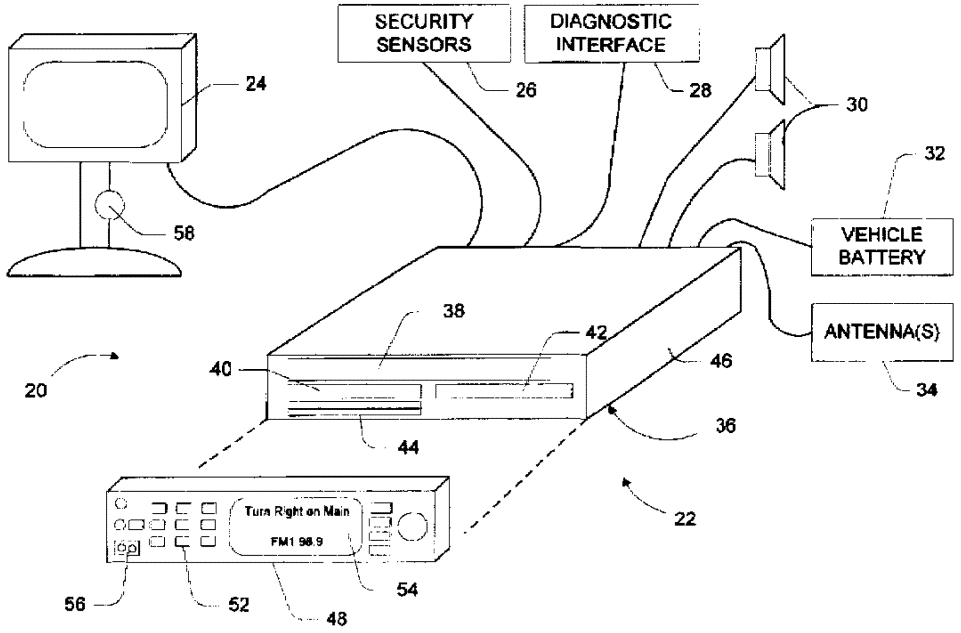
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Primary Examiner—Michael Zanelli
Attorney, Agent, or Firm—Lee & Hayes, PLLC

[57] **ABSTRACT**

A vehicle computer system has a housing sized to be mounted in a vehicle dashboard or other appropriate location, a computer mounted within the housing, and an open platform operating system which executes on an open hardware architecture computer. The open platform operating system supports multiple different applications that can be supplied by a vehicle user. For instance, the operating system can support applications pertaining to entertainment, navigation, communications, security, diagnostics, and others. The computer has one or more storage drive (e.g., CD drive, floppy disk drive, cassette player, or hard disk drive) which permits the vehicle user to download programs from a storage medium (e.g., CD, diskette, cassette, or hard disk) to the computer. In the described implementation, the computer has two independent processors. One processor, which runs the operating system, is mounted in a stationary base unit of the housing and the other processor is mounted to a faceplate which is detachable from the base unit. When the faceplate is attached, the first processor provides the primary control over all operating systems (i.e., entertainment, navigation, communications, security, diagnostics, and others) and the faceplate processor is subservient. When the faceplate is detached, it forms a portable RF device with the faceplate processor providing radio and communications capabilities.

46 Claims, 7 Drawing Sheets



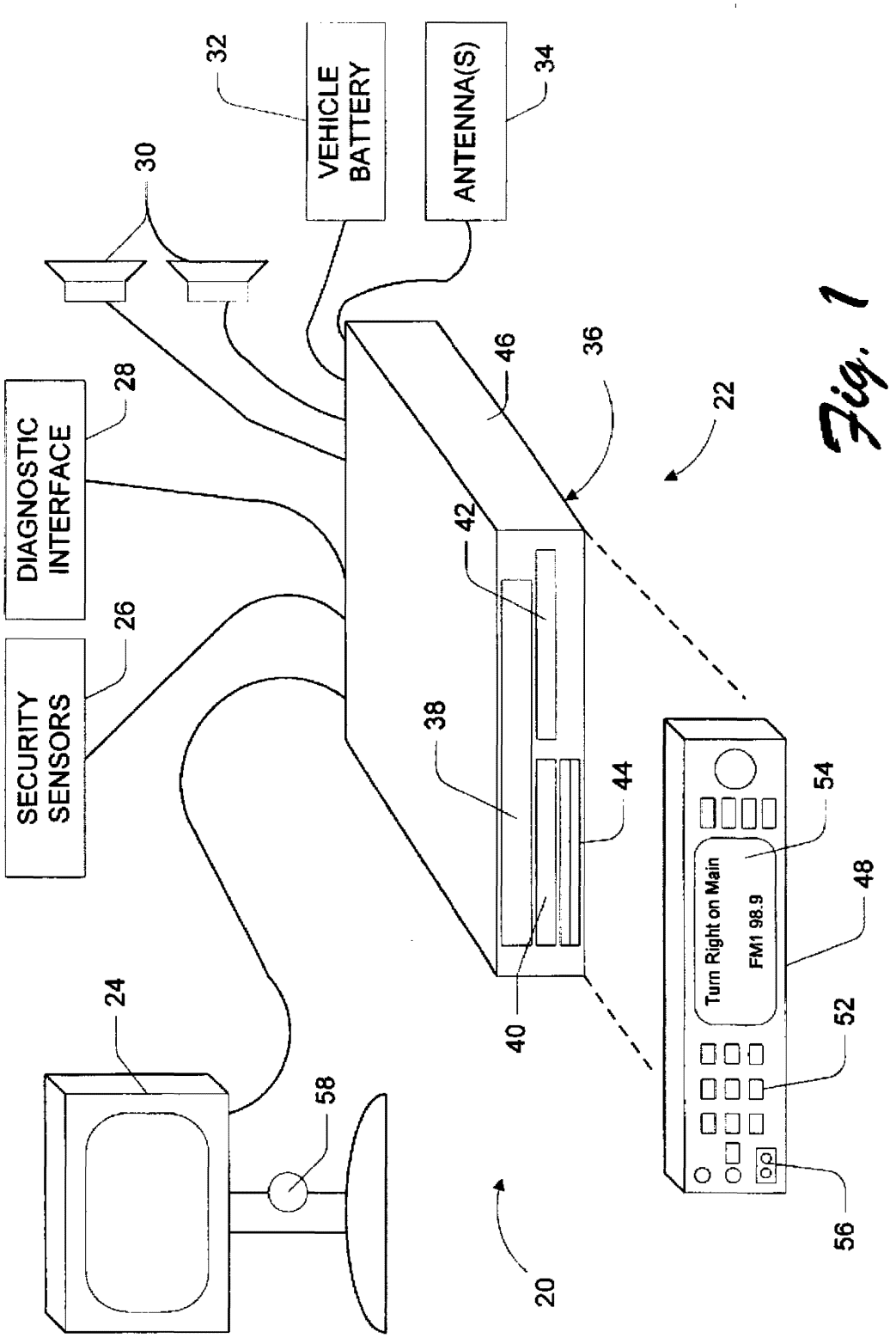

VEHICLE BATTERY
ANTENNA(S)
DIAGNOSTIC INTERFACE
SECURITY SENSORS
Turn Right on Main
FM1 98.9
32
34
30
28
26
46
36
22
42
38
44
54
48
52
40
24
58
56
20

Fig. 1

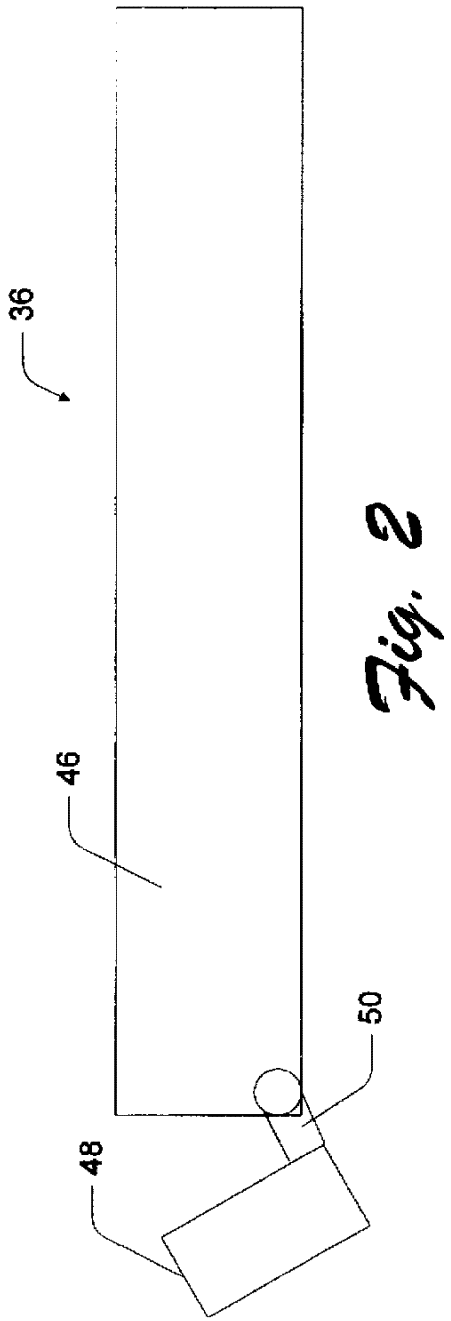


Fig. 2

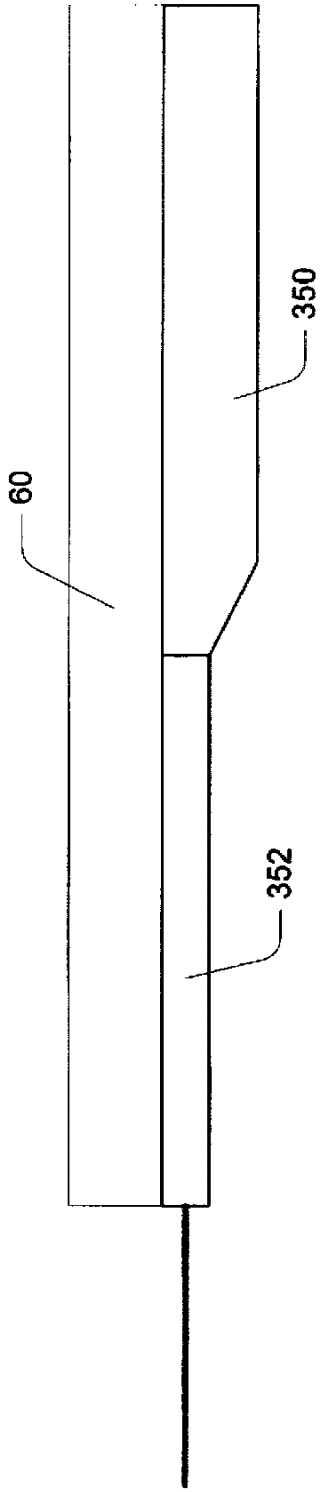


Fig. 6

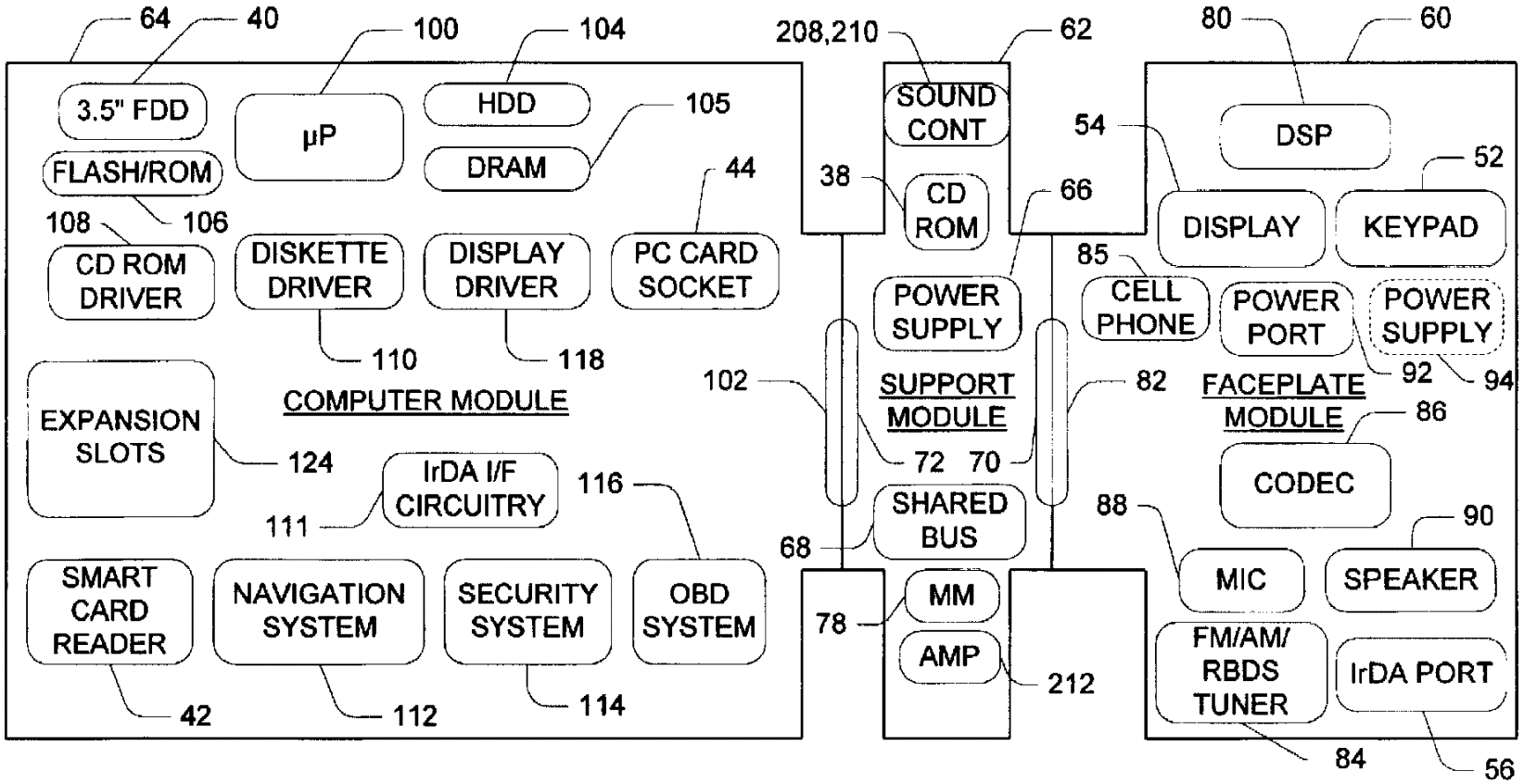

64
40
100
104
208,210
62
80
60
3.5" FDD
µP
HDD
105
SOUND CONT
DSP
54
52
FLASH/ROM
DRAM
38
CD ROM
66
DISPLAY
KEYPAD
44
108
106
CD ROM DRIVER
DISKETTE DRIVER
DISPLAY DRIVER
PC CARD SOCKET
85
CELL PHONE
POWER PORT
POWER SUPPLY
POWER SUPPLY
110
118
92
94
102
COMPUTER MODULE
SUPPORT MODULE
82
FACEPLATE MODULE
EXPANSION SLOTS
124
72
70
86
CODEC
IrDA I/F CIRCUITRY
116
111
SHARED BUS
88
90
68
MIC
SPEAKER
SMART CARD READER
NAVIGATION SYSTEM
SECURITY SYSTEM
OBD SYSTEM
MM
78
AMP
212
FM/AM/ RBDS TUNER
IrDA PORT
42
112
114
84
56
22

Fig. 3

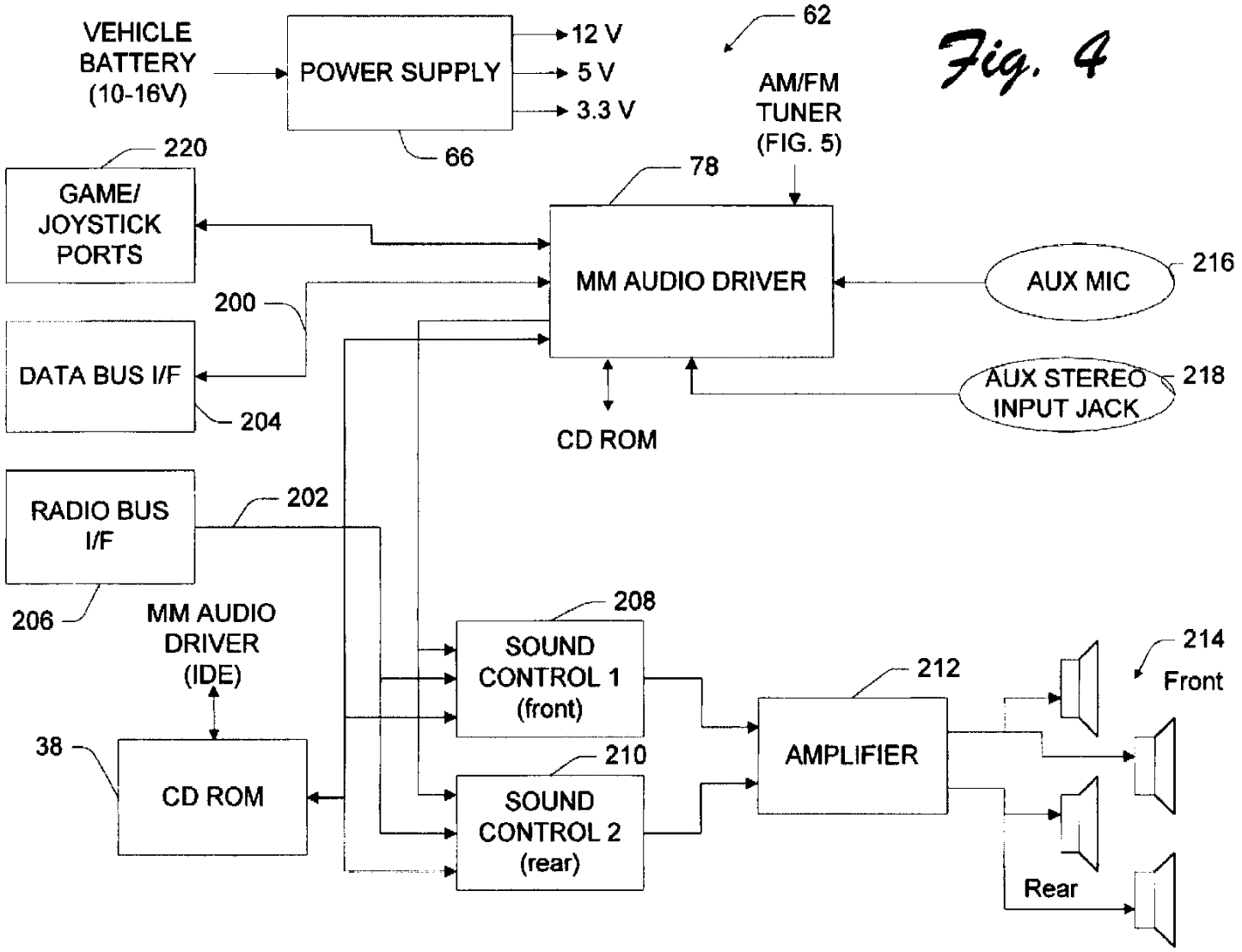

VEHICLE BATTERY (10-16V)
POWER SUPPLY
12 V
5 V
3.3 V
66
62
AM/FM TUNER (FIG. 5)
220
GAME/ JOYSTICK PORTS
78
MM AUDIO DRIVER
AUX MIC
216
200
DATA BUS I/F
204
AUX STEREO INPUT JACK
218
CD ROM
RADIO BUS I/F
202
206
MM AUDIO DRIVER (IDE)
208
SOUND CONTROL 1 (front)
214
Front
212
AMPLIFIER
38
CD ROM
210
SOUND CONTROL 2 (rear)
Rear

Fig. 4

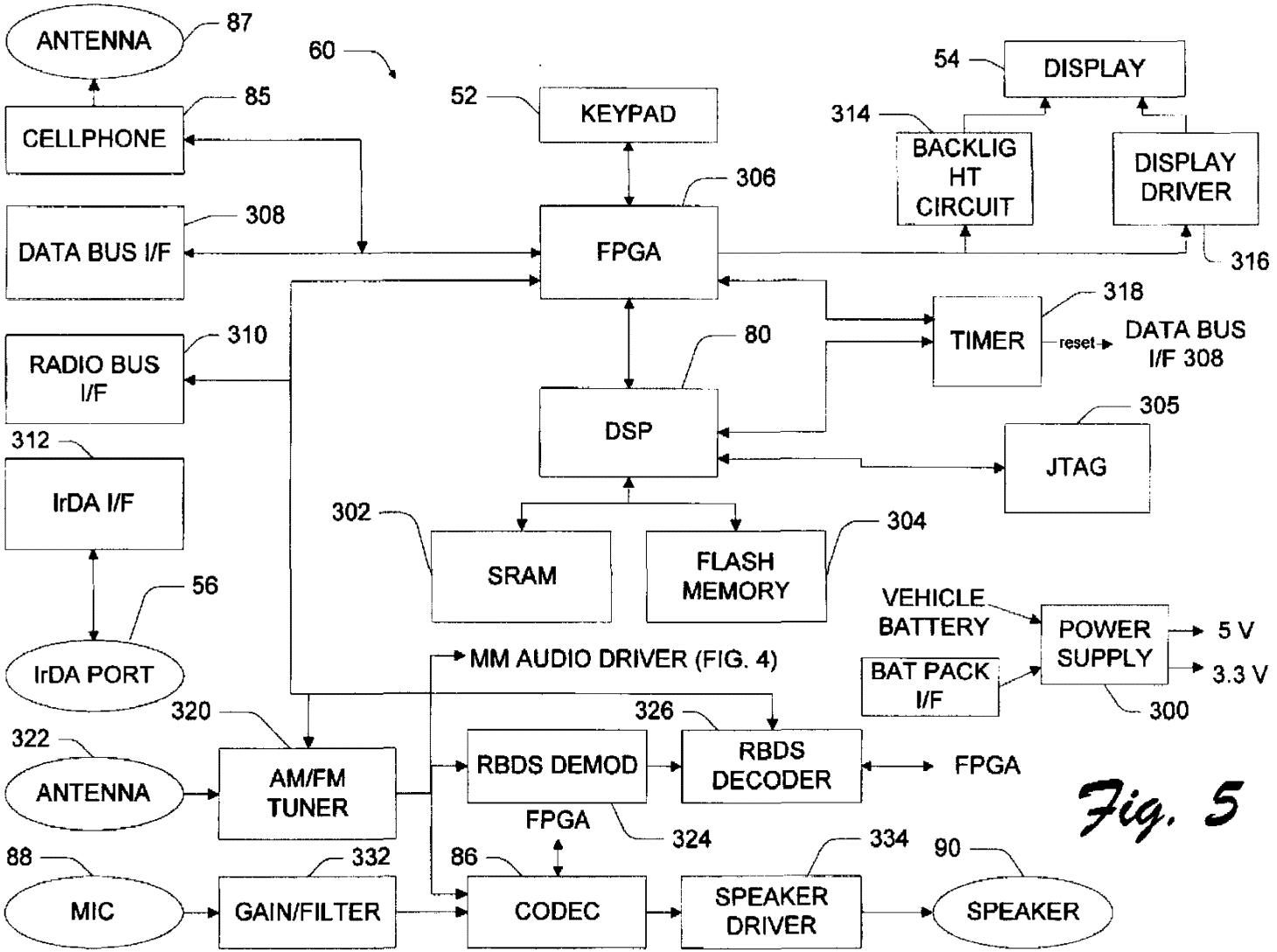

ANTENNA
87
60
54
DISPLAY
52
KEYPAD
314
CELLPHONE
85
BACKLIG HT CIRCUIT
DISPLAY DRIVER
306
DATA BUS I/F
308
FPGA
316
318
TIMER
reset
DATA BUS I/F 308
310
RADIO BUS I/F
80
DSP
305
JTAG
312
IrDA I/F
302
304
SRAM
FLASH MEMORY
56
VEHICLE BATTERY
POWER SUPPLY
5 V
3.3 V
IrDA PORT
MM AUDIO DRIVER (FIG. 4)
BAT PACK I/F
300
320
326
322
ANTENNA
AM/FM TUNER
RBDS DEMOD
RBDS DECODER
FPGA
FPGA
324
88
332
86
334
90
MIC
GAIN/FILTER
CODEC
SPEAKER DRIVER
SPEAKER

Fig. 5

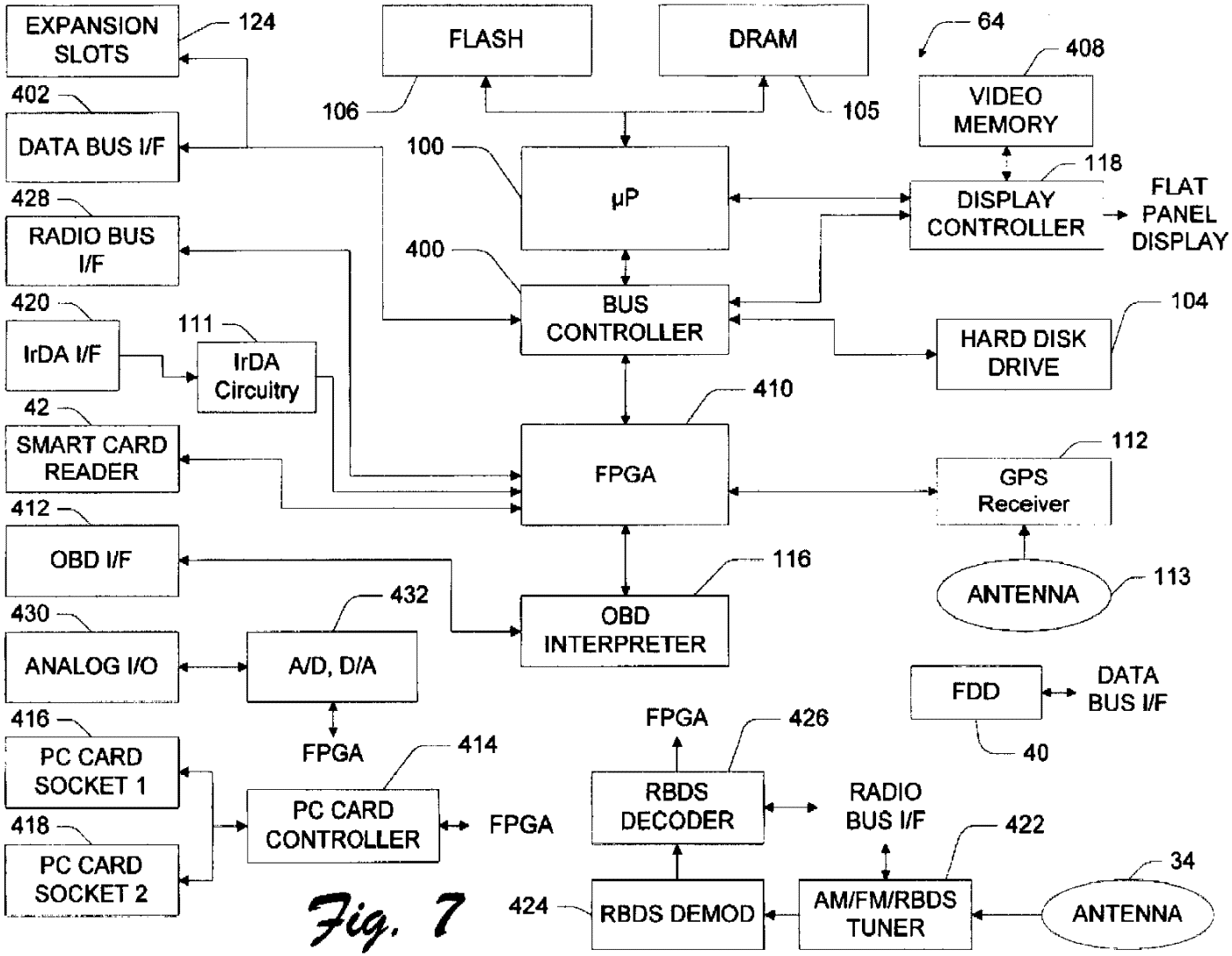

EXPANSION SLOTS
124
FLASH
DRAM
64
408
VIDEO MEMORY
402
DATA BUS I/F
106
105
100
µP
118
DISPLAY CONTROLLER
FLAT PANEL DISPLAY
428
RADIO BUS I/F
400
BUS CONTROLLER
420
IrDA I/F
111
IrDA Circuitry
HARD DISK DRIVE
104
42
SMART CARD READER
410
FPGA
112
GPS Receiver
412
OBD I/F
116
ANTENNA
113
432
OBD INTERPRETER
430
ANALOG I/O
A/D, D/A
FDD
DATA BUS I/F
FPGA
426
40
416
PC CARD SOCKET 1
FPGA
414
RBDS DECODER
RADIO BUS I/F
PC CARD CONTROLLER
FPGA
418
PC CARD SOCKET 2
422
34
424
RBDS DEMOD
AM/FM/RBDS TUNER
ANTENNA

Fig. 7

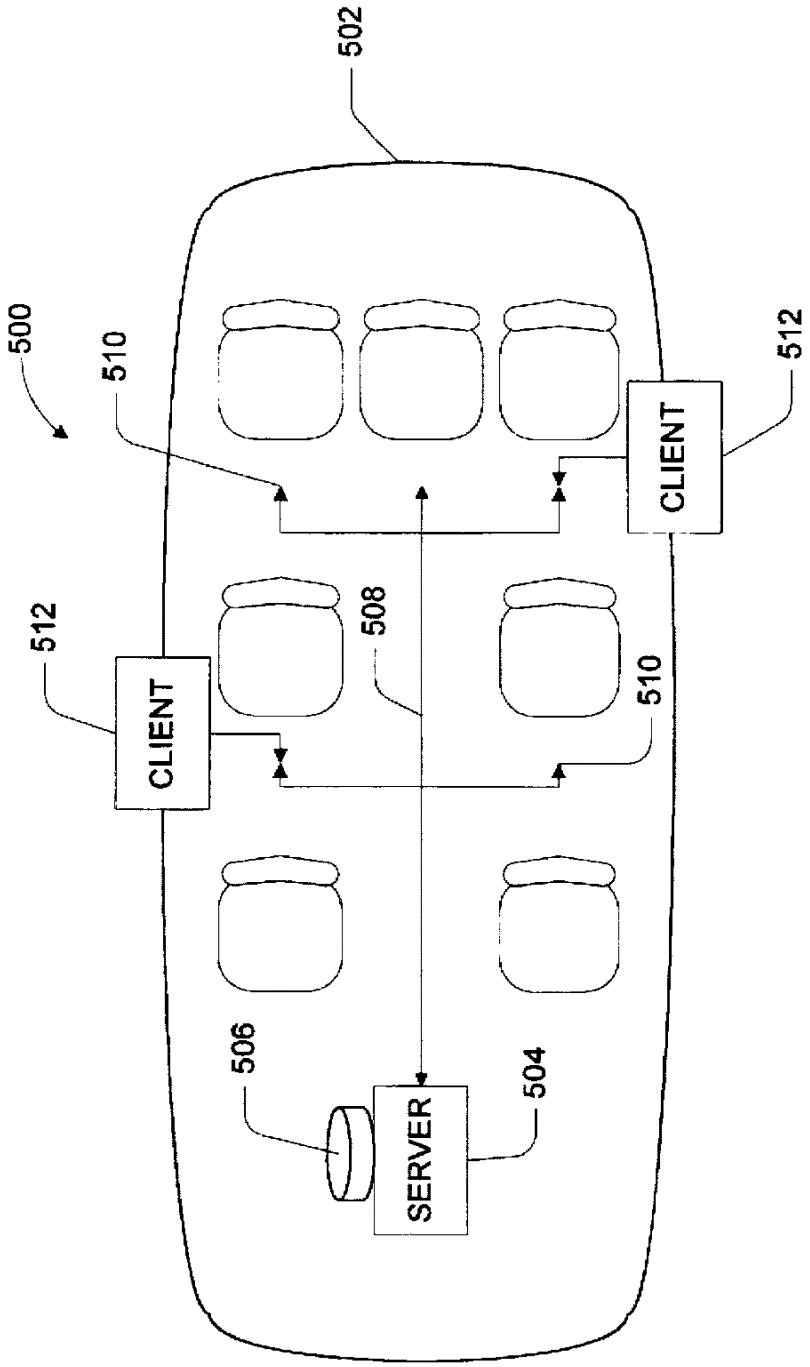


Fig. 8

VEHICLE COMPUTER SYSTEM

TECHNICAL FIELD

This invention relates to computer systems for vehicles.

BACKGROUND OF THE INVENTION

Modern vehicles are typically equipped with several independent electronic systems. For instance, most modern vehicles have a sound system and a security system. The sound system usually consists of an AM/FM radio, a cassette or CD (compact disk) player, an equalizer/amplifier, and speakers. The radio and player are arranged in a metal casing or housing that is mounted in a dashboard of the vehicle. The housing has a standardized size, often expressed in terms of DINs (Deutsche Industry Normen), to ensure that the sound system is compatible with and can be retrofit into most vehicle dashboards.

The security system is entirely separate from the sound system. The security system generally consists of security sensors placed throughout the vehicle, and a central application-specific integrated circuit (ASIC) to monitor the sensors and determine whether security is being jeopardized. Security System also controls actuators to lock/unlock doors or windows, and an alarm or siren.

Most late model (1996 or later for OBD II, 1993 or later for OBD I) vehicles are also constructed with a diagnostic system that analyzes performance of the vehicle's engine, transmission and fuel system, and other components. The diagnostic system can be coupled to an external computer to download or monitor diagnostic information that is useful to a vehicle mechanic during servicing of the vehicle. Additionally, the diagnostic system might include dashboard displays that inform the driver of various operating conditions.

In some recent models, vehicles are being equipped with a navigation system that incorporates a global positioning system (GPS) receiver. The GPS receiver has an antenna to receive signals from a satellite network. The vehicle navigation system uses the satellite positioning signals to compute coordinates that locate the vehicle over the surface of the earth with regard to longitude, latitude, and altitude. Also, with the appropriate map software, the vehicle's location can then be shown on a map.

Cellular communications systems have also been added to vehicles. These communications systems enable the vehicle driver or occupant to transact telephone calls from their vehicle. Some of the more sophisticated systems are voice controlled which permit the driver to initiate or receive calls while traveling without removing a hand from the driving wheel, or diverting his/her eyes from the navigation of the vehicle.

While these various electronics systems have proven useful to vehicle users, there is a drawback in that the systems are unrelated and incompatible. Each system employs separate proprietary dedicated processors or ASICs which execute incompatible proprietary software. If a vehicle owner would like to add a security system to his/her vehicle, the owner must purchase an entire security system from one of the vendors and have it customarily installed. There is no way to add security functionality to an existing electronics system, such as the navigation system or the sound system.

SUMMARY OF THE INVENTION

This invention concerns a vehicle computer system that is capable of integrating these diverse and separate systems as well as offering a general purpose computing platform that allows for easy expandability. The vehicle computer system has a housing sized to be mounted in a vehicle dashboard. This system provides an open hardware architecture and supports an open platform operating system. The open platform operating system supports multiple different applications that can be supplied by a software vendor. For instance, the operating system can support applications pertaining to entertainment, navigation, communications, security, diagnostics, and others In the preferred implementation, the operating system is a multitasking operating system capable of concurrently running multiple applications. The computer has one or more storage devices (e.g., hard disk drive, CD drive, floppy disk drive, cassette player, or smart card reader) which permits the user to download programs from a storage medium (e.g., hard disk, CD, diskette, cassette, or smart card) to the computer. Also, the user can write data to writeable medium (e.g., hard disk, diskette, cassette, or smart card). In this manner, the vehicle owner can easily add new systems to his/her vehicle by installing additional programs.

In one implementation, the vehicle computer system has two independent processors. One processor (e.g., an Intel® based microprocessor) is provided on a computer module which mounts to a stationary base unit of the housing that resides in the vehicle dashboard or other location. The operating system runs on this processor to support the vehicle-related applications and to additionally provide all of the functionality typically afforded by a personal computer. Another processor (e.g., a digital signal processor) is provided on a faceplate module that detachably connects to the base unit. The faceplate module has an AM/FM tuner, display, keypad, and a CODEC which are controlled by the second processor. A third module, known as the support module, resides in the stationary base unit. The support module contains a storage drive (which also functions as an entertainment player), power supply, multimedia audio driver for the entertainment system, and a communications bus.

The three modules operate cooperatively, or independently, of one another except that the support module can not operate by itself. The faceplate module can be detached from the base unit and operate independently as a portable radio with mono-audio sound. By use of the CODEC with built in speaker and microphone, the faceplate module can further function as a portable phone or a handset unit that can communicate with the base unit in the vehicle. The portable faceplate module can also be used to receive paging information, take voice notes, and to remotely operate the security system. While detached, the faceplate module is powered by an independent source, such as batteries.

The faceplate module and support module can operate independently of the computer module. The faceplate module is physically connected to the front of the base unit and electronically interfaced with the support module. When connected and the computer module is not connected, the faceplate module totally controls the entertainment system of the vehicle. The faceplate processor controls the multimedia audio driver and the CD player in the support module. The faceplate module derives its power from the vehicle batteries via the power supply in the faceplate module.

When the computer module is also present, the faceplate module is controlled as a hot pluggable peripheral device. The processor on the computer module has full control of the communications bus and is master to the faceplate processor. The computer module processor controls systems not contained in the faceplate and can indirectly control

resources contained in the faceplate. Also, the faceplate module processor lends signal processing resources to enhance the entertainment services and directly controls the resources contained in the faceplate.

The modular computer system affords tremendous flexibility when installing the system in a vehicle. As a low cost base model, the support module and faceplate module are installed in place of the conventional sound system. The housing is sized to the standard DIN form factor, so that the low cost base model can be substituted directly for the present sound system. This low cost model gives the owner an enhanced sound system with multimedia capabilities, plus a portable radio/phone system. The computer module can be installed as an upgrade feature to provide full computer system functionality. For instance, the computer module supports the navigation, security, diagnostics, communications, and entertainment systems, as well as any other application that the vehicle owner would like to subsequently install; a standard expansion bus is part of the computer module. The expansion bus can be used for adding additional peripherals.

In another implementation, the vehicle computer system includes a centralized server located in the dashboard or elsewhere in the vehicle and remote client computers located at the passengers of the vehicle. The server is connected to retrieve data or programs from the storage device, such as the CD player, floppy diskette, or hard drive, and to download such information to the client computers over a data network arranged in the vehicle. In this manner, a passenger can operate a game application or watch a video from their seat in the car without interrupting the driver or other occupants.

In yet another application, a single computer module could drive two or more graphic displays using separate graphic controllers; thus displaying separate images such as a moving map for the driver on one display and entertainment or TV for the passenger on another display.

BRIEF DESCRIPTION OF THE DRAWINGS

The same reference numerals are used throughout the drawings to reference like components and features.

FIG. **1** is a diagrammatic illustration of a vehicle computer system.

FIG. **2** is a diagrammatic side view of a base unit and detachable faceplate employed in the vehicle computer system.

FIG. **3** is a block diagram of the vehicle computer system according to one implementation having a faceplate module, a support module, and a computer module.

FIG. **4** is a functional block diagram of the support module.

FIG. **5** is a functional block diagram of the faceplate module.

FIG. **6** is a diagrammatic side view of the faceplate operating as a communications device while detached from the base unit of the vehicle computer system.

FIG. **7** is a functional block diagram of the computer module.

FIG. **8** is a diagrammatic illustration of the vehicle computer system according to another embodiment having a centralized server computing unit and one or more client computing units distributed on a data network in a vehicle.

DETAILED DESCRIPTION OF THE PREFERRED EMBODIMENT

FIG. **1** shows a vehicle computer system **20** according to one implementation of this invention. Vehicle computer system **20** has a centralized computer **22** coupled to various peripheral devices, including a monitor **24**, security sensors **26**, a vehicle diagnostic interface **28**, speakers **30**, vehicle battery **32**, and antenna(s) **34**. The computer **22** is assembled in a housing **36** that is sized to be mounted in a vehicle dashboard, similar to a conventional car stereo. Preferably, the housing **36** has a form factor of a single DIN (Deutsche Industry Normen). But, it possibly could be housed in a 2 DIN unit or other special form factor for an OEM.

The computer **22** runs an open platform operating system which supports multiple applications. Using an open platform operating system and an open computer system architecture, various software applications and hardware peripherals can be produced by independent vendors and subsequently installed by the vehicle user after purchase of the vehicle. This is advantageous in that the software applications do not need to be dedicated to specially designed embedded systems. The open hardware architecture is preferably running a multitasking operating system that employs a graphical user interface. One preferred operating system is a Windows® brand operating system sold by Microsoft Corporation, such as Windows 95® or Windows NT® or other derivative versions of Windows®. A multitasking operating system allows simultaneous execution of multiple applications.

The computer **22** includes at least one storage drive which permits the vehicle user to download programs and data from storage medium. In the illustrated implementation, the computer **22** has a CD ROM drive **38** which reads application-related CDs, as well as musical, video, game, or other types of entertainment CDs. In this manner, the CD ROM drive **38** performs a dual role of storage drive and entertainment player. Also, a hard disk drive (not shown in FIG. **1**) is included on the computer module which can be used for storing both application programs and user data. The computer **22** has an optional 3.5" floppy diskette drive **40**, a smart card reader **42**, and dual PCMCIA card sockets **44** which accept PCMCIA card types II and III. Hereinafter, the acronym "PC-Card" will be used in place of the acronym "PCMCIA."

The storage drives are mounted in a stationary base unit **46** of housing **36**. The base unit **46** is constructed and sized to be fixedly mounted in the dashboard. The housing **36** also has a faceplate **48** which is pivotally mounted to the front of the base unit **46**. The faceplate can be rotated to permit easy and convenient access to the storage drives.

FIG. **2** shows the housing **36** in more detail. Faceplate **48** has a physical coupling assembly **50** which enables the pivotal movement to alternately cover or expose the storage drives within the base unit **46**. Additionally, the physical coupling assembly **50** enables the faceplate **48** to be attached to or detached from the base unit **46**. This is represented in FIG. **1** in which the faceplate **48** is entirely detached from the base unit **46**.

With reference again to FIG. **1**, the computer **22** has a keypad **52** and a display **54** on the faceplate **48**. The display **54** is preferably a back lit LCD. The operating system executing on the computer **22** controls the faceplate keys **52** and the faceplate display **54** as peripheral devices when the faceplate is attached to the base unit. Additionally, as will be described below in more detail, the computer has a voice recognition device situated on the faceplate to permit the user to verbally enter commands in a hands-free, eyes-free environment. These voice commands can be used for controlling most operating modes of the vehicle computing platform. The computer **22** is also equipped with an IrDA

(infrared developers association) transceiver port **56** mounted on the faceplate **48** to transmit and receive data and programs using infrared signals. The entire faceplate unit **48** behaves as a multifunction peripheral to the computing platform.

To load an application or data onto the computer **22**, the vehicle user inserts a CD or diskette, if the application is not already contained on the hard disk, into the appropriate drive and the operating system downloads the application or data therefrom. The installation process can be automatically handled by the operating system, or with the assistance of commands input from the user in the form of keyed sequences on the keypad **52** or verbal instructions using the voice recognition device. Another technique to load data or applications or transfer data with other computing devices is through the use of the IrDA transceiver port **56**.

The computer **22** can output visual data to the LCD **54** at the faceplate, or to the standalone monitor **24**. The monitor **24** is preferably a small flat panel display (e.g., 6.4" screen) that is movably mounted on a stand or yoke and remotely located from the computer. The monitor **24** is fully adjustable to different viewing positions that can be seen by the driver or other passengers in the vehicle. The type of data displayed on the monitor can range widely from word instructions concerning the vehicle's performance, to diagrammatic directions used by the navigation system, to video movies for in-car entertainment. The monitor **24** is equipped with an automatic override switch **58** which automatically disables the display of any non-driving related data when being viewed by the driver. In the event that the monitor is positioned for driver viewing, only information supportive and helpful to driving (e.g., diagnostics, navigation directions) is displayed on the monitor, while distracting information (e.g., video movies, games) are blocked from display. In one implementation, the switch is an electrical cylindrical switch which closes when the display is capable of being viewed by the driver; thus, the software can sense the display position and only allow permitted information to be displayed.

In general, the vehicle computer system **20** can be used to integrate multiple vehicle-related systems onto one open platform hardware and software architecture. For instance, the vehicle computer system **20** can serve as a multimedia entertainment system, a navigation system, a communications system, a security system, and a diagnostics system. Moreover, the vehicle computer system **20** provides additional functionality traditionally associated with desk-top and laptop personal computers. For instance, vehicle computer system **20** can support word processing applications, spreadsheet applications, database applications, and appointment/schedule applications. Furthermore, the vehicle computer system **20** can be configured to operate as a server to other computing units in the vehicle to distribute games, video movies, and the like to passengers.

FIG. **3** shows the computer **22** according to one implementation of the invention. Computer **22** has three primary modules: a faceplate module **60**, a support module **62**, and a computer module **64**.

Support Module **62**

The support module **62** resides in the stationary base unit **46** (FIG. **1**) that is mounted in the vehicle dashboard. The support module **62** includes a power supply subsystem **66** and an internal bus **68** for the computer **22**. The internal bus **68** has a first interfacing slot **70** and a second interfacing slot **72** which provide shared access to the bus from the faceplate module **60** and the computer module **64**. The support module **62** also has the CD ROM player **38**, a multimedia audio driver **78**, audio amplifier, and sound control circuitry.

FIG. **4** shows the support module in more detail. The power supply subsystem **66** derives power from the vehicle battery, and transforms the battery voltage level (e.g., 10–16 volts) to appropriate chip voltage levels (e.g., 3.3–5 volts) or to a voltage sufficient to run the CD player **38**, diskette memory drive **40**, hard disk drive, and other devices possibly requiring 12 volts. The internal bus **68** preferably comprises two separate buses: an data-related bus **200** (e.g., a PCI bus) and a radio-related bus **202** (e.g., an I^2C bus). The first and second interfacing slots **70**, **72** include the data bus interface **204** for bus **200** and the radio bus interface **206** for bus **202**. The second interfacing slot also includes a power interface to supply power to the CPU module. For the faceplate module, however, vehicle power is taken directly from the vehicle battery and passed to the faceplate module, which has its own power regulation circuitry.

The multimedia audio driver **78** controls the audio sound system of the vehicle. It is coupled to control the CD ROM **76**, and parallel sound controllers **208** and **210**. The audio data coming out of the CD-ROM drive can be selected to feed the parallel sound controllers which control the volume, treble, bass, and balance for the front and rear speakers, respectively. The use of two sound control chips enables different audio sources to be selected and played in the front and rear of the vehicle. For example, the vehicle driver can listen to navigation instructions while the rear seat passengers can listen to their favorite tunes.

The audio signals are amplified by power amplifier **212** and converted to stereo sound by quad-speaker system **214**. The multimedia audio drive **78** also supports an auxiliary microphone input **216**, and an auxiliary stereo jack input **218** for attaching an external tape drive, portable tape player or some other external sound sources. A game/joystick port **220** is also provided in the support module **62** and coupled to the multimedia driver **78**.

Faceplate Module **60**

With reference to FIG. **3**, the faceplate module **60** resides on the detachable faceplate **48** (FIG. **1**). The faceplate module **60** includes a first processor in the form of a digital signal processor (DSP) **80**, although other types of processors may be employed. The faceplate module **60** further includes an electrical interface **82** which compatibly couples to the first interfacing slot **70** on support module **62** to permit data communication between the faceplate module and the support module.

The faceplate module **60** is primarily dedicated to entertainment and communications. When the faceplate module is coupled to the support module, the DSP **80** uses the internal shared bus **68** on the support module **62** to control the CD player **38** via the multimedia audio chip **78** when playing musical or video CDs and the multimedia audio driver **78** to optimize sound and video quality. It should be noted that analog or digital cassette players, or other entertainment players, can be substituted for the CD player or added to the system.

The faceplate module **60** is also equipped with a radio tuner **84** which supports radio functionality. The radio tuner **84** includes an AM/FM tuner, RBDS demodulator, and decoder to recover information transmitted on the FM subcarrier programming. Additionally, a cellular telephone **85** or an RF transceiver can optionally be attached to the faceplate. The faceplate module **60** includes an audio analog to digital converter and digital to analog converter (or "CODEC") **86** that converts analog voice signals into data

that can be sampled by the DSP **80**. Also, the CODEC converts DSP sample data into analog signals that can drive a small loud speaker. The CODEC **86** in conjunction with the cellular phone **85** can be configured to provide full cellular phone functionality, independent of the computer module **64**, or to operate as a remote handset that communicates with the computer module **64** or other phone. The CODEC **86** controls a microphone **88** to receive verbal input, and a speaker **90** to output voice. A power port **92** is also provided on the faceplate module **60** to enable use of an external power source (e.g., cellular battery pack **94**) when the faceplate module is physically detached from the base unit or to regulate the vehicle battery voltage when attached to the base unit.

FIG. **5** shows the faceplate module **60** in more detail. It has its own power supply subsystem **300** which receives power from either the vehicle battery or from a battery pack in the event that the faceplate module is detached from the base unit. The faceplate power supply subsystem **300** transforms the input voltage level to a suitable chip voltage level of 3.3 volts or 5 volts.

The DSP **80** has an SRAM **302** for data storage and buffering and a flash memory **304** for program and voice template storage. This flash memory can be updated via the data bus and JTAG (Joint Test Action Group) port **305**. Using the voice template in the flash memory **304**, the DSP **80** operates in conjunction with the CODEC **86** as a voice recognition device that records and analyzes voice commands in relation to the stored voice template to determine and execute verbal instructions. In some cases the request will need to be sent to the CPU module if present.

The DSP **80** is coupled to a field programmable gate array (FPGA) **306** which coordinates data flow on the faceplate module. The FPGA **306** is coupled to the data bus interface **308** and the radio bus interface **310** which form part of the electrical interface **82** that connects to the first interfacing slot **70** of the support module **62**. The data bus interface **308** also provides connection to any internal components embedded in the faceplate module **60**, such as the cellphone chipset **85**. The faceplate module **60** also has an IrDA interface port **312** coupled to the IrDA port **56** to convey the data to the computer module **64**, as described below. This IrDA interface **312** is also part of the electrical interface **82**.

The DSP **80** further controls the keypad **52** and display **54** via the FPGA **306**. The DSP **80** scans and interprets inputs from the keypad **52**. The input data can be acted upon by the DSP **80** or sent to the computer module **64** via the data bus interface **308**. The display **54** is preferably a back lit LCD, driven by a backlight circuit **314** and a display driver **316**. The display is memory mapped to an I/O space in the DSP **80** for direct control by the DSP. Additionally, the computer module **64** can send commands to the DSP to indirectly control the display resources and other DSP controlled resources. A watchdog timer **318** is contained on the faceplate module gets periodically reset by the DSP. If the DSP fails to reset this timer, then something is hung and all resources on all three modules are reset and the unit recovers to a default state.

The faceplate module has an AM/FM tuner **320** connected to receive an RF signal from an antenna **322**. The antenna **322** can be the vehicle antenna, or a separate remote antenna that is used by the faceplate module when detached from the base unit. The RF signal received at the tuner **320** is demodulated by a demodulator **324** to retrieve the information signal from the carrier signal. The information signal is then decoded by a decoder **326** and passed to the DSP **80** via the FPGA **306**. It is noted that the decoding function performed by decoder **326** can alternatively be performed by logic contained in the FPGA **306**. The DSP passes the radio signal over the data bus interface **308** to the multimedia audio driver in the support module **62** to be played over the sound system in high quality, stereo sound.

A separate mono CODEC **86** is also coupled to receive analog sound signals from the microphone **322** or tuner **320**. The CODEC **86** in conjunction with the microphone **88**, speaker **90**, and cellphone or RF transceiver provides telecommunications functionality in the faceplate module. A gain/filter **332** and a speaker driver **334** associated with the CODEC **86** are optimized to provide premium voice recognition and playback for use against vehicle and environmental noise. The CODEC **86** can also be used to supply voice commands to the DSP **80** via FPGA **306**. The DSP **80** is programmed to recognize certain voice commands using a voice template stored in the flash memory **304**.

The faceplate module **60** can be disconnected from the base unit and employed as a portable RF device for both radio reception and telecommunications with the optional cellphone module or RF transceiver module. As shown in FIG. **5**, the cellphone module **85** is connected to the data bus I/F **308** and to an antenna **87** to provide telecommunications. FIG. **6** shows the faceplate module **60** detached from the base unit and coupled to a conventional cellular battery pack **350** and a cellular phone RF transceiver and antenna unit **352**. The faceplate module **60** can play monosound radio using the speaker **90**, and provide telecommunications directly to a cellular network, or indirectly through the base unit. Additionally, the portable RF device can provide support for features like paging, voice recording, and voice dialing.

Computer Module **64**

The computer module **64** may reside in the dashboard-mounted base unit **46** or in a separate location and includes a second processor in the form of a microprocessor **100**, such as an Intel® 486 microprocessor. The computer module **64** is configured as a plug-in motherboard having an electrical interface **402**, which compatibly couples to the second interfacing slot **72** on support module **62**. When plugged in, the computer module **64** has access to the internal shared bus **68**. In this manner, the faceplate module **60**, support module **62**, and computer module **64** all share the same internal bus **68** to communicate with one another. The computer module **64** derives power from power supply subsystem **66** on the support module **62**.

The microprocessor **100** runs an open platform operating system, such Windows 95® or Windows NT® or other Windows® derivative operating systems from Microsoft Corporation. The operating system is stored in a hard disk drive **104** (e.g., >200 Mbytes). The computer module **64** supports any variety of applications that the vehicle user might desire. These applications can also be stored on the hard disk drive **104** or on a removable storage medium, such as a CD ROM, cassette, CD changer, or floppy diskette. A DRAM **105** (e.g., 8 Mbytes) and flash memory **106** (e.g., 512 Kbytes) are employed in the computer module to support the microprocessor **100** in running the operating system and loaded applications.

When the user wishes to install a program on the computer module **64**, he/she inserts a floppy diskette into the floppy disk drive **40** or a CD ROM into the CD drive **38**. The operating system senses the new storage device and initiates the install procedures. BIOS extensions are stored with the operating system to enable booting from the CD ROM or

floppy disk drive (FDD). The computer module **64** has a CD ROM driver **108** and diskette driver **110** to control the CD player **38** or diskette drive **40**, respectively, during this read operation. If contained on the CD, the program data is transferred from the CD ROM drive **38** through the MM chip **78** to bus **68** on the support module **62**, and then over the interface coupling **72/102** to the microprocessor **100** and RAM **106** on the computer module **64**. If the data is contained on the floppy disk, then the data is transferred directly through the FDD interface contained on the computer module. As noted above, data can also be input via the IrDA port **56** on the faceplate. Such data is transferred via the faceplate/support coupling **70/82**, the shared bus **68** (or separate conductor), and the support/computer coupling **72/102** to the IrDA interface circuitry **111** contained on the computer module.

The computer module **64** has a navigation system **112** which includes both a GPS (global positioning system) receiver and a map application, such as Automap™, a program produced by Microsoft Corporation. A security system **114** is provided in the computer module **64** to manage vehicle security. The security system **114** monitors the security sensors **26** (FIG. **1**) for any potential threat of theft or vandalism. The security system **114** is connected to actuators which lock/unlock doors and windows, and to an alarm which can be activated upon detection of unwanted tampering.

An OBD (On Board Diagnostic) interpreter **116** is provided in the computer module to communicate with the OBD system built into the vehicle by the manufacturer. The OBD interpreter **116** interprets the status data received and provides performance related information from the vehicle's OBD system to the microprocessor **100**. Also, commands can be provided to the interpreter which allows non-critical car systems to be controlled.

The computer module **64** also includes at least one flat panel display controller **118** to control the flat panel monitor **24**. A dual PC card socket **44** is provided to support 2-type II or 1-type III PC cards. Such cards might be configured as extra memory, moderns, network adapters, or other components. The computer module **64** also has a smart card reader **42** which accepts smart cards (i.e., plastic cards with an integrated circuit mounted thereon). The smart cards can be programmed as a key to the vehicle, to contain encrypted driver identification that the security system uses to authenticate the driver before the vehicle can be started, and be programmed to remember vehicle driver configuration profiles. In the event the microprocessor does not recognize the identification on the smart card, the security system can activate the alarm or take other precautionary measures to prevent theft by unauthorized users. For added security, a driver might also be asked to input a PIN (personal identification number) using the keypad **52** on the faceplate.

The computer module also includes expansion slots **124** to support a variety of peripheral devices. For instance, the computer module **64** can support additional peripherals via the expansion slots such as a universal serial bus, analog I/O, an RF transceiver, a cellular phone/modem, a display, a tape player, an MPEG video/audio decoder, a TV tuner, a gyroscope, a keyboard, a mouse, a joystick, and a docking station.

FIG. **7** shows the computer module **64** in more detail. The microprocessor **100** is coupled to a bus controller **400**, such as an PCI bus controller. The bus controller **400** is attached to the data bus interface **402** and the expansion slots **124**. Additionally, the bus controller **400** directly supports the hard disk drive **104**. A DRAM **105** (e.g., 8 Mbytes) and a flash memory **106** (e.g., 512 Kbytes) provide data and caching storage for the microprocessor. The microprocessor **100** manages the flat panel display controller **118** with video memory **408** (e.g., 512 Kbytes) to output visual display data received from bus controller **400** to the flat panel display **24** (FIG. **1**).

An FPGA **410** is connected to the bus controller **400** and is controlled by the microprocessor **100**. The FPGA **410** is connected to the navigation system **112** and the OBD interpreter **116**. The GPS receiver **112** is connected to GPS antenna **113** to receive RF signals from the satellite-based GPS. The GPS antenna **113** is separate from the AM/FM antenna **322** (FIG. **5**) and the cellphone antenna **87** (FIG. **5**) because of the different wavelengths. However, in another implementation, the GPS antenna **113** and the cellphone antenna **87** can be packaged as two antenna elements in one enclosure. The navigation system **112** can be implemented using a GPS chipset manufactured by Trimble Navigation, Rockwell International, Phillips Semiconductor or others. The OBD interpreter **116** is connected to an OBD interface **412** that interconnects to the vehicle manufacturer's diagnostic system.

The bus controller **400** supports a PC card controller **414** which manages two PC card sockets **416** and **418**. The first PC card socket **416** accepts a type II PC card when no type III card is present in the second slot, and the second PC card socket **418** accepts either a type II or type III PC card. The FPGA **410** is further connected to a smart card reader **42**, and to an IrDA interface **420** via IrDA circuitry **111**. The IrDA interface **420** is coupled to receive or transmit data via infrared signals using the IrDA port **56** on the faceplate. The FPGA has a DUART or other serial-to-parallel converter to perform rudimentary conversion of the serial data stream received from the smart card or infrared carrier signal to a data set usable by the microprocessor.

The computer module **64** is equipped with a second radio receiver unit consisting of an AM/FM tuner **422** connected to receive an RF signal from antenna **34**, a demodulator **424**, and a decoder **426**. The second radio receiver unit can be used to receive radio signals for timed recording of radio programming for later playback. Additionally, the second radio receiver can be tuned to receive both the FM subcarrier and audio programming of the primary FM channel. Such FM subcarrier might carry weather, news, sports, financial, traffic, paging, or other information. With two radio receiver units (i.e., one in the faceplate module and one in the computer module), the computer system can receive both the primary channel and the subchannels concurrently. A radio bus interface **428** is used to connect the second radio receiver unit to the FPGA (**410**) which then converts the data to digital data to be transmitted over the data bus (e.g., PCI bus) to the multimedia audio driver and sound system on the support module **62**.

An analog I/O **430** and converters **432** are optionally provided on the computer module **64** to provide an analog input port to the computer and are used to interface to the security system. The security sensors **26** (FIG. **1**) are connected to analog inputs **430**, while the actuators which lock/unlock doors and windows and an alarm are driven by analog outputs **430**.

The modular vehicle computer system described herein offers a unique flexibility to be customarily configured according to the tastes and preferences of each vehicle owner. There are three primary configurations of the modular vehicle computer system: a portable RF device, an

entertainment/communication system, and a fully operable computer system that supports communications and entertainment.

Configuration 1: Portable RF Device

In this first configuration, the faceplate module **60** is physically detached from the base unit and electrically disconnected from the support module interface slot **70** to operate as a portable RF electronics device. In this mode, the faceplate module **60** functions as a portable radio unit with monosound via the single speaker **90**. The faceplate module **60** can also function as a portable telecommunications device using the CODEC **86**, microphone **88**, and speaker **90** for voice input/output, and the keypad **52** or voice to dial numbers. Additionally, by virtue of the RF receiver and using the RBDS information over the FM subcarrier, the faceplate module can function as a pager to receive messages that can be stored as voice notes, or displayed on the LCD **54**. Also, voice can be recorded by the user and stored in the flash memory of the faceplate.

Configuration 2: Vehicle Entertainment/Communication System

In this second configuration, the faceplate module **60** is attached to the base unit and electrically connected to the interface slot **70** to communicate with the support module **62**. However, the computer module is removed from the base unit. In this arrangement, the double module unit functions as an entertainment/communications system in that it provides all of the functionality of conventional car stereo systems while optionally integrating telecommunication functionality. The DSP **80** in the faceplate module **60** controls the AM/FM radio, the CD ROM drive, and the multimedia audio drive. The vehicle user can play CDs or tune to a favorite radio station and listen to high quality, stereo sound. Additionally, the user can receive and initiate telephone calls, receive pages, or record voice notes in the same manner as the portable faceplate module. One added convenience is that all of these features are voice activated to maintain a hands-free, eyes-free driving environment.

Configuration 3: Full Computer System

In the third configuration, both the faceplate module **60** and the computer module **64** are coupled to the support module. The triple module arrangement forms the full computer system capable of supporting a wide range of applications (e.g., navigation, security, diagnostics) as well as communications. Additionally, the tri-module configuration provides an enhanced entertainment system that offers both audio and video, as well as a second tuner to receive financial, weather, and other news in the FM sub carriers via RBDS.

When both processing modules are connected to the support module, the microprocessor **100** on the computer module **64** operates as the master processor with full control of the shared bus **68** and resources. The DSP **80** in the faceplate module functions as a slave processor. This hierarchy is established simply by plugging the computer module into the support module which places the DSP in a slave mode. The DSP is relegated to audio signal processing for enhanced stereo sound, scanning the keypad **52**, exporting visual data to the LCD **54**, controlling the faceplate tuner and performing voice recognition. As a result, the faceplate module **60** is treated as a peripheral device on the shared bus **68** that is controlled by the computer module **64**, whereby the keypad **52**, LCD **54**, communications CODEC **86**, and faceplate tuner serve as I/O peripherals accessed via registers in the faceplate FPGA.

The faceplate module **60** can be removed while the computer module **64** is powered up. With the loss of these peripherals, the computer module **64** loses some functionality and some DSP enhanced audio qualities. However, the computer module **64** still supports many applications, including security, diagnostics, navigation, paging, and others.

It is further noted that the complete vehicle computer system can be removed from the base unit for security reasons, or to plug the computer into a docking station at the user's residence or office. With a docking station, the user can install or configure various programs for vehicle usage, or simply use the computer module as a portable computer.

System Software

As noted above, the vehicle computer system runs an open platform operating system, such as Windows 95®, Windows NT®, or Windows® derivative. There are several applications that are supported by the operating system. These applications include a navigation application, a security application, a radio-on-demand application (program recording and playback based on radio program attribute such as time or content), a paging application, and a faceplate user interface. The applications can be stored on the hard disk drive, or on CD ROMs that are inserted into the CD ROM drive.

The vehicle computer system also implements several application program interfaces (APIs) that offer specific functionality to support the various applications. Example APIs include a position and navigation API, a smart card and cryptography API, a diagnostics API, radio/TV tuner API, and analog I/O API.

These applications and APIs are vehicle related. Other applications which are unrelated to vehicles can also be loaded onto the computer. Such applications might include a banking/financial application, such as Money™ from Microsoft Corporation, to assist the user in banking while on the road. There might also be video applications that facilitate display of in-car video movies or games. Essentially, the vehicle computer system can support any applications that run on the open platform operating system, which are many and varied.

Vehicle Network

FIG. **8** shows a vehicle computer network system **500** designed for a vehicle **502**. In this example illustration, the vehicle **502** is a minivan or sport utility vehicle which seats seven occupants. The system **500** has a server computing unit **504** which is mounted in a first location of the vehicle **502**. Preferably, this server computing unit **504** is implemented as computer **22** described above and mounted in the vehicle dashboard or other suitable location. The server computing unit **504** runs a server operating system, such as Windows NT®.

A mass storage device or database **506** is provided at the server computing unit **504** to store data. In one implementation, the storage device **506** comprises data and programs stored on a CD that can be read using the CD ROM drive of the server computing unit. Alternatively, the storage device **504** can be implemented as a hard disk drive or a tape storage.

A data network **508** is arranged throughout the vehicle **502** to provide connection ports at various locations remote from the server computing unit **504**. Here, connection ports **510** are provided at each of the rear five passenger seats.

The vehicle computer network system **500** has one or more client processing units **512** equipped with a compatible interface adapter for the network connection port **510**. Once connected to the network, the client processing unit **512** can

receive data and programs from the central storage device **506** via server computing unit **504**. The client processing unit **512** preferably has a visual display screen and audio sound card to provide multimedia entertainment.

According to this arrangement, the server computing unit **504** can provide in-car entertainment to passengers. For instance, a movie can be shown to a passenger by inserting a video disk into the CD ROM drive **506** at the server computing unit **504**. The central computing unit becomes a video server distributing video over the data network **508** to the client processing units **512**. Other types of entertainment include games and music.

The network system can be configured to be interactive in which the client computing units **512** can request certain entertainment from the server computing unit **504**. For example, suppose a game CD having multiple games is loaded in the CD ROM drive. One passenger wants to play an combat video game, while another passenger wishes to play computer chess. Each client computing unit can request the appropriate game from the server computing unit **504**, which retrieves the games and distributes them to the requesting client computing units.

In compliance with the statute, the invention has been described in language more or less specific as to structure and method features. It is to be understood, however, that the invention is not limited to the specific features described, since the means herein disclosed comprise exemplary forms of putting the invention into effect. The invention is, therefore, claimed in any of its forms or modifications within the proper scope of the appended claims appropriately interpreted in accordance with the doctrine of equivalents and other applicable judicial doctrines.

We claim:

1. A vehicle computer system comprising:

a housing of a size suitable to be mounted in a vehicle dashboard;

a computer mounted within the housing;

an open platform operating system executing on the computer, the operating system being configured to support multiple applications that are supplied by a vehicle user;

a faceplate attached to the housing; and

a peripheral device contained in the faceplate and compatibly connected to the computer, the operating system managing the peripheral device.

2. A vehicle computer system as recited in claim **4** further comprising:

a removable storage medium that stores individual ones of the applications; and

the computer having a storage drive that compatibly reads the storage medium to load the individual applications from the storage medium to the computer.

3. A vehicle computer system as recited in claim **4** wherein the operating system is a multitasking operating system that is capable of concurrently running the multiple applications.

4. A vehicle computer system as recited in claim **1** wherein the peripheral device is a display.

5. A vehicle computer system as recited in claim **1** wherein the peripheral device is an input mechanism.

6. A vehicle computer system as recited in claim **1** wherein the applications supported by the operating system are selected from a group comprising a navigational application, an entertainment application, a communications application, a vehicle security application, and a vehicle diagnostics application.

7. A vehicle computer system as recited in claim **1** wherein the housing has a form factor of a single DIN.

8. A vehicle computer system as recited in claim **1** further comprising a data network connected to the computer, the data network having at least one connection interface provided at a location remote from the vehicle dashboard.

9. A vehicle computer system as recited in claim **8** further comprising at least one client processing unit having a network port to compatibly couple to the connection interface of the data network.

10. A vehicle computer system comprising:

a housing of a size suitable to be mounted in a vehicle dashboard, the housing having first and second support structures that can be physically connected to, or separated from, one another;

a first processing unit mounted to the first support structure of the housing to provide first processing and control capabilities;

a second processing unit mounted to the second support structure of the housing to provide second processing and control capabilities;

a busing subsystem to electrically interconnect the first and second processing units when the first and second support structures are physically connected to one another; and

the first processing unit, the second processing unit, and the busing subsystem being arranged within the housing so that the vehicle computer system conforms to a form factor for mounting in the vehicle dashboard.

11. A vehicle computer system as recited in claim **10** wherein

the second support structure is a base unit constructed for physical mounting in the vehicle dashboard; and

the first support structure is a detachable faceplate that can be attached to or detached from the base unit.

12. An vehicle computer system as recited in claim **10** wherein:

the first processing unit is a digital signal processor; and

the second processing unit is microprocessor.

13. A vehicle computer system as recited in claim **10** further comprising a data network connected to the second processing unit, the data network having at least one connection interface provided at a location remote from the vehicle dashboard.

14. A vehicle computer system as recited in claim **13** further comprising at least one client processing unit having a network port to compatibly couple to the connection interface of the data network.

15. An vehicle computer system comprising:

a housing having a base unit and a faceplate;

a support module mounted to the base unit, the support module having a communications bus and first and second interfacing slots to provide access to the communications bus;

a first processor mounted to the faceplate to form a faceplate module, the faceplate module being compatibly connected to the first interfacing slot of the support module;

a computer module having a second processor, the computer module being compatibly connected to the second interfacing slot of the support module; and

the communications bus electronically interconnecting the faceplate module, the computer module, and the support module.

16. A vehicle computer system as recited in claim **15** wherein the housing has a form factor of a single DIN.

17. A vehicle computer system as recited in claim 15 wherein the computer module has an open platform operating system executing on the second processor, the operating system being configured to support multiple applications that are supplied by a vehicle user.

18. A vehicle computer system as recited in claim 15 wherein the faceplate module is controlled as a peripheral device by the computer module.

19. A vehicle computer system as recited in claim 15 further comprising an input device provided on the faceplate module that is electrically coupled as a peripheral to the computer module.

20. A vehicle computer system as recited in claim 15 further comprising an output device provided on the faceplate module that is electrically coupled as a peripheral to the computer module.

21. A vehicle computer system as recited in claim 15 further comprising a storage drive mounted in the housing, the storage drive reading information stored on a compatible storage medium to load the information into the computer module.

22. A vehicle computer system as recited in claim 15 further comprising a graphical display monitor separate and remotely located from the housing, but electrically coupled as a peripheral to the computer module.

23. A vehicle computer system as recited in claim 15 further comprising:

a first radio tuner provided in the faceplate module; and

a second radio turner provided in the computer module.

24. A vehicle computer system as recited in claim 15 wherein the faceplate module includes a voice recognition device to receive verbal commands from a user.

25. A vehicle computer system as recited in claim 15 wherein the faceplate module includes a speech generation device to produce verbal commands.

26. A vehicle computer system as recited in claim 15 wherein the faceplate module is physically detachable from the housing, the faceplate module being disconnected from the first interfacing slot when the faceplate module is physically detached form the housing, the faceplate module having an RF receiver and being operable as a portable RF receiving device to receive RF signals when the faceplate module is detached from the housing.

27. A vehicle computer system as recited in claim 15 wherein the faceplate module includes a microphone and speaker.

28. A vehicle computer system as recited in claim 15 wherein the faceplate module is physically detachable from the housing, the faceplate module being disconnected from the first interfacing slot when the faceplate module is physically detached form the housing, the faceplate module having a communications transceiver and being operable as a portable wireless communications device.

29. A vehicle computer system as recited in claim 15 wherein the computer module can be disconnected from the second interfacing slot and removed from the housing.

30. A vehicle computer system as recited in claim 15 further comprising a data network connected to the computer module, the data network having at least one connection interface provided at a location remote from the vehicle dashboard.

31. A vehicle computer system as recited in claim 30 further comprising at least one client processing unit having a network port to compatibly couple to the connection interface of the data network.

32. A vehicle entertainment/communication system comprising:

a base unit of a size suitable to be mounted in a vehicle dashboard;

a faceplate detachably connected to the base unit;

an entertainment player;

a processor mounted to the faceplate to form a faceplate module, the processor being configured to control the entertainment player when the faceplate module is attached to the base unit; and

an RF receiver provided in the faceplate module and operatively coupled to the processor, the faceplate module being operable as a portable RF receiving device to receive RF signals when the faceplate module is detached from the base unit.

33. A vehicle entertainment/communication system as recited in claim 32 wherein the faceplate module has a power connector to enable use of an external power source when the faceplate module is detached from the base unit.

34. A vehicle entertainment/communication system as recited in claim 32 wherein the faceplate module has a communications transceiver and the faceplate module is operable as a portable wireless communications device when the faceplate module is detached from the base unit.

35. A vehicle entertainment/communication system as recited in claim 32 further comprising first and second compatible transceivers, the first transceiver being located in the base unit and the second transceiver being located in the faceplate module, the faceplate module being operable to communicate with the base unit when the faceplate module is detached from the base unit.

36. A vehicle computer system comprising:

a housing of a size suitable to be mounted in a vehicle dashboard;

a computer mounted within the housing;

a graphical display monitor separate and remotely located from the housing, but electrically coupled as a peripheral to the computer, the computer controlling graphical data output to the graphical display monitor; and

the graphical display monitor having an automatic override switch that is activated when the display is viewable by the driver to prevent display of non-driving related information.

37. A vehicle computer system as recited in claim 36 wherein the graphical display monitor is a flat panel display.

38. A vehicle computer system as recited in claim 36 further comprising an open platform operating system executing on the computer, the operating system being configured to support multiple applications that are supplied by a vehicle user.

39. A vehicle computer system as recited in claim 36 wherein the housing has a form factor of a single DIN.

40. A vehicle computer system as recited in claim 36 further comprising a data network connected to the computer, the data network having at least one connection interface provided at a location remote from the vehicle dashboard.

41. A vehicle computer system as recited in claim 40 further comprising at least one client processing unit having a network port to compatibly couple to the connection interface of the data network.

42. A portable RF electronics device for use in conjunction with a vehicle entertainment system, the vehicle entertainment system having a base unit sized to be mounted in a vehicle dashboard and a player mounted in the base unit, the portable RF electronics device comprising:

a faceplate having a physical coupling assembly which enables the faceplate to be attached to or detached from the base unit of the vehicle entertainment system;

a processor mounted to the faceplate to form a faceplate module, the faceplate module having an electrical interface which compatibly couples to an interface on the base unit to permit data communication from the faceplate module to the player, the processor being configured to control the player device when the faceplate module is electrically coupled to the base unit; and

an RF receiver provided in the faceplate module and operatively coupled to the processor, the faceplate module being operable as a portable RF receiving device to receive RF signals when the faceplate module is physically detached from the base unit.

43. A portable RF electronics device as recited in claim **42** further comprising a power connector to enable use of an external power source when the faceplate module is physically detached from the base unit.

44. A portable RF electronics device as recited in claim **42** further comprising a CODEC provided in the faceplate module to enable portable wireless communications when the faceplate module is physically detached from the base unit.

45. A portable RF electronics device as recited in claim **42** further comprising a voice recognition device provided in the faceplate module to receive verbal commands from a user.

46. A portable RF electronics device as recited in claim **42** further comprising an AM/FM/RBDS tuner provided in the faceplate module.

* * * * *

US006009363A

United States Patent [19]

Beckert et al.

[11] Patent Number: 6,009,363

[45] Date of Patent: Dec. 28, 1999

[54] **VEHICLE COMPUTER SYSTEM WITH HIGH SPEED DATA BUFFER AND SERIAL INTERCONNECT**

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[73] Assignee: **Microsoft Corporation**, Redmond, Wash.

[21] Appl. No.: **08/668,781**

[22] Filed: **Jun. 24, 1996**

Related U.S. Application Data

[63] Continuation-in-part of application No. 08/564,586, Nov. 29, 1995, Pat. No. 5,794,164.

[51] **Int. Cl.**[6] **H04B 1/03**

[52] **U.S. Cl.** **701/33**; 370/522; 340/825.25; 361/814; 455/345; 307/10.7

[58] **Field of Search** 701/29–33, 24, 701/35; 364/551.01; 340/439, 426, 691, 825.5, 310.1, 538, 825.25, 815.69; 361/686, 683, 680, 814, 679; 395/281, 290; 370/522, 476, 537; 455/345, 346, 349, 348; 307/10.7, 10.1

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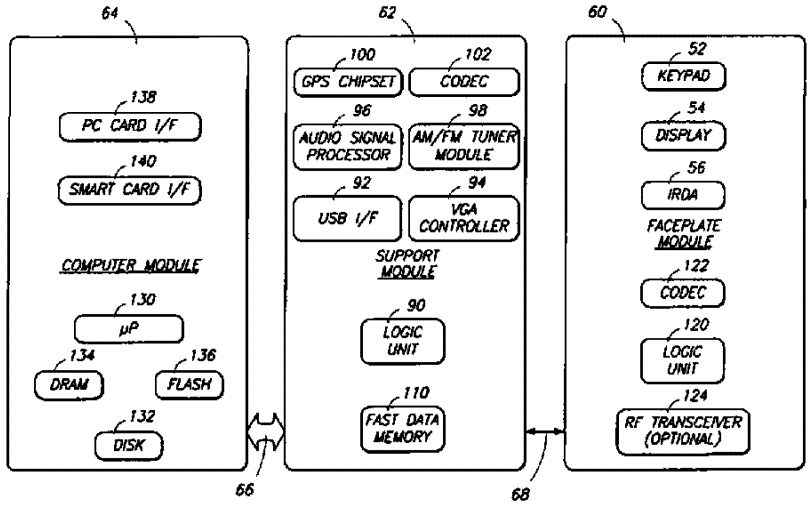
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Primary Examiner—Jacques H. Louis-Jacques
Attorney, Agent, or Firm—Lee & Hayes, PLLC

[57] **ABSTRACT**

A vehicle computer system has a housing sized to be mounted in a vehicle dashboard or other appropriate location. The housing includes a base unit and a faceplate. A first logic unit is mounted to the base unit to form a support module. The support module has two interfacing slots and can support connections to multiple peripheral devices. The support module facilitates high speed data exchange between the peripheral devices for streaming continuous audio or video data. The support module has a fast data memory to temporarily hold data being communicated between the peripheral devices. The support module also has a memory access circuit associated with each of the peripheral devices which designates at least one storage area within the fast data memory to hold data received from, or to be sent to, the associated peripheral device. The vehicle computer has a computer module which can be connected to or removed from one interfacing slot of the support module. A multi-bit bus (e.g., PCI bus) interfaces the computer module and the support module. The vehicle computer system also has a logic unit mounted to the faceplate to form a faceplate module. This module is detachably connected to the other interfacing slot of the support module. When the faceplate module is attached, a high speed serial interface electronically couples the support module to the faceplate module. The high speed serial interface enables the logic units on the support and faceplate modules to exchange a high speed, synchronized, serial bit stream. This data stream is organized into multiple frames, with each frame having multiple data bits and at least one valid bit to indicate whether the data bits are valid.

31 Claims, 9 Drawing Sheets



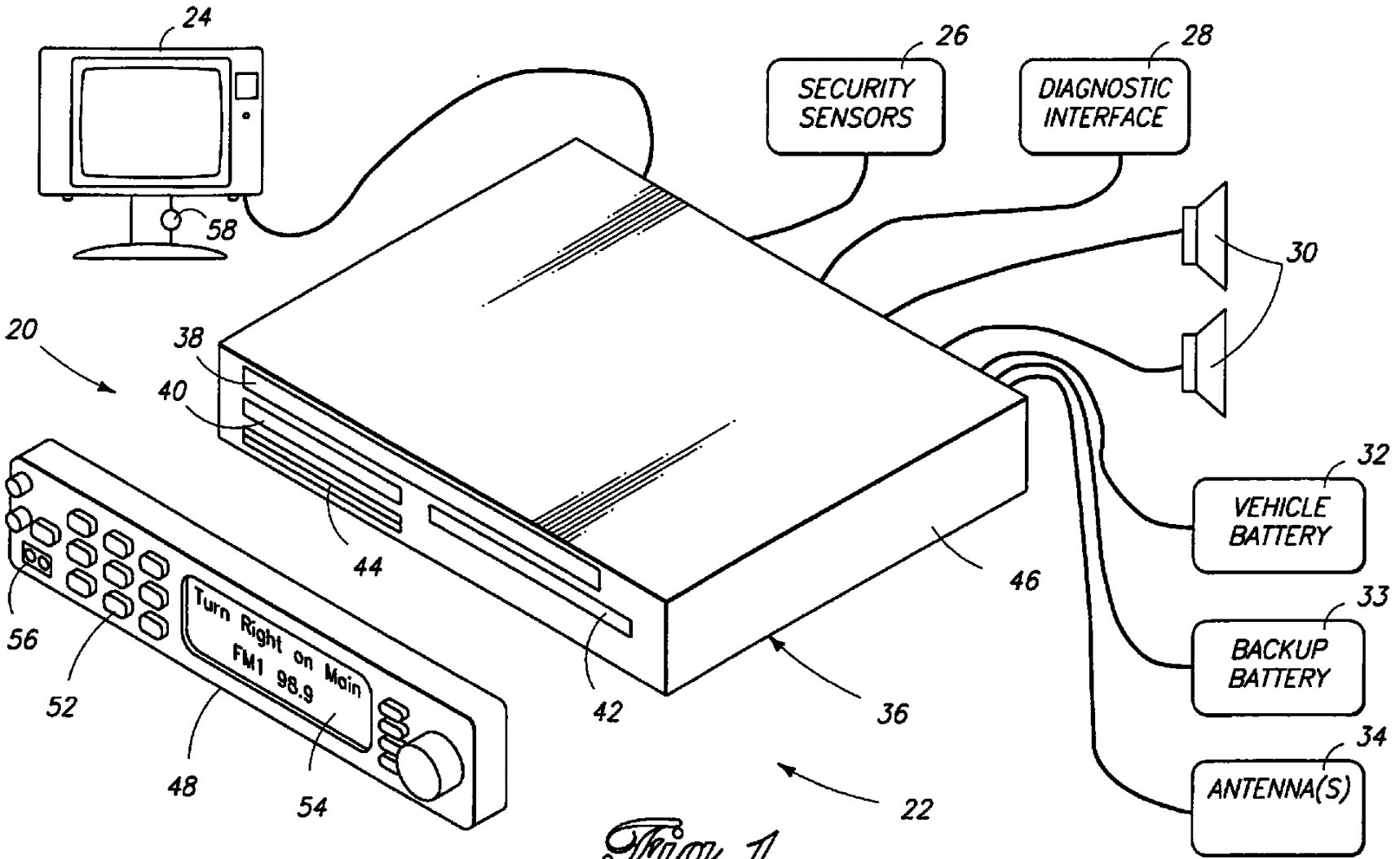

24
26
SECURITY SENSORS
28
DIAGNOSTIC INTERFACE
58
30
20
38
40
32
VEHICLE BATTERY
44
46
33
BACKUP BATTERY
56
Turn Right on Main
FM1 98.9
52
42
36
34
ANTENNA(S)
48
54
22

Fig 1

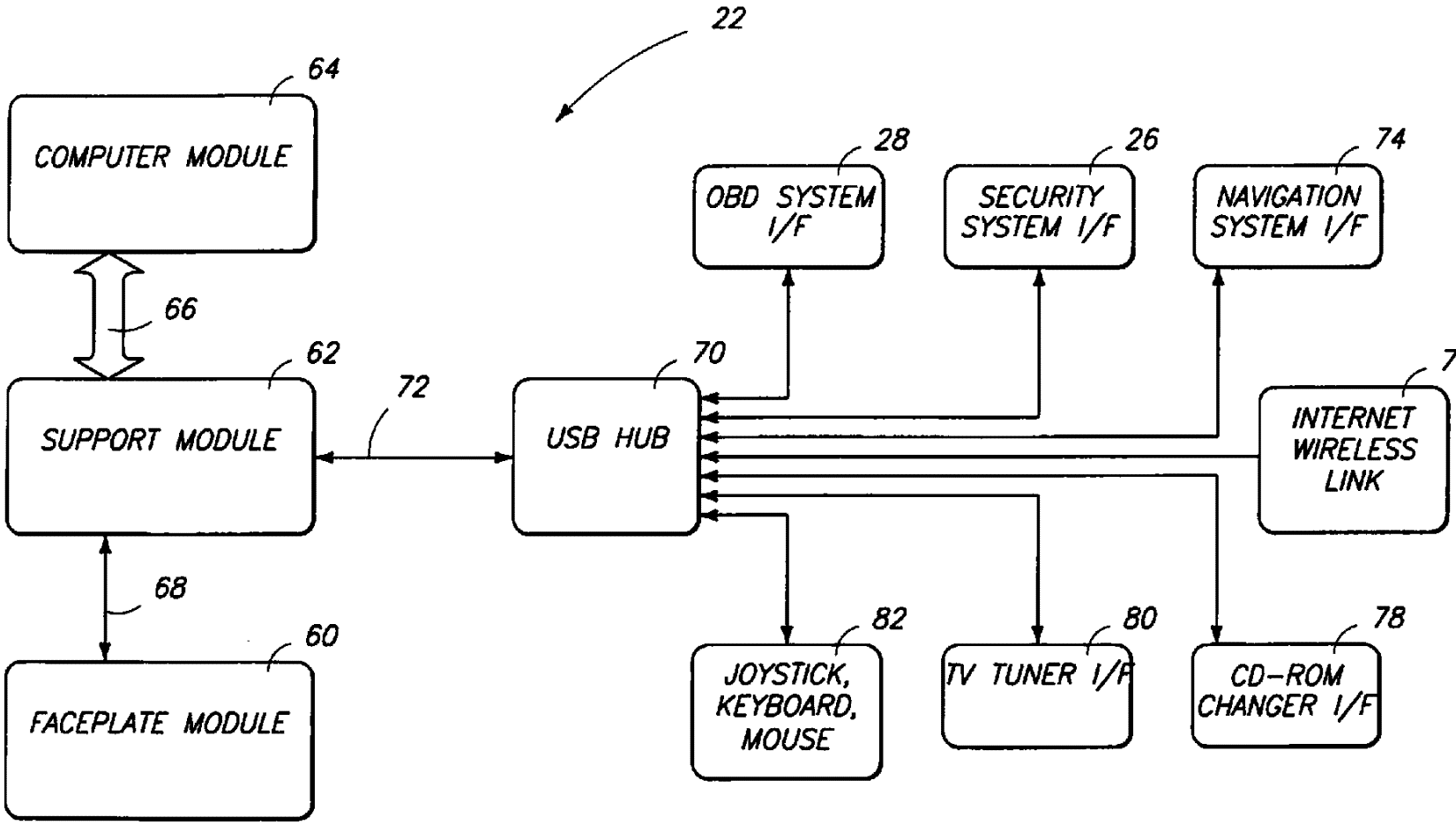

22
64
COMPUTER MODULE
66
62
SUPPORT MODULE
72
68
60
FACEPLATE MODULE
70
USB HUB
28
OBD SYSTEM I/F
26
SECURITY SYSTEM I/F
74
NAVIGATION SYSTEM I/F
76
INTERNET WIRELESS LINK
82
JOYSTICK, KEYBOARD, MOUSE
80
TV TUNER I/F
78
CD-ROM CHANGER I/F

Fig 2

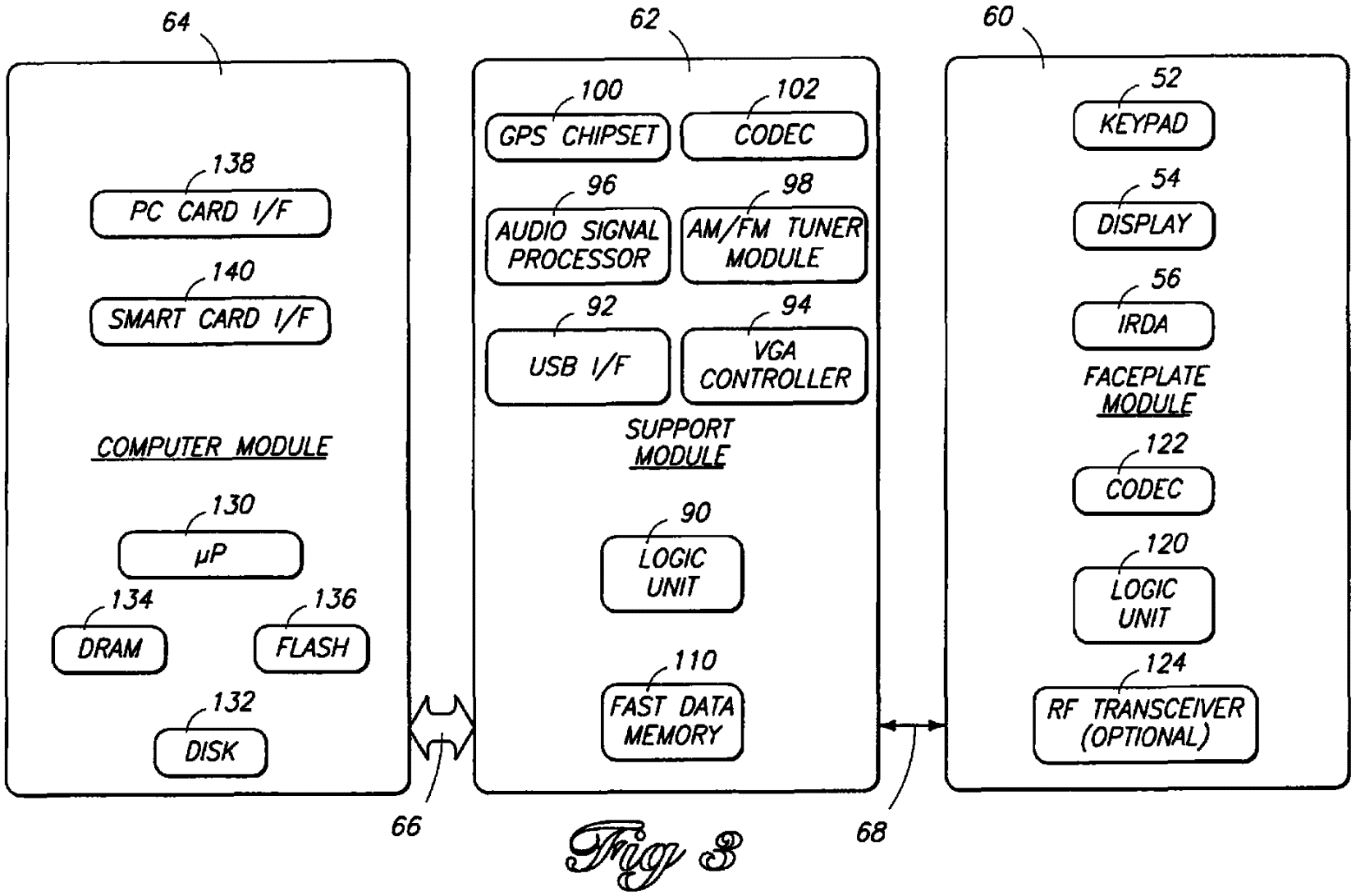

64
62
60
138
PC CARD I/F
140
SMART CARD I/F
COMPUTER MODULE
130
μP
134
DRAM
136
FLASH
132
DISK
100
GPS CHIPSET
102
CODEC
96
AUDIO SIGNAL PROCESSOR
98
AM/FM TUNER MODULE
92
USB I/F
94
VGA CONTROLLER
SUPPORT MODULE
90
LOGIC UNIT
110
FAST DATA MEMORY
52
KEYPAD
54
DISPLAY
56
IRDA
FACEPLATE MODULE
122
CODEC
120
LOGIC UNIT
124
RF TRANSCEIVER (OPTIONAL)
66
68

Fig 3

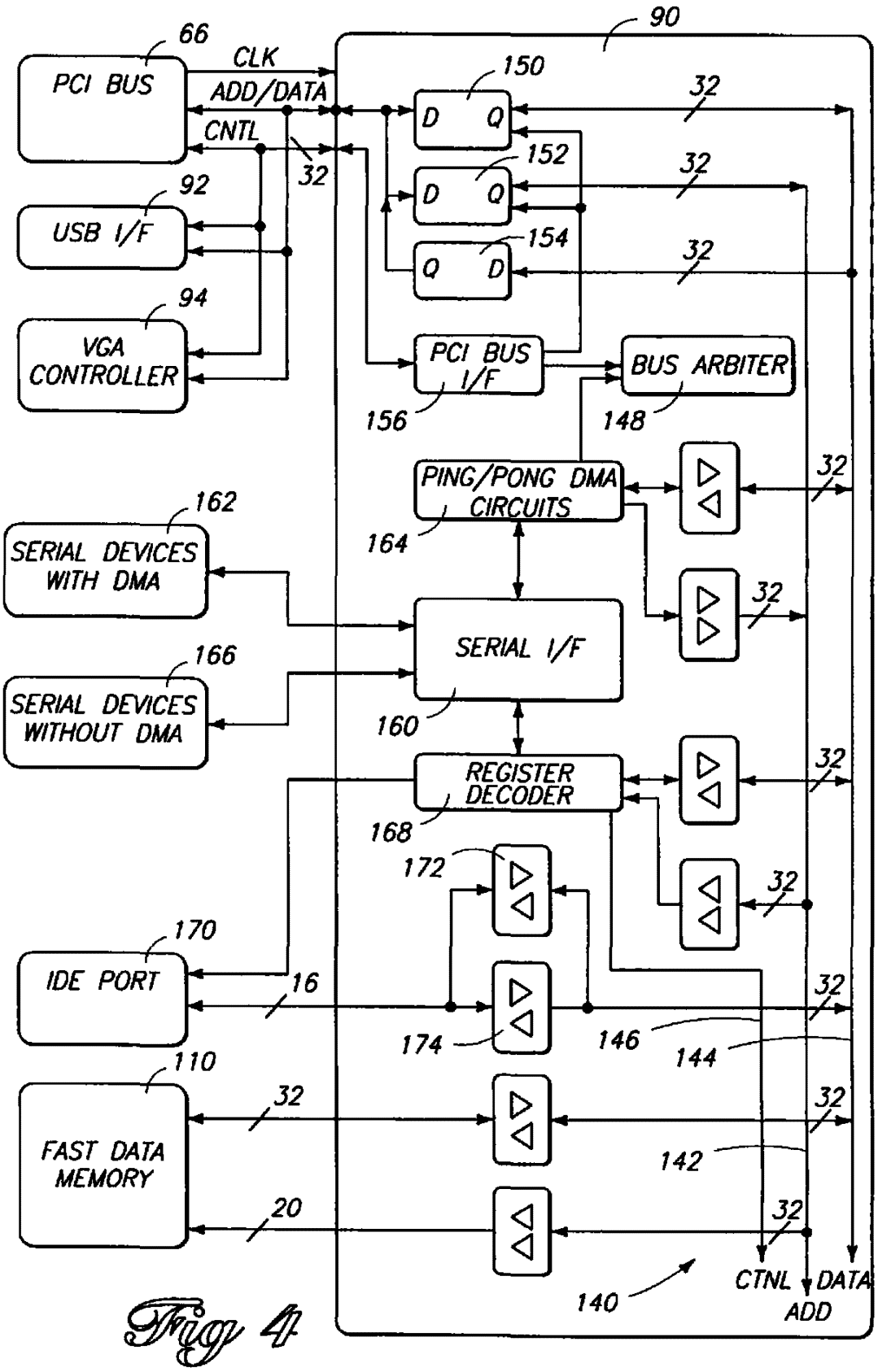
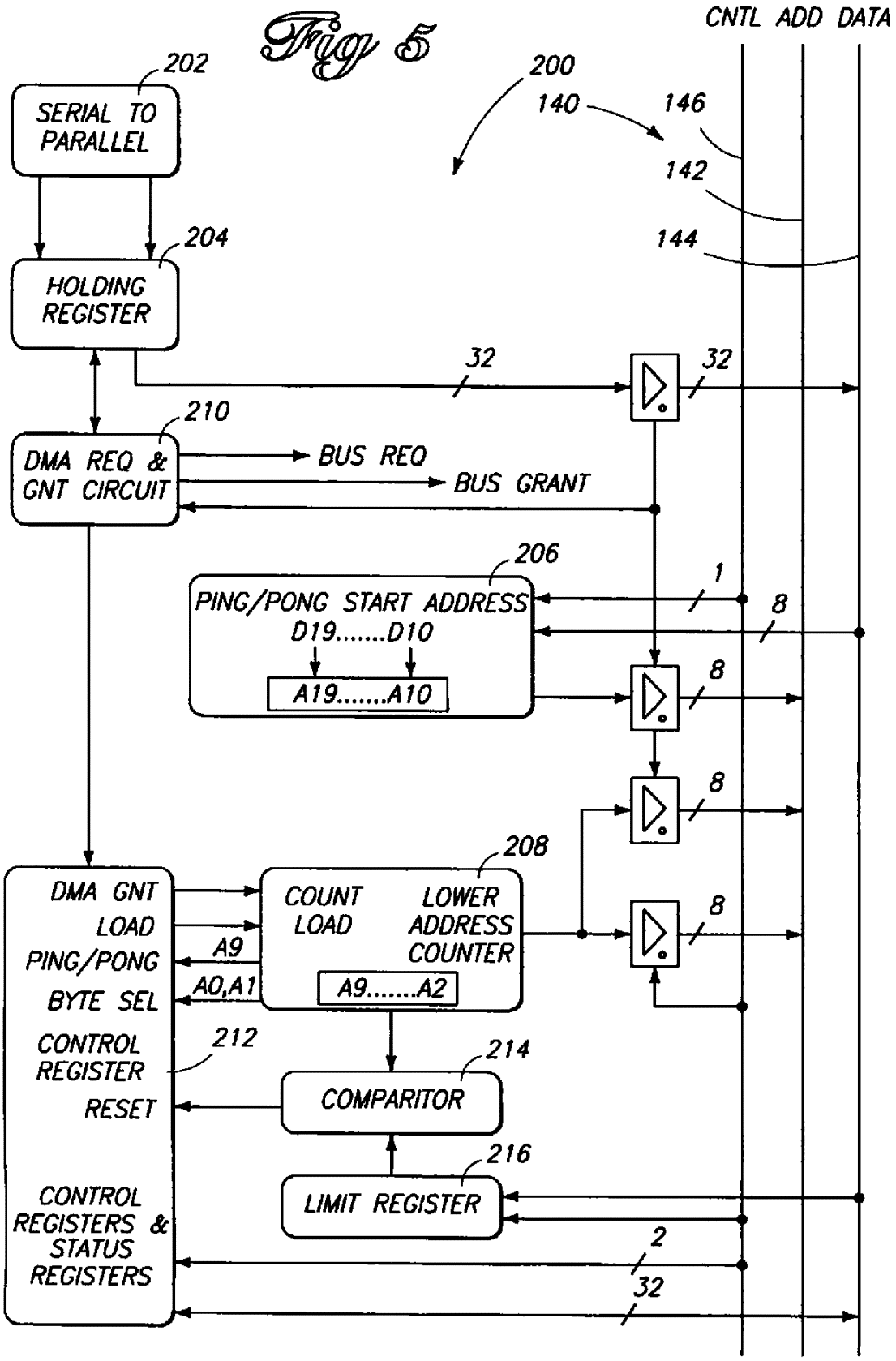

90
66
PCI BUS
CLK
ADD/DATA
CNTL
32
150
152
154
D Q
Q D
92
USB I/F
94
VGA CONTROLLER
PCI BUS I/F
156
BUS ARBITER
148
PING/PONG DMA CIRCUITS
164
162
SERIAL DEVICES WITH DMA
166
SERIAL DEVICES WITHOUT DMA
SERIAL I/F
160
REGISTER DECODER
168
172
170
IDE PORT
16
174
146
144
110
FAST DATA MEMORY
20
142
140
CTNL
DATA
ADD

Fig 4

Fig 5


CNTL ADD DATA
202
SERIAL TO PARALLEL
200
140
146
142
144
204
HOLDING REGISTER
32
32
210
DMA REQ & GNT CIRCUIT
BUS REQ
BUS GRANT
206
PING/PONG START ADDRESS
D19.....D10
A19.....A10
1
8
8
8
8
208
DMA GNT
LOAD
PING/PONG
BYTE SEL
A9
A0,A1
COUNT LOAD
LOWER ADDRESS COUNTER
A9.....A2
212
CONTROL REGISTER
RESET
214
COMPARITOR
216
LIMIT REGISTER
CONTROL REGISTERS & STATUS REGISTERS
2
32

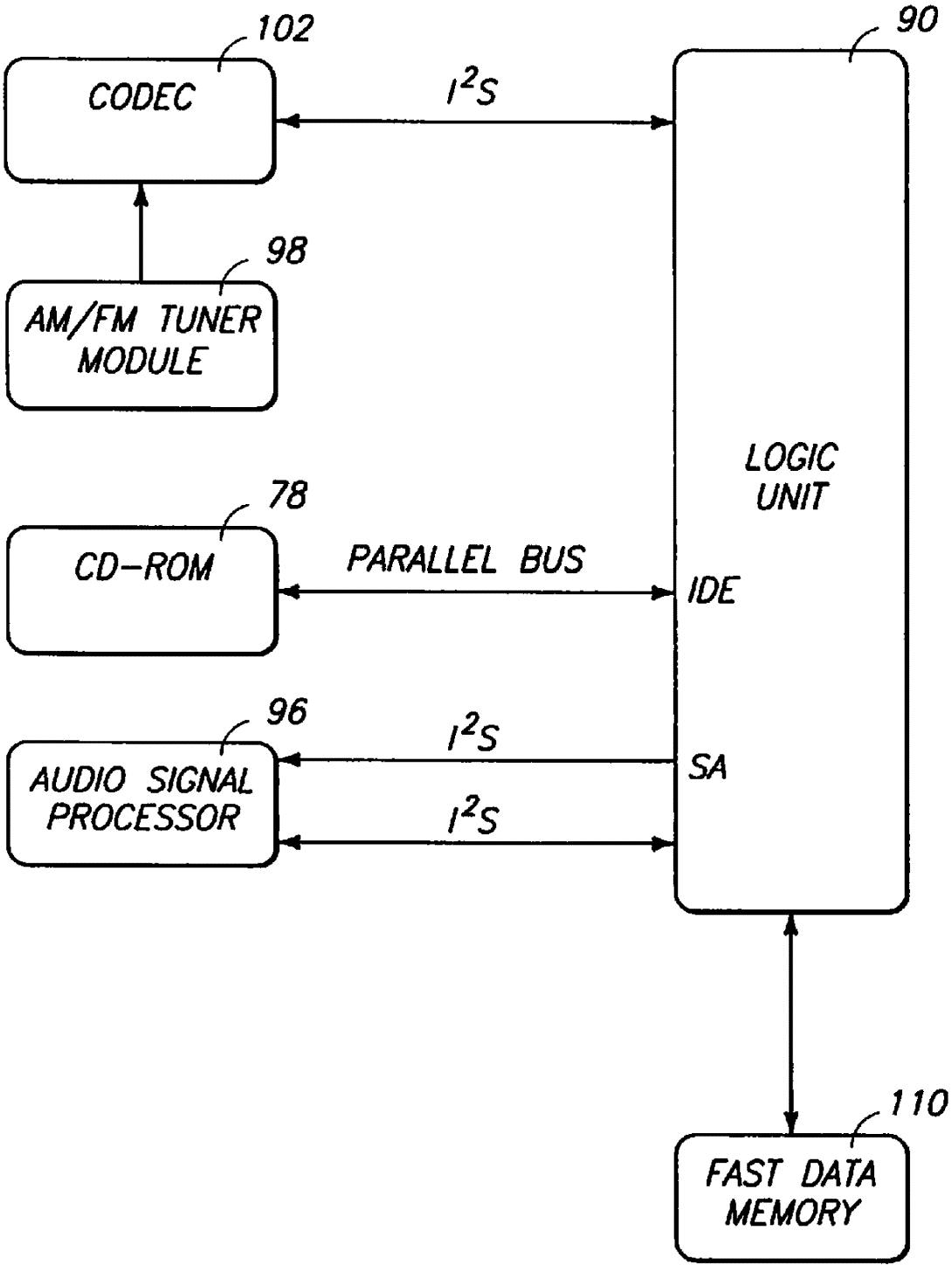

102
CODEC
I²S
90
98
AM/FM TUNER MODULE
LOGIC UNIT
78
CD-ROM
PARALLEL BUS
IDE
96
AUDIO SIGNAL PROCESSOR
I²S
SA
I²S
110
FAST DATA MEMORY

Fig 6

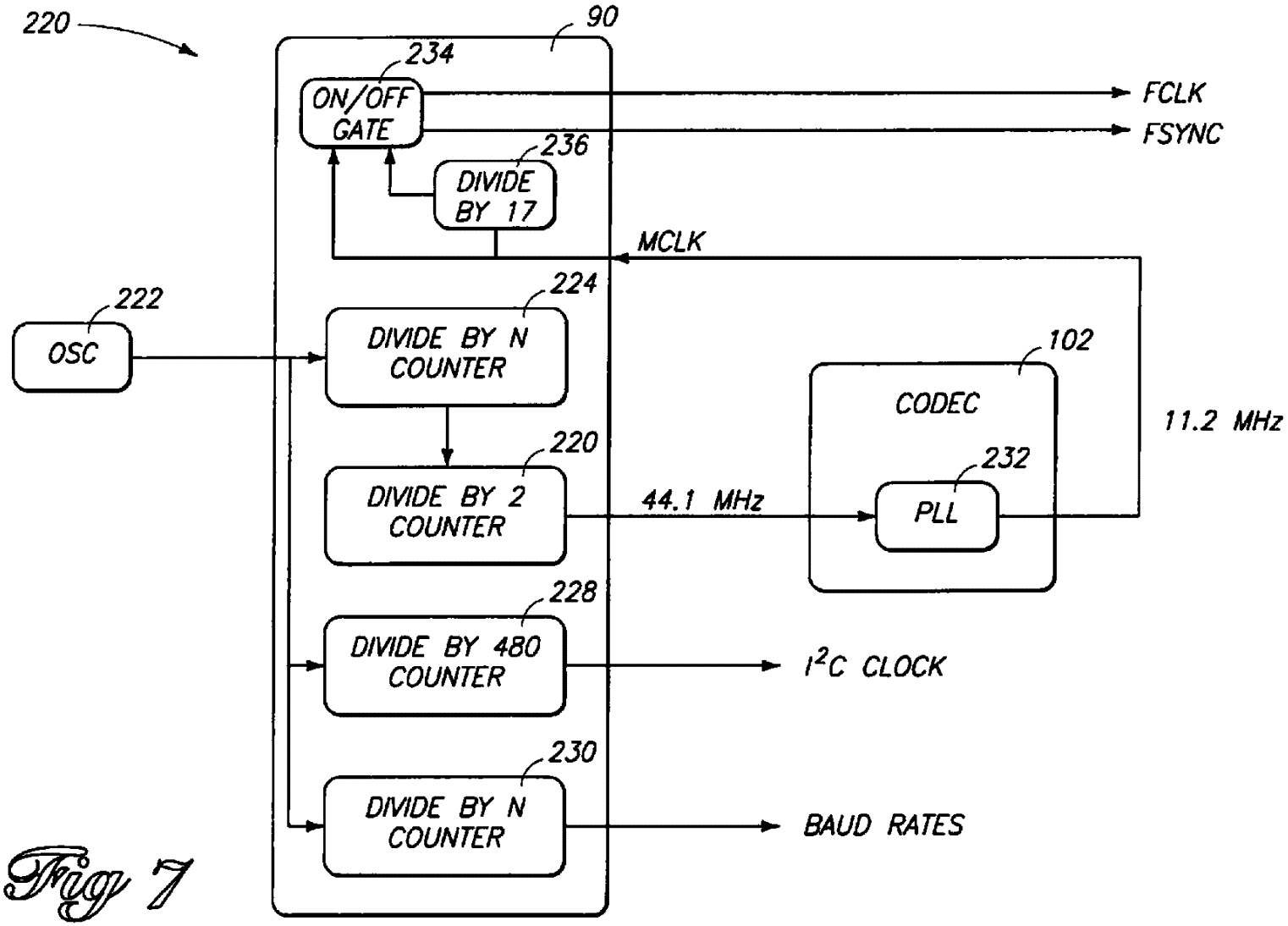

220
90
234
ON/OFF GATE
FCLK
FSYNC
236
DIVIDE BY 17
MCLK
222
OSC
224
DIVIDE BY N COUNTER
102
CODEC
11.2 MHz
220
DIVIDE BY 2 COUNTER
44.1 MHz
232
PLL
228
DIVIDE BY 480 COUNTER
I2C CLOCK
230
DIVIDE BY N COUNTER
BAUD RATES

Fig 7

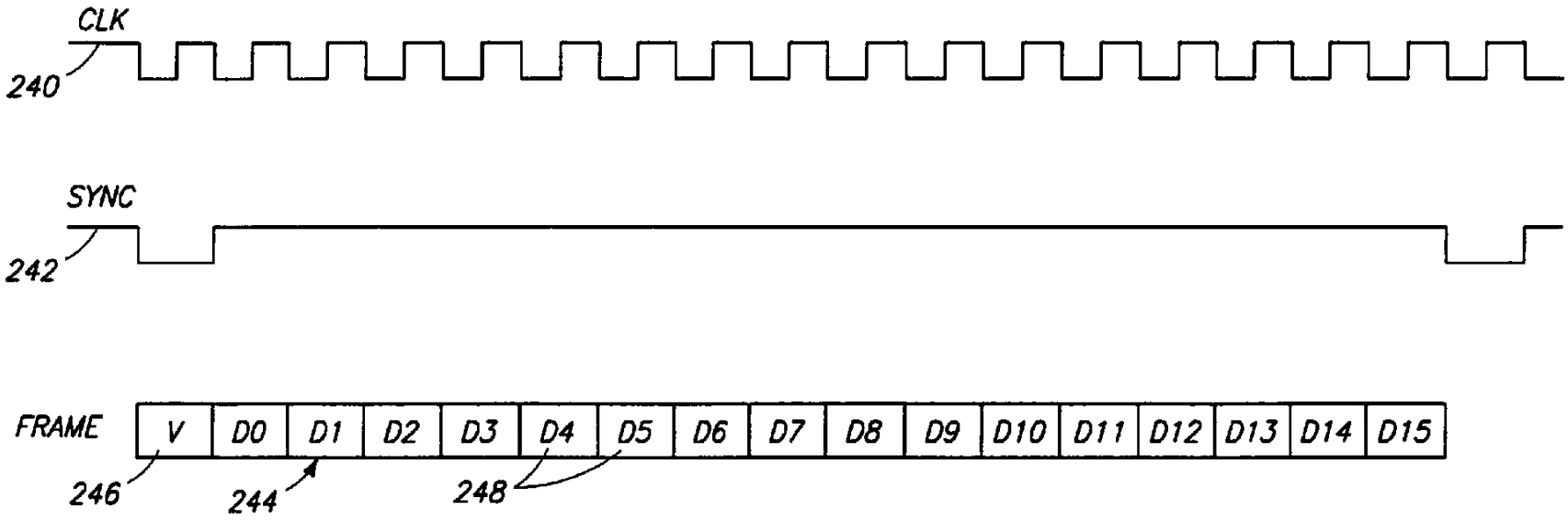

CLK
240
SYNC
242
FRAME
V
D0
D1
D2
D3
D4
D5
D6
D7
D8
D9
D10
D11
D12
D13
D14
D15
246
244
248

Fig 8

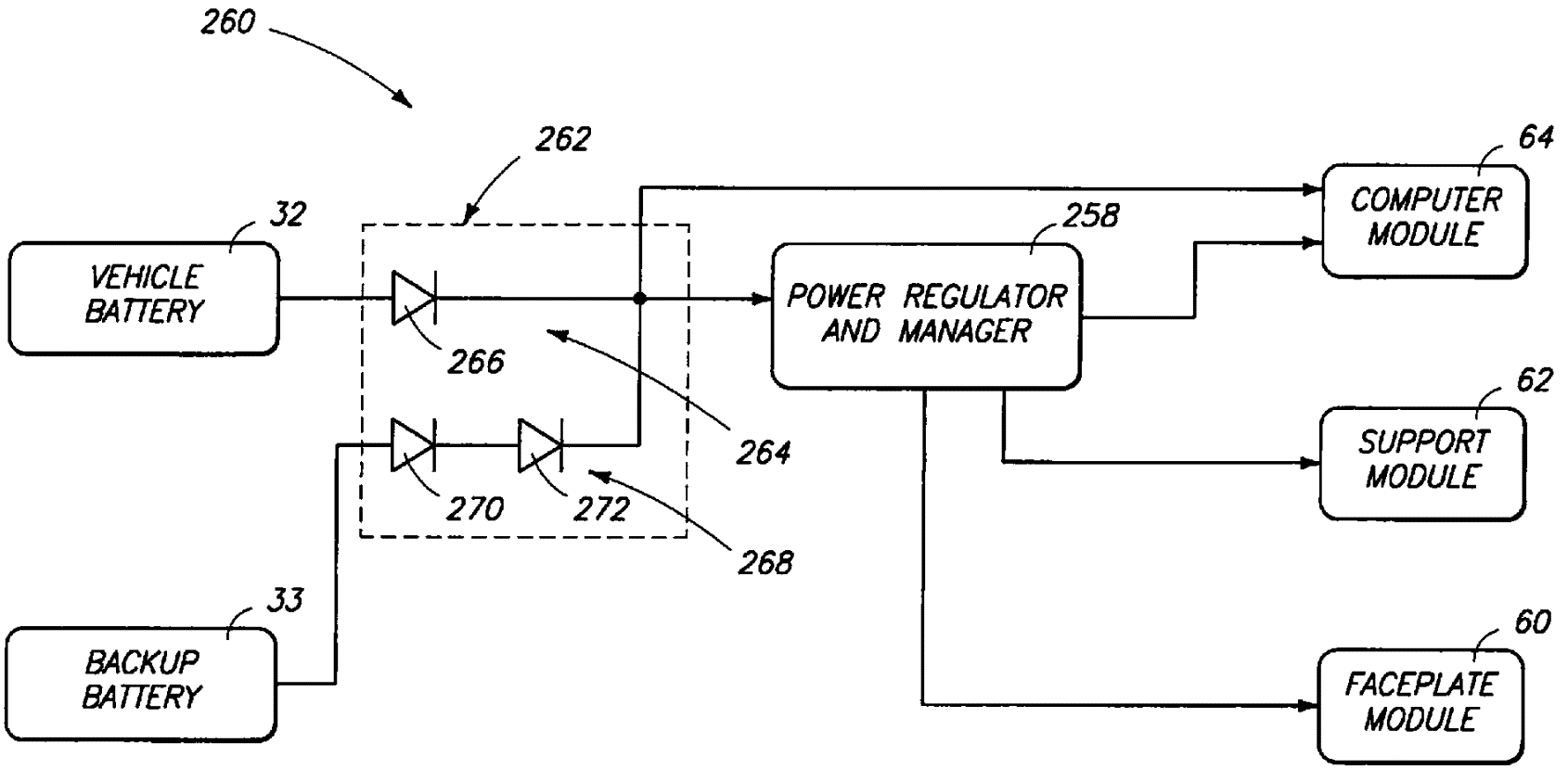

260
262
32
VEHICLE BATTERY
266
264
270
272
268
33
BACKUP BATTERY
258
POWER REGULATOR AND MANAGER
64
COMPUTER MODULE
62
SUPPORT MODULE
60
FACEPLATE MODULE

Fig 9

VEHICLE COMPUTER SYSTEM WITH HIGH SPEED DATA BUFFER AND SERIAL INTERCONNECT

This is a continuation-in-part of U.S. Pat. application Ser. No. 08/564,586, filed Nov. 29, 1995, which issued as U.S. Pat. No. 5,794,164, on Aug. 11, 1998.

TECHNICAL FIELD

This invention relates to computer systems for vehicles.

BACKGROUND OF THE INVENTION

Modern vehicles are typically equipped with several independent electronic systems. For instance, most modern vehicles have a sound system and a security system. The sound system usually consists of an AM/FM radio, a cassette or CD (compact disk) player, an equalizer/amplifier, and speakers. The radio and player are arranged in a metal casing or housing that is mounted in a dashboard of the vehicle. The housing has a standardized size, often expressed in terms of DINs (Deutsche Industry Normen), to ensure that the sound system is compatible with and can be retrofit into most vehicle dashboards.

The security system is entirely separate from the sound system. The security system generally consists of security sensors placed throughout the vehicle, and a central application-specific integrated circuit (ASIC) to monitor the sensors and determine whether security is being jeopardized. Security System also controls actuators to lock/unlock doors or windows, and an alarm or siren.

Most late model vehicles are also constructed with a diagnostic system that analyzes performance of the vehicle's engine, transmission and fuel system, and other components (1996 or later for OBD II, 1993 or later for OBD I). The diagnostic system can be coupled to an external computer to download or monitor diagnostic information that is useful to a vehicle mechanic during servicing of the vehicle. Additionally, the diagnostic system might include dashboard displays that inform the driver of various operating conditions.

In some recent models, vehicles are being equipped with a navigation system that incorporates a global positioning system (GPS) receiver. The GPS receiver has an antenna to receive signals from a satellite network. The vehicle navigation system uses the satellite positioning signals to compute coordinates that locate the vehicle over the surface of the earth with regard to longitude, latitude, and altitude. Also, with the appropriate map software, the vehicle's location can then be shown on a map.

Cellular communications systems have also been added to vehicles. These communications systems enable the vehicle driver or occupant to transact telephone calls from their vehicle. Some of the more sophisticated systems are voice controlled which permit the driver to initiate or receive calls while traveling without removing a hand from the driving wheel, or diverting his/her eyes from the operation of the vehicle.

While these various electronics systems have proven useful to vehicle users, there is a drawback in that the systems are unrelated and incompatible. Each system employs separate proprietary dedicated processors or ASICs (application specific integrated circuits) which execute incompatible proprietary software. If a vehicle owner would like to add a security system to his/her vehicle, the owner must purchase an entire security system from one of the vendors and have it customarily installed. There is no way to add security functionality to an existing electronics system, such as the navigation system or the sound system.

SUMMARY OF THE INVENTION

This invention concerns a vehicle computer system that is capable of integrating these diverse and separate systems as well as offering a general purpose computing platform that allows for easy expandability. The vehicle computer system has a housing sized to be mounted in a vehicle dashboard or other convenient location. This system provides an open hardware architecture and supports an open platform operating system. The open platform operating system supports multiple different applications that can be supplied by a software vendor. For instance, the operating system can support applications pertaining to entertainment, navigation, communications, security, diagnostics, and others. In the preferred implementation, the operating system is a multi-tasking operating system capable of concurrently running multiple applications. The computer has one or more storage devices (e.g., hard disk drive, CD drive, floppy disk drive, cassette player, or smart card reader) which permits the user to download programs from a storage medium (e.g., hard disk, CD, diskette, or cassette) to the computer. Also, the user can read or write data to writeable medium (e.g., hard disk, diskette, cassette, or smart card). In this manner, the vehicle owner can easily add new systems to his/her vehicle by installing additional programs.

In the described implementation, the vehicle computer system has three modules: a support module, a computer module, and faceplate module. The support module is formed as part of a stationary base unit of the housing that resides in the vehicle dashboard or other location. It has its own logic unit which can be implemented in a field programmable gate array (FPGA), application specific integrated circuit (ASIC), customized processor, or the like. The support module also has an audio signal processor, such as a digital signal processor (DSP), which performs the signal processing for audio and video data. One could combine this DSP into the ASIC if desired.

The computer module can be connected to or removed from the support module. The computer module has a processor, such as an x86-type microprocessor, which runs the operating system. The computer module and support module are interfaced using a multi-bit bus, such as a PCI bus.

The faceplate module is detachably connected to the support module. The faceplate module has a logic unit of its own to control an RF transceiver such as a Cell phone, a two-way pager, or a point-to-point spread spectrum transceiver, a display, a keypad, and a CODEC. The faceplate and support modules are connected using a high speed serial connection. Data is exchanged between the faceplate and support module as a synchronized serial bit stream which is organized into multiple frames. Each frame has multiple data bits and at least one valid bit to indicate whether the data bits are valid.

According to one aspect of this invention, the support module is configured to support multiple peripheral devices (including such components as CD-ROM, AM/FM tuner, audio signal processor, navigation system, security sensors, vehicle diagnostics interface (OBD interface), etc.) and to facilitate data communication between them. The support module has a logic unit with an internal address/data bus structure that is independent and separate from the internal bus of the computer module. This logic unit's bus functions

as the peripheral communication pathway so that peripheral devices can communicate with one another without intervention from the computer module. For instance, all of the audio sound generation, processing, and output can be handled through the support module while consuming minimal processing resources of the computer module.

According to another aspect, a fast data memory is coupled to the internal address/data bus structure of the support module's logic unit to temporarily hold data being communicated between peripheral devices. The fast data memory is partitioned into storage areas that correspond to each of the peripheral devices. The logic unit has memory access circuits associated with each of the peripheral devices which designate particular storage areas of the fast data memory to hold data received from, or to be sent to, the associated peripheral device. The memory access circuits and fast data memory form a fast communications buffer in which data being received from, or sent to, a peripheral device is quickly exchanged through the memory.

The data exchange speed is further improved through use of a mapping overlay technique, in which memory access circuits for two communicating peripheral devices have pointers designating the same memory area. In this manner, while one memory access circuit is filling the storage area with data from one peripheral device (e.g., an AM/FM tuner, CD-ROM, etc.), the other memory access circuit is reading data from the storage area to output to the other peripheral device (e.g., an audio signal processor).

BRIEF DESCRIPTION OF THE DRAWINGS

The same reference numerals are used throughout the drawings to reference like components and features.

FIG. **1** is a diagrammatic illustration of a vehicle computer system.

FIG. **2** is a diagrammatic illustration of the vehicle computer system interfaced with multiple external peripheral devices.

FIG. **3** is a block diagram of the vehicle computer system according to one implementation having a faceplate module, a support module, and a computer module.

FIG. **4** is a block diagram of an interface and internal bus structure of the support module. FIG. **4** shows the use of a fast data memory as a high speed data communications buffer.

FIG. **5** is a block diagram of a memory access circuit which maps data from peripheral devices into storage locations within the fast data memory.

FIG. **6** is a block diagram of the support module which is used to illustrate audio data exchange among multiple serial devices through the fast data memory.

FIG. **7** is a functional block diagram of a master clock generating unit which produces a master audio clock signal used throughout the vehicle computer system.

FIG. **8** is a timing diagram illustrating a serial bit stream used to communicate data between the support and faceplate modules.

FIG. **9** is a block diagram of a power system employed by the vehicle computer system.

DETAILED DESCRIPTION OF THE PREFERRED EMBODIMENT

FIG. **1** shows a vehicle computer system **20** according to one implementation of this invention. Vehicle computer system **20** has a centralized computer **22** coupled to various external peripheral devices, including a monitor **24**, security sensors **26**, a vehicle diagnostic interface **28**, speakers **30**, a vehicle battery **32**, a backup battery **33**, and antenna(s) **34**. The computer **22** is assembled in a housing **36** that is sized to be mounted in a vehicle dashboard, similar to a conventional automobile stereo. Preferably, the housing **36** has a form factor of a single DIN (Deutsche Industry Normen). But, it possibly could be housed in a 2 DIN unit or other special form factor for an OEM.

The computer **22** runs an open platform operating system which supports multiple applications. Using an open platform operating system and an open computer system architecture, various software applications and hardware peripherals can be produced by independent vendors and subsequently installed by the vehicle user after purchase of the vehicle. This is advantageous in that the software applications do not need to be specially configured for uniquely designed embedded systems. The open hardware architecture preferably runs a multitasking operating system that employs a graphical user interface. One preferred operating system is a Windows® brand operating system sold by Microsoft Corporation, such as Windows 95® or Windows NT® or other derivative versions of Windows®. A multitasking operating system allows simultaneous execution of multiple applications.

The computer **22** includes at least one storage drive which permits the vehicle user to download programs and data from storage medium. In the illustrated implementation, the computer **22** has a CD ROM drive **38** which reads application-related CDs, as well as musical, video, game, or other types of entertainment CDs. In this manner, the CD ROM drive **38** performs a dual role of storage drive and entertainment player. The computer **22** has an optional 3.5" floppy diskette drive **40**, a smart card reader **42**, and dual PCMCIA card sockets **44** which accept PCMCIA card types I, II and III. Two types I or II cards can be simultaneously used, but only one card if a type III can be used. Hereinafter, the acronym "PC-Card" will be used in place of the acronym "PCMCIA." Also, a hard disk drive (not shown) can be included on the computer **22** for storing both application programs and user data. A DVD (digital video disk) player may also be included in the computer **22**.

The storage drives are mounted in a base unit **46** of housing **36**. The base unit **46** is constructed and sized to be mounted in the dashboard. Optionally, this base unit may be removable in the same fashion as a laptop computer and its associated docking station. This high end option allows the user to take his vehicle computer to his home or office to serve as his portable PC. The housing **36** also has a detachable faceplate **48** which is pivotally mounted to the front of the base unit **46**. The faceplate can be rotated to permit easy and convenient access to the storage drives.

The computer **22** has a keypad **52** and a display **54** on the faceplate **48**. The operating system executing on the computer **22** controls the faceplate peripheral, which through the faceplate processor, can control the faceplate keys **52** and the faceplate display **54** as peripheral devices when the faceplate is attached to the base unit. Additionally, the computer **22** has a voice recognition device to permit the user to verbally enter commands in a hands-free, eyes-free environment. These voice commands can be used for controlling most operating modes of the vehicle computing platform. The computer **22** is also equipped with an IrDA (infrared developers association) transceiver port **56** mounted on the faceplate **48** to transmit and receive data and programs using infrared signals. The entire faceplate unit **48** behaves as a multifunction peripheral to the computing platform.

To load an application or data onto the computer **22**, the vehicle user inserts a CD or other media (if the application is not already contained on the hard disk) into the appropriate drive and the operating system downloads the application or data therefrom. The installation process can be automatically handled by the operating system, or with the assistance of commands input from the user in the form of keyed sequences on the keypad **52** or verbal instructions using the voice recognition device. Another technique to load data or applications or transfer data with other computing devices is through the use of the IrDA transceiver port **56**, or the wireless Internet link **76**.

The computer **22** can output visual data to the LCD **54** at the faceplate, or to the monitor **24**. The display **54** is preferably a back lit LCD. The monitor **24** is preferably a small flat panel display (e.g., 6.4" screen) that is movably mounted on a stand or yoke and remotely located from the computer. The monitor **24** is fully adjustable to different viewing positions that can be seen by the driver or other passengers in the vehicle. The type of data displayed on the monitor can range widely from word instructions concerning the vehicle's performance, to diagrammatic directions used by the navigation system, to video movies for in-car entertainment. The monitor **24** is equipped with an automatic override switch **58** which automatically disables the display of any non-driving related data when positioned to be viewed by the driver. When facing the driver, only information supportive and helpful to driving (e.g., diagnostics, navigation directions) is displayed on the monitor, while distracting information (e.g., video movies, games) is blocked from display. In one implementation, the switch is an electrical cylindrical switch which closes when the display is capable of being viewed by the driver; thus, the software can sense the display position and only allow permitted information to be displayed.

In general, the vehicle computer system **20** can be used to integrate multiple vehicle-related systems onto one open platform hardware and software architecture. For instance, the vehicle computer system **20** can serve as a multimedia entertainment system, a navigation system, a communications system, a security system, and a diagnostics system. Moreover, the vehicle computer system **20** provides additional functionality traditionally associated with desk-top and laptop personal computers. For instance, vehicle computer system **20** can support word processing applications, spreadsheet applications, database applications, and appointment/schedule applications. Furthermore, the vehicle computer system **20** can be configured to operate as a server to other computing units in the vehicle to distribute games, video movies, and the like to passengers.

FIG. **2** shows the computer **22** according to one implementation of the invention. Computer **22** has three primary modules: a faceplate module **60**, a support module **62**, and a computer module **64**. The computer module **64** is operatively connected to the support module **62** via a multi-bit bus **66**. In the preferred implementation, the multi-bit bus is a PCI (Peripheral Component Interconnect) bus. The support module **62** and faceplate module **60** are interconnected via a high speed serial interface **68** which supports high speed, serial data communication. A preferred serial transmission scheme is described below in more detail with reference to FIG. **8**.

In FIG. **2**, the support module **62** is also connected to a universal serial bus (USB) hub **70** via a multi-bit connector **72** (e.g., 8 bits). The USB hub **70** provides connections to many peripheral devices (e.g., 128 devices). Example peripheral devices include the OBD (On Board Diagnostic) system **28**, the security system **26**, navigation system **74**, a wireless link **76** to the Internet, a CD-ROM changer **78**, a TV tuner **80**, and user I/O devices such as a joystick, keyboard or a mouse **82**. This USB hub could be separate as shown in FIG. **2** or it could be integrated into one or more of the USB peripherals.

FIG. **3** shows the three modules of the vehicle computer **22** in more detail. The support module **62** resides in the typically stationary base unit **46** (FIG. **1**) that is mounted in the vehicle dashboard or other convenient location. The support module **62** includes a logic unit **90** which is responsible for facilitating communication among peripheral devices, establishing a master audio clock signal used throughout the vehicle computer system, and coordinating the entertainment functionality of the computer system. The logic unit **90** can be implemented as an FPGA (field programmable gate array). It is noted that the logic code for an FPGA is developed using a hardware description language, such as VHDL (IEEE standard 1076-1993), and can be recompiled for an ASIC (application specific integrated circuit) architecture. The logical unit **90** can further be implemented as a microprocessor, a RISC (reduced instruction set computing) processor, or other processing devices.

The support module **62** has several hardware interfaces. A USB interface **92** is driven from the PCI bus **66** and provides the interconnection to the various USB peripherals shown in FIG. **2**. A USB hub may be required as shown if the peripherals do not incorporate one and more USB peripherals than supported directly by the support module are attached. A VGA controller **94** is provided on the support module **62** to drive the display **24** (FIG. **1**). The VGA controller **94** is also driven from the PCI bus. It is noted that the USB interface and VGA controller could be incorporated into the logic unit **90**. An ATAPI-IDE interface (used to drive the CD ROM or DVD player), and a PCI interface are implemented as part of the logic unit **90**. For supporting higher bandwidth video applications such as multiple video screens, a P1394 interface could be added to the system and driven from the PCI interface or incorporated in logic unit **90**.

The support module **62** also includes an audio signal processor **96** to perform the sound processing algorithms which may include: sound equalization, digital crossover, bass, treble, volume, surround sound, Dolby pro-logic™, AC-3 and MPEG decoding. The audio signal processor **96** also drives digital to analog converters for a six channel audio output (not shown). The audio signal processor **96** is preferably implemented as a DSP (digital signal processor), such as a Motorola DSP56009. The support module also includes an AM/FM tuner module **98**, a GPS (global positioning system) chipset **100** to provide for satellite navigation such that the longitude, latitude, and altitude of the vehicle may be readily determined, and one or more audio analog to digital converters and digital to analog converters (or "CODECS") **102**.

A fast data memory **110** functions as a high speed data communications buffer between the serial peripheral devices. The fast data memory is preferably implemented as a high speed SRAM (static random access memory) which provides high speed buffering and "ping-ponging" of audio data or USB data to minimize processor interaction. In the preferred implementation, the fast data memory **110** acts as a fast data memory buffer which accommodates data exchange among many devices. The fast data memory **110** is described below in more detail with reference to FIG. **6**.

With continuing reference to FIG. **3**, the faceplate module **60** resides on the detachable faceplate **48** (FIG. **1**). The

faceplate module **60** is connected to the support module through a connector that facilitates easy detachability of the faceplate **48** from the main housing **36**. The faceplate module **60**, through the detachable connector, communicates bi-directional data to the support module **62** by means of the high speed serial interconnect **68**. The faceplate module **60** includes a logic unit **120** which can be implemented as an FPGA, ASIC, DSP, or other device. The faceplate module **60** also includes a keypad **52**, a display **54**, an IrDA port **56**, and a CODEC **122**. Additionally, the faceplate module contains a slot for an optional plug-in RF transceiver **124** such as a cellphone, two-way pager, or point-to-point spread spectrum transceiver.

Typically, the computer module **64** resides in the dashboard-mounted base unit **46** and includes a processor in the form of a microprocessor **130**, such as an Intel® x86-type microprocessor. When plugged in, the computer module **64** is connected to the PCI bus **66** to communicate with the support module **62**.

The microprocessor **130** runs an open platform operating system, such Windows 95® or Windows NT™ or other Windows® derivative operating systems from Microsoft Corporation. The operating system is stored in a hard disk drive **132** (e.g. typically >200 Mbytes). This hard disk drive may be either integrated into the computer module as shown or it may be in the form of a PC-Card. The computer module **64** supports any variety of applications that the vehicle user might desire. These applications can also be stored on the hard disk drive **132** or on a removable storage medium, such as a CD ROM, cassette, PC-Card Flash memory, PC-Card hard disk drive, or floppy diskette. Additionally, user applications may be downloaded from an optional wireless Internet connection. A DRAM memory **134** and Flash memory (or other non volatile memory) **136** are employed in the computer module to support the microprocessor **130** in running the operating system and loaded applications.

The computer module **64** has a PC-Card interface **138** which includes a PC card socket used to support types I, II, or III PC cards (e.g., extra memory, hard disk drives, modems, RF transceivers, network adapters, or other PC-Card peripherals). The computer module **64** also has a Smart Card interface **140** which accepts Smart Cards.

A more detailed explanation of the three modules in the vehicle computer system is provided in co-pending U.S. patent application Ser. No. 08/564,586 entitled "Vehicle Computer System," which was filed on Nov. 29, 1995 in the names of Richard D. Beckert, Mark M. Moeller, and William Wong and which issued as U.S. Pat. No. 5,794,164 on Aug. 11, 1998. This application is assigned to Microsoft Corporation and is incorporated herein by reference.

According to one aspect of this invention, the logic unit **90** within the support module **62** is configured with its own multi-bit bus structure that is separate from the bus of the microprocessor **130** of the computer module **64**. The logic unit **90** and microprocessor **130** are interfaced using a bus, such as PCI bus **66**. By configuring the logic unit **90** with its own bus, the logic unit **90** is capable of better performing its tasks independent of intervention from the microprocessor **130**. Moreover, the internal bus of the logic unit **90** facilitates data communication between the audio components and other serial devices while using minimal processing resources of the microprocessor **130**.

FIG. **4** shows a preferred implementation of an internal bus structure **140** of the logic unit **90** of the support module and the interface between the internal bus **140** and external devices. The internal multi-bit bus structure **140** includes an address bus **142**, a data bus **144**, and a control bus **146**. In the illustrated implementation, the data bus **144** is a 32-bit bus and the address bus **142** is a sufficiently large to support in parallel at least **19** address bits, such as through a 32-bit bus. The busses are tri-state busses which are driven by one of several sources. An internal bus arbiter **148** determines which device is in control of the bus structure **140**.

The PCI bus **66** connecting the support module **62** to the computer module **64** is connected to the internal bus structure **140** via latches **150**, **152**, and **154**, and a PCI bus interface **156**. The PCI connection has primary control over the internal bus structure **140**. The USB interface **92** and the VGA controller **94** are devices on the PCI bus interconnect, or they may be incorporated into the logic unit **90**.

Serial devices are connected to the internal bus structure **140** via a serial interface **160**. Some of the peripheral devices are implemented to write data directly to the fast data memory **110** use a direct memory access (DMA) process (described below). Such serial devices are referenced by number **162**. Example of DMA-configured peripheral devices include the audio signal processor **94**, the faceplate module **60** (which is treated as a multifunction peripheral when attached to the support module), the AM/FM tuner **98**, etc. From the perspective of the logic unit, these serial devices behave with respect to the DMA process as any peripheral device. Accordingly, in this context, the serial devices internal to the support module may be referred to as "serial devices," "serial peripheral devices," or simply "peripheral devices."

The data from the serial devices **162** are received at the serial interface **160** and transferred to ping/pong DMA circuits **164**. The DMA circuits **164** include a serial to parallel converter to convert the data to a parallel format. The parallel data is transferred from the ping/pong DMA circuits **164** over the bus structure **140** to the fast data memory **110**. An example ping/pong DMA circuits **164** is described in more detail below with reference to FIG. **5**.

Other peripheral devices, referenced by number **166**, are not linked to DMA circuitry because of their low bandwidth requirements. An example of this peripheral device is the navigation GPS chipset **100**. Serial data from a peripheral device **166** is received at the serial interface **160** and stored in a parallel format in an internal register where it may be read by the computer module **64**.

The logic unit **90** supports an IDE (Integrated Device Eletronics) port **170** for connection to the CD ROM or other IDE compatible device, such as a DVD player or IDE hard disk drive. The CD ROM is an IDE device with an ATAPI software interface, and typically has a 16-bit bus. The IDE port **170** is accessible from the bus structure **140** through two 16-bit bi-directional buffers **172** and **174** to translate the 16-bit CD-ROM data to the proper word location in the 32-bit internal data bus **144**. The microprocessor in the computer module communicates to the CD ROM through a sequence of ATAPI commands written to registers decoded by the logic unit. The register decoder **168** decodes and transfers read/write timing signals to IDE port **170** for output to the IDE compatible device.

Memory locations within the fast data memory **110**, the I/O ports to the peripheral devices **162**, **166**, and the IDE port **170** can be mapped into the address space presented by the logic unit **90**. Data can be sent to the peripheral devices or memory **110** over the internal address/data bus **140** by using addresses which have been uniquely assigned to each peripheral device or memory block. In a preferred implementation, the memory **110** is a 32-bits wide SRAM

with four byte enable lines to allow for combinations of byte, word, or double word access. The Fast Data memory address and data lines are driven by the logic unit **90** from the internal address/data bus structure **140** and the Fast Data Memory will be enabled when the address is in the range mapped to the multiport memory **110**. The address/data bus structure **140** will also be driven for transfers between the host processor and peripheral registers such as the computer module reading the GPS receive registers.

The internal address/data bus **140** splits its time between requests from the PCI bus **66** and DMA requests for accessing the memory **110**. The bus arbiter **148** controls the bus ownership and has selection logic to transition between a PCI bus request and a DMA request. The bus arbiter circuit **148** generally tries to grant one-half of the bus bandwidth to the PCI bus **66** and one-half to the DMA processes. When the arbiter decodes an active request, it initiates a bus cycle state machine and the active request grants the bus to either the PCI bus or to one of the internal DMA circuits.

As noted above, signals received from the PCI bus **66** have priority on the address/data bus **140**. The PCI bus signals are input into the logic unit **90** as 32-bit multiplexed signals consisting of address/data bits plus the PCI control/timing signals. When a PCI bus cycle begins, the logic unit **90** decodes the address. If the address corresponds to a mapped I/O port in or controlled by logic unit **90** or to a memory location within fast data memory **110**, the logic unit **90** drives a device select signal back to the PCI master at the computer module **64**, which in turn sets a PCI BUS REQUEST bit inside the logic unit **90**. The bus arbiter **148** grants the PCI bus **66** access to the internal address/data bus **140** at the next opportunity.

While this is happening the PCI bus is held in a wait state until the logic unit **90** asserts a target ready signal. The bus arbiter **148** grants the PCI bus interface circuit **156** access to the internal bus when the PCI BUS GRANT signal is active. This initiates a bus cycle state machine in the logic unit, which generates an internal read or write bus cycle. If the logic unit starts a write cycle, it waits for an initiator ready signal from the PCI bus to indicate that the write data is valid. For a read cycle, the internal bus cycle completes and the data is latched in the output data latch **154** of the PCI interface circuit. The logic unit **90** then asserts the target ready signal to allow the PCI master of the PCI bus **66** to complete the bus cycle.

When the PCI bus cycle is not mapped to an I/O port or to a memory location in memory **110**, the PCI bus interface **156** in the logic unit keeps the internal address and data bus isolated from the PCI bus **66**. In this manner, the PCI bus **66** and the internal bus structure **140** of the logic unit **90** can both be executing independent bus cycles. As a result, the data/address bus **140** of the logic unit **90** can service DMA bus operations occurring between the various serial devices **162** and the memory **110** without impacting the bandwidth of the PCI bus **66** or the microprocessor in the computer module **64**.

One aspect of this design is the way in which multiple peripheral devices **162** communicate through shared memory buffers in the fast static memory **110**. Many serial devices can be receiving data and buffering the data in the fast data memory **110** without intervention from the microprocessor on the computer module. The internal address/data bus structure **140** of the logic units, combined with the ping/pong DMA circuits **164**, form an effective communications buffer for handling the data communications between the serial devices, thereby significantly reducing the processor overhead in handling numerous data streams.

In the preferred implementation, there is one ping/pong DMA circuit for each corresponding DMA-configured serial peripheral device **162**. Recall from above that the fast data memory **110** has partitioned memory space that is mapped to corresponding ones of the peripheral devices. In this manner, storage areas within the memory **110** correspond to different peripheral devices. The ping/pong DMA circuit designates through memory pointers particular storage areas of the fast data memory **110** that belong to its associated peripheral device.

FIG. **5** shows a ping/pong DMA circuit **200** in more detail. The DMA circuit **200** has a serial-to-parallel converter **202** to convert the serial data received from the associated peripheral device into a parallel format for transfer on the internal bus **140**. The parallel data is placed initially in a holding register **204**.

A start address register **206** is provided to locate the appropriate buffer area within the fast data memory to hold the data in the holding register **204**. The logic unit initializes a DMA process by writing a word to the start address register **206**. The word defines the beginning of the buffer area in the fast data memory **110**. The upper bits of the start address register **206** represent the upper address lines of a buffer pointer into the memory **110**. In this implementation, the lower address bits in the start address register **206** are not used. The start address of the buffer area is on a page boundary and the size of the buffer area is a pre-determined size corresponding to the page size.

A lower address counter **208** is used to access the specific location within the designated buffer area of the memory. The number of bits in counter **208** corresponds to the size of the buffer area. In this implementation, the counter employs ten address bits A0–A9. A count output by the counter **208** is used as a pointer to the specific location into which the data in the holding register **204** is to be stored. Once the data is transferred to the storage location, the counter is incremented to reference the next appropriate location.

Each ping/pong DMA circuit defines two buffers within the buffer area of the memory **110**: a "ping" buffer and a "pong" buffer. The ping buffer represents a portion of the buffer area for a particular device into which data is being written from that device. Conversely, the pong buffer represents another portion of the buffer area from which data is being read. The upper address bit A9 of the counter **208** divides the buffer area into the ping and the pong buffers. When a transition of the upper counter bit occurs an interrupt may be generated, if the corresponding interrupt mask is enabled.

Address bits A0 and A1 are used to generate the four byte select signals of the internal address/data bus **140**. The lower two bits A0 and A1 of the counter **208** are used to select one of the byte select lines if the transfer is byte wide. The lower bit A1 is used to select an upper pair or lower pair of the byte select lines if the transfer is word wide. All byte enables are active for double word transfers. In this manner, the DMA process accommodates byte, word, or double word size data packets. As an example, a DMA circuit for an I^2C bus™ compatible peripheral device is configured for byte size data packets (i.e., 8 bits) because data is received from an I^2C bus™ in byte sizes. CD-ROM data is transferred in word sizes (i.e., 16 bits) which is appropriate for its bus size. I^2S digital audio data is transferred on a double word size (i.e., 32 bits).

In the case of a serial receive process, a serial data stream received from a peripheral device is shifted within the serial-to-parallel converter **202** to form units of 8, 16, or 32

bits in length. After the appropriate number of shifts, the data is transferred to register **204**. This transfer causes the DMA REQ & GNT circuit **210** to set a Bus Request signal.

The bus arbiter circuit **148** (FIG. **4**) looks at the bus request and grants the bus **140** to the DMA request at the next opportunity. Initiating a bus grant signal signifies that the bus has been granted to the DMA process. The bus grant signal enables the upper address bits A10–A19 in the start address register **206** and the lower address bits A2–A9 in the counter **208** to drive the internal address bus **142** for locating the appropriate address space in the fast data memory buffer. The appropriate byte enable lines are also driven. The data is transferred from the holding register **204** onto the data bus **144** and written into the fast data memory **110** at the address on the address bus **142**. The counter **208** is then incremented by one byte, word, or double word to prepare for the next address space of the buffer.

The logic unit can clear the counter **208** or inhibit the request signal by writing to a control register **212**.

In the illustrated implementation, a limit register **216** is used to set a limit value which may be less than that of the full size of the ping/pong buffer. For most cases, the limit value is set equal to the buffer size. In some cases, however, the buffer size might need to be smaller to handle odd size data blocks, such as data from the CD-ROM or other certain USB peripheral devices. The comparitor **214** compares the pointer moving through the buffer with the limit value stored in register **216**. When the counter **208** reaches the limit value in register **216**, the counter is reset and starts again. As a result, the size of the ping/pong buffer is not restricted to some capacity based on a power of two. The comparitor and limit register enable the buffer to accommodate irregular data block sizes.

The serial transmission case in which data is read out of the memory buffer is similar in the way of seizing control of the internal address bus and moving data out of the memory and onto the bus. In the transmission case, the Bus Request signal is activated when the data contents of the holding register **204** are transferred to the converter **202** for output, thereby leaving the holding register empty and awaiting the next data unit.

The direct memory access configuration of the logic unit **90**, memory **110**, and DMA circuits **200** enable fast and effective handling of the data communication to and from the serial peripheral devices. It permits the logic unit **90** to support many different serial peripheral devices without burdening the computer module. Another advantage is that the logic unit **90** enables efficient use of the memory space through the use of an "overlay" technique.

To illustrate an efficient memory overlay technique, FIG. **6** shows a simplified block diagram of the logic unit **90** coupled to various peripheral devices including, for example, the CD-ROM **78**, audio signal processor **96**, AM/FM tuner **98** via CODEC **102**. A sound source can be linked to the digital audio signal processor **96** by overlaying the ping/pong buffer area in the fast data memory **110** designated for the sound source with the ping/pong buffer area designated for the audio signal processor **96**. In this manner, the buffer area for the sound source has the same beginning and end points as the buffer area for the audio signal processor. This overlay allows the two devices to share the same buffer to efficiently exchange data. The sound source fills up its corresponding ping buffer area which happens to be the pong buffer for the audio signal processor. Concurrently, the audio signal processor is reading out of its ping buffer (i.e., the sound source's pong buffer) to retrieve data just filled by the sound source. When the sound source fills its ping buffer and the audio processor finishes reading its ping buffer, the sound source begins writing data to its corresponding pong buffer and the audio processor begins reading from its pong buffer which was just filled by the sound source.

Whenever a DMA process crosses a ping or pong boundary, an interrupt is generated, if unmasked. This is true for both the DMA process of the audio source and for the DMA process for an output to the signal processor. The interrupts may be used by software to guarantee that the two DMA processes stay synchronized.

The DMA overlaying process is further demonstrated by the following examples in which memory buffers designated for different data sources are overlaid on the memory buffers designated for the signal processor. These examples are described with reference to FIGS. **4–6**.

Suppose the AM/FM tuner **98** is the source of the audio data. The AM/FM tuner **98** produces audio data which is digitized into a serial data stream in the a CODEC. The DMA circuit **200** corresponding to the AM/FM tuner **98** receives the serial stream, converts it to a parallel format, and requests permission to write the data over the internal data bus **144** to the buffer pointed to by the ping/pong start address register **206**. More particularly, the data is written to a location within the buffer referenced by the counter **208**. For discussion purposes, suppose that the upper bit A9 is "**0**" to designate that the data is written to "ping" buffer.

Concurrently, the DMA circuit **200** corresponding to the audio signal processor **96** maintains an address in its register **206** which references the same buffer area of the memory **110** used by the AM/FM tuner **98**. However, the upper counter bit A9 of its counter **208** has a binary "1" to reference the "pong" buffer of the signal processor space. While data from the AM/FM tuner **98** is written to its ping buffer (also the audio signal processor's ping buffer), the signal processor is reading data from its pong buffer (also the tuner's pong buffer). Both of these events are based on a master clock signal so that the toggle between the ping and pong buffers for both the tuner and signal processor occur simultaneously in both incoming and outgoing data. The interrupts generated by both incoming and outgoing toggles can be ignored, unless the logic unit **90** has some interest in the data.

Accordingly, the architecture promotes efficient data transfer from the AM/FM tuner to the signal processor without burdening the processing resources of the computer module or the logic unit.

As another example, suppose the CD ROM **78** is the source of the data. The DMA circuits associated with the CD ROM **78** and the audio signal processor **96** are configured to point to the same buffer area of the fast data memory **110** buffer, with the ping buffer of each overlapping with the pong buffer of the other. In this case, the logic unit **90** interfaces with the CD ROM **78** through the IDE port, but the overlay aspects are essentially the same. The CD ROM alternately fills its associated ping and pong buffer spaces within the fast data memory **110** while the audio processor concurrently reads from its associated ping and pong buffers to extract the audio data just written by the CD ROM.

The logic unit facilitates similar data flow between the signal processor and other serial devices, including the CODEC, the USB hub which connects to many outside peripheral devices, the computer module via the PCI bus, and so forth.

FIG. **7** shows a master audio clock generating unit **220** that is resident in the support module **62**. The master clock

generating unit provides clock signals to many components and interfacing busses. The master clock generating unit **220** includes a clock oscillator **222** which, in the preferred implementation, is a 48 MHz oscillator. A divide-by-N counter **224** and a divide-by-two counter **226** are formed as part of the logic unit **90** to produce a master audio clock signal used to synchronize the various audio components in the vehicle computer system. Assuming a 48 MHz oscillator, the counters **224** and **226** produce an audio clock signal of approximately 44.1 KHz. The clock generating unit **220** also includes a divide-by-480 counter **228** to produce a 100 KHz I^2C bus™ clock signal, and a divide-by-N counter circuit **230** which produces various baud rates for UARTs.

The master clock generating unit **220** employs a phased lock loop (PLL) **232** of the CODEC **102** which multiplies the audio clock signal to yield a high speed clock signal that can be transmitted over the high speed serial interface **68** to the faceplate module. In the illustrated implementation, for example, the PLL **232** multiplies the 44.1 KHz signal by a factor **256** to produce a high speed clock signal of approximately 11.2 MHz. This high speed clock signal is passed back through the logic unit **90** where it is passed through an on/off gate **234** to be selectively output to the faceplate module as the faceplate clock FCLK signal when the faceplate is attached. Additionally, the logic unit **90** has a divide-by-17 counter **236** which generates a synchronizing bit FSYNC every 17th bit of the high speed clock signal. The faceplate module is equipped with a clock generation circuit which divides the high speed clock signal back down to the desired audio rate of 44.1 KHz. If the faceplate module is detached from the support module, the logic unit **90** disables the FCLK signal to conserve power.

One benefit of the master clock generating unit **220** is that it can adjust and fine tune the clock frequency to accommodate fixed rate audio devices, such as a CD ROM player. Such devices often have a fixed rate that might vary slightly from the specified optimal clock frequency. To ensure an optimum synchronization among the audio components, the master clock generating unit **220** adjusts itself by altering the value N in the divide-by-N counter **224** to thereby produce slightly different audio clock rates that approximate the desired 44.1 KHz. This master clock adjustability feature provides better synchronization which in turn promotes optimal sound quality.

Data is carried over the high speed serial interconnect between the support and faceplate modules using the 11.2 MHz clock rate. According to an aspect of this invention, the data is transferred as a synchronized serial bit stream which is organized into multiple frames. Each frame has multiple data bits and at least one valid bit to indicate whether the data bits are valid. The frames are set apart from one another by a synchronization signal.

FIG. **8** shows a timing diagram of the high speed clock **240**, a synchronization signal **242**, and one data frame **244** according to a preferred implementation. The clock signal **240** is produced at a frequency of approximately 11.2 MHz. The synchronization signal **242** is asserted every 17th clock pulse and remains asserted through one clock period. Following this synchronization bit, a 17-bit frame is transferred. The frame includes a valid bit **246** and 16 bits of data D0–D15. The valid bit **246** is set when the data bits **248** are valid and reset when the accompanying data bits are not valid.

FIG. **9** shows another aspect of this invention concerning the power system **260** for the vehicle computer system. The power system **260** is designed to ensure that the vehicle computer system has power in the event that the primary vehicle battery **32** is disconnected, becomes discharged, or during engine starting. For instance, the vehicle battery **32** may be rendered ineffective if the user accidentally leaves on the vehicle lights, or if a person attempts to disarm the vehicle by disconnecting the battery. It is desirable that the computer system remain operative to maintain security and communication features even though the system can no longer draw power from the vehicle battery. Another concern is that the voltage output of the vehicle battery **32** can be reduced to less than five volts when the vehicle is being started. This brief low voltage period may adversely affect operation of the vehicle computer system.

To alleviate these potential problems, the power system **260** has a backup battery **33** which functions as a secondary power source to the vehicle computer system. The backup battery **33** can be identical to the primary battery or something with less, but sufficient power to support a computer system. The power system **260** also includes a power source selector **262** coupled between (1) both the primary and secondary power sources **32, 33** and (2) the vehicle computer system. The power source selector **262** alternately enables the primary battery **32** or the backup battery **33** to supply power to the vehicle computer system. The power is input to a power regulator and manager **258**, which converts the power to the appropriate levels for use in the computer module **64**, the support module **62**, and the faceplate module **60**.

In the illustrated implementation, the power source selector **262** is configured using solid state electronic devices in the form of diodes that do not require any switching or relay circuitry. The selector **262** includes a first diode path **264** having n diodes (n=1, 2, . . .), as represented by diode **266**, connected between the vehicle battery **32** and the vehicle computer system. The selector **262** also includes a second diode path **268** having at least n+1 diodes, as represented by two diodes **270** and **272**, connected between the backup battery **33** and the vehicle computer system. By placing at least one more diode in the backup-to-computer path **268**, the vehicle computer system will draw voltage primarily from the vehicle battery **32** during normal operation because there is less voltage drop in the primary-to-computer path **264** so long as the vehicle battery **32** has sufficient power.

In the event that the vehicle battery **32** becomes discharged to point below the voltage level of the backup battery (plus a voltage drop for the additional diode(s) in the second path **268**), the computer system draws voltage from the backup battery **33**. The diode **266** prevents current from going back into the dead or discharged battery **32** to efficiently divert the power to the vehicle computer system.

The backup battery **33** has its own charging circuit (not shown) which enables it to be charged when the vehicle is operating. For instance, in an automobile, the charging circuit allows the automobile's alternator to charge the backup battery **33**.

The power regulator and manager **258** provides four main power states during operation of the vehicle computer system. These states include power up, intermediate power, power down, and power off. In the "power up" state, all components in the computer system are fully powered up. In the "intermediate power" state, some of the components are powered up, while others of the components and peripheral devices are powered down. The "power down" state is the lowest power state without removing power altogether. The busses and logic unit are on, but most components and peripherals are powered down. User activation can bring the

system back from the power down state to a power up state. In the "power off" state, all components are off, excepting a few wake-up circuits, battery-backed clock, and the like.

In compliance with the statute, the invention has been described in language more or less specific as to structure and method features. It is to be understood, however, that the invention is not limited to the specific features described, since the means herein disclosed comprise exemplary forms of putting the invention into effect. The invention is, therefore, claimed in any of its forms or modifications within the proper scope of the appended claims appropriately interpreted in accordance with the doctrine of equivalents and other applicable judicial doctrines.

We claim:

1. A vehicle computer system comprising:

a housing of a size suitable to be mounted in a vehicle dashboard, the housing having first and second support structures that can be physically connected to, or separated from, one another;

a first logic unit mounted to the first support structure of the housing;

a second logic unit mounted to the second support structure of the housing;

a high speed serial interface to electrically interconnect the first and second logic units when the first and second support structures are physically connected to one another; and

the first and second logic units being configured to exchange data via the high speed serial interface using a synchronized serial bit stream which is organized into multiple frames, individual frames having multiple data bits and at least one valid bit to indicate whether the data bits are valid.

2. A vehicle computer system as recited in claim 1, wherein one of the first and second logic units transmits at least one synchronizing bit to commence a start of a frame and synchronize the serial bit stream.

3. A vehicle computer system as recited in claim 1, wherein each frame is a 17-bit frame consisting of 16 data bits and one valid bit.

4. A vehicle computer system as recited in claim 1, wherein the housing has a form factor of a single DIN.

5. A vehicle computer system as recited in claim 1, wherein the first support structure is configured to be mounted within the vehicle dashboard and the second support structure is a detachable faceplate.

6. A vehicle computer system as recited in claim 1, further comprising a power system comprising:

a backup power source; and

a power source selector coupled between (1) both the backup power source and a primary vehicle battery and (2) the vehicle computer system, the power source selector alternately enabling at least one of the primary vehicle battery or the backup power source to supply power to the vehicle computer system.

7. A vehicle computer system as recited in claim 1, wherein the first logic unit is configured to interface with multiple peripheral devices, and the first logic unit uses direct access memory to facilitate data communication with the peripheral devices.

8. In a vehicle computer system having a clock generator that generates clock pulses, a method for transmitting data comprising the step of serially sending one synchronizing bit every N clock pulses followed by an N-bit frame comprising N-1 data bits and one valid bit to indicate whether the data bits are valid, wherein N is an integer greater than one.

9. A method as recited in claim 8 wherein the multi-bit frame is a 17-bit frame consisting of 16 data bits and one valid bit.

10. A serial data stream transmitted over a serial conductor as a result of the step recited in claim 8.

11. A vehicle computer system programmed to perform the step recited in claim 8.

12. A vehicle computer power system for a vehicle computer system to be mounted in a vehicle, the vehicle having a primary power source, the power system comprising:

a secondary power source mounted external to the vehicle computer system;

a power source selector coupled between (1) both the primary and secondary power sources and (2) the vehicle computer system, the power source selector alternately enabling at least one of the primary power source or the secondary power source to supply power to the vehicle computer system;

the power source selector having a first diode path connected between the primary power source and the vehicle computer system, the first diode path having n diodes; and

the power source selector having a second diode path connected between the secondary power source and the vehicle computer system, the second diode path having at least n+1 diodes.

13. A vehicle computer system comprising a vehicle computer power system as recited in claim 12.

14. A vehicle computer system, comprising:

a housing of a size suitable to be mounted in a vehicle dashboard;

a logic unit mounted in the housing, the logic unit having an internal multi-bit bus structure and being configured to interface with one or more peripheral devices;

a processing unit mountable in the housing, the processing unit having an internal multi-bit bus structure separate from the bus structure of the logic unit;

a data memory operatively coupled to the bus structure of the logic unit to temporarily hold data being communicated between the peripheral devices, the data memory being partitioned into storage areas for corresponding ones of the peripheral devices; and

the logic unit having one or more memory access circuits associated with corresponding ones of the peripheral devices, each memory access circuit designating storage areas of the data memory to hold input data received from, or output data to be sent to, the associated peripheral device.

15. A vehicle computer system as recited in claim 14 wherein the logic unit and the processing unit are interfaced using a multi-bit bus.

16. A vehicle computer system for use in a vehicle, comprising:

a logic unit;

a data memory accessible by the logic unit to temporarily hold data being communicated between peripheral devices, the data memory being partitioned into storage areas for corresponding ones of the peripheral devices; and

the logic unit having one or more memory access circuits associated with corresponding ones of the peripheral devices, each memory access circuit designating one storage area of the data memory to hold input data received from the associated peripheral device and

another storage area of the data memory to hold output data to be sent to the associated peripheral device.

17. A vehicle computer system as recited in claim 16 wherein the logic unit has an address/data bus structure and the data memory is coupled to the address/data bus structure, the memory access circuits being capable of accessing the data memory directly using the address/data bus structure.

18. A vehicle computer system as recited in claim 16 configured to support first and second peripheral devices, further comprising:

first and second memory access circuits associated with the first and second peripheral devices, respectively; and

the first memory access circuit being configured to designate a particular storage area of the data memory to hold data received from the first peripheral device and the second memory access circuit being configured to designate the same particular storage area of the data memory to hold data to be sent to the second peripheral device.

19. A vehicle computer system as recited in claim 16, further comprising a power system comprising:

a backup power source; and

a power source selector coupled between (1) both the backup power source and a primary vehicle battery and (2) the vehicle computer system, the power source selector alternately enabling at least one of the primary vehicle battery or the backup power source to supply power to the vehicle computer system.

20. In a vehicle computer system to be mounted in a vehicle, the vehicle computer system having a processing unit connected to communicate with multiple peripheral devices, a subsystem for processing continuous audio or video data received from a data source comprising:

a data processor;

a memory partitioned into pages;

a first memory access circuit associated with the data source to facilitate data transfer between the memory and the data source, the first memory access circuit being configured to input data received from the data source in a particular memory page; and

a second memory access circuit associated with the data processor to facilitate data transfer between the memory and the data processor, the second memory access circuit being configured to retrieve the data from the particular memory page and to output the data to the data processor.

21. A subsystem as recited in claim 20, wherein the data processor comprises a digital signal processor.

22. A vehicle computer system comprising a subsystem as recited in claim 20.

23. In a vehicle computer system to be mounted in a vehicle, the vehicle computer system supporting at least one peripheral device having a fixed clock frequency, a master clock generating unit comprising:

an oscillator to provide a fundamental clock frequency; and

clock frequency adjustment circuitry coupled to the oscillator to produce one or more master clock frequencies based upon the fundamental clock frequency, the clock frequency adjustment circuitry being adjustable to synchronize to the fixed clock frequency of the peripheral component.

24. A vehicle computer system comprising a subsystem as recited in claim 23.

25. A vehicle computer system comprising:

a housing having a base unit and a faceplate;

a logic unit mounted to the base unit to form a support module, the support module having an interfacing slot and being configured to support multiple peripheral devices;

the faceplate having at least one electronic component to form a faceplate module, the faceplate module being compatibly connected to the interfacing slot of the support module;

a high speed serial interface electronically coupling the logic unit to the electronic component on the faceplate module, the high speed serial interface enabling the logic unit to transfer a synchronized serial bit stream to the electronic component, the serial bit stream being organized into multiple frames, individual frames having multiple data bits and at least one valid bit to indicate whether the data bits are valid; and

the support module being configured to facilitate data communication between the peripheral devices, the support module having a data memory to temporarily hold data being communicated between the peripheral devices and one or more memory access circuits associated with corresponding ones of the peripheral devices, each memory access circuit designating at least one storage area within the data memory to hold input data received from, or output data to be sent to, the associated peripheral device.

26. A vehicle computer system as recited in claim 25, wherein the support module has another interfacing slot, and the vehicle computer system further comprises a computer module having a second processing unit, the computer module being compatibly connected to the other interfacing slot of the support module.

27. A vehicle computer system as recited in claim 26, wherein each of the first and second processing units has its own internal multi-bit bus.

28. A vehicle computer system as recited in claim 26, wherein each individual frame is a 17-bit frame consisting of 16 data bits and one valid bit.

29. A vehicle computer system as recited in claim 26, wherein the support module is configured to support first and second peripheral devices, further comprising:

first and second memory access circuits associated with the first and second peripheral devices, respectively; and

the first memory access circuit being configured to designate a particular storage area of the data memory to hold data received from the first peripheral device and the second memory access circuit being configured to designate the same particular storage area of the data memory to hold data to be sent to the second peripheral device.

30. A vehicle computer system as recited in claim 25, wherein the vehicle computer system is connected to receive power from a primary vehicle battery, and further comprising a power system comprising:

a backup power source; and

a power source selector coupled between (1) both the backup power source and the primary vehicle battery and (2) the vehicle computer system, the power source

selector alternately enabling at least one of the primary vehicle battery or the backup power source to supply power to the vehicle computer system.

31. A vehicle computer system, comprising:

first and second logic units mountable in a vehicle;

a clock generator that generates clock pulses;

a high speed serial interface to electrically interconnect the first and second logic units; and

the first and second logic units being configured to exchange data via the high speed serial interface by sending one synchronizing bit every N clock pulses followed by an N-bit frame comprising N-1 data bits and one valid bit to indicate whether the data bits are valid, wherein N is an integer greater than one.

* * * * *

US006028537A

United States Patent [19]

Suman et al.

[11] Patent Number: 6,028,537

[45] Date of Patent: Feb. 22, 2000

[54] **VEHICLE COMMUNICATION AND REMOTE CONTROL SYSTEM**

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[73] Assignee: **Prince Corporation**, Holland, Mich.

[21] Appl. No.: **08/874,210**

[22] Filed: **Jun. 13, 1997**

Related U.S. Application Data

[60] Provisional application No. 60/019,773, Jun. 14, 1996.

[51] **Int. Cl.**[7] **G08G 1/123**

[52] **U.S. Cl.** **340/988**; 340/426; 342/457; 455/422

[58] **Field of Search** 340/426, 988; 342/457, 357; 701/213; 455/422

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Primary Examiner—Brent A. Swarthout

Attorney, Agent, or Firm—Price, Heneveld, Cooper, DeWitt & Litton

[57] **ABSTRACT**

The vehicle communication and control system of the present invention includes a transceiver for sending and receiving RF signals, a processor coupled to the transceiver, a location identifying sensor coupled to the processor for supplying vehicle location data, a user interface coupled to the processor for providing information to a user and for enabling a user to input commands to be executed by the processor, and a vehicle accessory interface for coupling the processor to a vehicle accessory control circuit to enable the processor to issue commands to a vehicle accessory. The processor is preferably adapted to perform a wide variety of functions in response to user input commands, received RF signals, and other commands received from other vehicle accessories and components coupled to the system of the present invention through the vehicle system bus. Some of these functions include establishing a two-way communication link, requesting and providing location-specific information, enabling remote tracking of the vehicle, issuing an emergency request or a request for roadside assistance, requesting and receiving navigational information, remote control of vehicle functions, enabling remote diagnostics of the vehicle, and enabling reprogramming of various vehicle accessories and components.

28 Claims, 62 Drawing Sheets

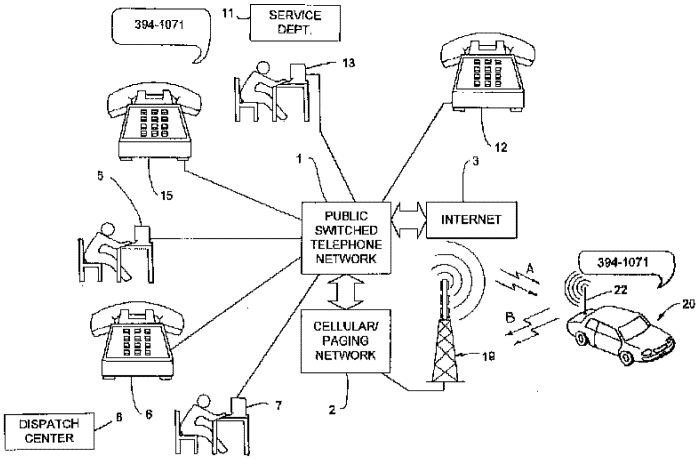
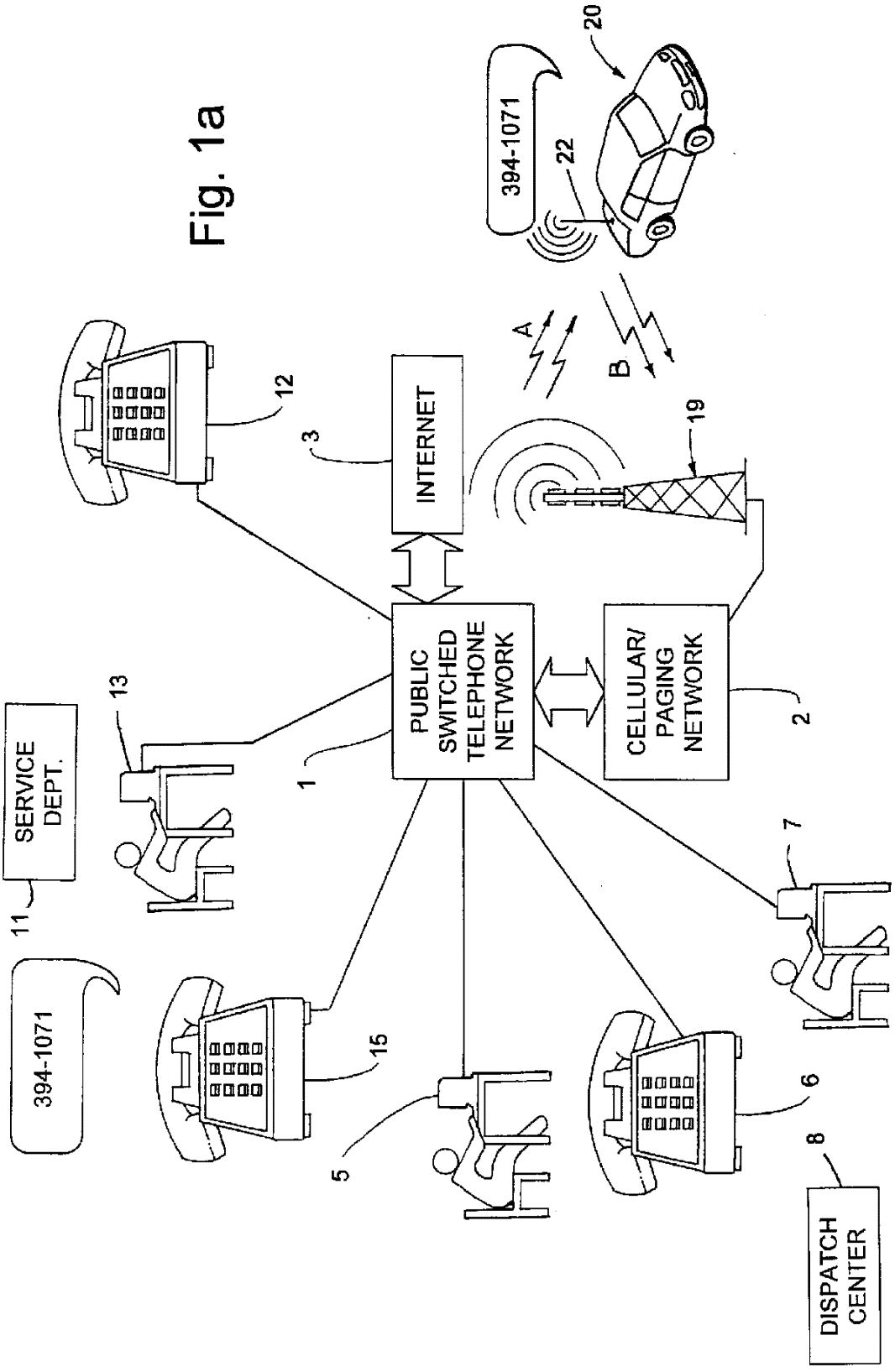


Fig. 1a


PUBLIC SWITCHED TELEPHONE NETWORK
CELLULAR/ PAGING NETWORK
INTERNET
SERVICE DEPT.
DISPATCH CENTER
394-1071
394-1071
A
B
1
2
3
5
6
7
8
11
12
13
15
19
20
22

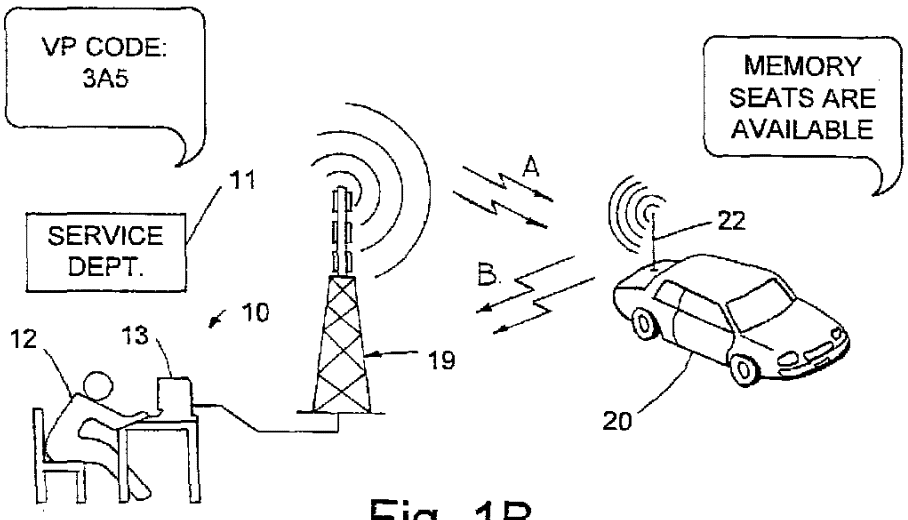

VP CODE:
3A5
MEMORY
SEATS ARE
AVAILABLE
11
SERVICE
DEPT.
A
B.
22
10
12
13
19
20

Fig. 1B

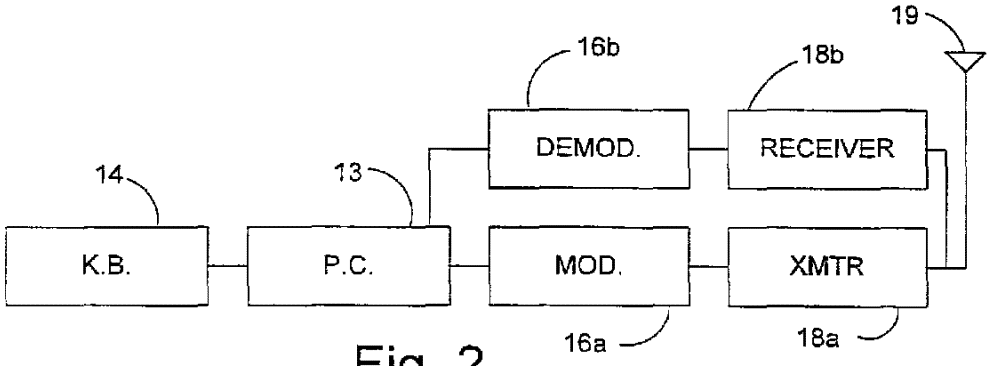

19
16b
18b
DEMOD.
RECEIVER
14
13
K.B.
P.C.
MOD.
XMTR
16a
18a

Fig. 2

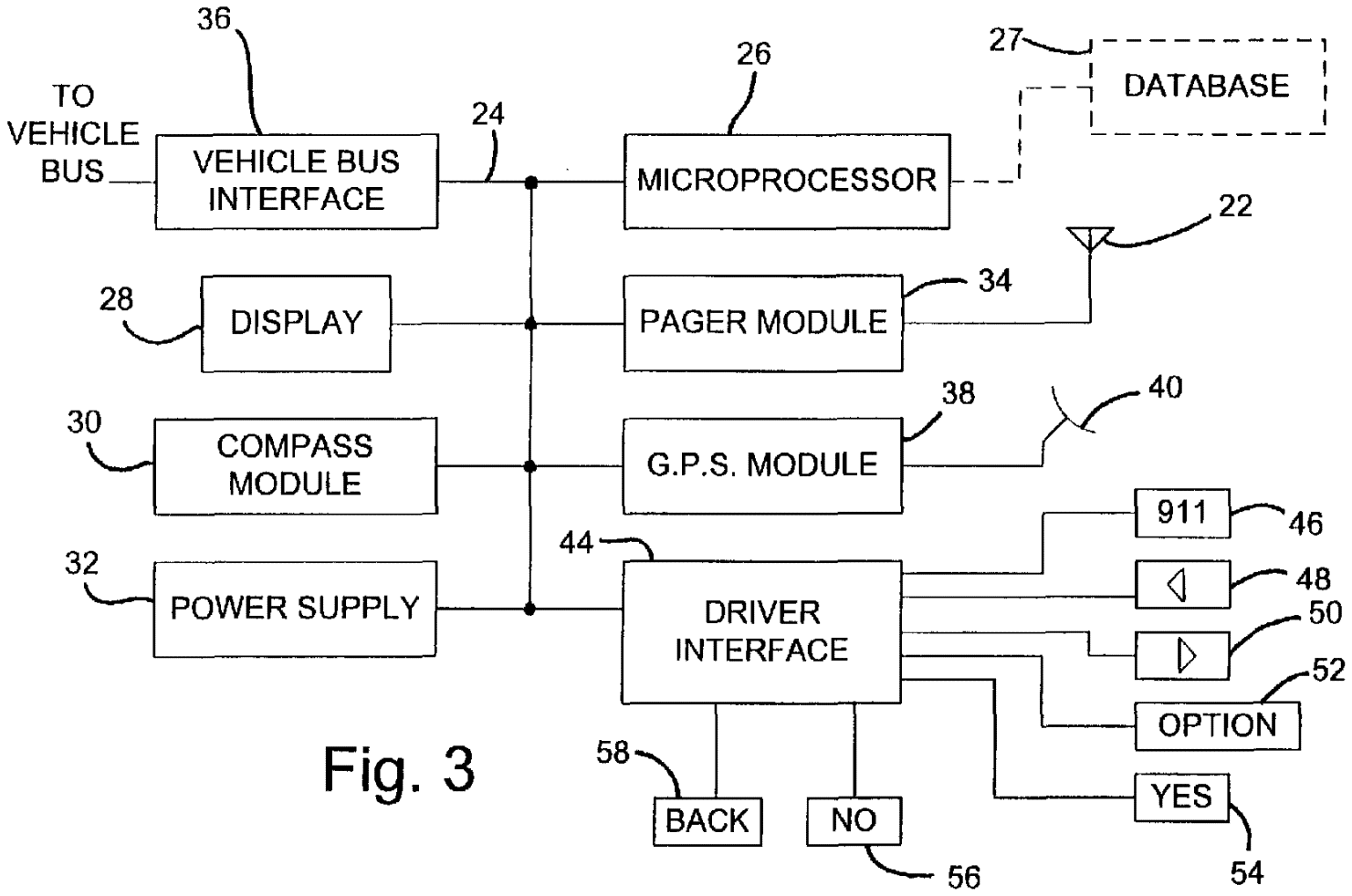

36
TO VEHICLE BUS
VEHICLE BUS INTERFACE
24
26
MICROPROCESSOR
27
DATABASE
22
28
DISPLAY
PAGER MODULE
34
30
COMPASS MODULE
38
40
G.P.S. MODULE
32
POWER SUPPLY
44
DRIVER INTERFACE
911
46
48
50
52
OPTION
YES
54
58
BACK
NO
56

Fig. 3

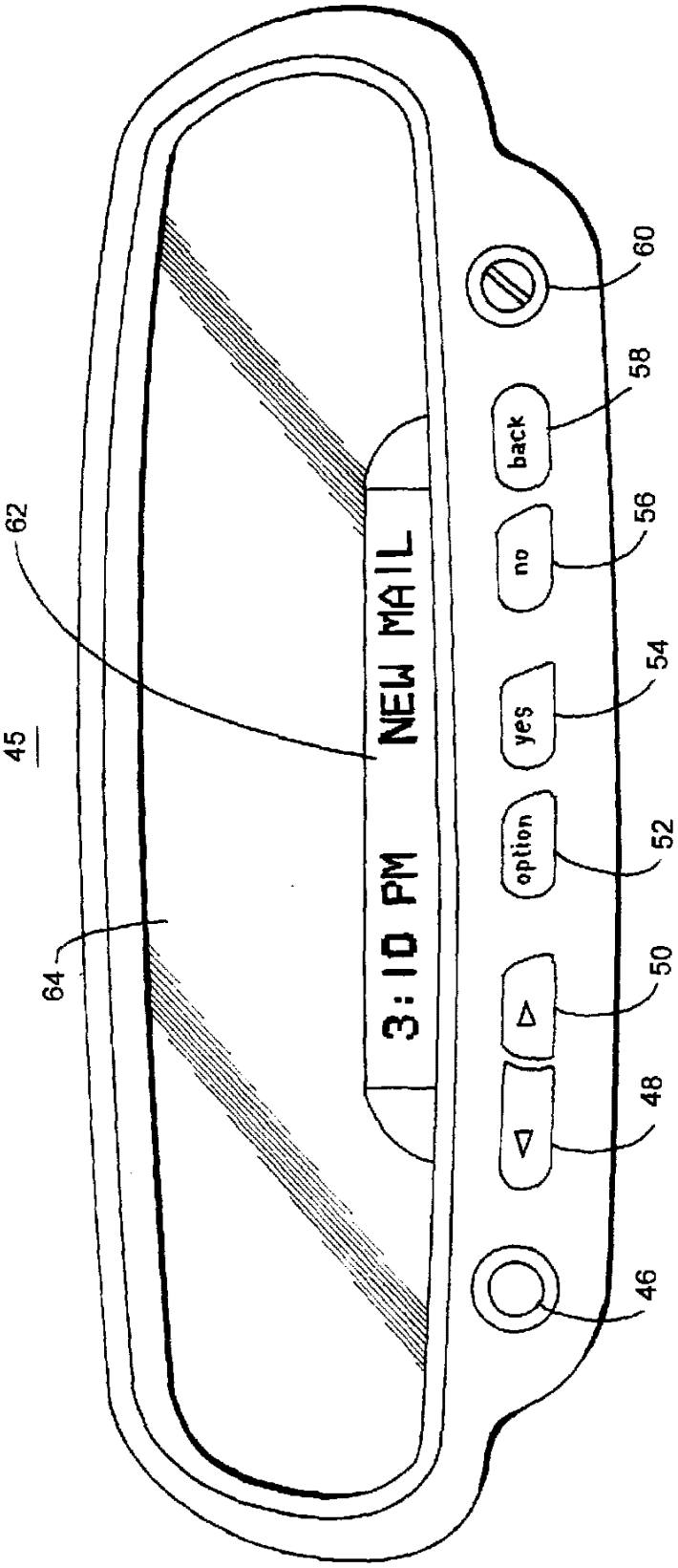


Fig. 4

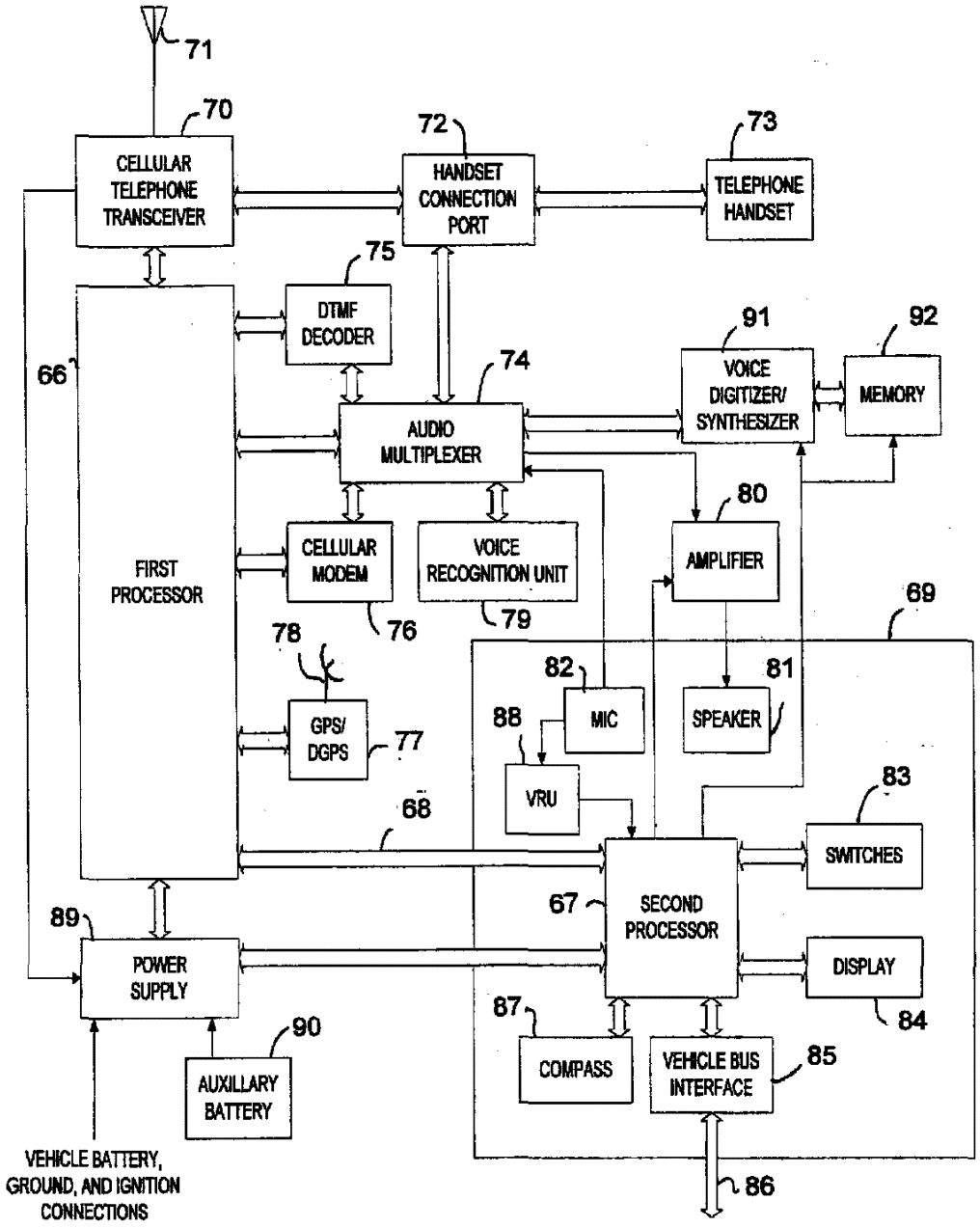

71
70
CELLULAR TELEPHONE TRANSCEIVER
72
HANDSET CONNECTION PORT
73
TELEPHONE HANDSET
75
DTMF DECODER
66
FIRST PROCESSOR
74
AUDIO MULTIPLEXER
91
VOICE DIGITIZER/ SYNTHESIZER
92
MEMORY
80
AMPLIFIER
CELLULAR MODEM
76
VOICE RECOGNITION UNIT
79
78
GPS/ DGPS
77
69
82
MIC
88
VRU
81
SPEAKER
83
SWITCHES
68
67
SECOND PROCESSOR
89
POWER SUPPLY
DISPLAY
84
87
COMPASS
VEHICLE BUS INTERFACE
85
90
AUXILLARY BATTERY
VEHICLE BATTERY, GROUND, AND IGNITION CONNECTIONS
86

Fig. 5

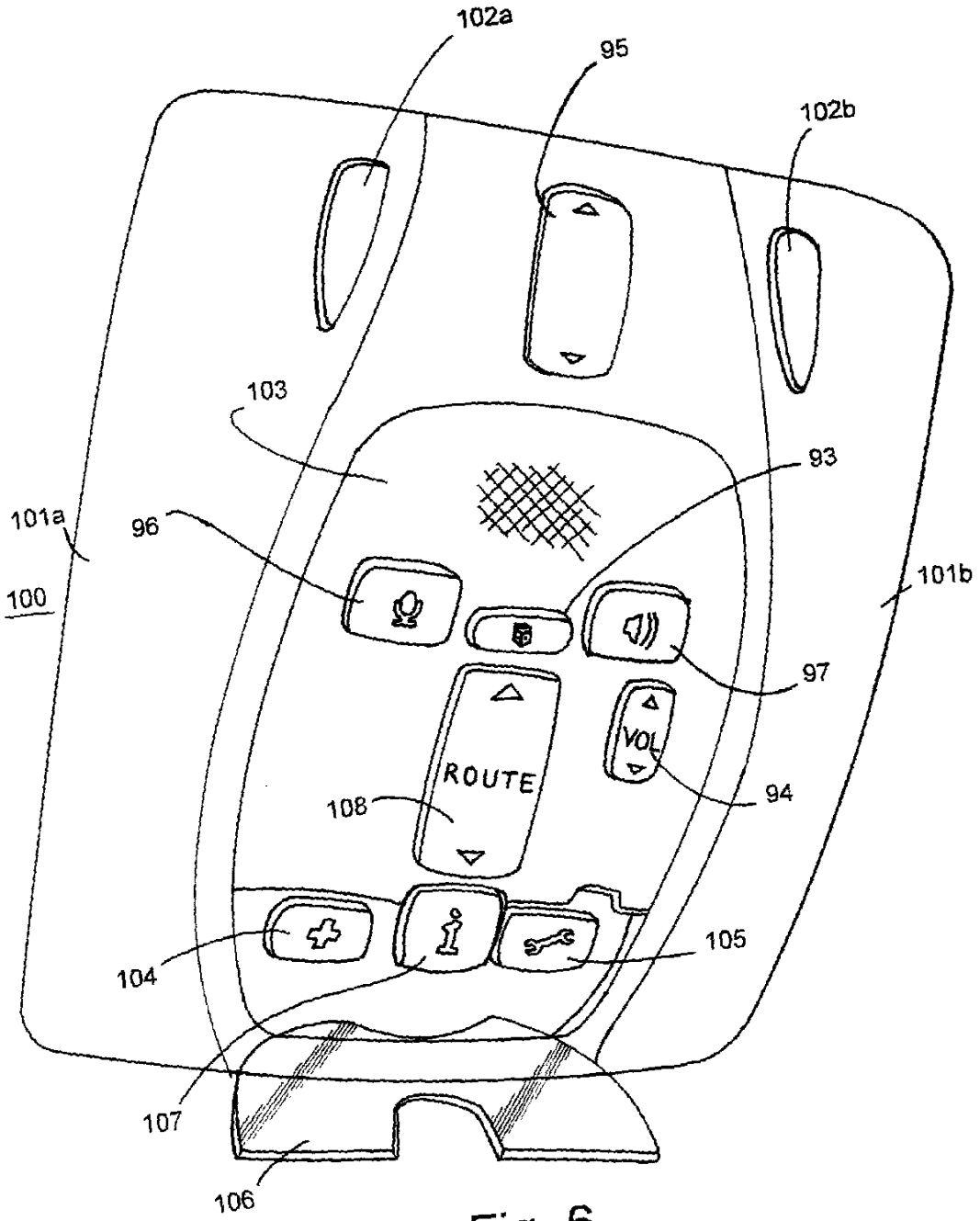

102a
95
102b
103
93
101a
96
100
101b
97
VOL
ROUTE
108
94
104
105
107
106

Fig. 6

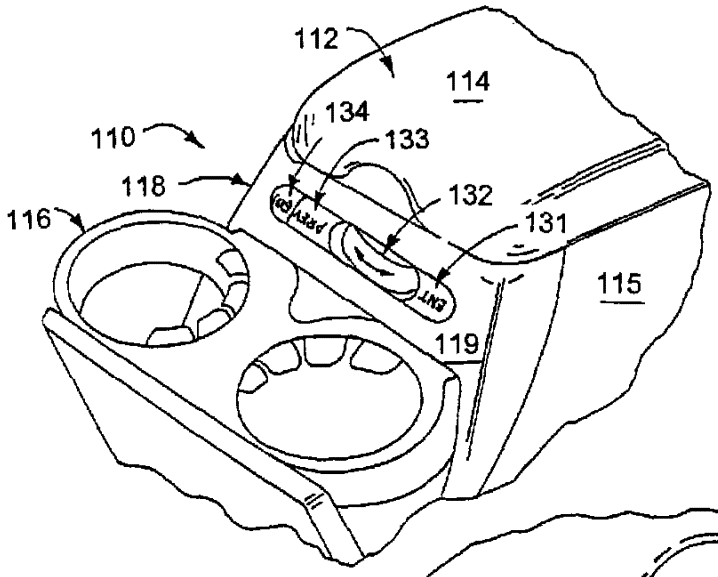


Fig. 7

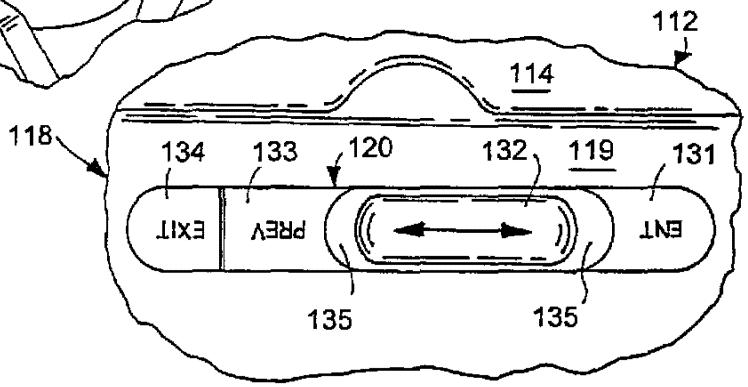


Fig. 8

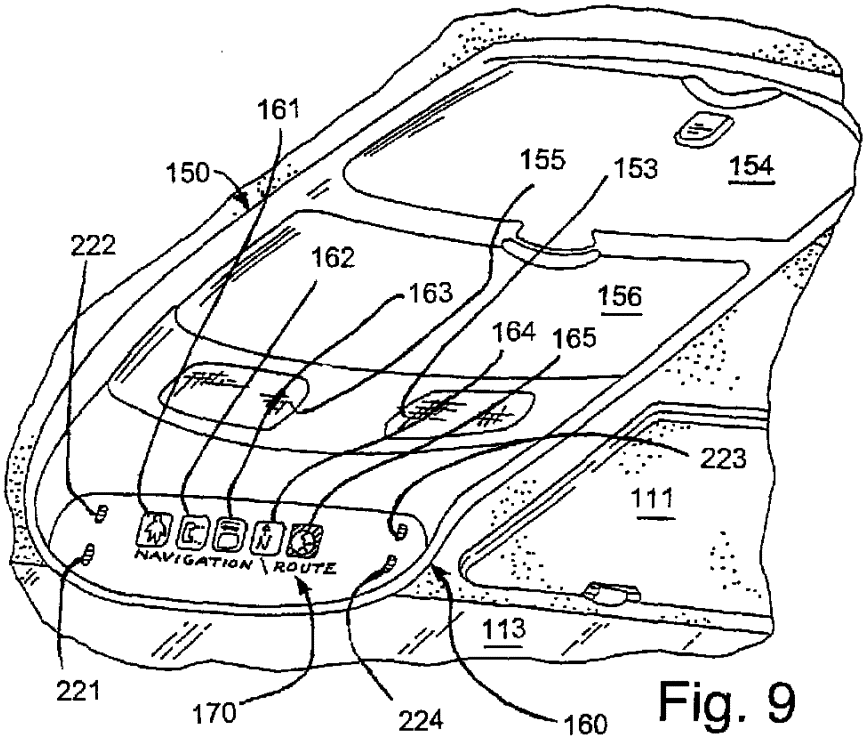


Fig. 9

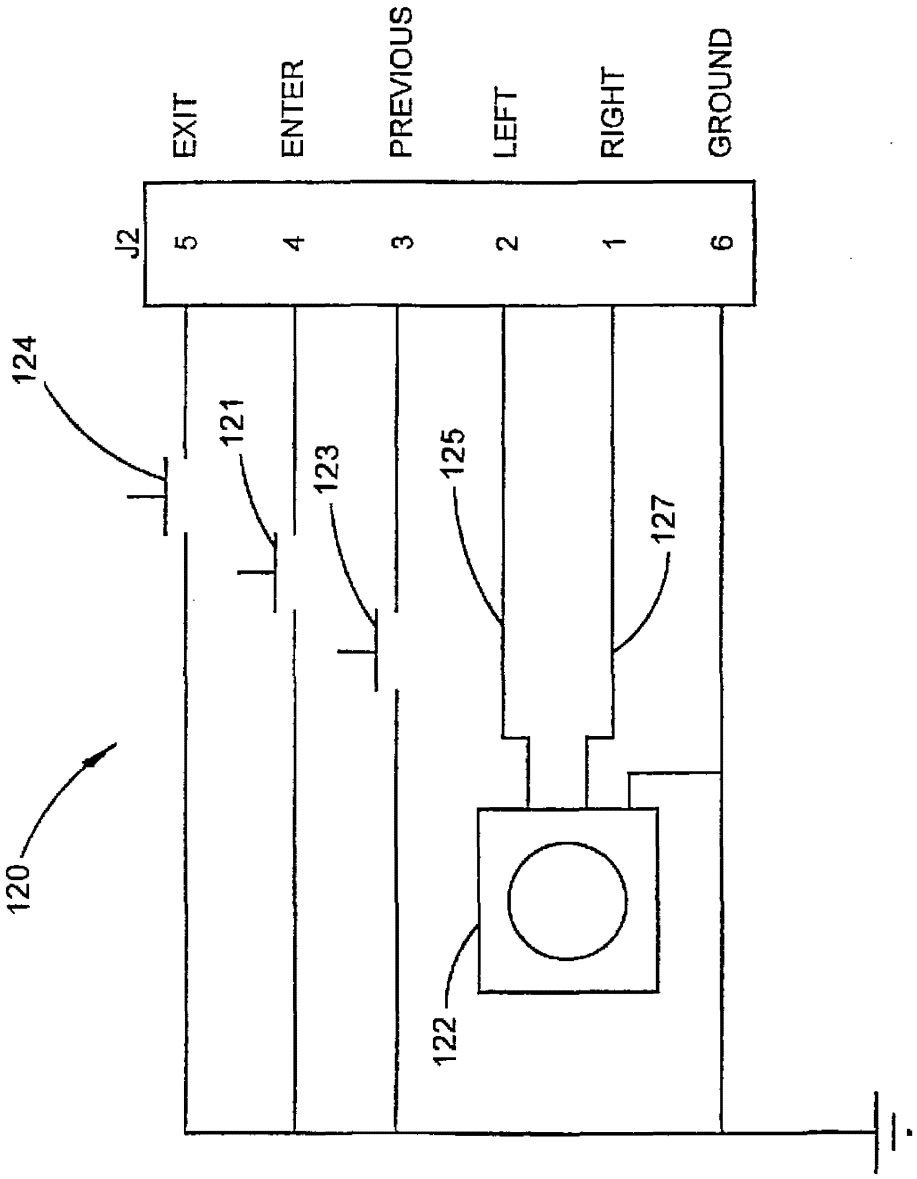
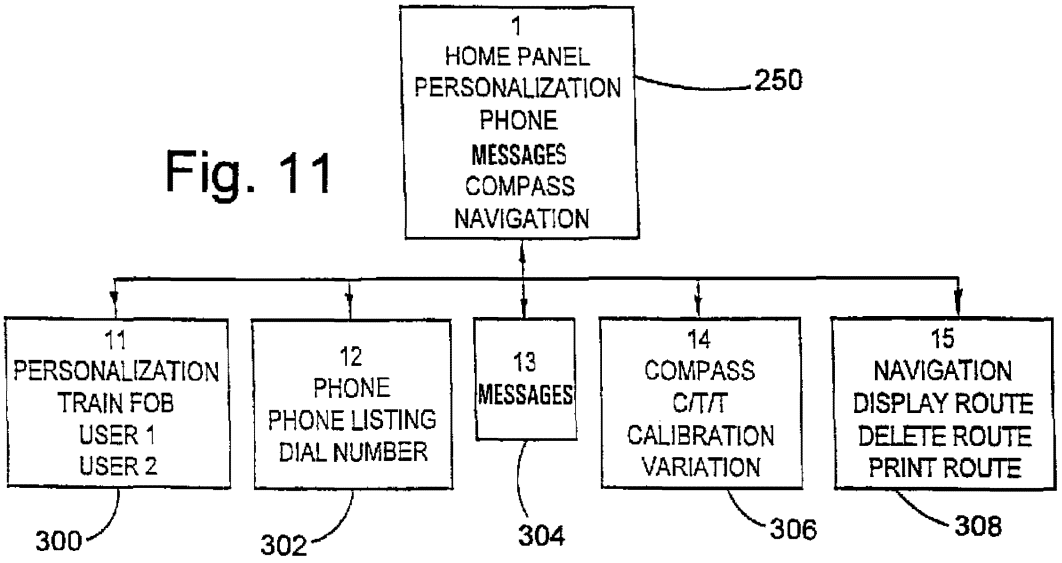

EXIT
ENTER
PREVIOUS
LEFT
RIGHT
GROUND
J2
5
4
3
2
1
6
124
121
123
125
127
120
122

Fig. 10

Fig. 11


1
HOME PANEL
PERSONALIZATION
PHONE
MESSAGES
COMPASS
NAVIGATION
250
11
PERSONALIZATION
TRAIN FOB
USER 1
USER 2
300
12
PHONE
PHONE LISTING
DIAL NUMBER
302
13
MESSAGES
304
14
COMPASS
C/T/T
CALIBRATION
VARIATION
306
15
NAVIGATION
DISPLAY ROUTE
DELETE ROUTE
PRINT ROUTE
308

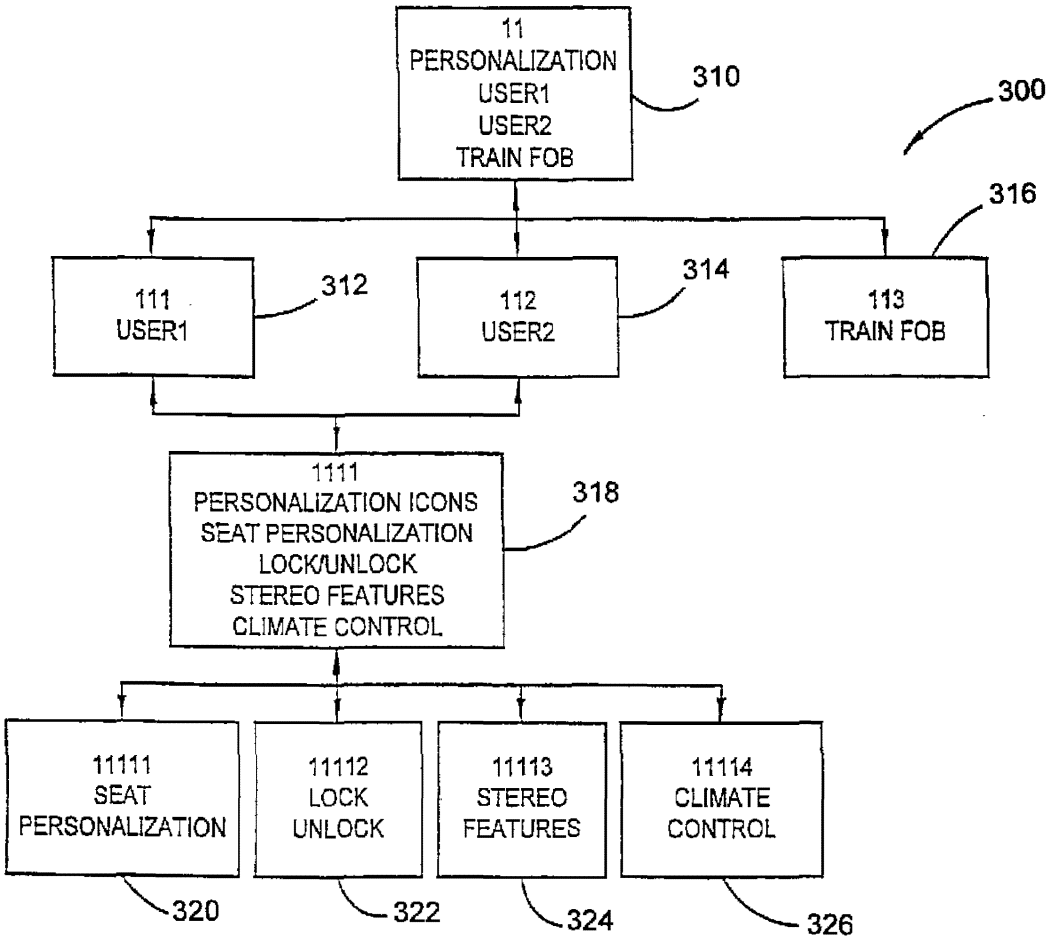

11
PERSONALIZATION
USER1
USER2
TRAIN FOB
310
300
316
111
USER1
312
112
USER2
314
113
TRAIN FOB
1111
PERSONALIZATION ICONS
SEAT PERSONALIZATION
LOCK/UNLOCK
STEREO FEATURES
CLIMATE CONTROL
318
11111
SEAT
PERSONALIZATION
320
11112
LOCK
UNLOCK
322
11113
STEREO
FEATURES
324
11114
CLIMATE
CONTROL
326

Fig. 12

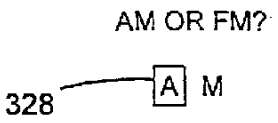


Fig. 13

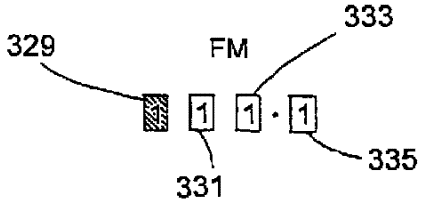


Fig. 15

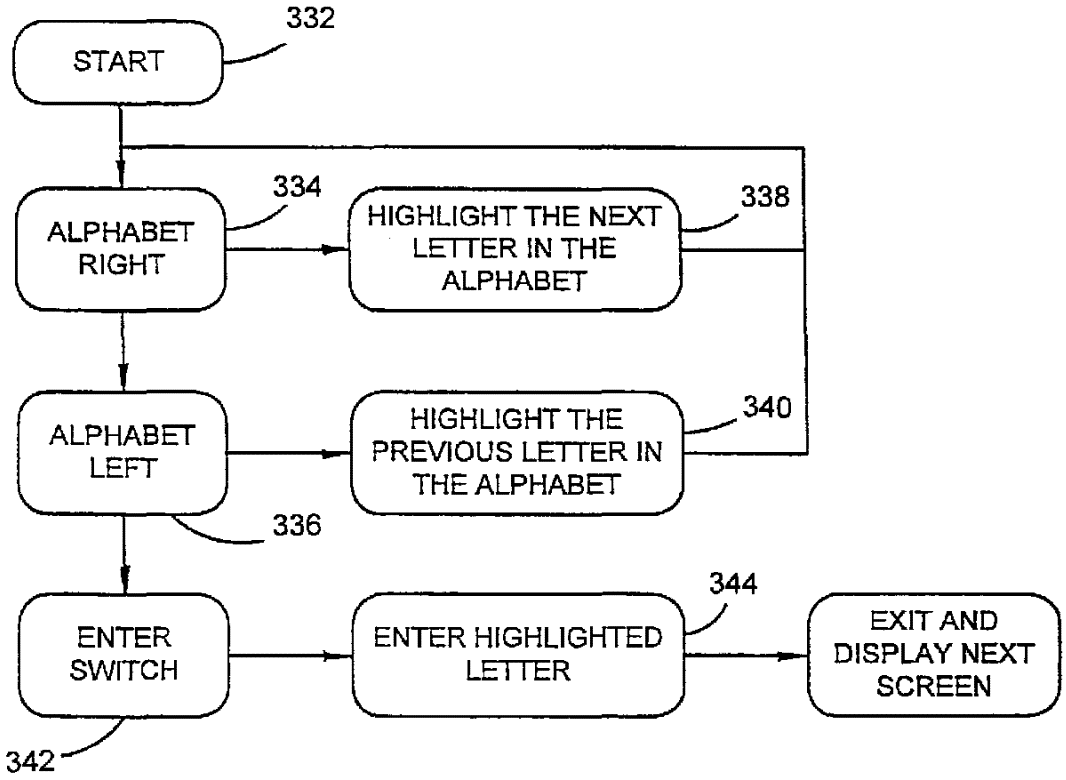


Fig. 14

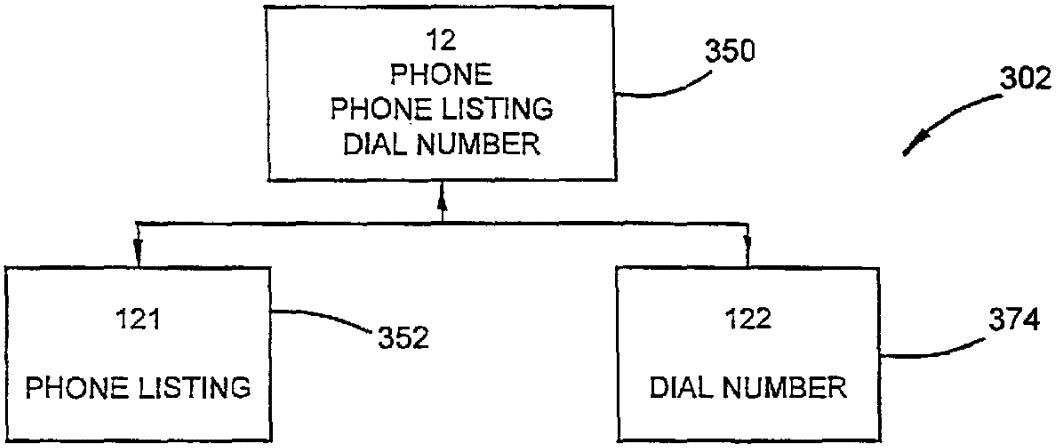


Fig. 16

PHONE LIST

1 JOE SMITH 616-123-4567
2
3

Fig. 17

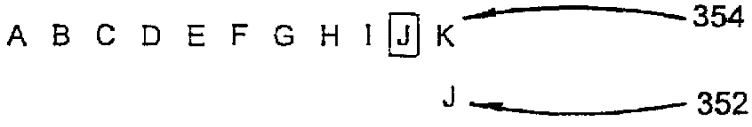


Fig. 18

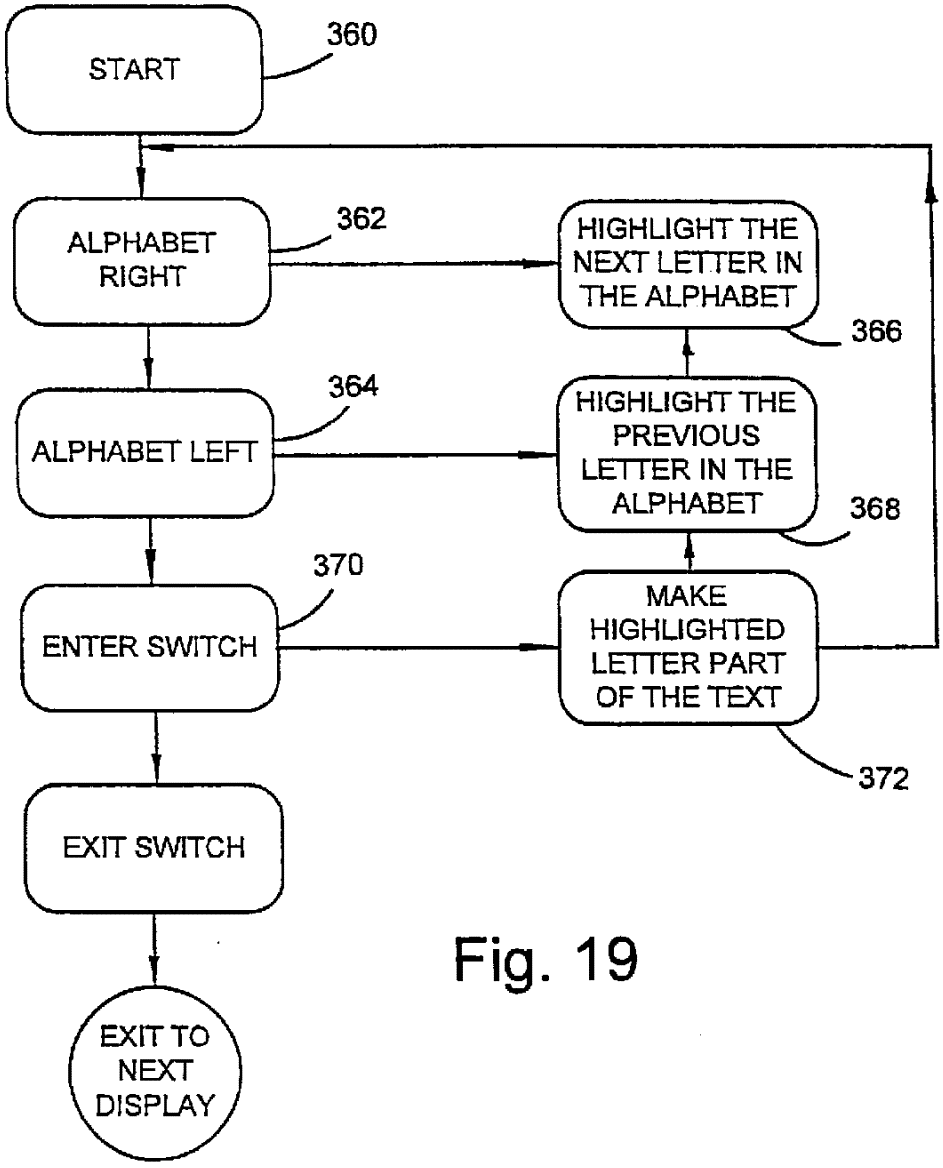

START
360
ALPHABET RIGHT
362
HIGHLIGHT THE NEXT LETTER IN THE ALPHABET
366
ALPHABET LEFT
364
HIGHLIGHT THE PREVIOUS LETTER IN THE ALPHABET
368
ENTER SWITCH
370
MAKE HIGHLIGHTED LETTER PART OF THE TEXT
372
EXIT SWITCH
EXIT TO NEXT DISPLAY

Fig. 19

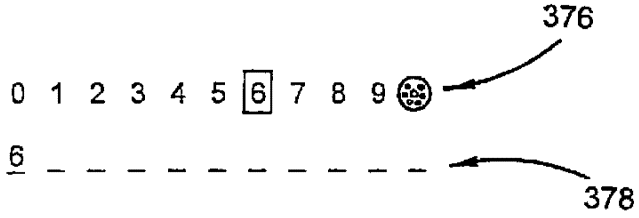

376
0 1 2 3 4 5 6 7 8 9
6
378

Fig. 20

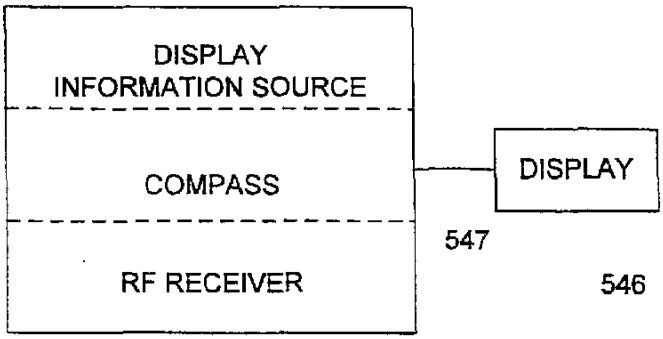

DISPLAY
INFORMATION SOURCE
COMPASS
RF RECEIVER
DISPLAY
547
546

Fig. 37

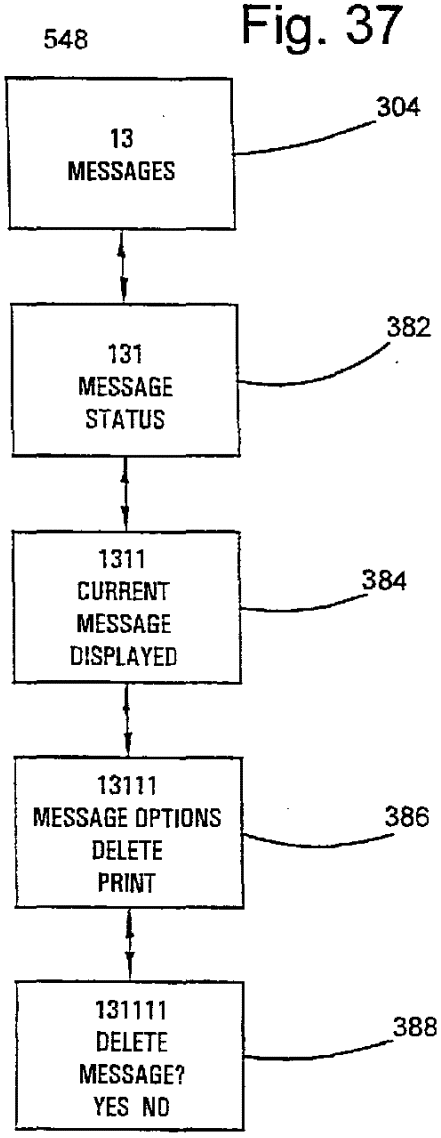

548
13
MESSAGES
304
131
MESSAGE
STATUS
382
1311
CURRENT
MESSAGE
DISPLAYED
384
13111
MESSAGE OPTIONS
DELETE
PRINT
386
131111
DELETE
MESSAGE?
YES NO
388

Fig. 21

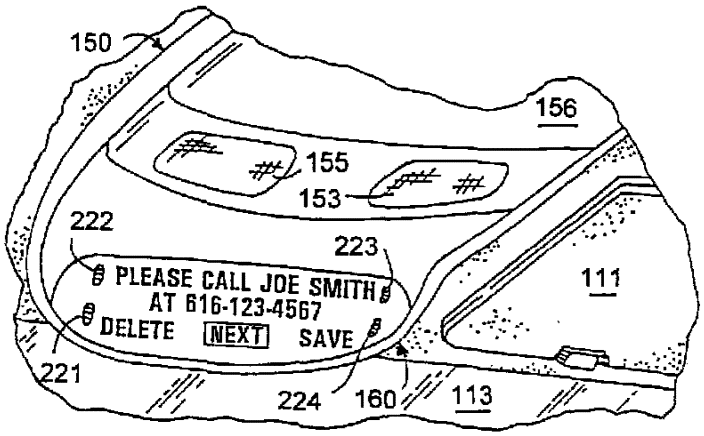


Fig. 22

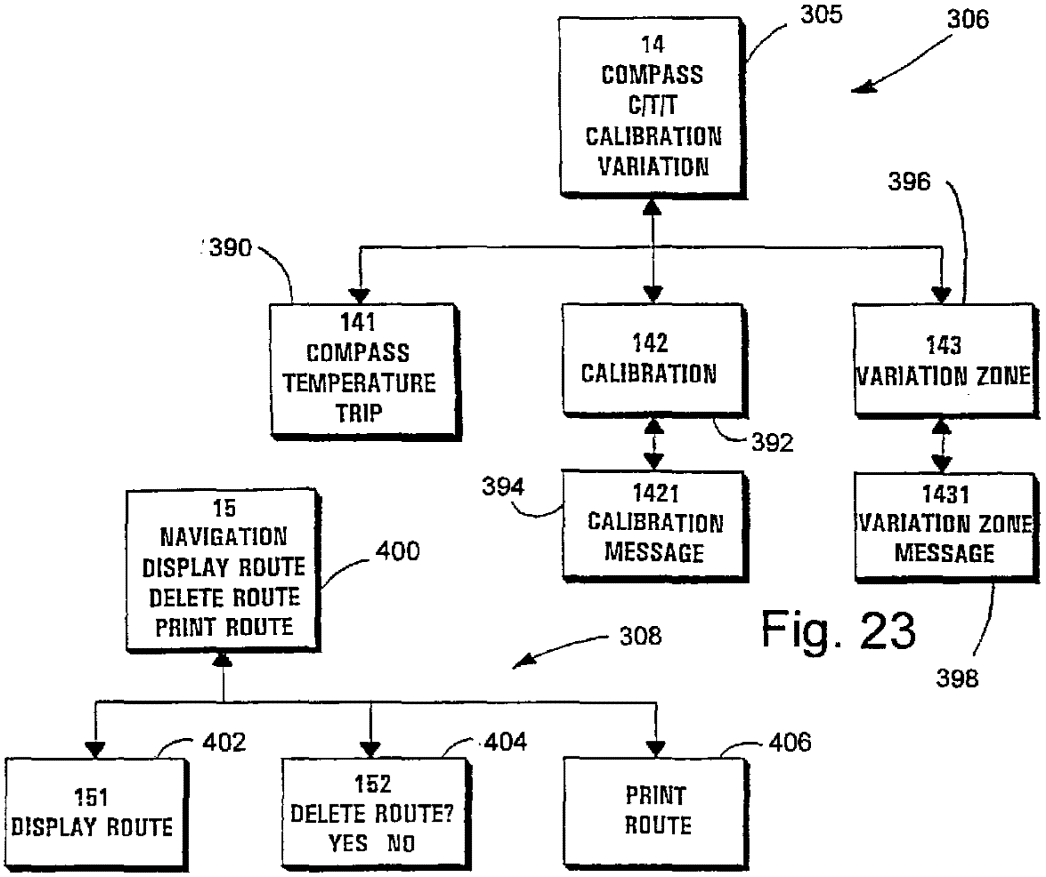


Fig. 23

Fig. 24

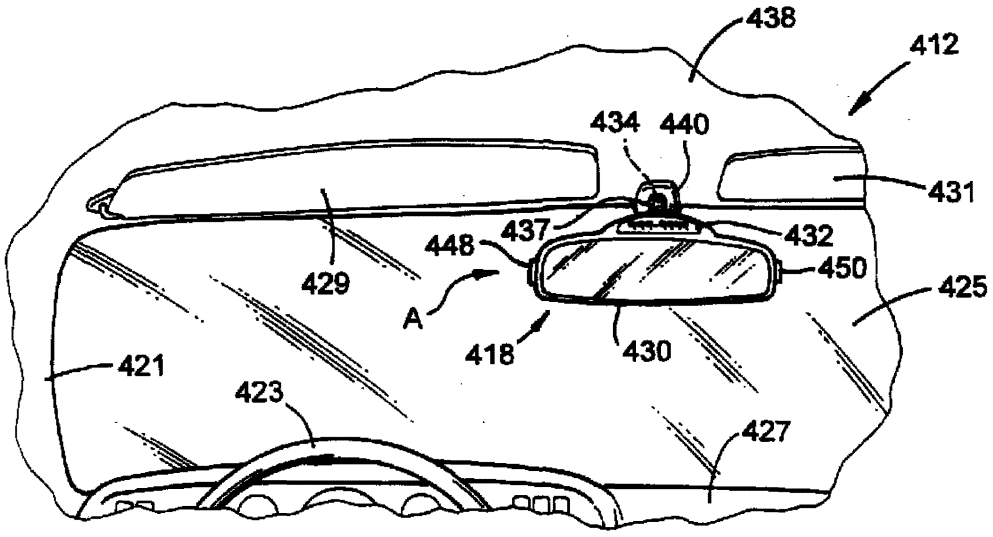

438
412
434
440
431
437
432
448
450
429
425
A
418
430
421
423
427

Fig. 25

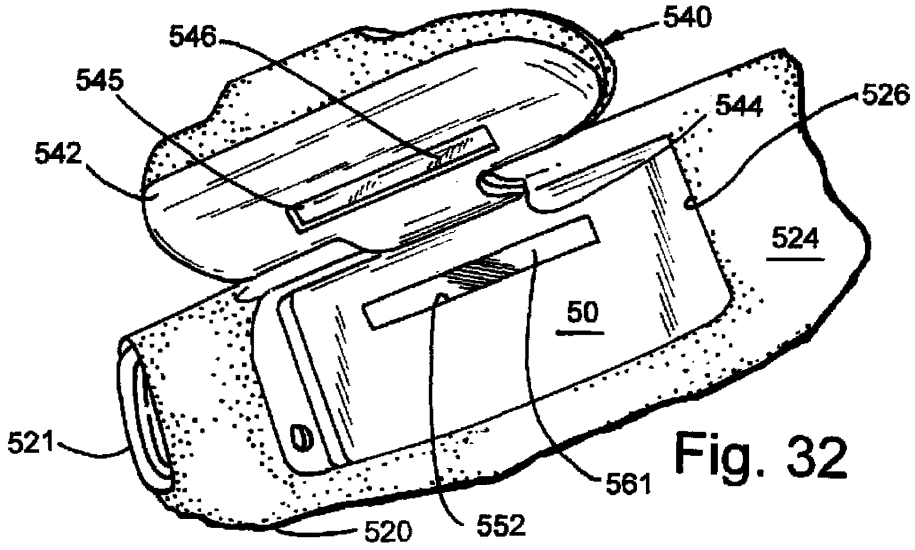
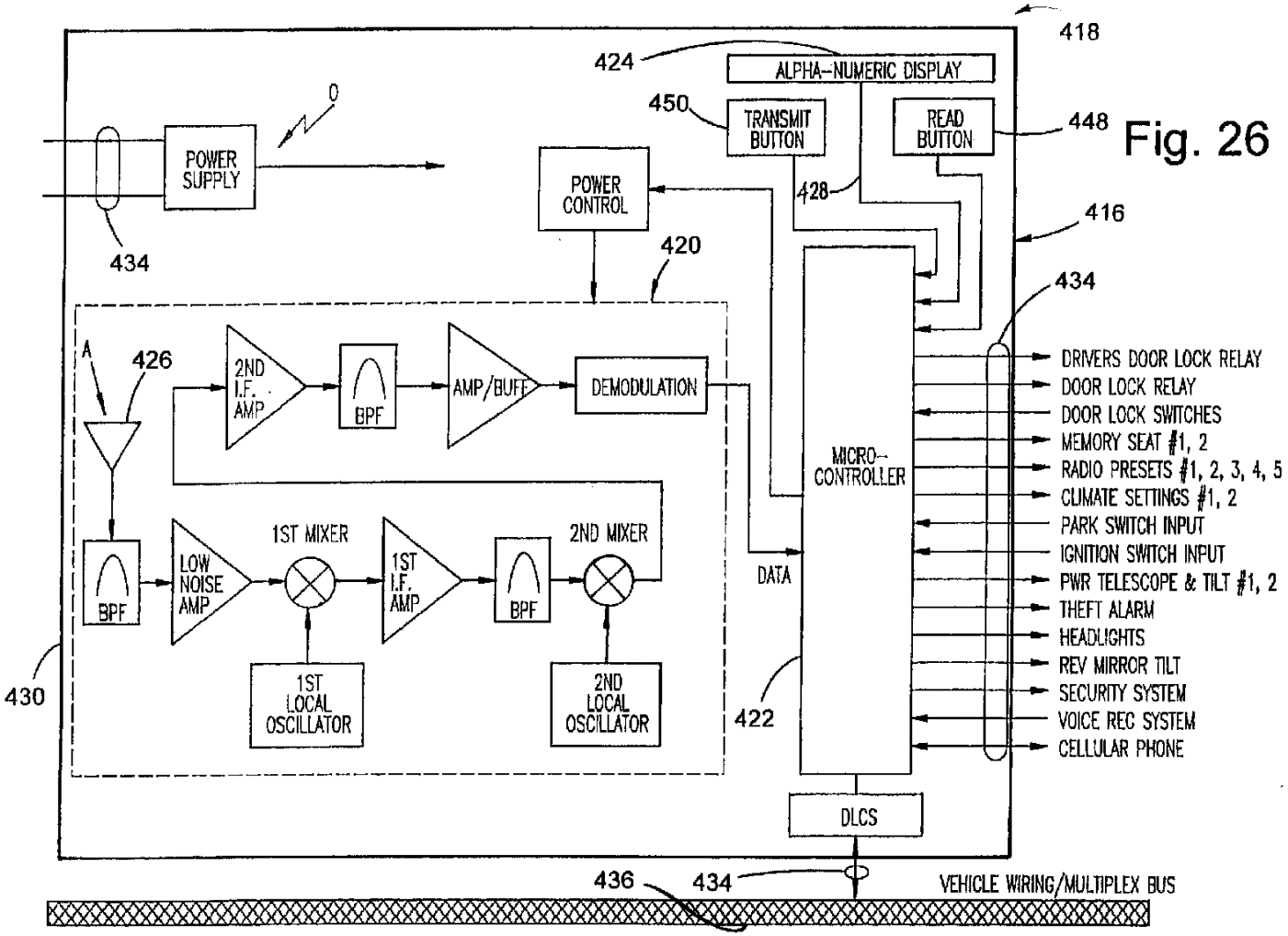

540
546
545
544
526
542
524
50
521
561
520
552

Fig. 32


418
424
ALPHA-NUMERIC DISPLAY
450
TRANSMIT BUTTON
READ BUTTON
448
Fig. 26
POWER SUPPLY
POWER CONTROL
428
416
434
420
434
A
426
2ND I.F. AMP
BPF
AMP/BUFF
DEMODULATION
DRIVERS DOOR LOCK RELAY
DOOR LOCK RELAY
DOOR LOCK SWITCHES
MEMORY SEAT #1, 2
RADIO PRESETS #1, 2, 3, 4, 5
CLIMATE SETTINGS #1, 2
PARK SWITCH INPUT
IGNITION SWITCH INPUT
PWR TELESCOPE & TILT #1, 2
THEFT ALARM
HEADLIGHTS
REV MIRROR TILT
SECURITY SYSTEM
VOICE REC SYSTEM
CELLULAR PHONE
MICRO-CONTROLLER
1ST MIXER
2ND MIXER
LOW NOISE AMP
1ST I.F. AMP
BPF
BPF
DATA
430
1ST LOCAL OSCILLATOR
2ND LOCAL OSCILLATOR
422
DLCS
436
434
VEHICLE WIRING/MULTIPLEX BUS

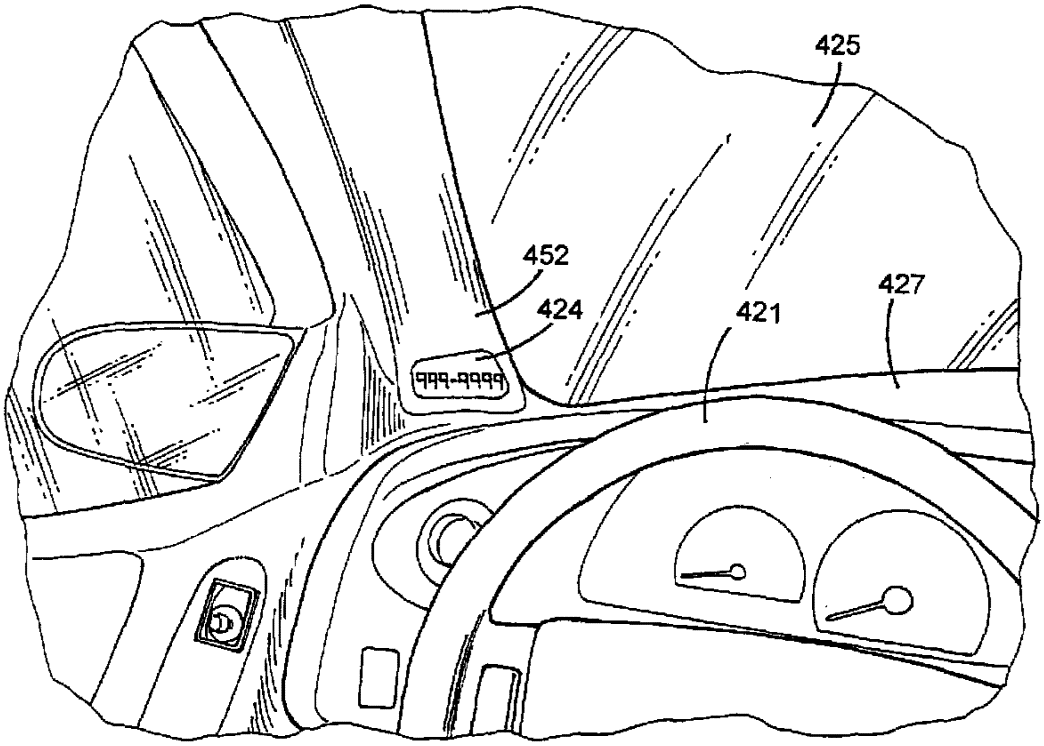

425
452
424
427
421
999-9999

Fig. 27

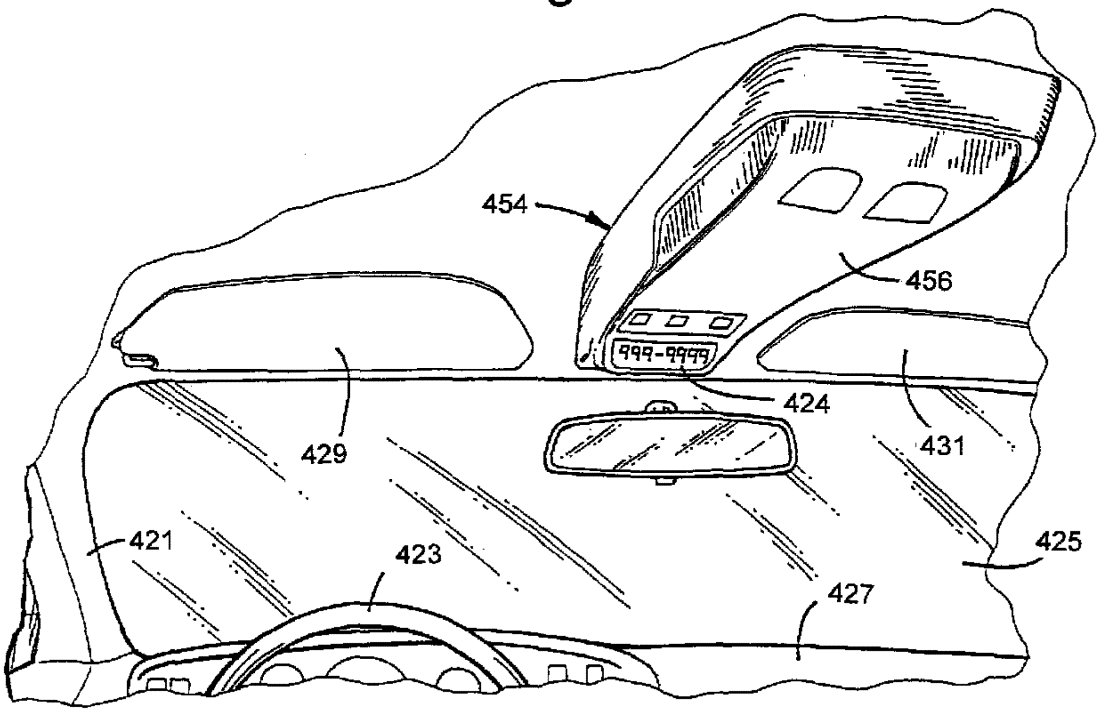

454
456
999-9999
424
429
431
421
423
425
427

Fig. 28

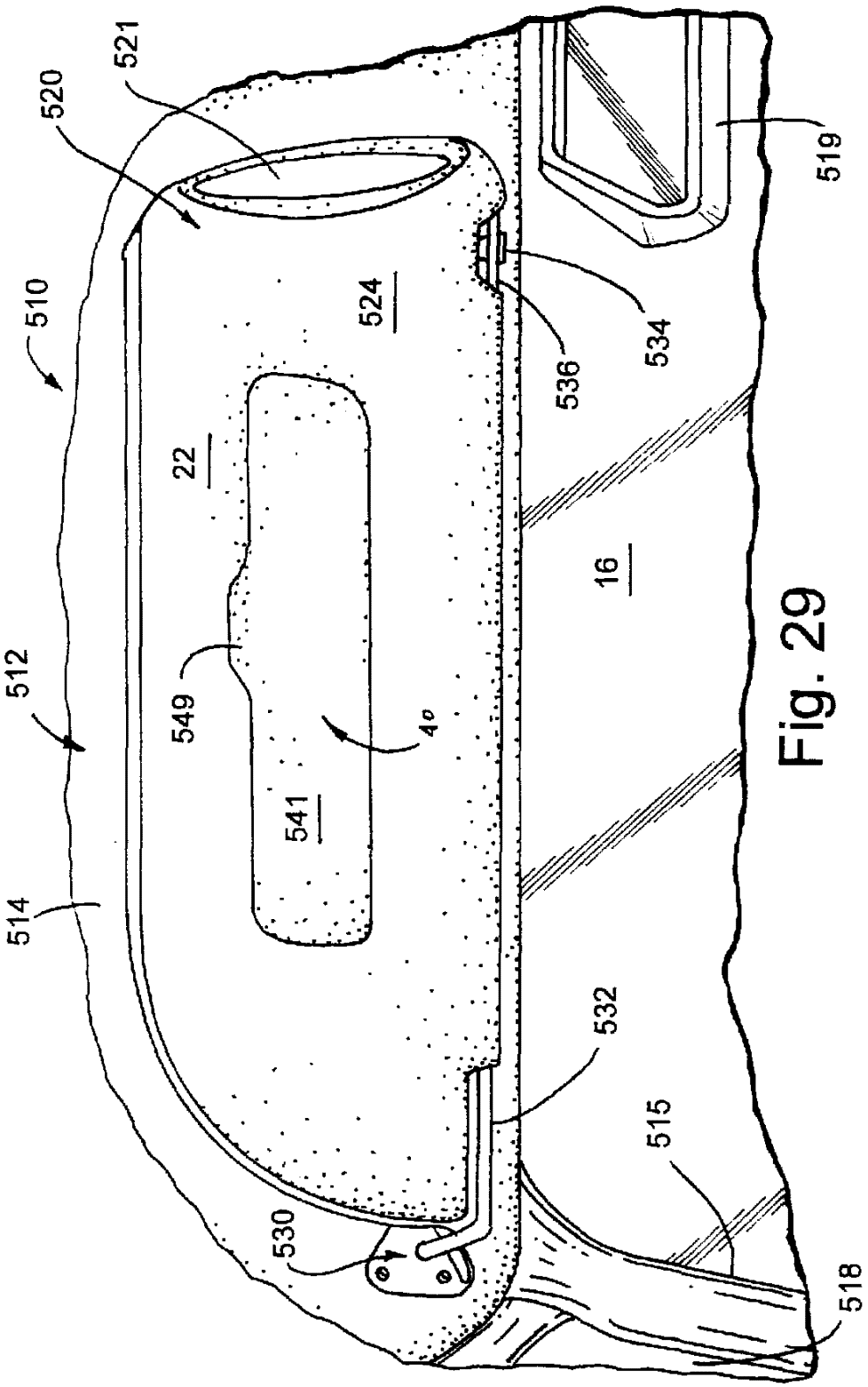

521
520
519
510
524
534
536
22
16
512
549
4°
541
514
532
515
530
518

Fig. 29

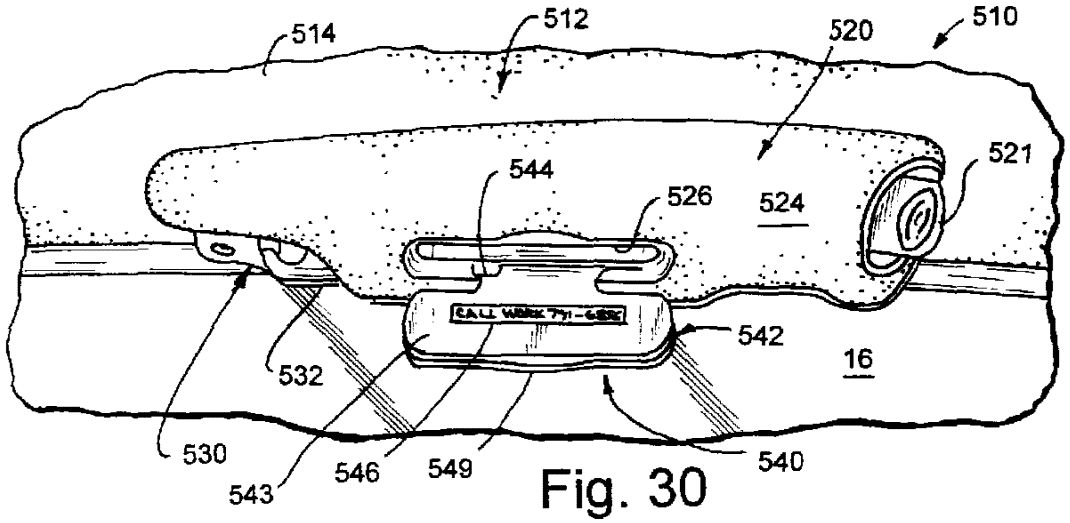


Fig. 30

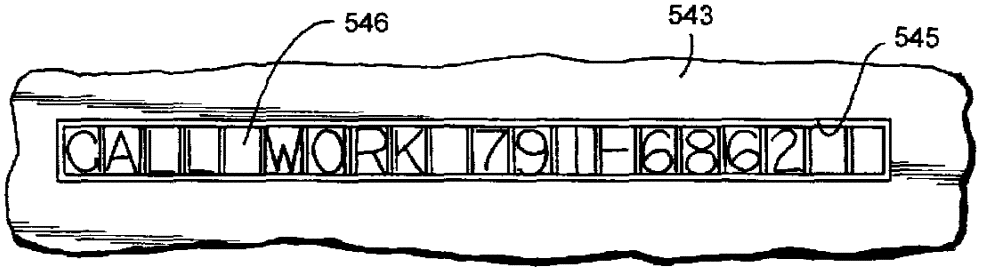


Fig. 30a

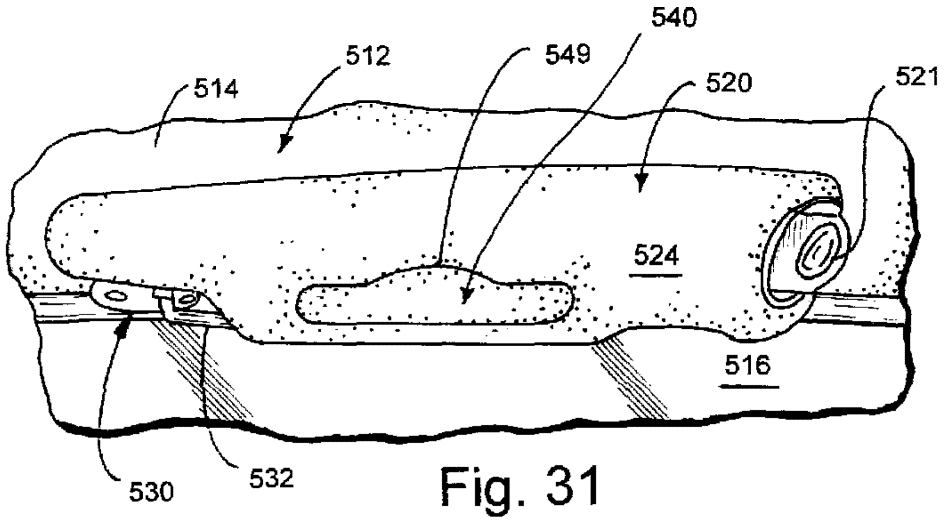


Fig. 31

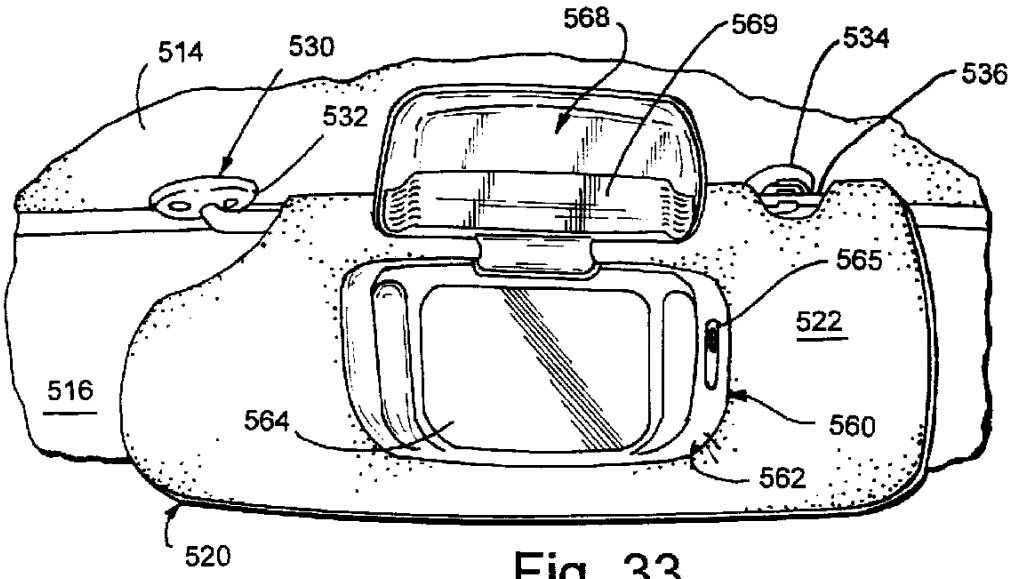

568
569
534
536
514
530
532
565
522
516
564
560
562
520

Fig. 33

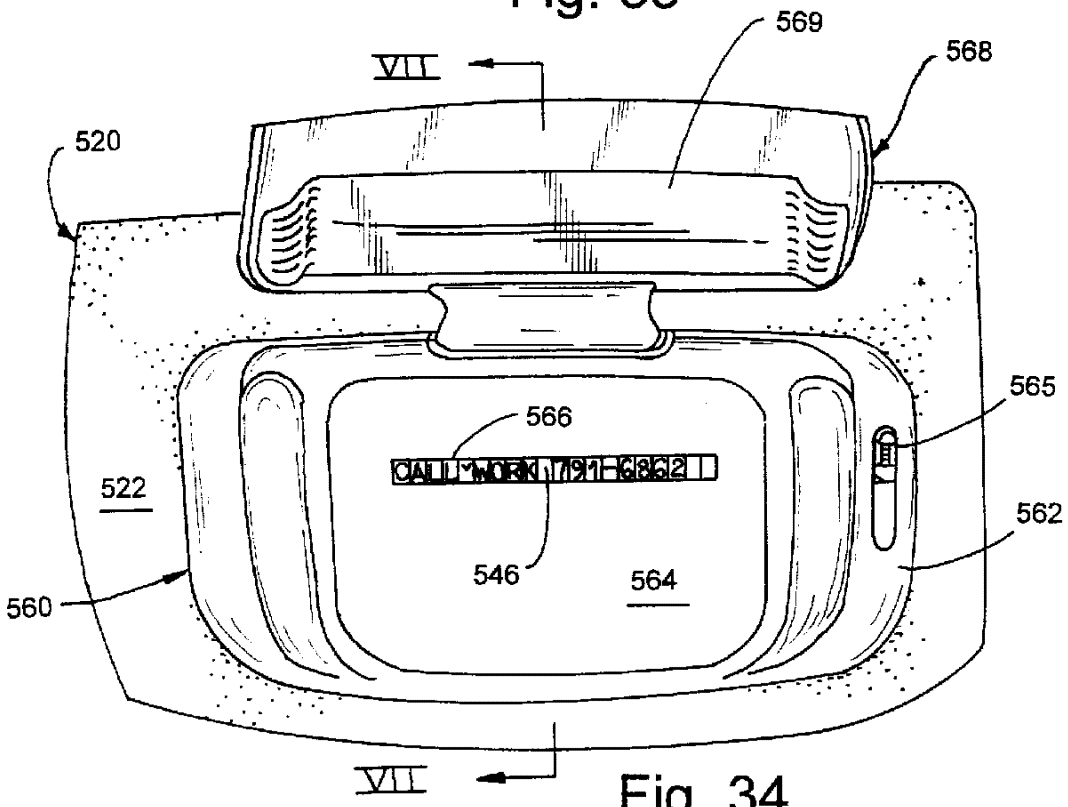

569
568
VII
520
565
566
522
562
546
564
560
VII

Fig. 34

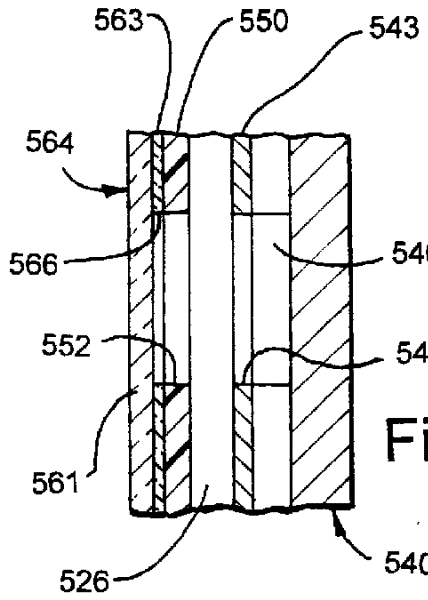

563
550
543
564
566
546
552
545
561
526
540

Fig. 35

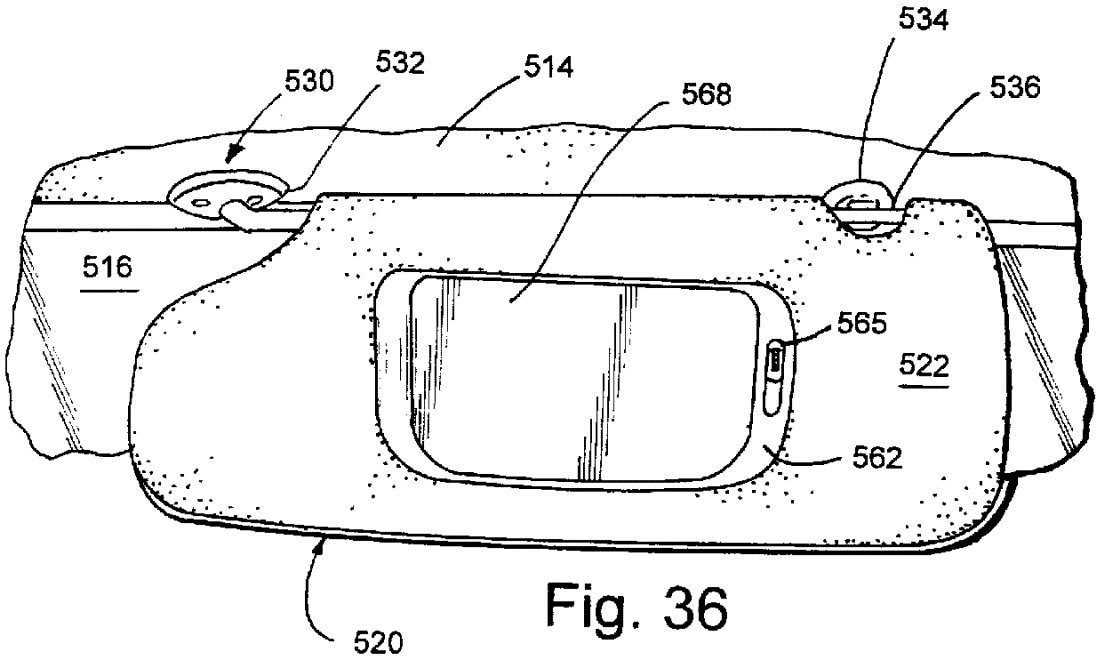

534
530
532
514
568
536
516
565
522
562
520

Fig. 36

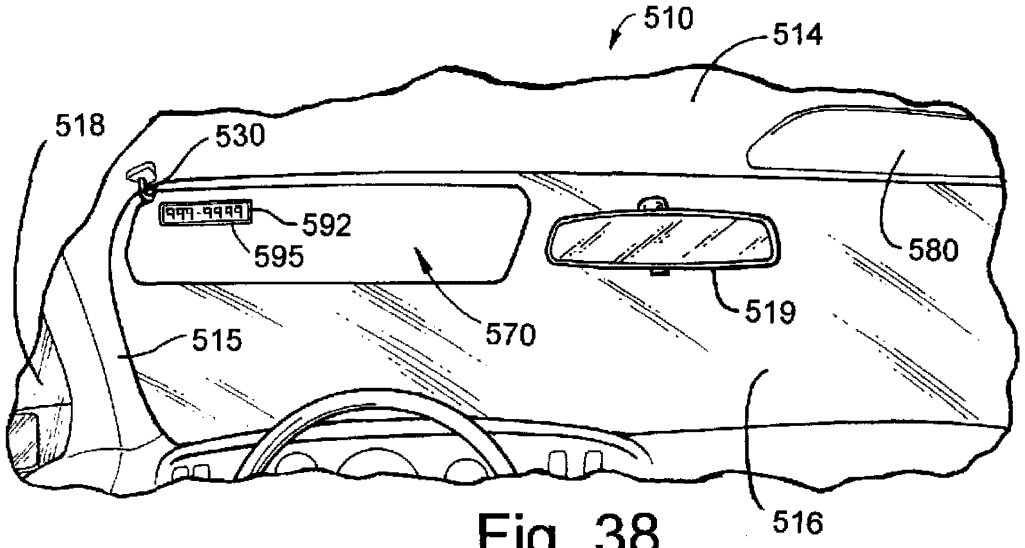


Fig. 38

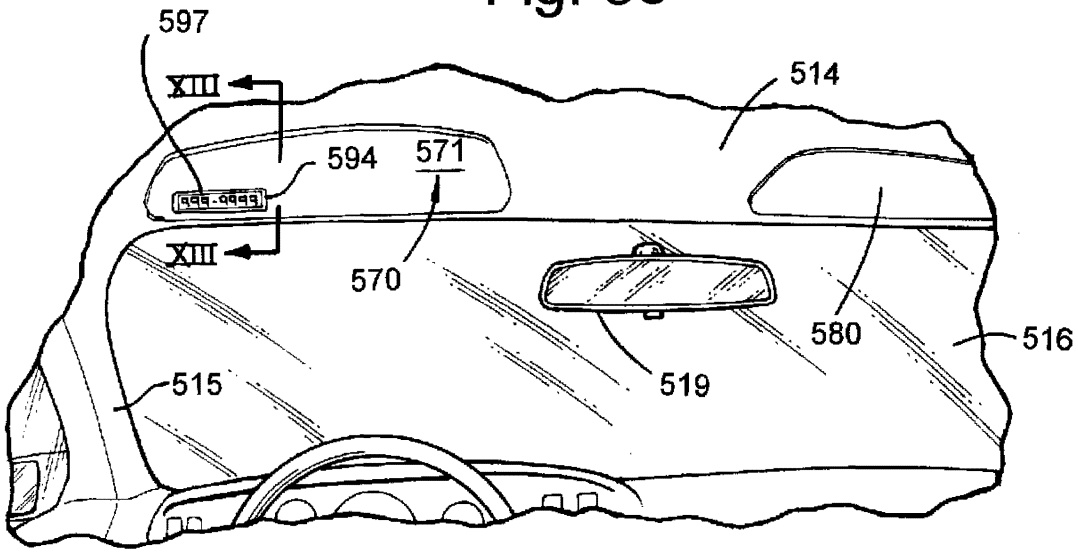


Fig. 39

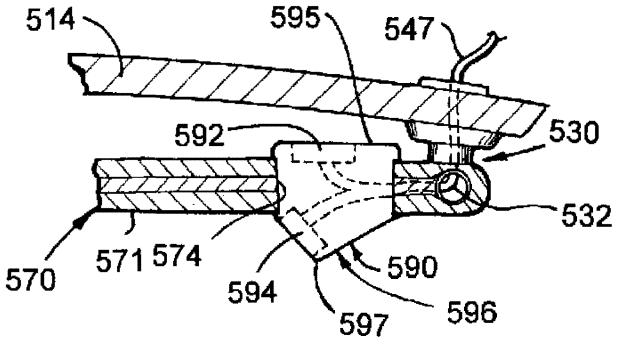


Fig. 40

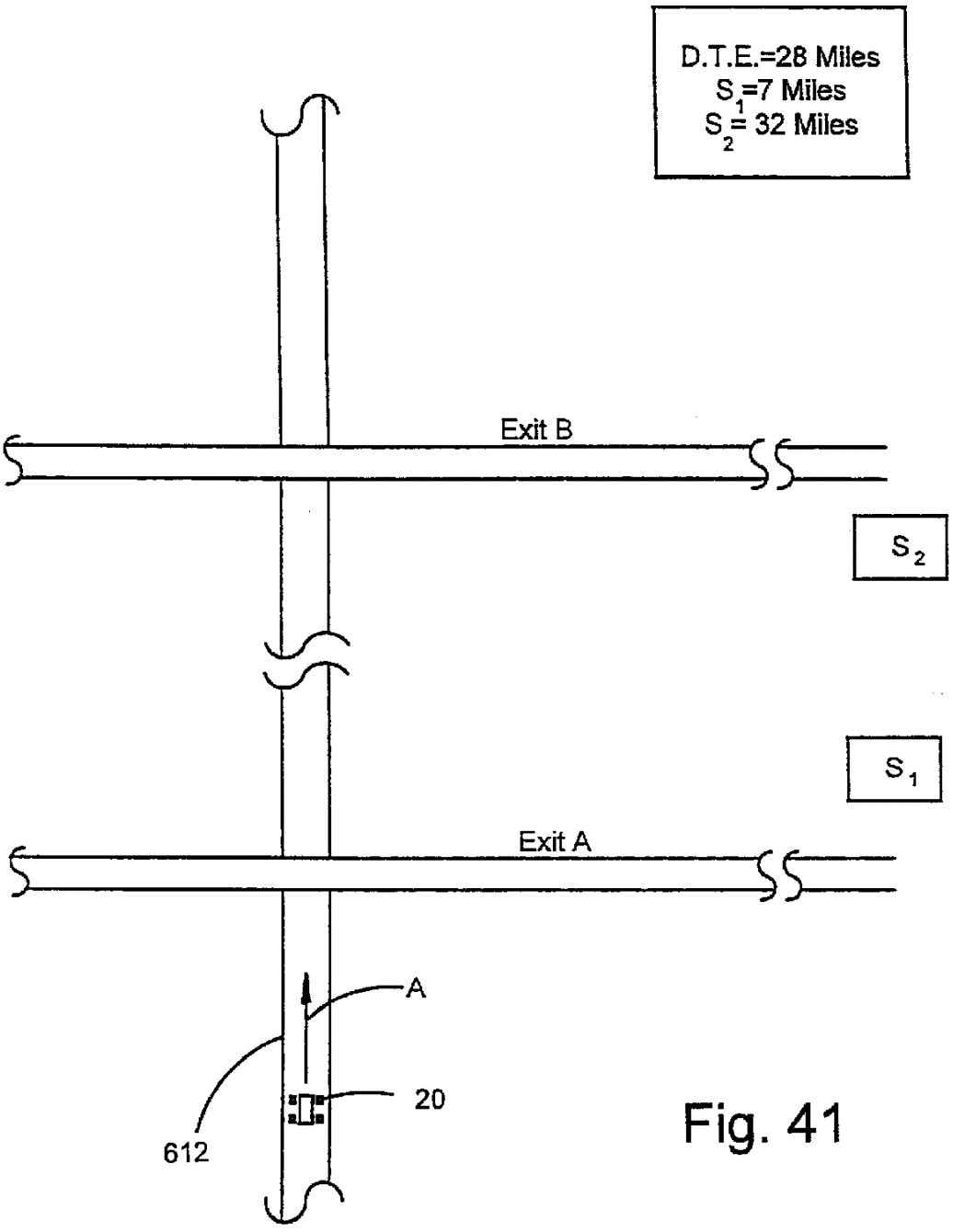


Fig. 41

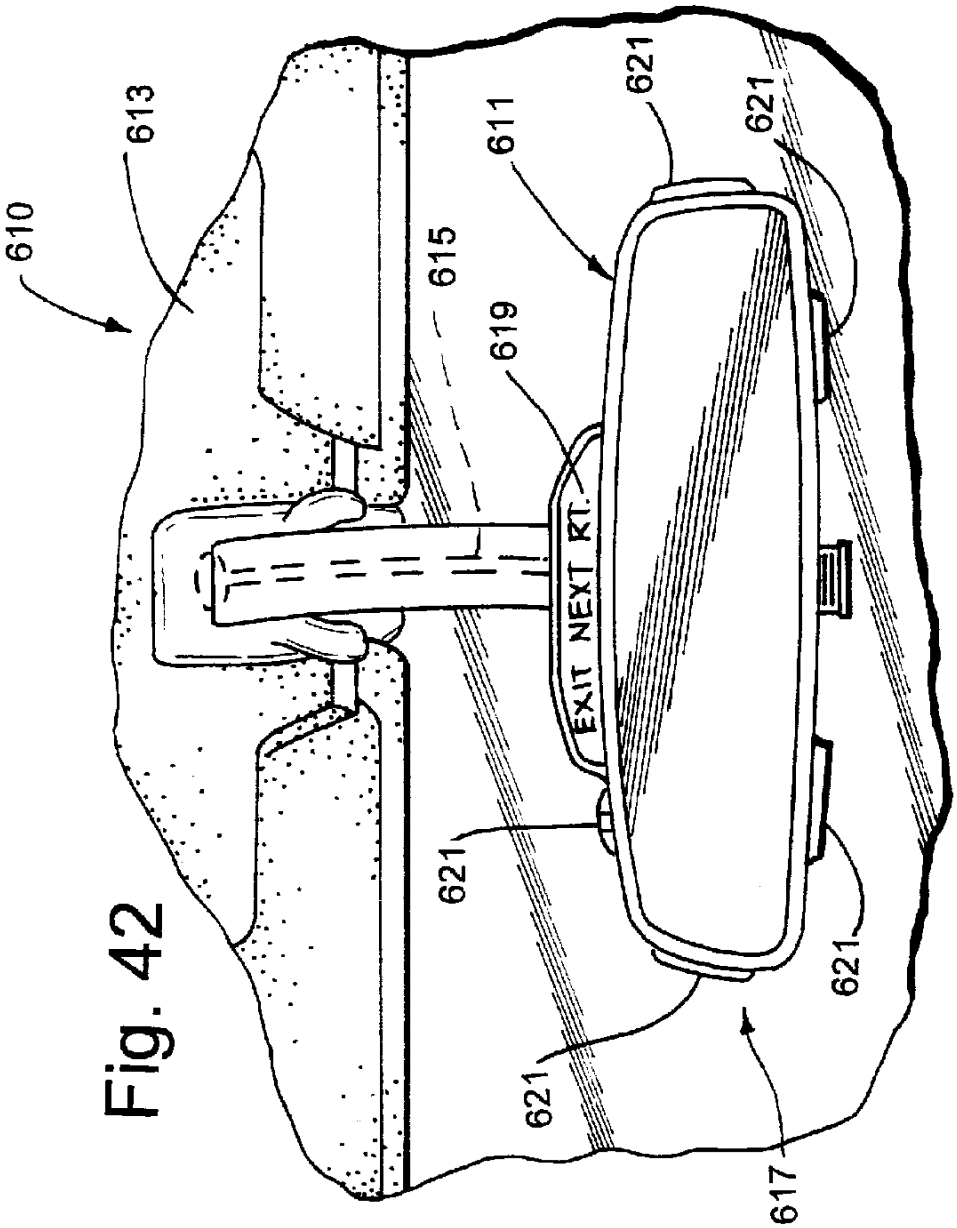
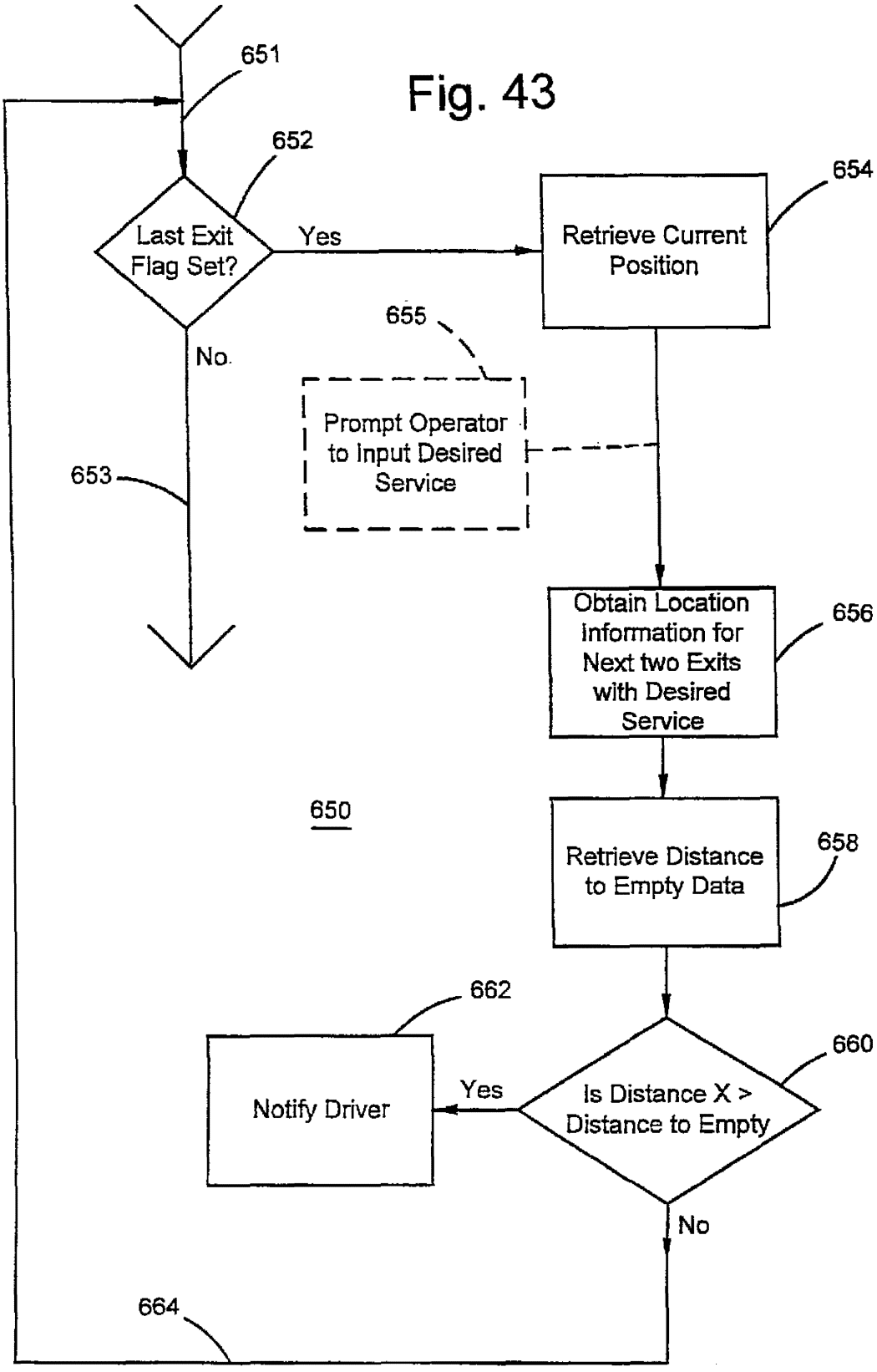


Fig. 42

Fig. 43


651
652
Last Exit Flag Set?
Yes
No
654
Retrieve Current Position
655
Prompt Operator to Input Desired Service
653
Obtain Location Information for Next two Exits with Desired Service
656
650
Retrieve Distance to Empty Data
658
662
Notify Driver
Yes
660
Is Distance X > Distance to Empty
No
664

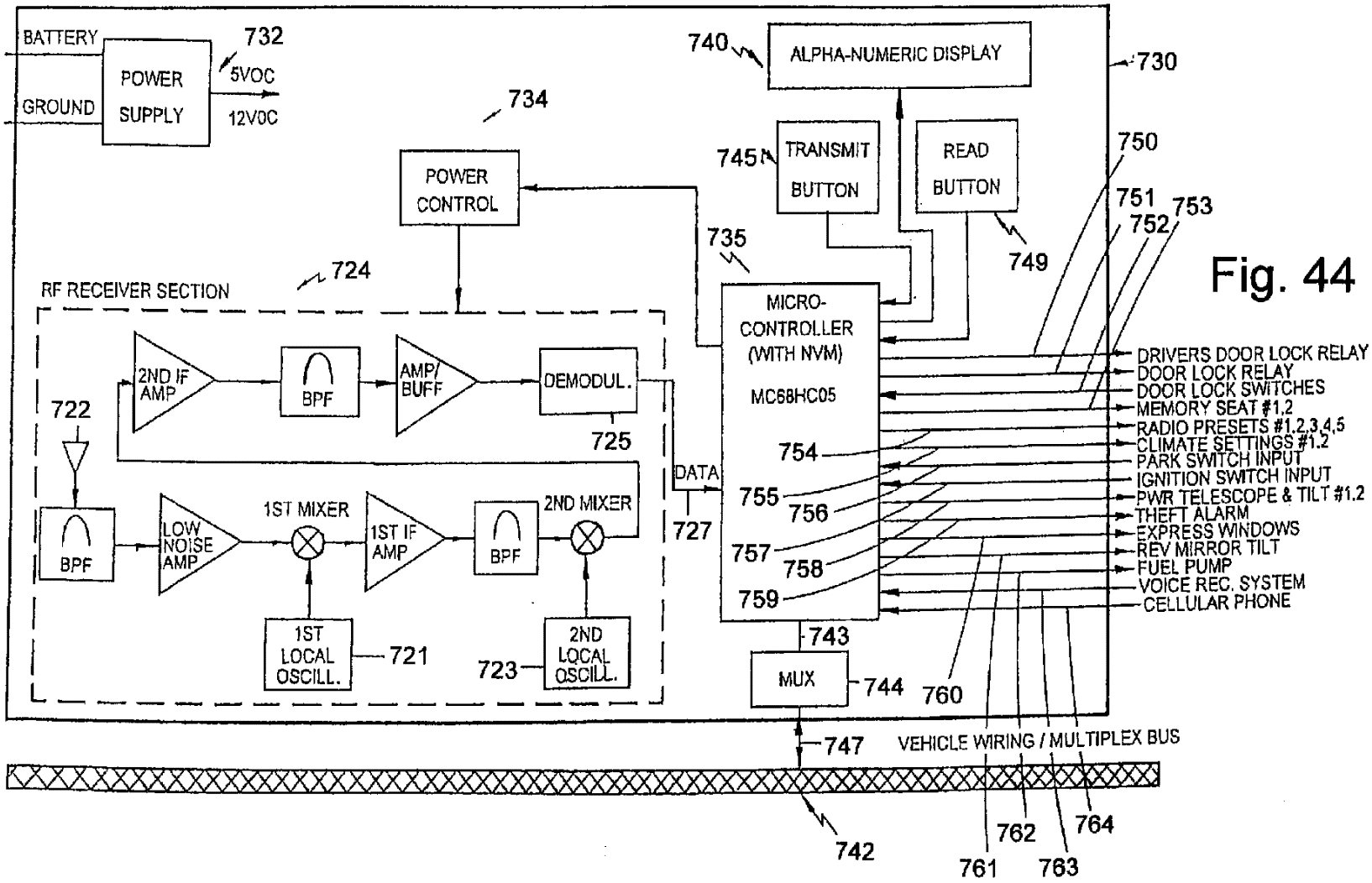
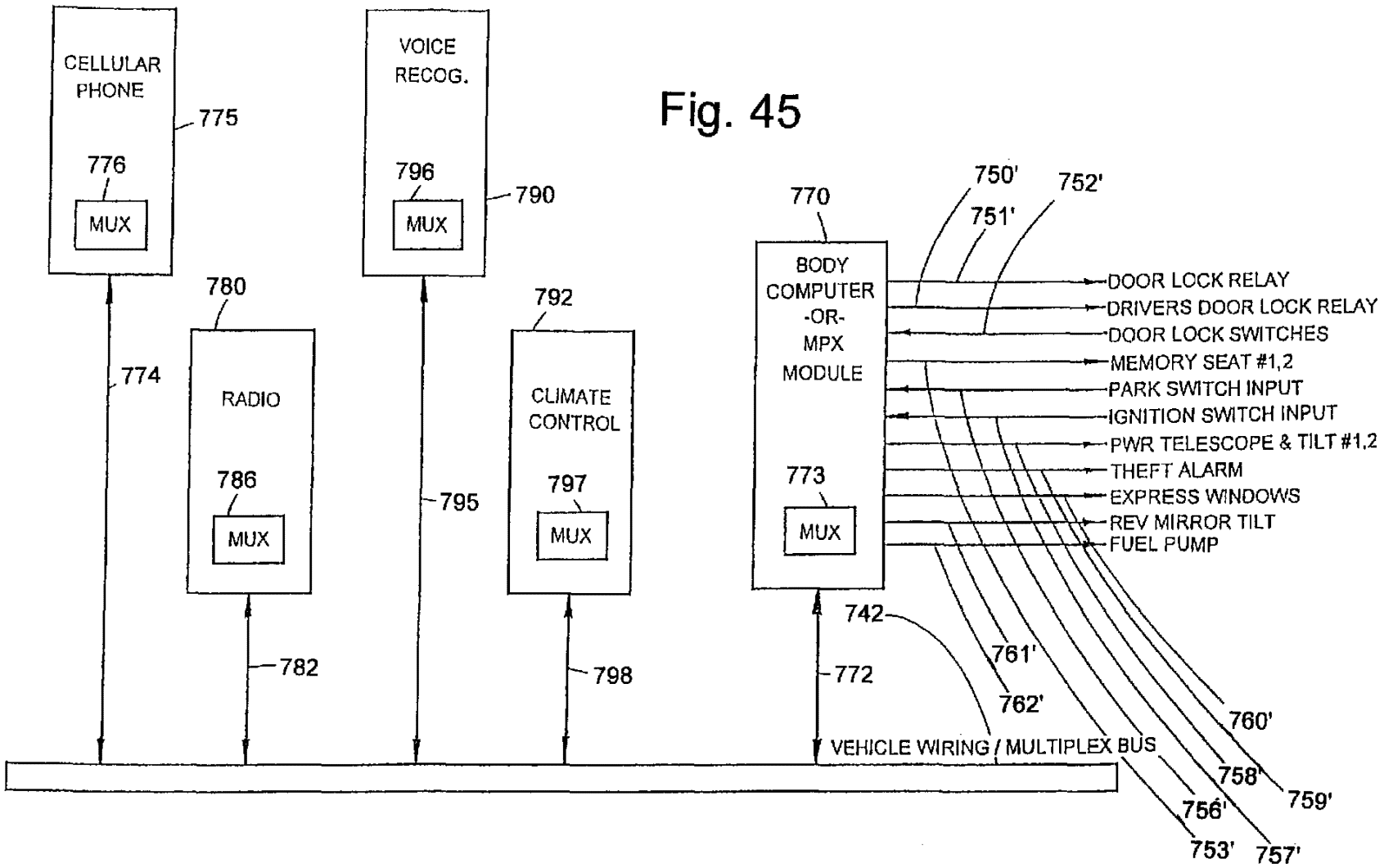

BATTERY
GROUND
POWER SUPPLY
732
5VOC
12VOC
734
740
ALPHA-NUMERIC DISPLAY
730
745
TRANSMIT BUTTON
READ BUTTON
749
750
751
752
753
POWER CONTROL
735
724
RF RECEIVER SECTION
MICRO-CONTROLLER (WITH NVM)
MC68HC05
722
2ND IF AMP
BPF
AMP/ BUFF
DEMODUL.
725
DATA
727
754
755
756
757
758
759
BPF
LOW NOISE AMP
1ST MIXER
1ST IF AMP
BPF
2ND MIXER
1ST LOCAL OSCILL.
721
2ND LOCAL OSCILL.
723
743
MUX
744
760
747
VEHICLE WIRING / MULTIPLEX BUS
742
761
762
763
764
DRIVERS DOOR LOCK RELAY
DOOR LOCK RELAY
DOOR LOCK SWITCHES
MEMORY SEAT #1,2
RADIO PRESETS #1,2,3,4,5
CLIMATE SETTINGS #1,2
PARK SWITCH INPUT
IGNITION SWITCH INPUT
PWR TELESCOPE & TILT #1,2
THEFT ALARM
EXPRESS WINDOWS
REV MIRROR TILT
FUEL PUMP
VOICE REC. SYSTEM
CELLULAR PHONE

Fig. 44

Fig. 45


CELLULAR PHONE
775
776
MUX
VOICE RECOG.
796
MUX
790
780
RADIO
786
MUX
792
CLIMATE CONTROL
797
MUX
770
BODY COMPUTER -OR- MPX MODULE
773
MUX
750'
751'
752'
DOOR LOCK RELAY
DRIVERS DOOR LOCK RELAY
DOOR LOCK SWITCHES
MEMORY SEAT #1,2
PARK SWITCH INPUT
IGNITION SWITCH INPUT
PWR TELESCOPE & TILT #1,2
THEFT ALARM
EXPRESS WINDOWS
REV MIRROR TILT
FUEL PUMP
774
795
782
798
772
742
761'
762'
760'
758'
759'
756'
753'
757'
VEHICLE WIRING / MULTIPLEX BUS

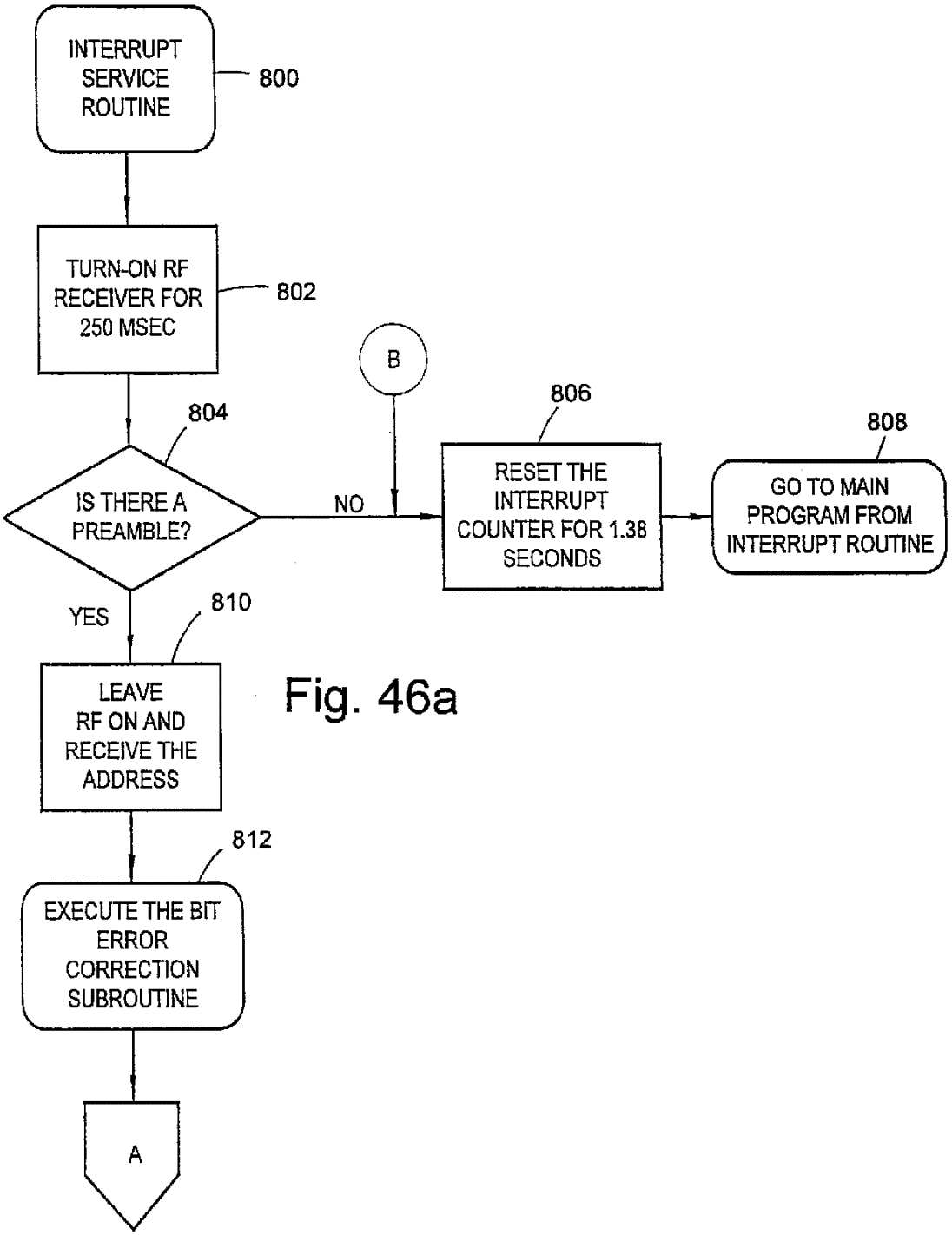

INTERRUPT SERVICE ROUTINE
800
TURN-ON RF RECEIVER FOR 250 MSEC
802
B
804
806
808
IS THERE A PREAMBLE?
NO
RESET THE INTERRUPT COUNTER FOR 1.38 SECONDS
GO TO MAIN PROGRAM FROM INTERRUPT ROUTINE
YES
810
LEAVE RF ON AND RECEIVE THE ADDRESS
812
EXECUTE THE BIT ERROR CORRECTION SUBROUTINE
A

Fig. 46a

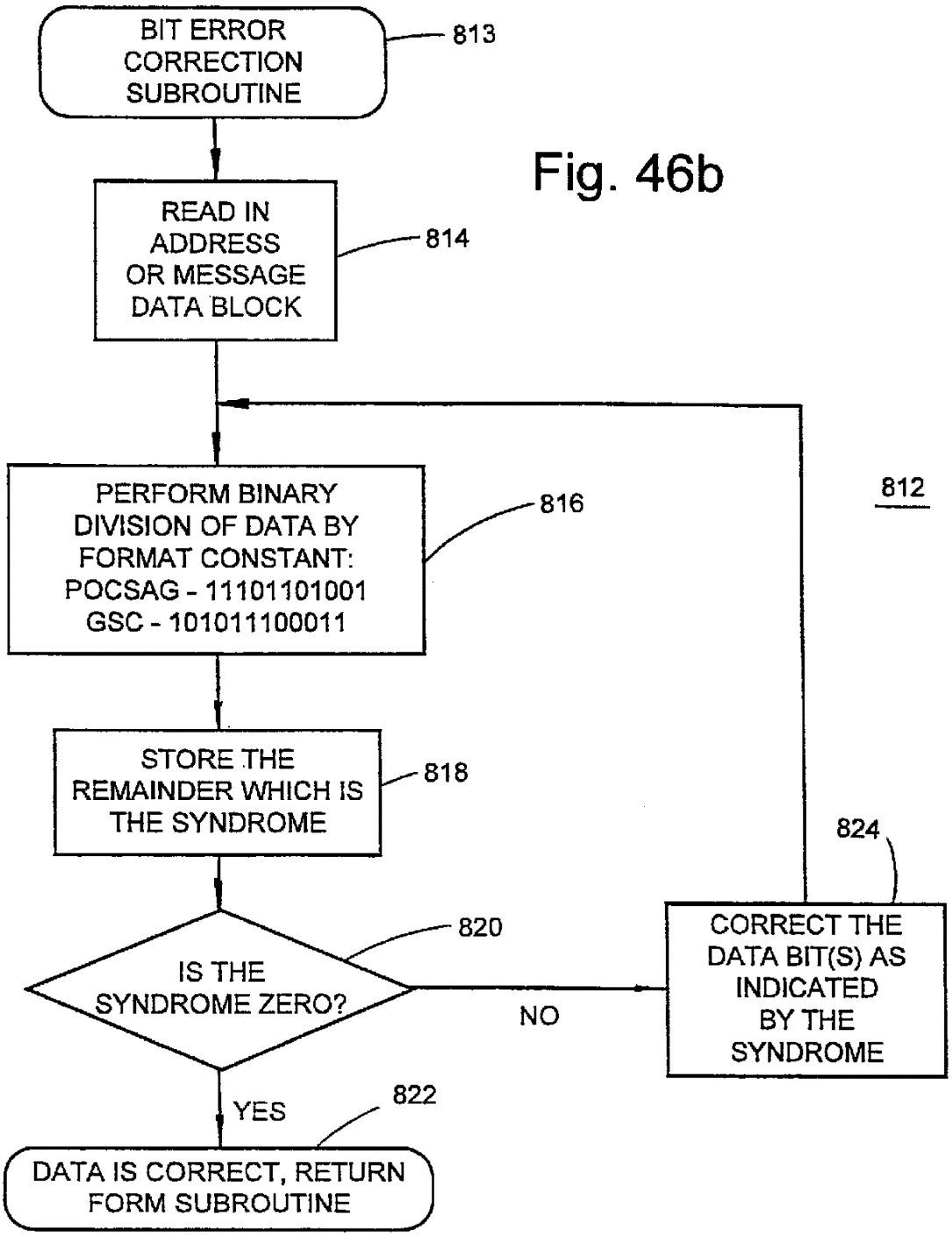

BIT ERROR CORRECTION SUBROUTINE
813
READ IN ADDRESS OR MESSAGE DATA BLOCK
814
PERFORM BINARY DIVISION OF DATA BY FORMAT CONSTANT: POCSAG - 11101101001 GSC - 101011100011
816
812
STORE THE REMAINDER WHICH IS THE SYNDROME
818
824
IS THE SYNDROME ZERO?
820
NO
CORRECT THE DATA BIT(S) AS INDICATED BY THE SYNDROME
YES
822
DATA IS CORRECT, RETURN FORM SUBROUTINE

Fig. 46b

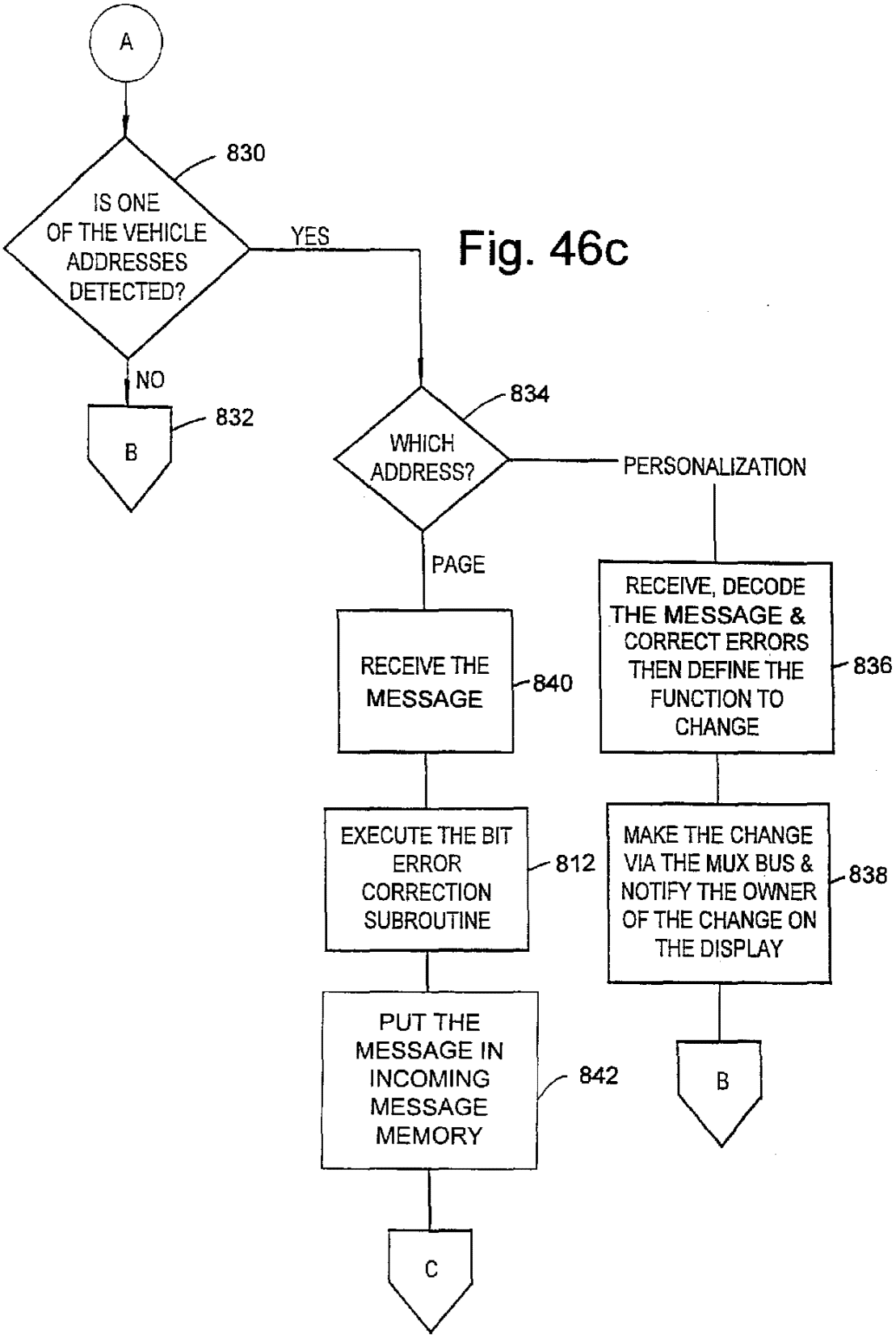

A
830
IS ONE OF THE VEHICLE ADDRESSES DETECTED?
YES
NO
B
832
834
WHICH ADDRESS?
PERSONALIZATION
PAGE
RECEIVE THE MESSAGE
840
RECEIVE, DECODE THE MESSAGE & CORRECT ERRORS THEN DEFINE THE FUNCTION TO CHANGE
836
EXECUTE THE BIT ERROR CORRECTION SUBROUTINE
812
MAKE THE CHANGE VIA THE MUX BUS & NOTIFY THE OWNER OF THE CHANGE ON THE DISPLAY
838
PUT THE MESSAGE IN INCOMING MESSAGE MEMORY
842
B
C

Fig. 46c

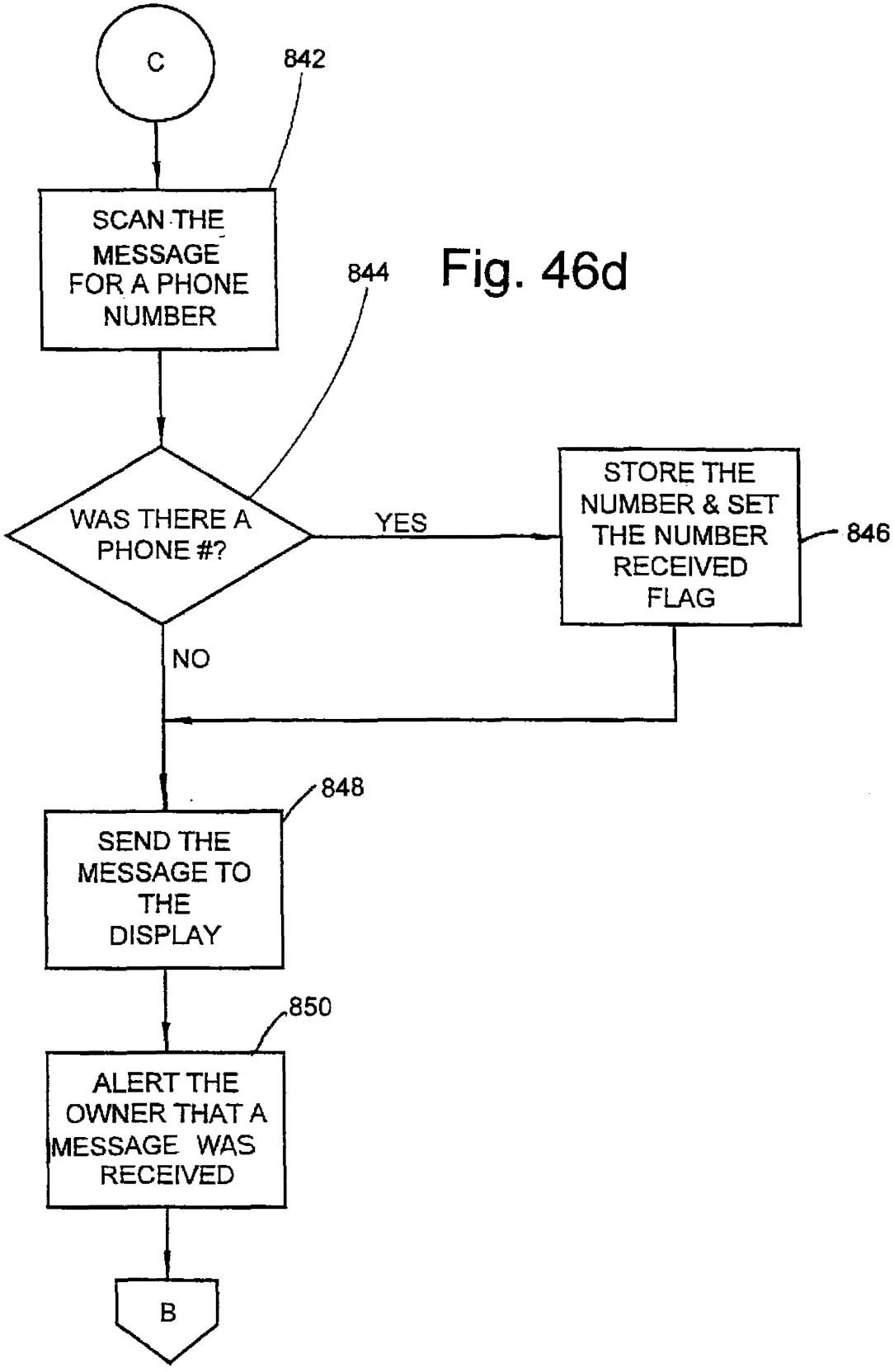

C
842
SCAN THE MESSAGE FOR A PHONE NUMBER
844
WAS THERE A PHONE #?
YES
STORE THE NUMBER & SET THE NUMBER RECEIVED FLAG
846
NO
848
SEND THE MESSAGE TO THE DISPLAY
850
ALERT THE OWNER THAT A MESSAGE WAS RECEIVED
B

Fig. 46d

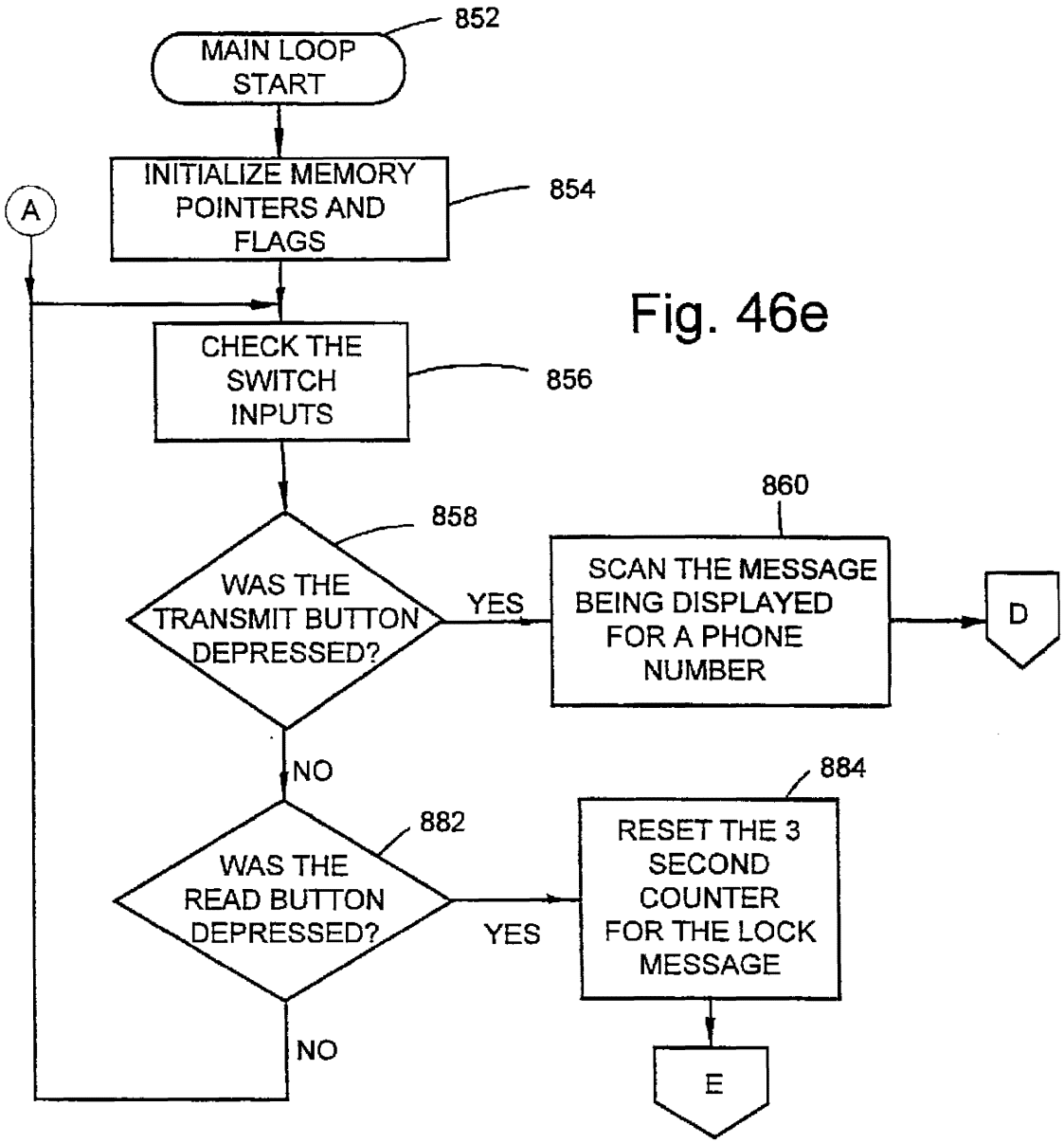
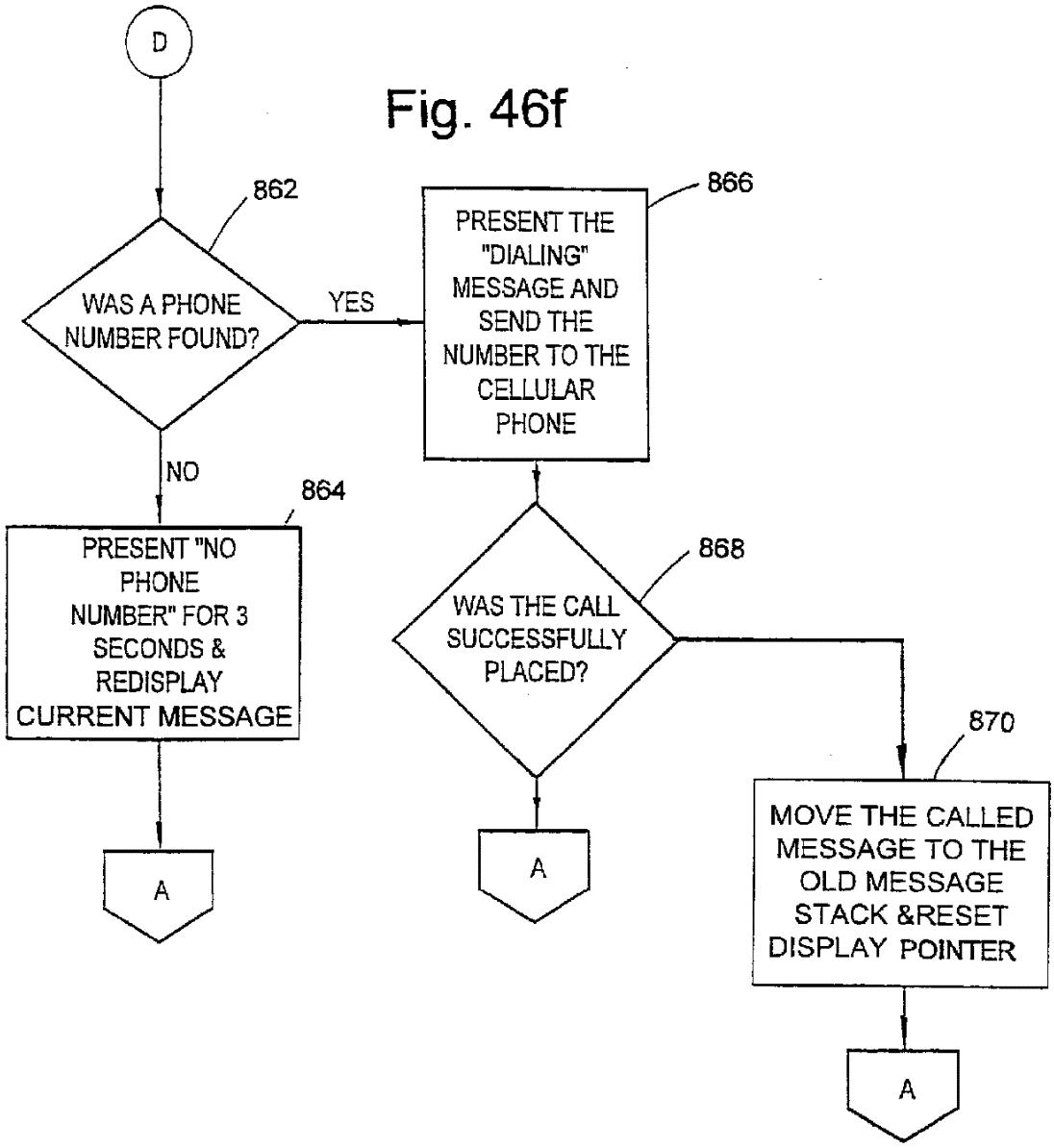

852
MAIN LOOP START
INITIALIZE MEMORY POINTERS AND FLAGS
854
A
CHECK THE SWITCH INPUTS
856
858
WAS THE TRANSMIT BUTTON DEPRESSED?
YES
860
SCAN THE MESSAGE BEING DISPLAYED FOR A PHONE NUMBER
D
NO
882
WAS THE READ BUTTON DEPRESSED?
YES
884
RESET THE 3 SECOND COUNTER FOR THE LOCK MESSAGE
NO
E

Fig. 46e

Fig. 46f


D
862
WAS A PHONE NUMBER FOUND?
YES
NO
866
PRESENT THE "DIALING" MESSAGE AND SEND THE NUMBER TO THE CELLULAR PHONE
864
PRESENT "NO PHONE NUMBER" FOR 3 SECONDS & REDISPLAY CURRENT MESSAGE
868
WAS THE CALL SUCCESSFULLY PLACED?
870
MOVE THE CALLED MESSAGE TO THE OLD MESSAGE STACK &RESET DISPLAY POINTER
A
A
A

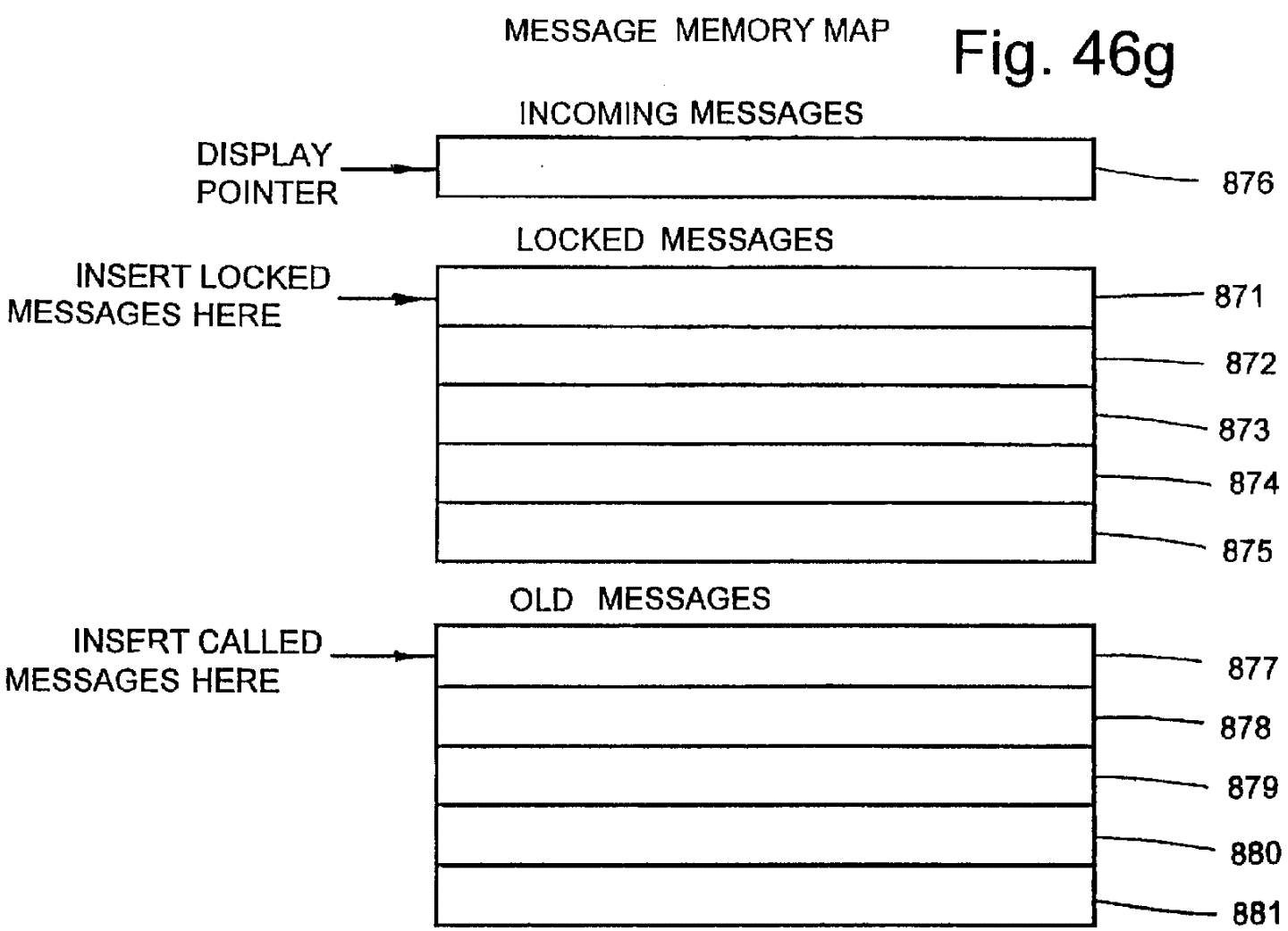
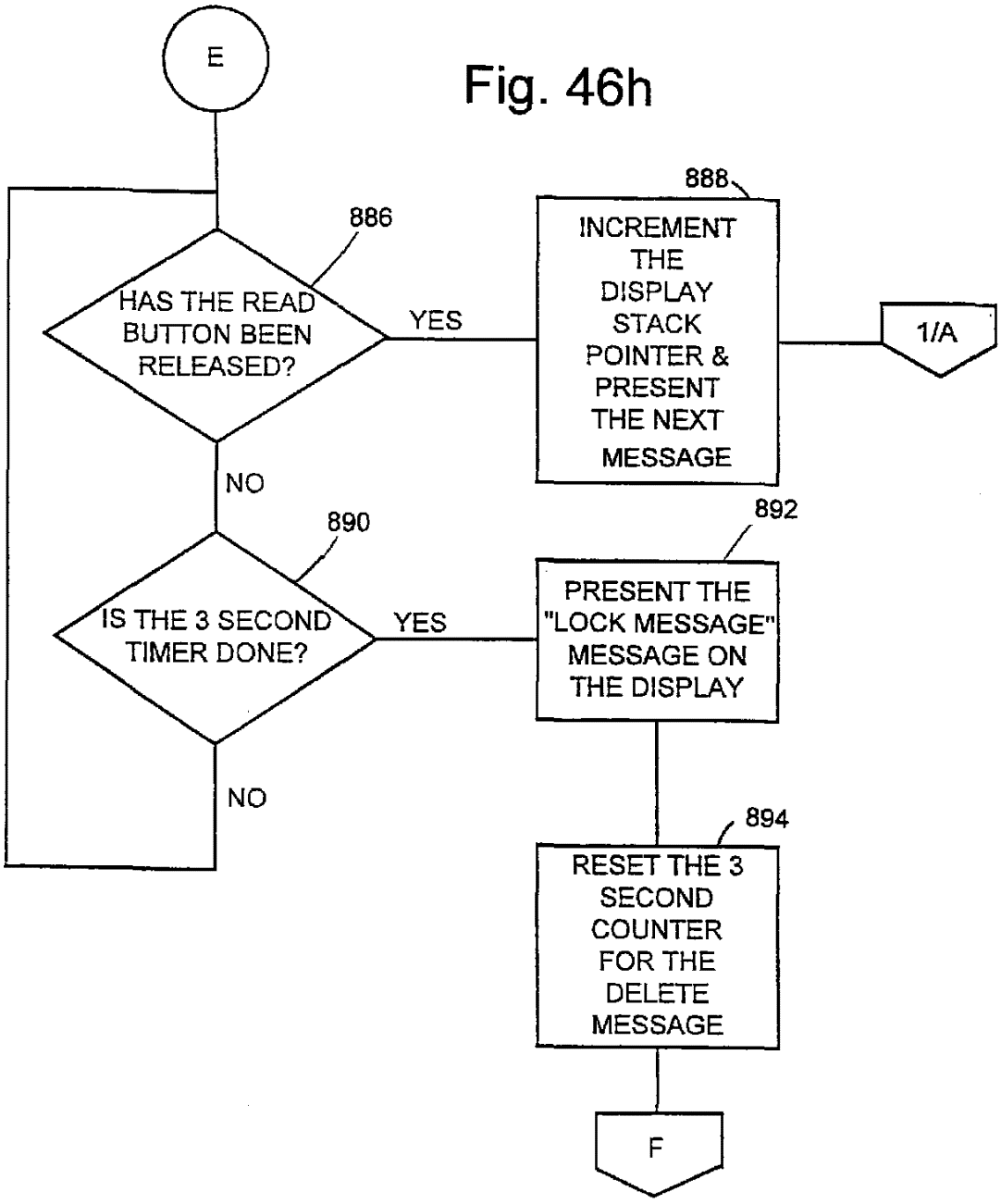

MESSAGE MEMORY MAP
INCOMING MESSAGES
DISPLAY POINTER
876
LOCKED MESSAGES
INSERT LOCKED MESSAGES HERE
871
872
873
874
875
OLD MESSAGES
INSERT CALLED MESSAGES HERE
877
878
879
880
881

Fig. 46g

Fig. 46h


E
886
HAS THE READ BUTTON BEEN RELEASED?
YES
888
INCREMENT THE DISPLAY STACK POINTER & PRESENT THE NEXT MESSAGE
1/A
NO
890
IS THE 3 SECOND TIMER DONE?
YES
892
PRESENT THE "LOCK MESSAGE" MESSAGE ON THE DISPLAY
NO
894
RESET THE 3 SECOND COUNTER FOR THE DELETE MESSAGE
F

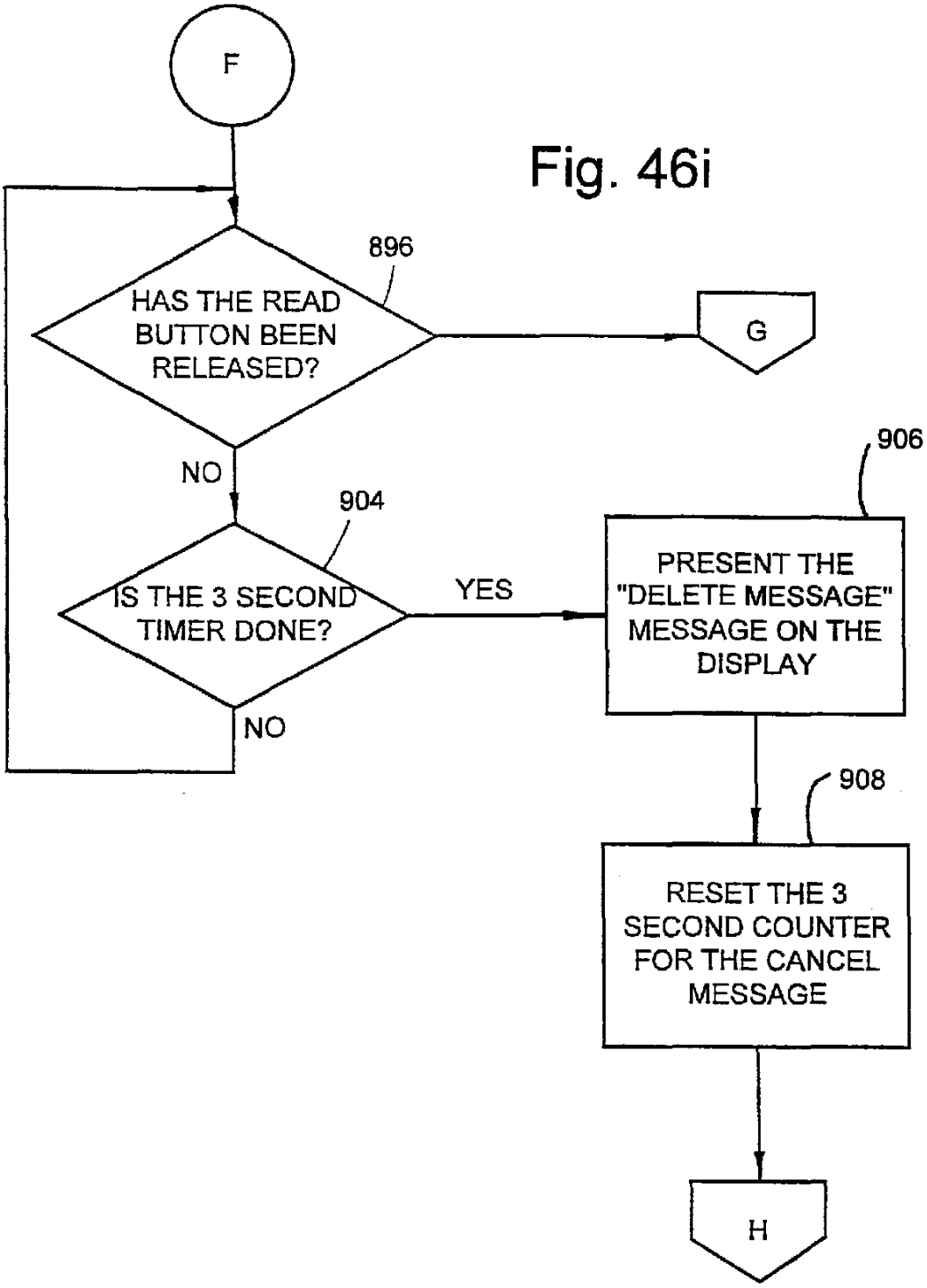

F
896
HAS THE READ BUTTON BEEN RELEASED?
G
NO
904
IS THE 3 SECOND TIMER DONE?
YES
906
PRESENT THE "DELETE MESSAGE" MESSAGE ON THE DISPLAY
NO
908
RESET THE 3 SECOND COUNTER FOR THE CANCEL MESSAGE
H

Fig. 46i

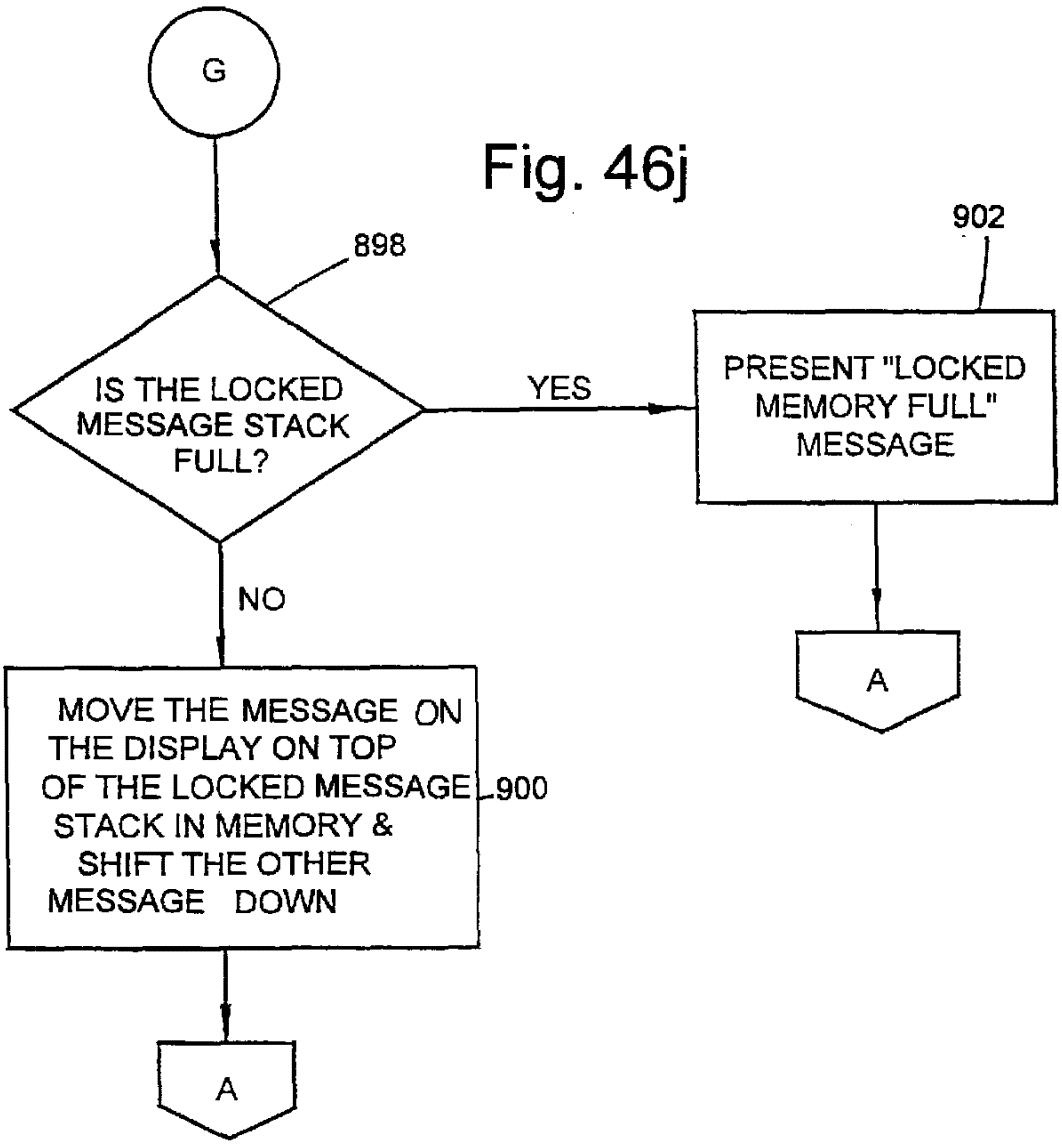
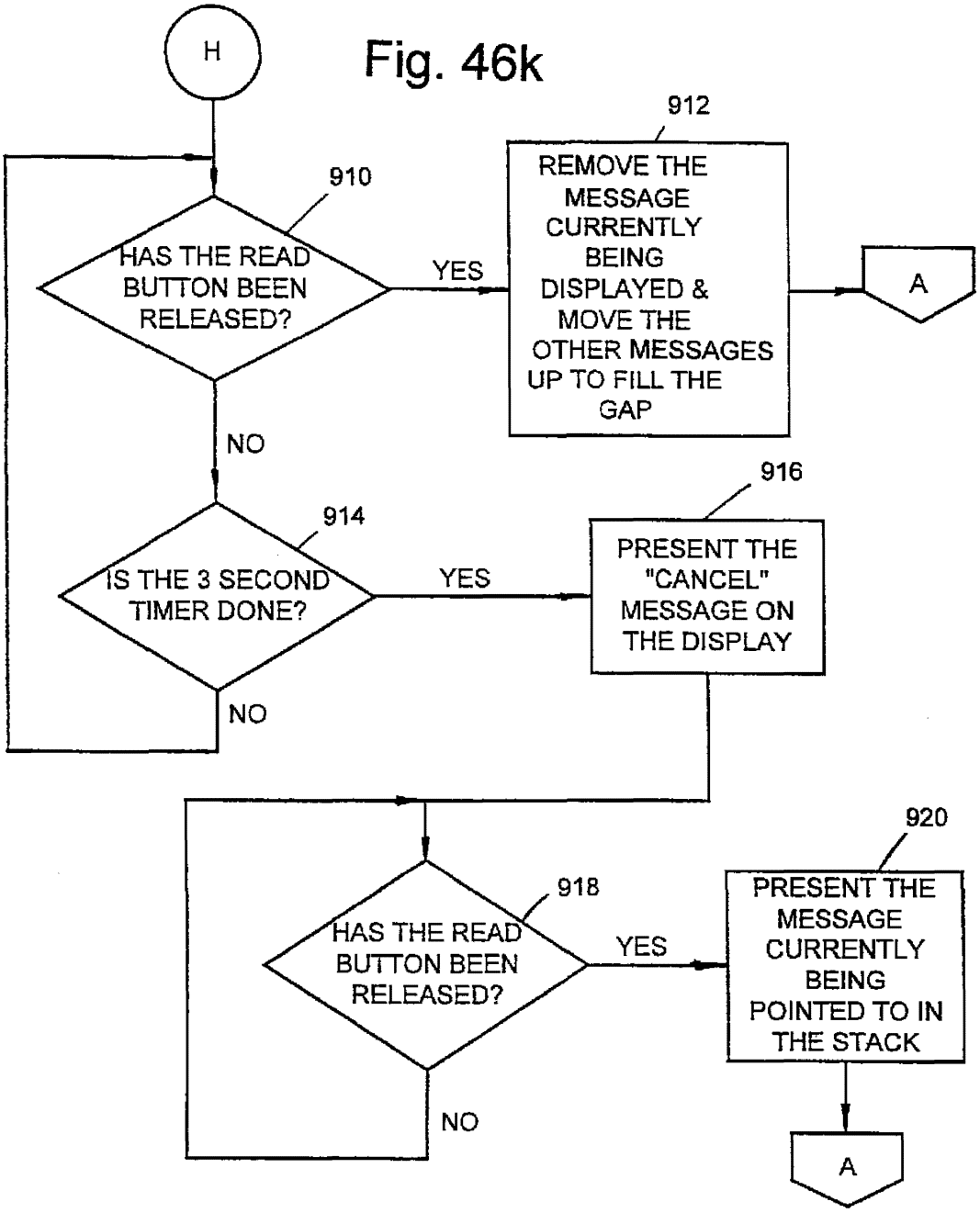

G
898
IS THE LOCKED MESSAGE STACK FULL?
YES
902
PRESENT "LOCKED MEMORY FULL" MESSAGE
A
NO
MOVE THE MESSAGE ON THE DISPLAY ON TOP OF THE LOCKED MESSAGE STACK IN MEMORY & SHIFT THE OTHER MESSAGE DOWN
900
A

Fig. 46j

Fig. 46k


H
910
HAS THE READ BUTTON BEEN RELEASED?
YES
912
REMOVE THE MESSAGE CURRENTLY BEING DISPLAYED & MOVE THE OTHER MESSAGES UP TO FILL THE GAP
A
NO
914
IS THE 3 SECOND TIMER DONE?
YES
916
PRESENT THE "CANCEL" MESSAGE ON THE DISPLAY
NO
918
HAS THE READ BUTTON BEEN RELEASED?
YES
920
PRESENT THE MESSAGE CURRENTLY BEING POINTED TO IN THE STACK
NO
A

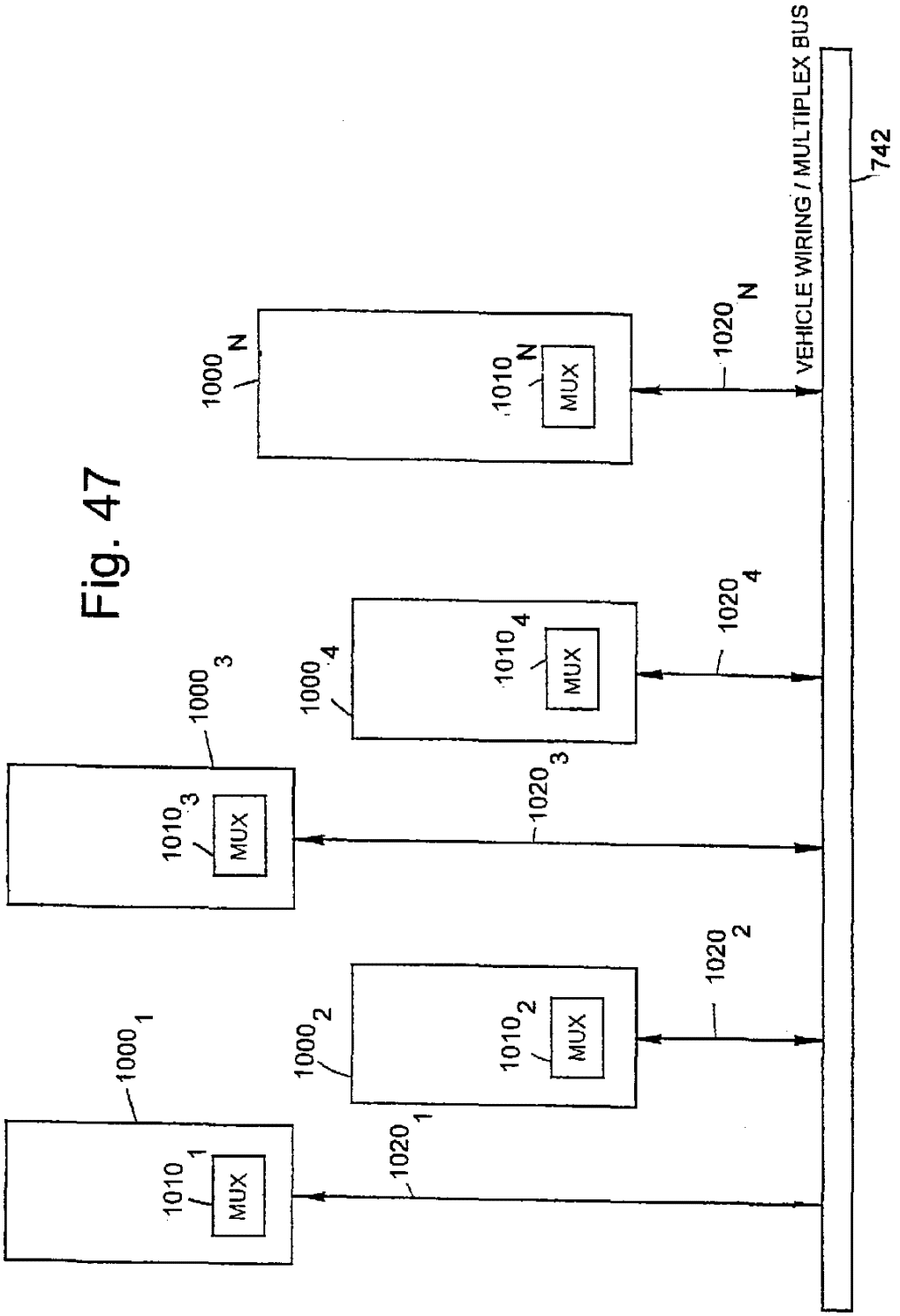

VEHICLE WIRING / MULTIPLEX BUS
742
1000 N
1010 N
MUX
1020 N
1000 4
1010 4
MUX
1020 4
1000 3
1010 3
MUX
1020 3
1000 2
1010 2
MUX
1020 2
1000 1
1010 1
MUX
1020 1

Fig. 47

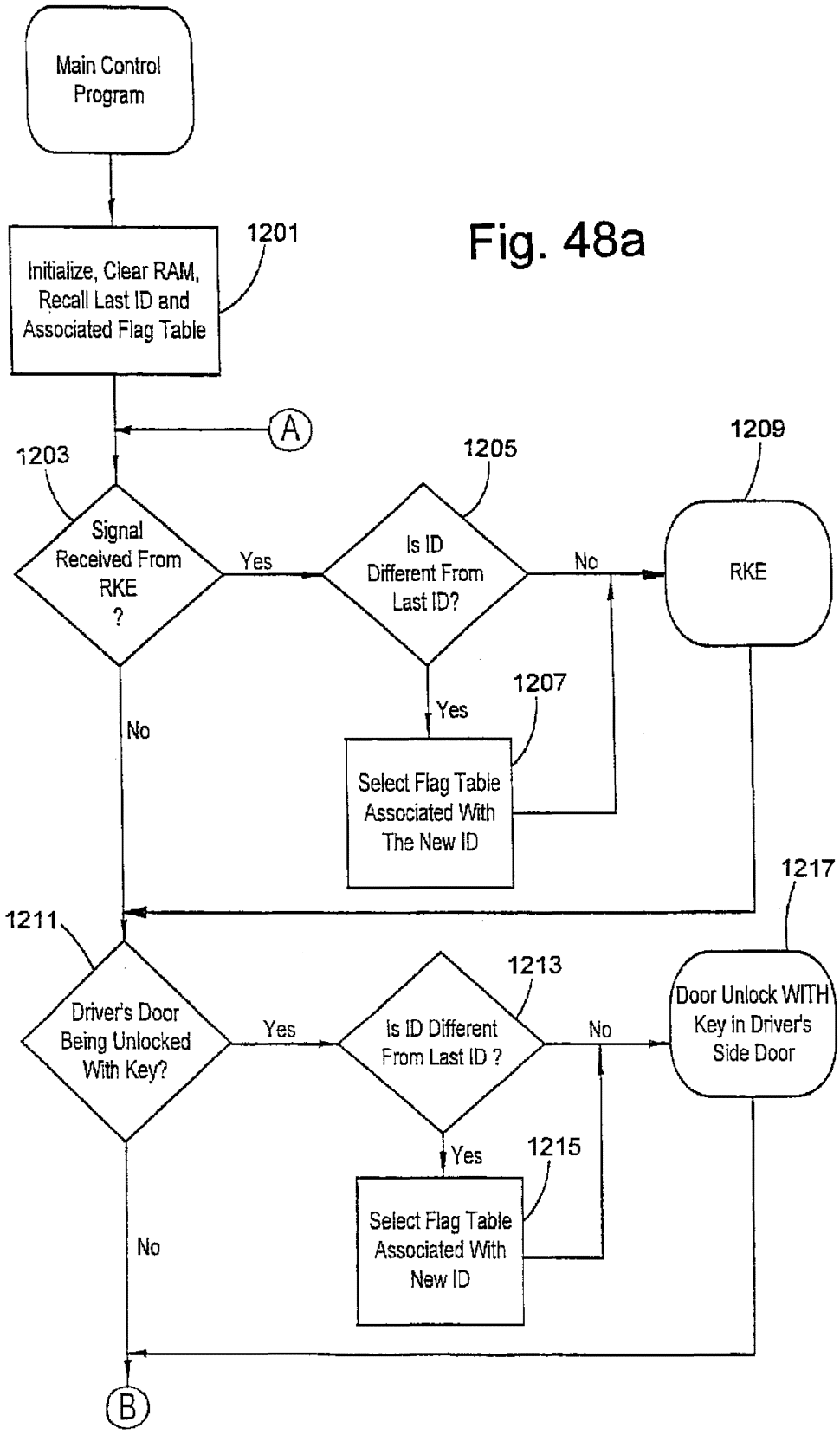

Main Control Program
Initialize, Clear RAM, Recall Last ID and Associated Flag Table
1201
A
1203
Signal Received From RKE ?
Yes
1205
Is ID Different From Last ID?
No
1209
RKE
Yes
1207
Select Flag Table Associated With The New ID
No
1217
1211
Driver's Door Being Unlocked With Key?
Yes
1213
Is ID Different From Last ID ?
No
Door Unlock WITH Key in Driver's Side Door
Yes
1215
Select Flag Table Associated With New ID
No
B

Fig. 48a

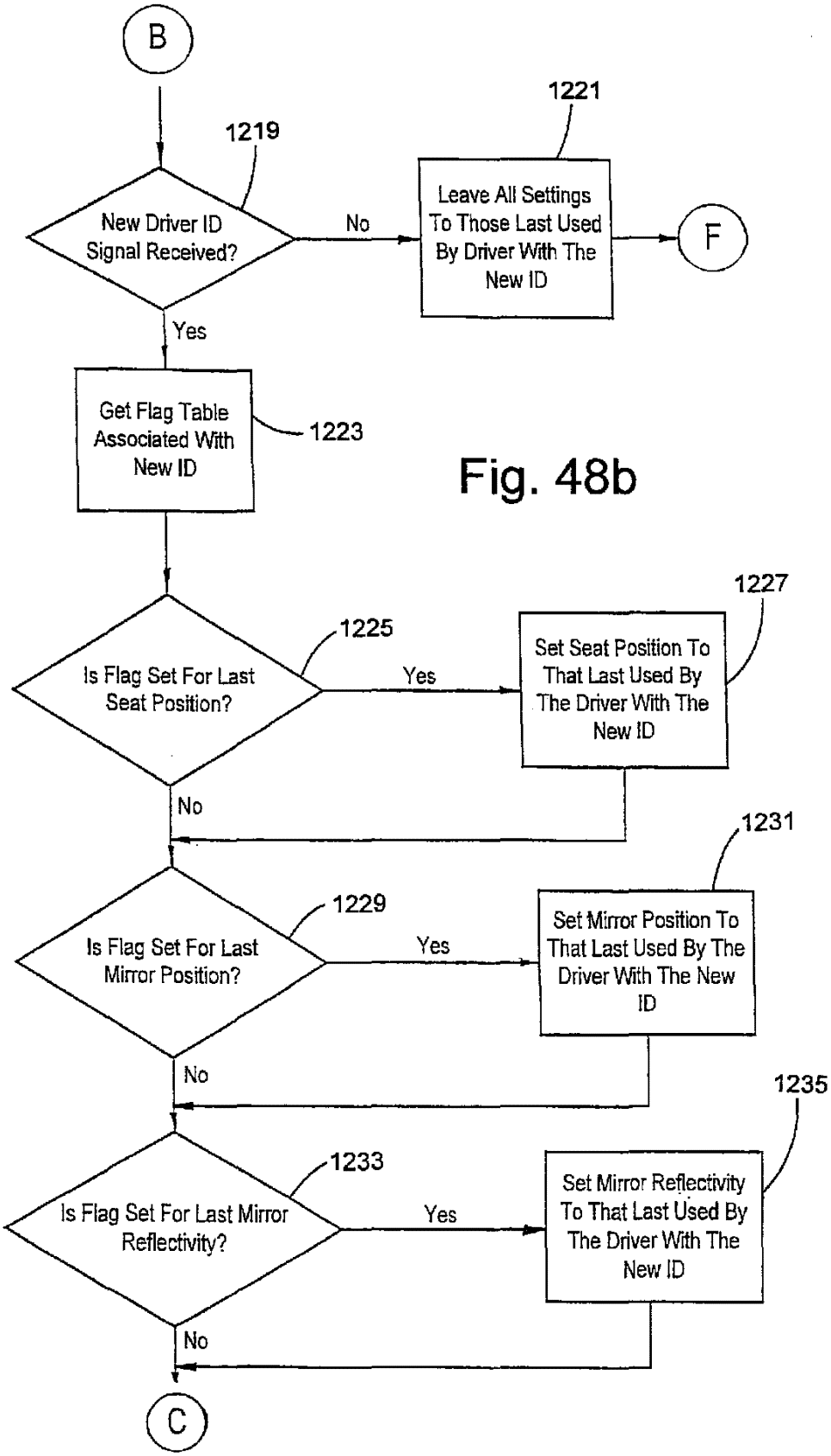

B
1219
New Driver ID Signal Received?
No
1221
Leave All Settings To Those Last Used By Driver With The New ID
F
Yes
Get Flag Table Associated With New ID
1223
1225
Is Flag Set For Last Seat Position?
Yes
1227
Set Seat Position To That Last Used By The Driver With The New ID
No
1231
1229
Is Flag Set For Last Mirror Position?
Yes
Set Mirror Position To That Last Used By The Driver With The New ID
No
1235
1233
Is Flag Set For Last Mirror Reflectivity?
Yes
Set Mirror Reflectivity To That Last Used By The Driver With The New ID
No
C

Fig. 48b

Fig. 48c

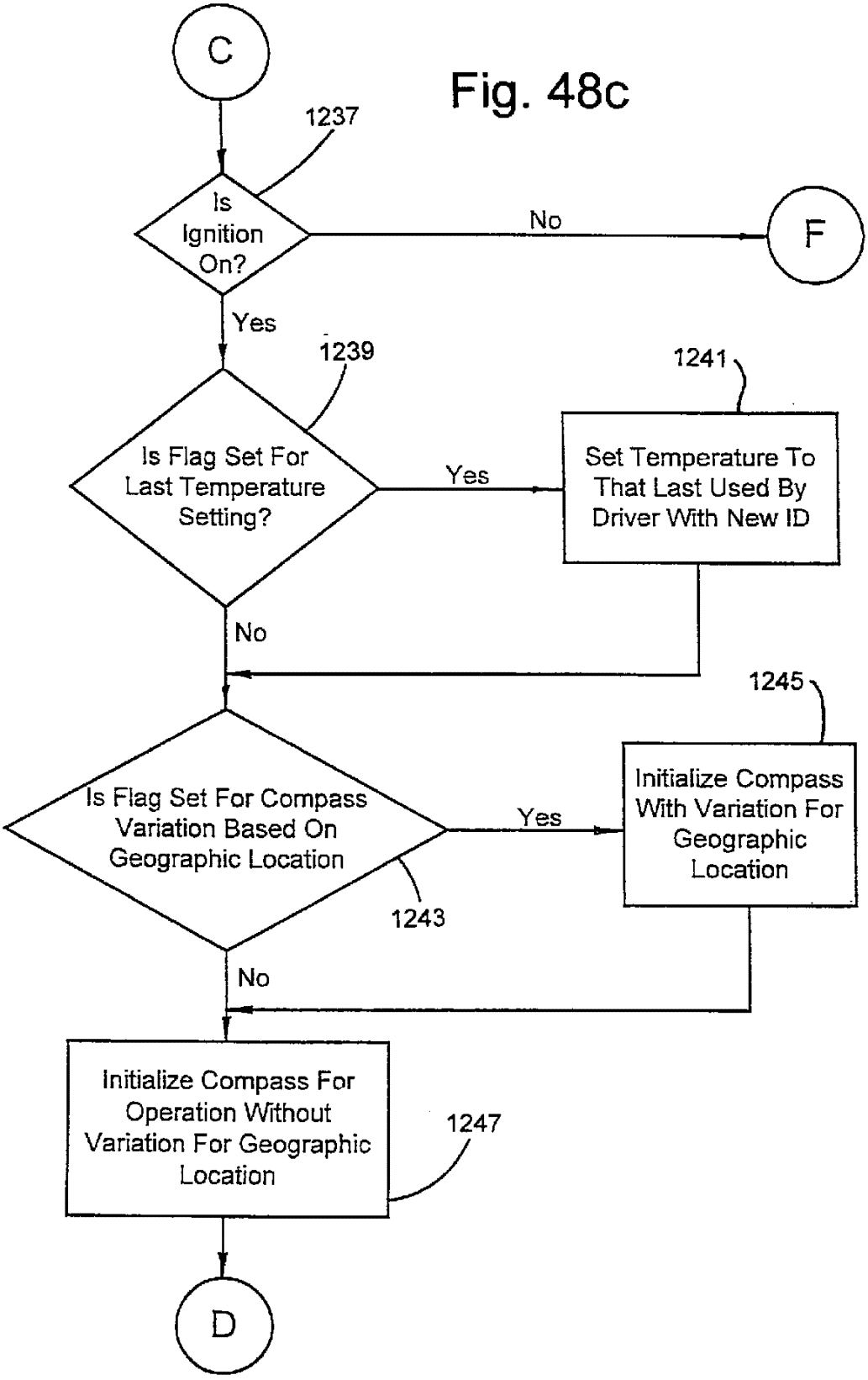
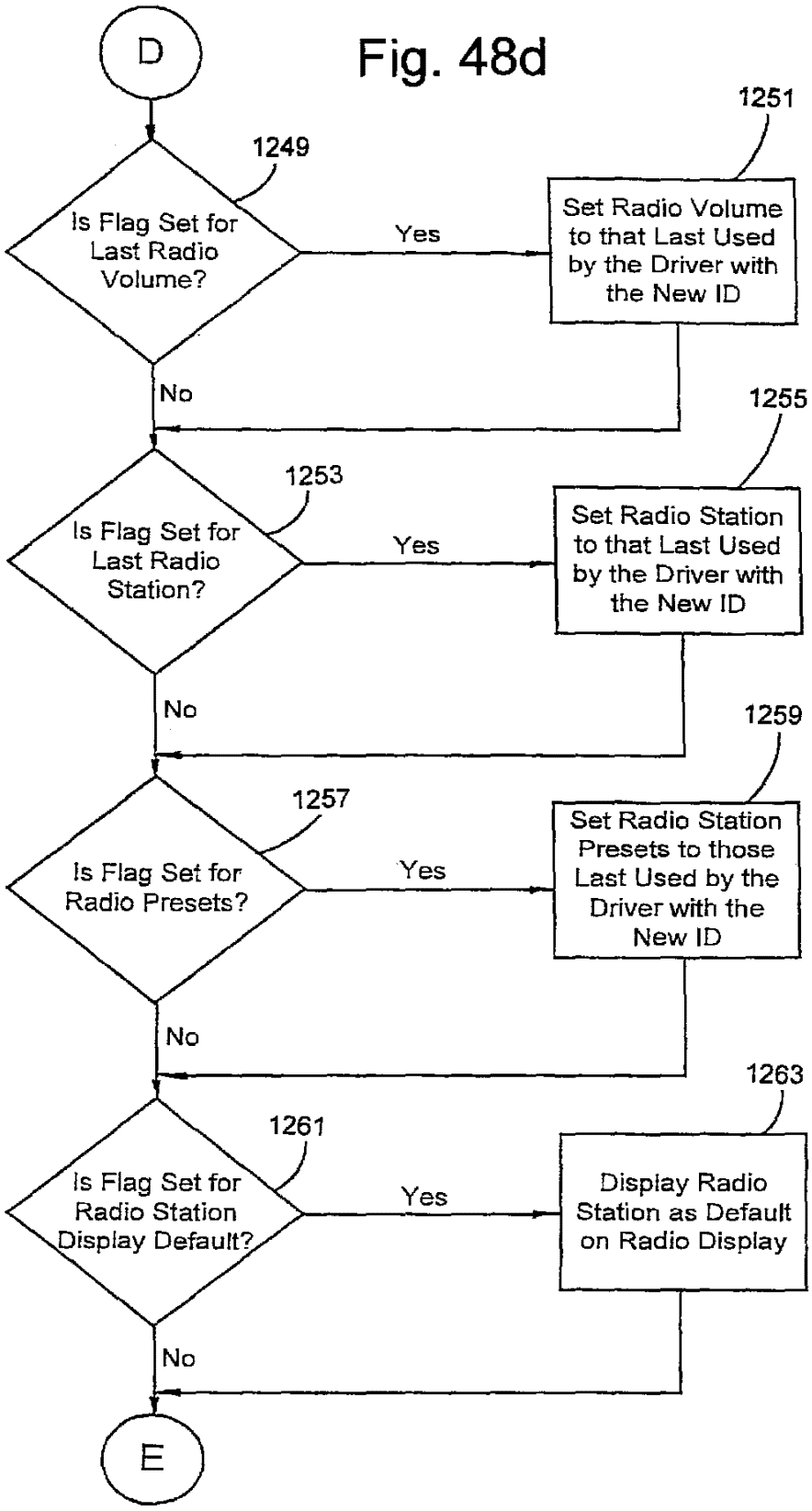

C
1237
Is Ignition On?
No
F
Yes
1239
Is Flag Set For Last Temperature Setting?
Yes
1241
Set Temperature To That Last Used By Driver With New ID
No
1245
Is Flag Set For Compass Variation Based On Geographic Location
Yes
Initialize Compass With Variation For Geographic Location
1243
No
Initialize Compass For Operation Without Variation For Geographic Location
1247
D

Fig. 48d


D
1249
Is Flag Set for Last Radio Volume?
Yes
1251
Set Radio Volume to that Last Used by the Driver with the New ID
No
1253
Is Flag Set for Last Radio Station?
Yes
1255
Set Radio Station to that Last Used by the Driver with the New ID
No
1257
Is Flag Set for Radio Presets?
Yes
1259
Set Radio Station Presets to those Last Used by the Driver with the New ID
No
1261
Is Flag Set for Radio Station Display Default?
Yes
1263
Display Radio Station as Default on Radio Display
No
E

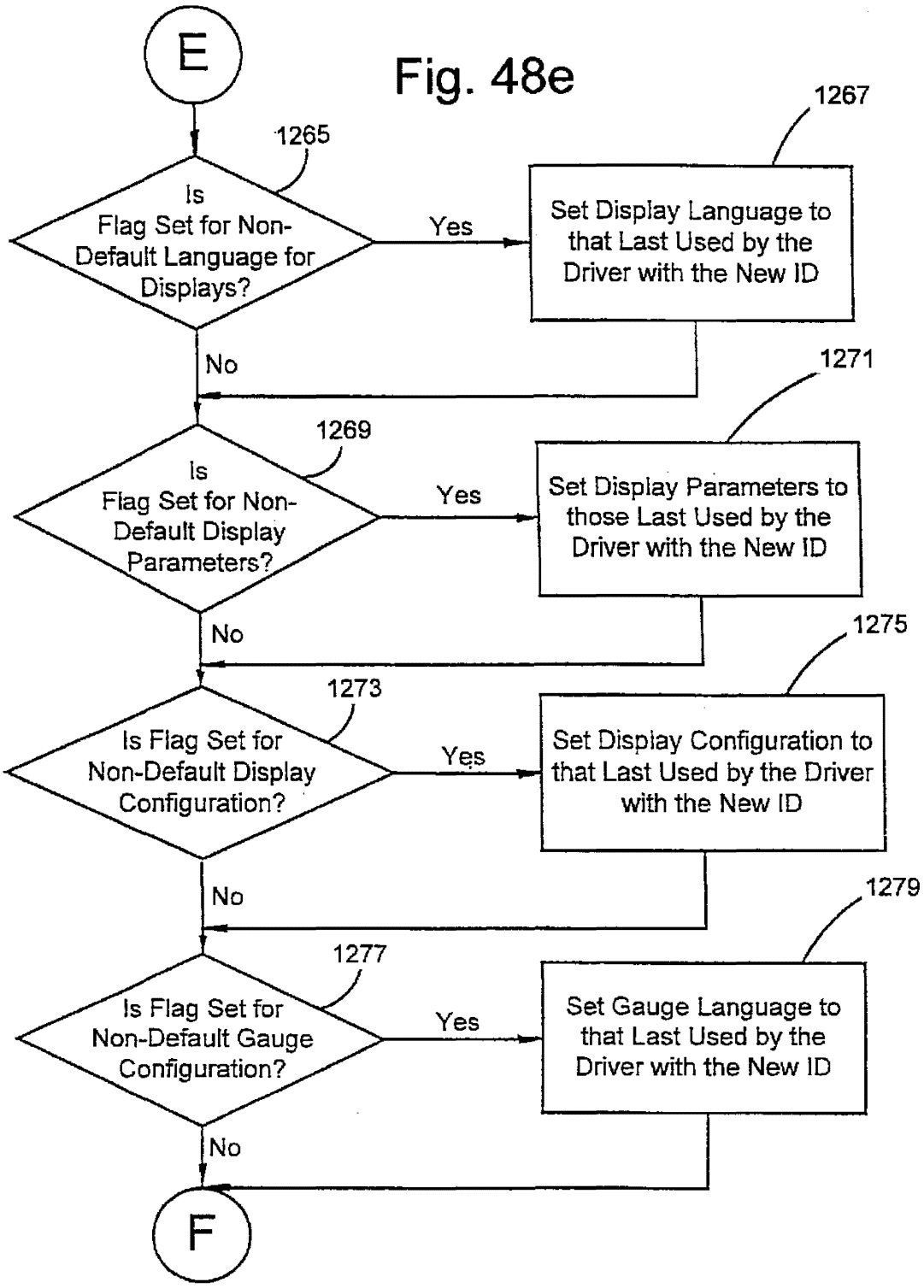

E
1265
Is Flag Set for Non-Default Language for Displays?
Yes
1267
Set Display Language to that Last Used by the Driver with the New ID
No
1269
Is Flag Set for Non-Default Display Parameters?
Yes
1271
Set Display Parameters to those Last Used by the Driver with the New ID
No
1273
Is Flag Set for Non-Default Display Configuration?
Yes
1275
Set Display Configuration to that Last Used by the Driver with the New ID
No
1277
Is Flag Set for Non-Default Gauge Configuration?
Yes
1279
Set Gauge Language to that Last Used by the Driver with the New ID
No
F

Fig. 48e

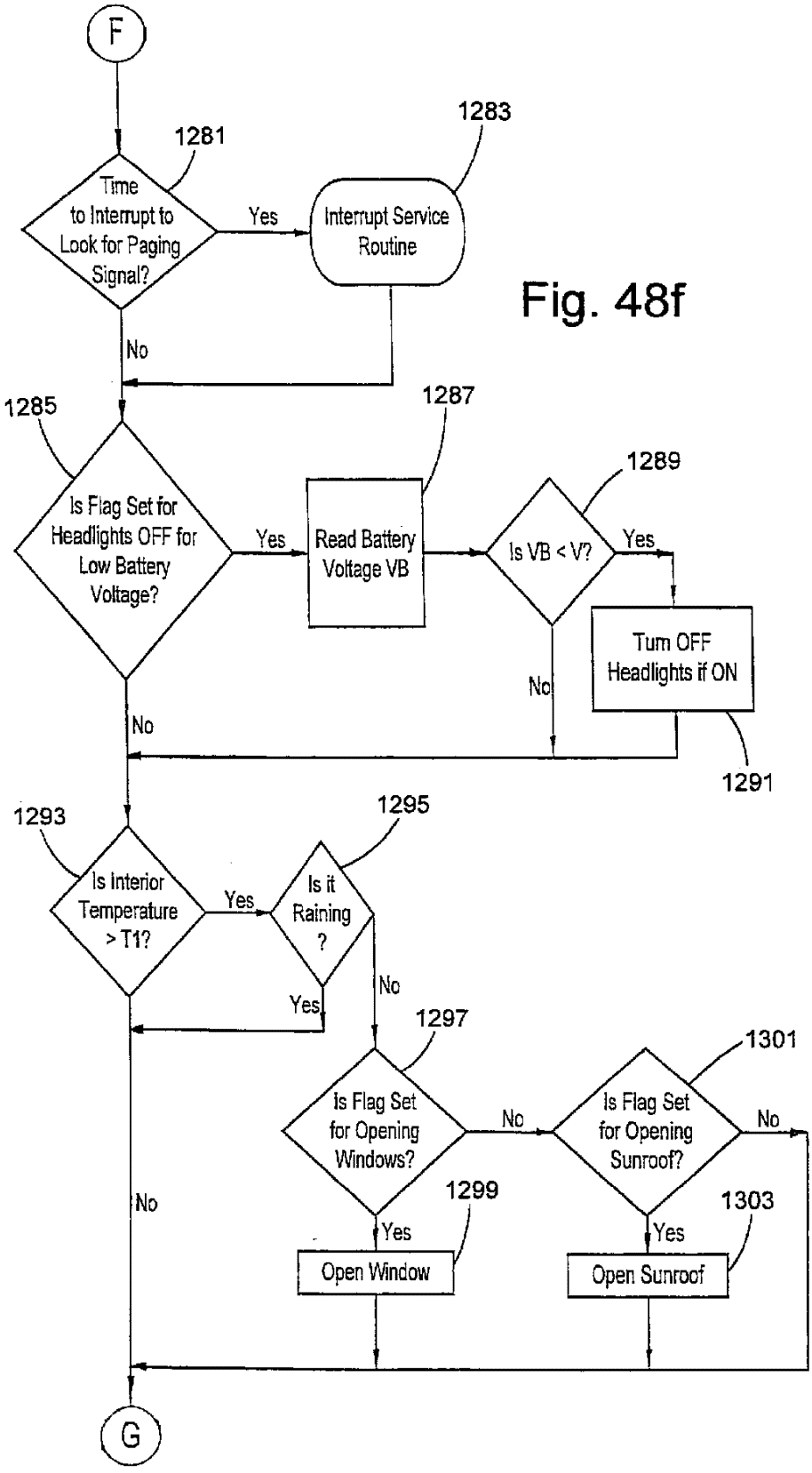

F
1281
Time to Interrupt to Look for Paging Signal?
Yes
1283
Interrupt Service Routine
No
1285
Is Flag Set for Headlights OFF for Low Battery Voltage?
Yes
1287
Read Battery Voltage VB
1289
Is VB < V?
Yes
Turn OFF Headlights if ON
No
No
1291
1293
Is Interior Temperature > T1?
Yes
1295
Is it Raining ?
Yes
No
1297
Is Flag Set for Opening Windows?
No
1301
Is Flag Set for Opening Sunroof?
No
No
Yes
1299
Open Window
Yes
1303
Open Sunroof
G

Fig. 48f

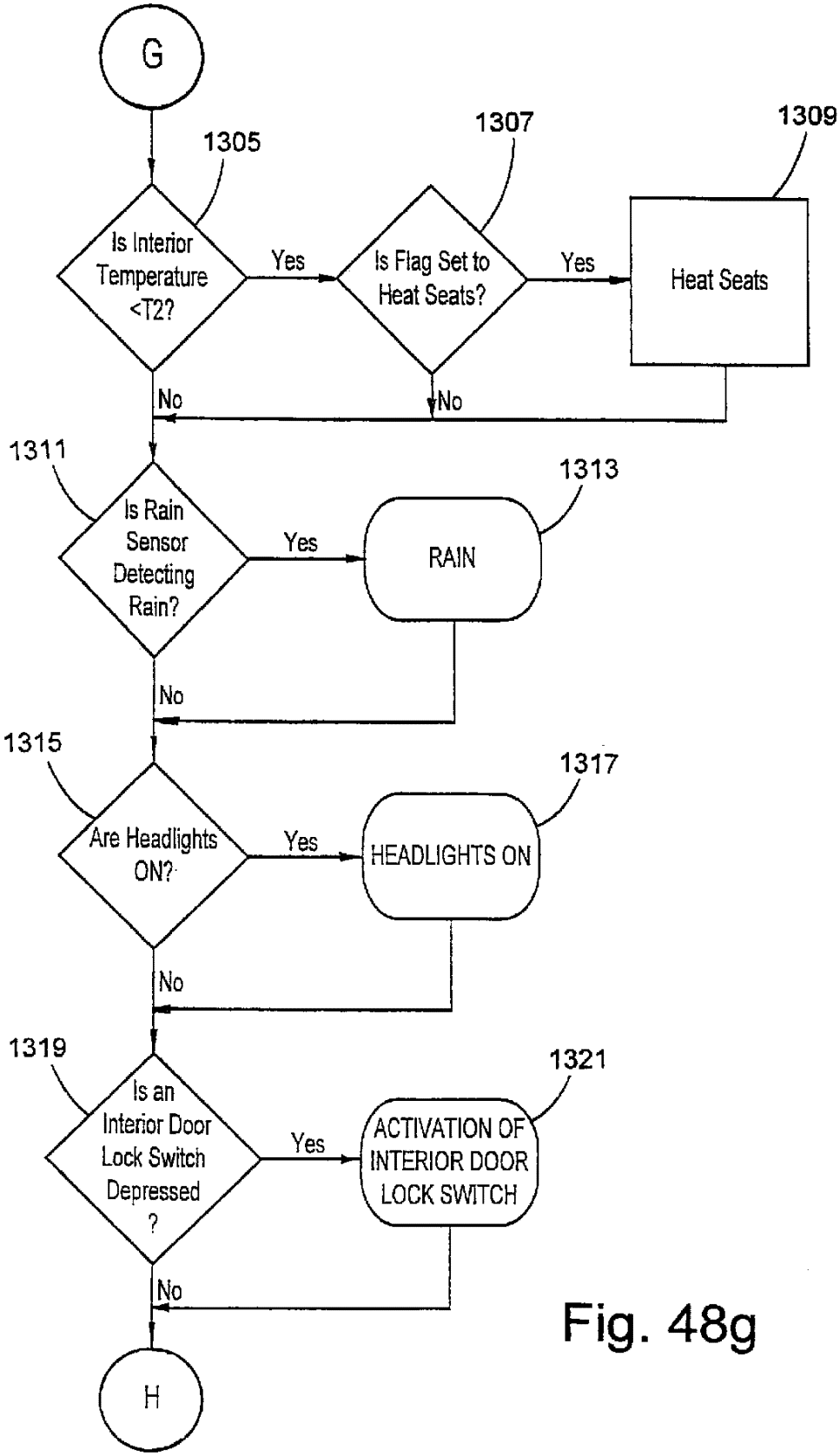

G
1305
Is Interior Temperature <T2?
Yes
1307
Is Flag Set to Heat Seats?
Yes
1309
Heat Seats
No
No
1311
Is Rain Sensor Detecting Rain?
Yes
1313
RAIN
No
1315
Are Headlights ON?
Yes
1317
HEADLIGHTS ON
No
1319
Is an Interior Door Lock Switch Depressed ?
Yes
1321
ACTIVATION OF INTERIOR DOOR LOCK SWITCH
No
H

Fig. 48g

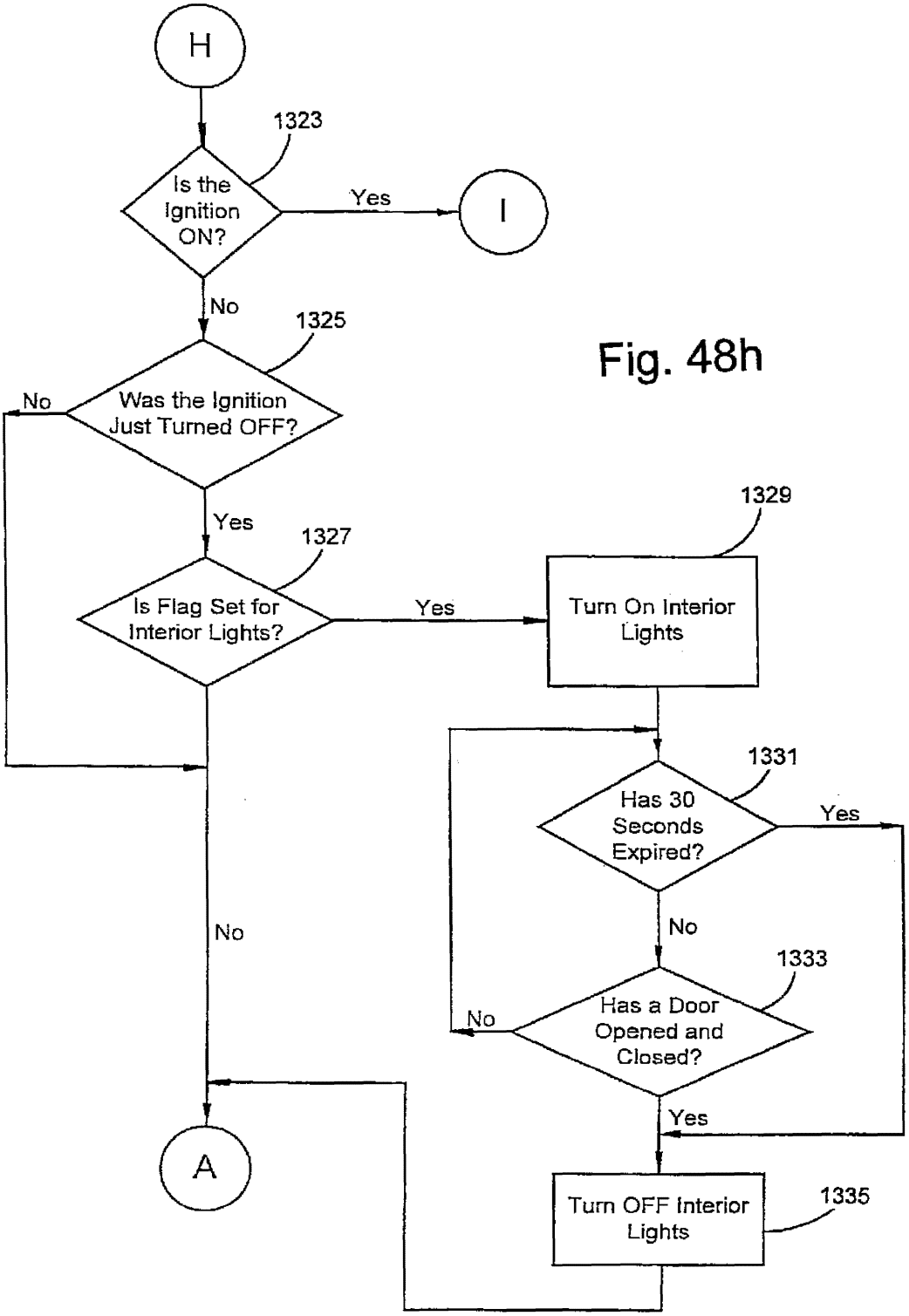

H
1323
Is the Ignition ON?
Yes
I
No
1325
Was the Ignition Just Turned OFF?
No
Yes
1327
Is Flag Set for Interior Lights?
Yes
1329
Turn On Interior Lights
1331
Has 30 Seconds Expired?
Yes
No
1333
Has a Door Opened and Closed?
No
Yes
No
A
Turn OFF Interior Lights
1335

Fig. 48h

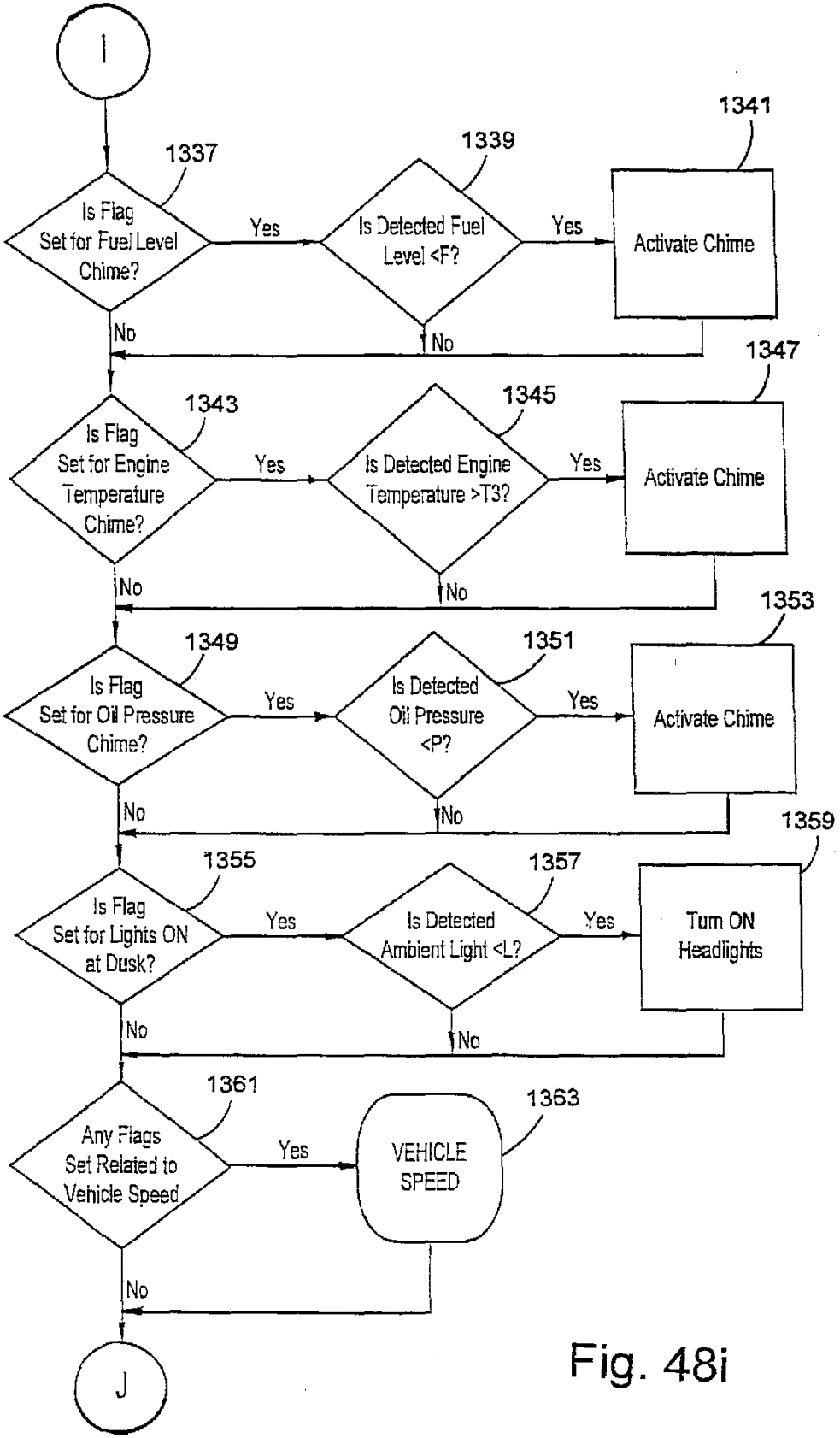

I
1337
Is Flag Set for Fuel Level Chime?
Yes
1339
Is Detected Fuel Level <F?
Yes
1341
Activate Chime
No
No
1343
Is Flag Set for Engine Temperature Chime?
Yes
1345
Is Detected Engine Temperature >T3?
Yes
1347
Activate Chime
No
No
1349
Is Flag Set for Oil Pressure Chime?
Yes
1351
Is Detected Oil Pressure <P?
Yes
1353
Activate Chime
No
No
1355
Is Flag Set for Lights ON at Dusk?
Yes
1357
Is Detected Ambient Light <L?
Yes
1359
Turn ON Headlights
No
No
1361
Any Flags Set Related to Vehicle Speed
Yes
1363
VEHICLE SPEED
No
J

Fig. 48i

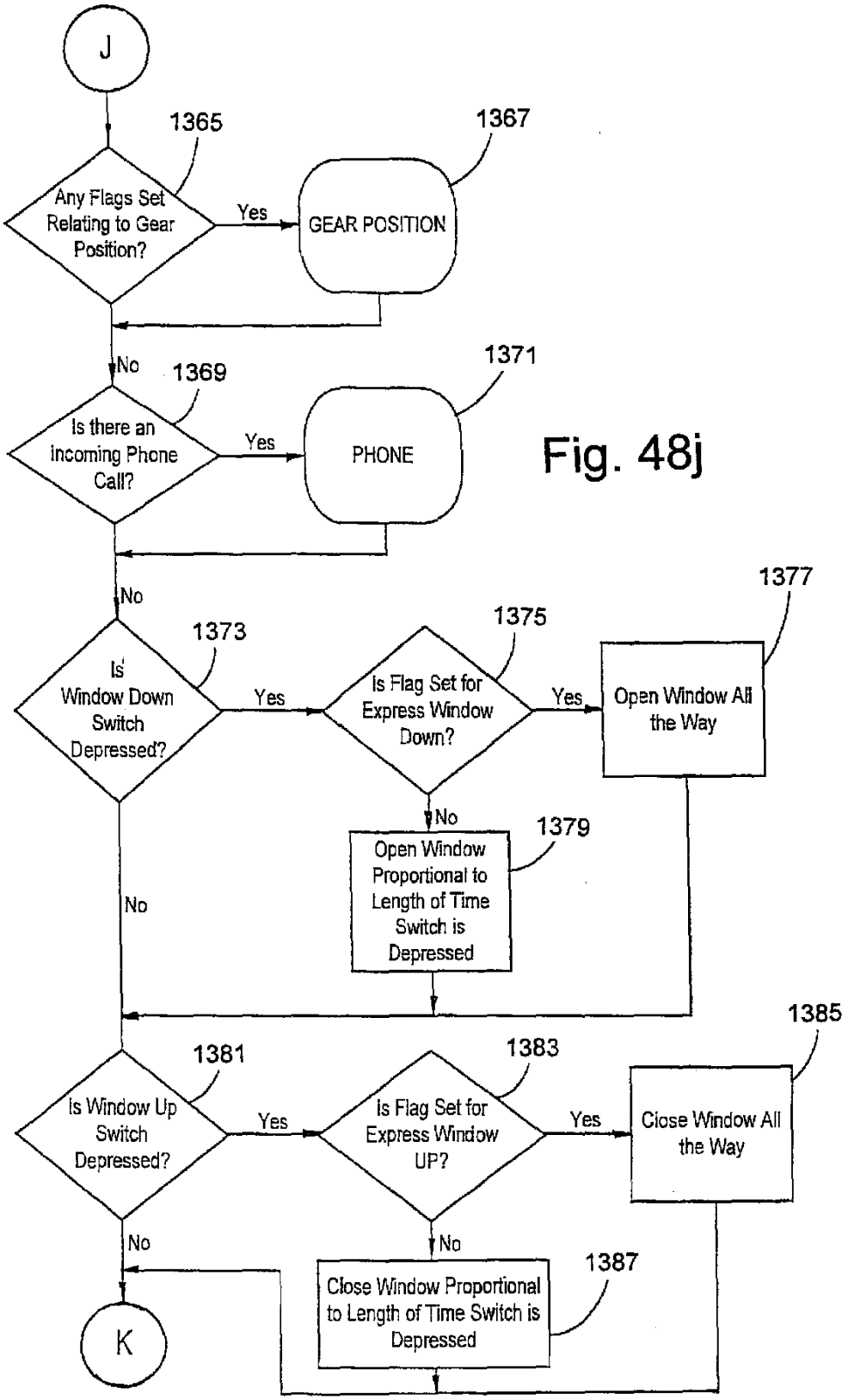

J
1365
Any Flags Set Relating to Gear Position?
Yes
1367
GEAR POSITION
No
1369
Is there an incoming Phone Call?
Yes
1371
PHONE
No
1373
Is Window Down Switch Depressed?
Yes
1375
Is Flag Set for Express Window Down?
Yes
1377
Open Window All the Way
No
1379
Open Window Proportional to Length of Time Switch is Depressed
No
1381
Is Window Up Switch Depressed?
Yes
1383
Is Flag Set for Express Window UP?
Yes
1385
Close Window All the Way
No
No
1387
Close Window Proportional to Length of Time Switch is Depressed
K

Fig. 48j

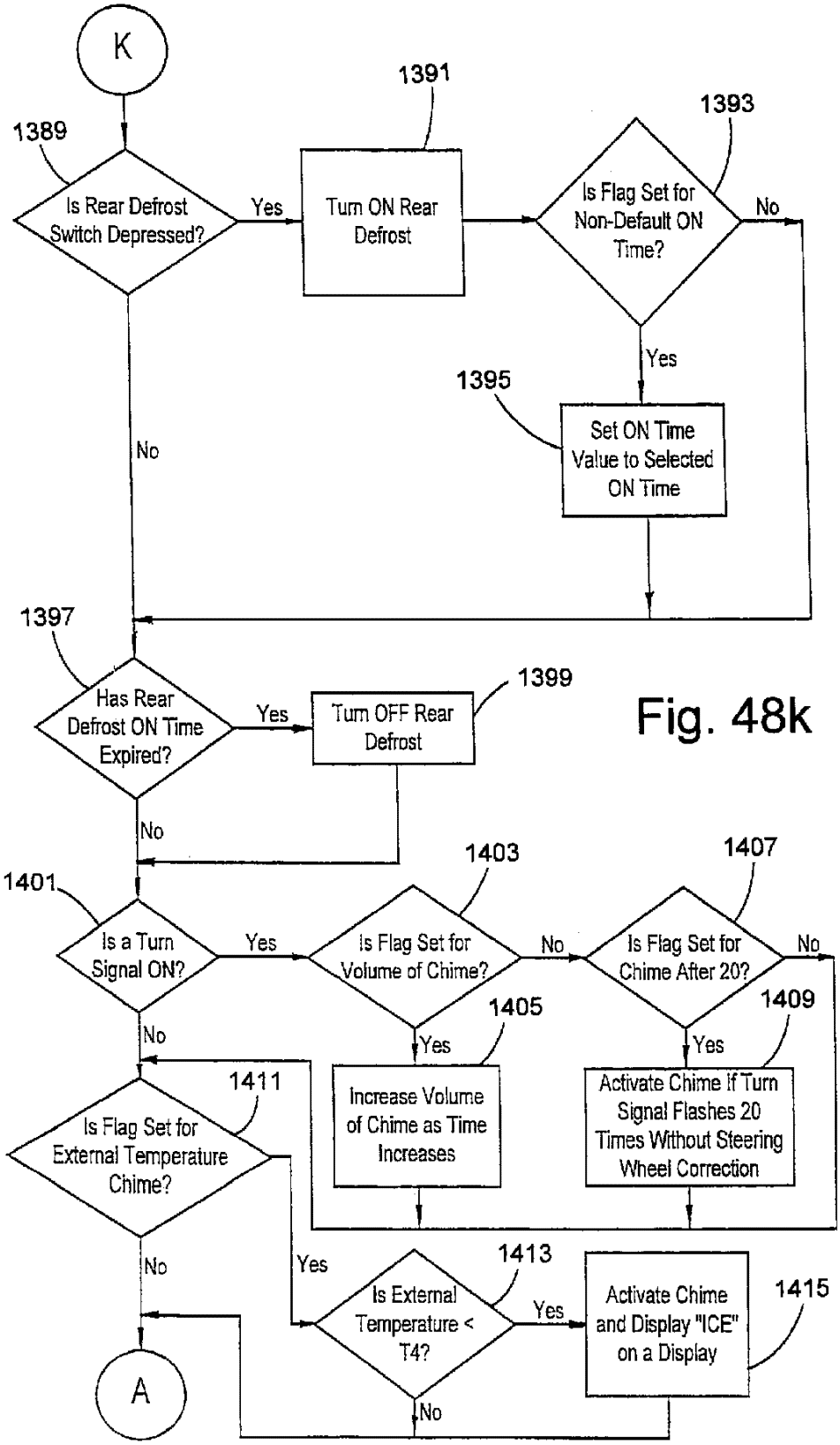

K
1389
Is Rear Defrost Switch Depressed?
Yes
1391
Turn ON Rear Defrost
1393
Is Flag Set for Non-Default ON Time?
No
Yes
1395
Set ON Time Value to Selected ON Time
No
1397
Has Rear Defrost ON Time Expired?
Yes
1399
Turn OFF Rear Defrost
No
1401
Is a Turn Signal ON?
Yes
1403
Is Flag Set for Volume of Chime?
No
1407
Is Flag Set for Chime After 20?
No
No
Yes
1405
Increase Volume of Chime as Time Increases
Yes
1409
Activate Chime If Turn Signal Flashes 20 Times Without Steering Wheel Correction
1411
Is Flag Set for External Temperature Chime?
No
Yes
1413
Is External Temperature < T4?
Yes
1415
Activate Chime and Display "ICE" on a Display
No
A

Fig. 48k

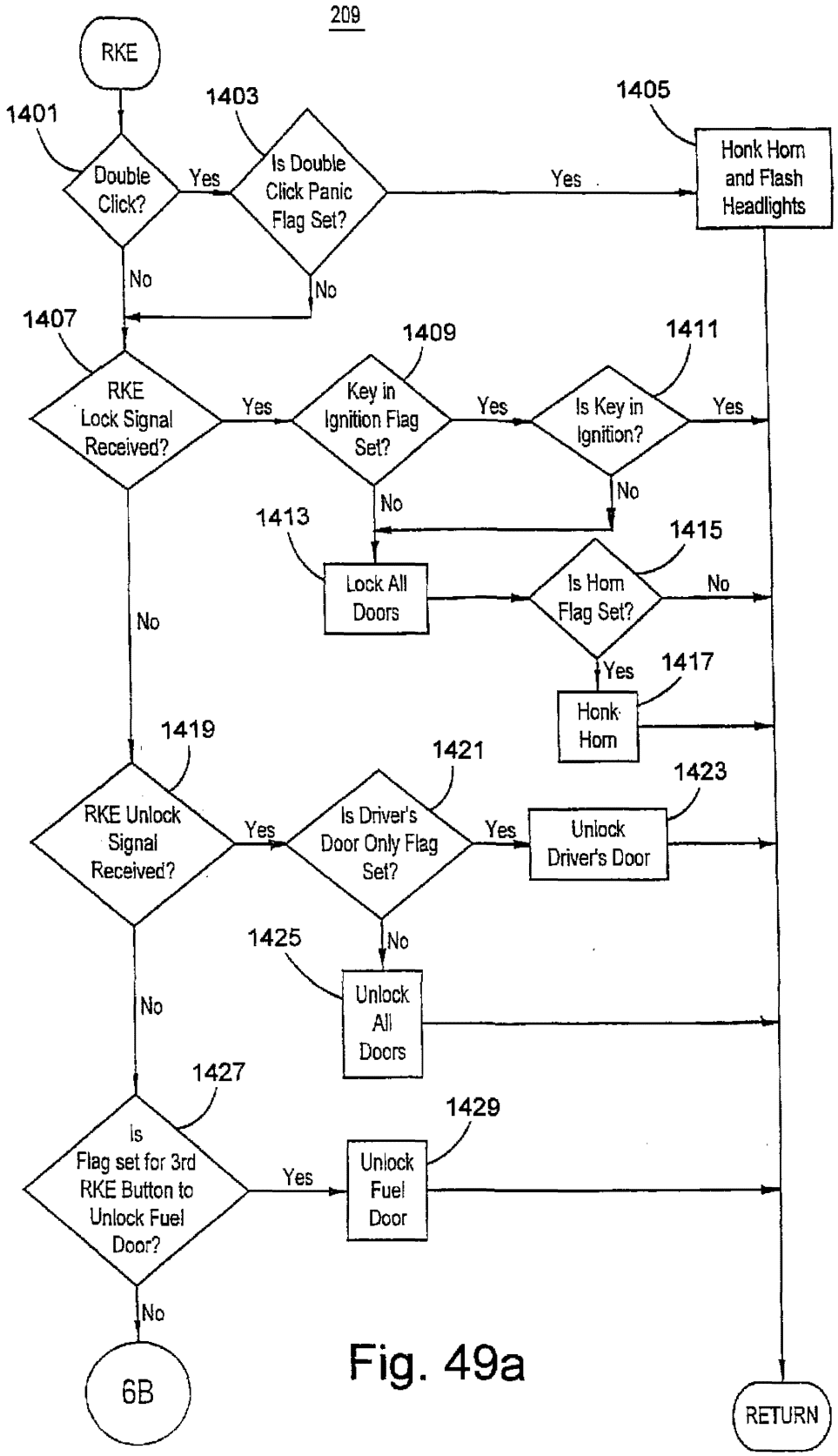

209
RKE
1401
Double Click?
Yes
1403
Is Double Click Panic Flag Set?
Yes
1405
Honk Horn and Flash Headlights
No
No
1407
RKE Lock Signal Received?
Yes
1409
Key in Ignition Flag Set?
Yes
1411
Is Key in Ignition?
Yes
No
No
1413
Lock All Doors
1415
Is Horn Flag Set?
No
Yes
1417
Honk Horn
No
1419
RKE Unlock Signal Received?
Yes
1421
Is Driver's Door Only Flag Set?
Yes
1423
Unlock Driver's Door
No
1425
Unlock All Doors
No
1427
Is Flag set for 3rd RKE Button to Unlock Fuel Door?
Yes
1429
Unlock Fuel Door
No
6B
RETURN

Fig. 49a

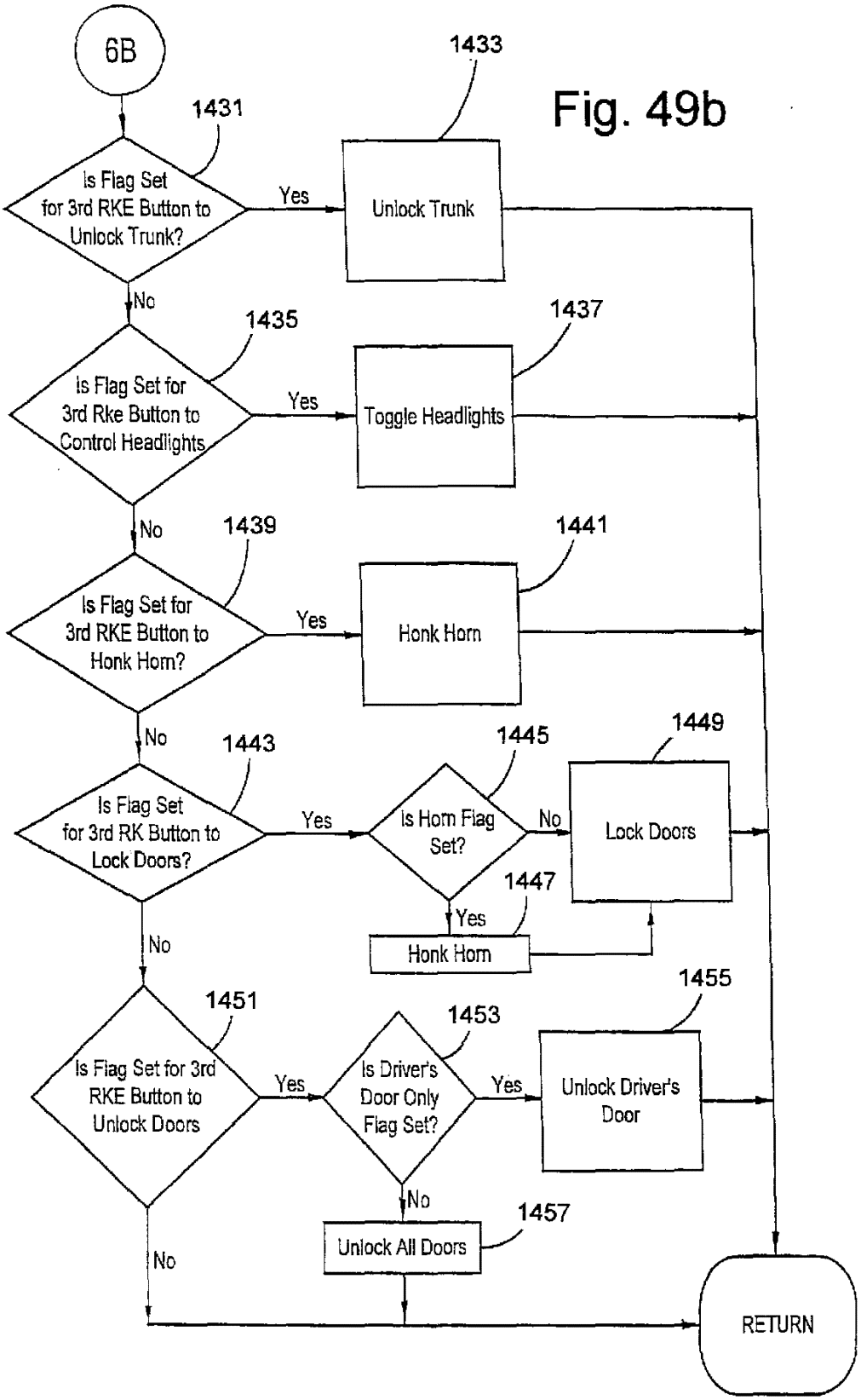

6B
1431
Is Flag Set for 3rd RKE Button to Unlock Trunk?
Yes
1433
Unlock Trunk
No
1435
Is Flag Set for 3rd Rke Button to Control Headlights
Yes
1437
Toggle Headlights
No
1439
Is Flag Set for 3rd RKE Button to Honk Horn?
Yes
1441
Honk Horn
No
1443
Is Flag Set for 3rd RK Button to Lock Doors?
Yes
1445
Is Horn Flag Set?
No
1449
Lock Doors
Yes
1447
Honk Horn
No
1451
Is Flag Set for 3rd RKE Button to Unlock Doors
Yes
1453
Is Driver's Door Only Flag Set?
Yes
1455
Unlock Driver's Door
No
1457
Unlock All Doors
No
RETURN

Fig. 49b

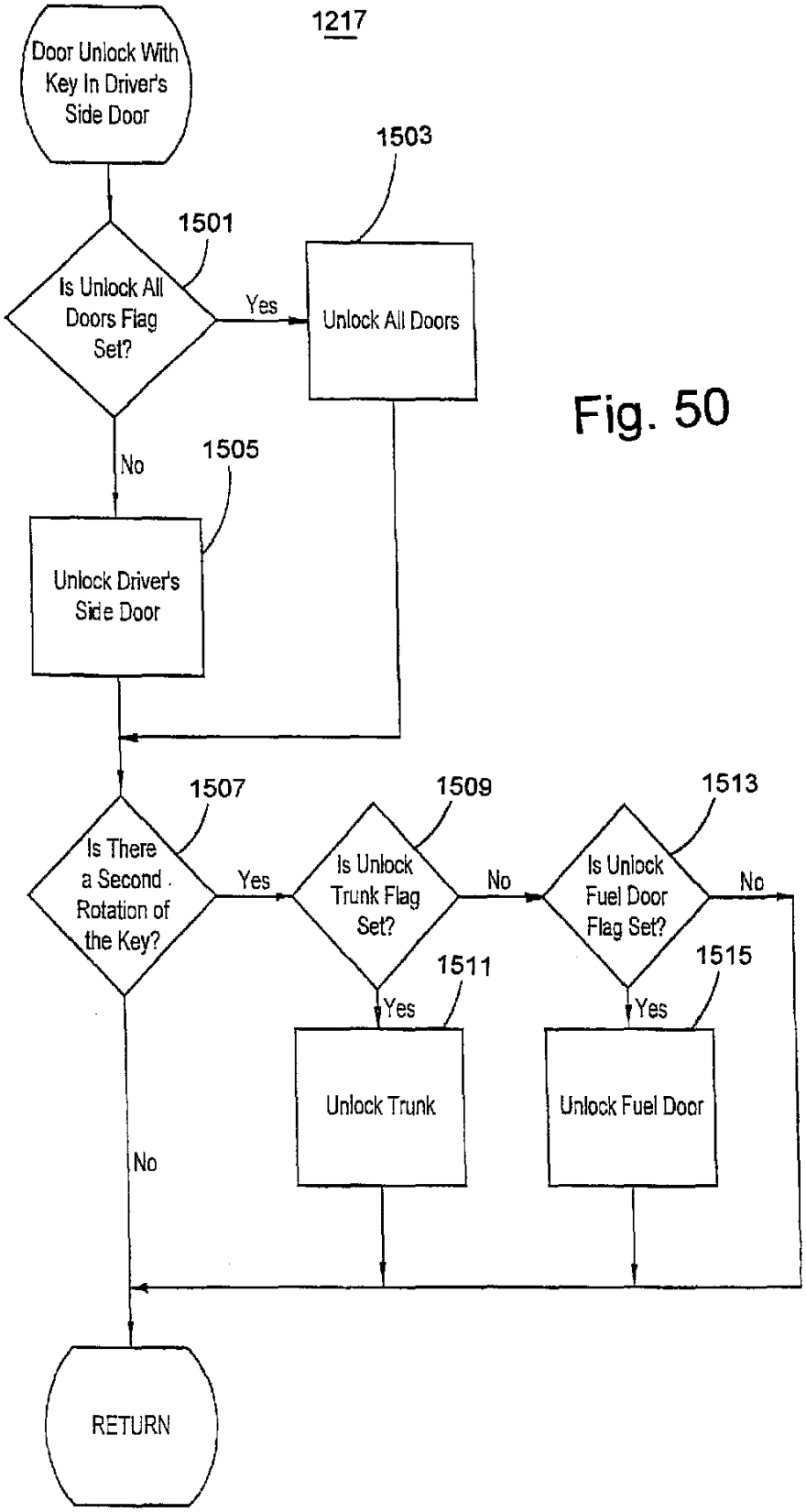

1217
Door Unlock With Key In Driver's Side Door
1501
Is Unlock All Doors Flag Set?
Yes
1503
Unlock All Doors
No
1505
Unlock Driver's Side Door
1507
Is There a Second Rotation of the Key?
Yes
1509
Is Unlock Trunk Flag Set?
No
1513
Is Unlock Fuel Door Flag Set?
No
Yes
1511
Unlock Trunk
Yes
1515
Unlock Fuel Door
No
RETURN

Fig. 50

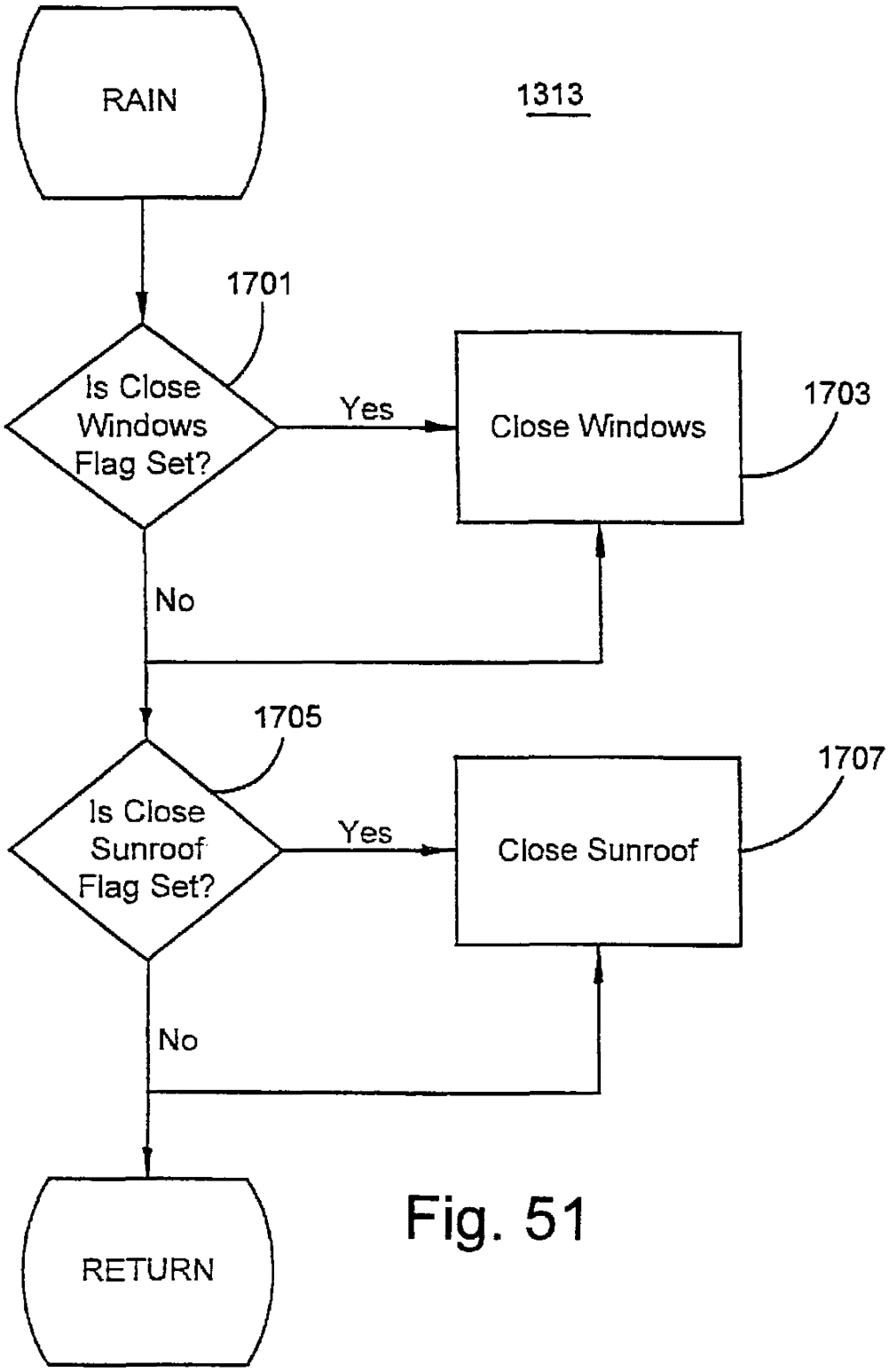

RAIN
1313
1701
Is Close Windows Flag Set?
Yes
Close Windows
1703
No
1705
Is Close Sunroof Flag Set?
Yes
Close Sunroof
1707
No
RETURN

Fig. 51

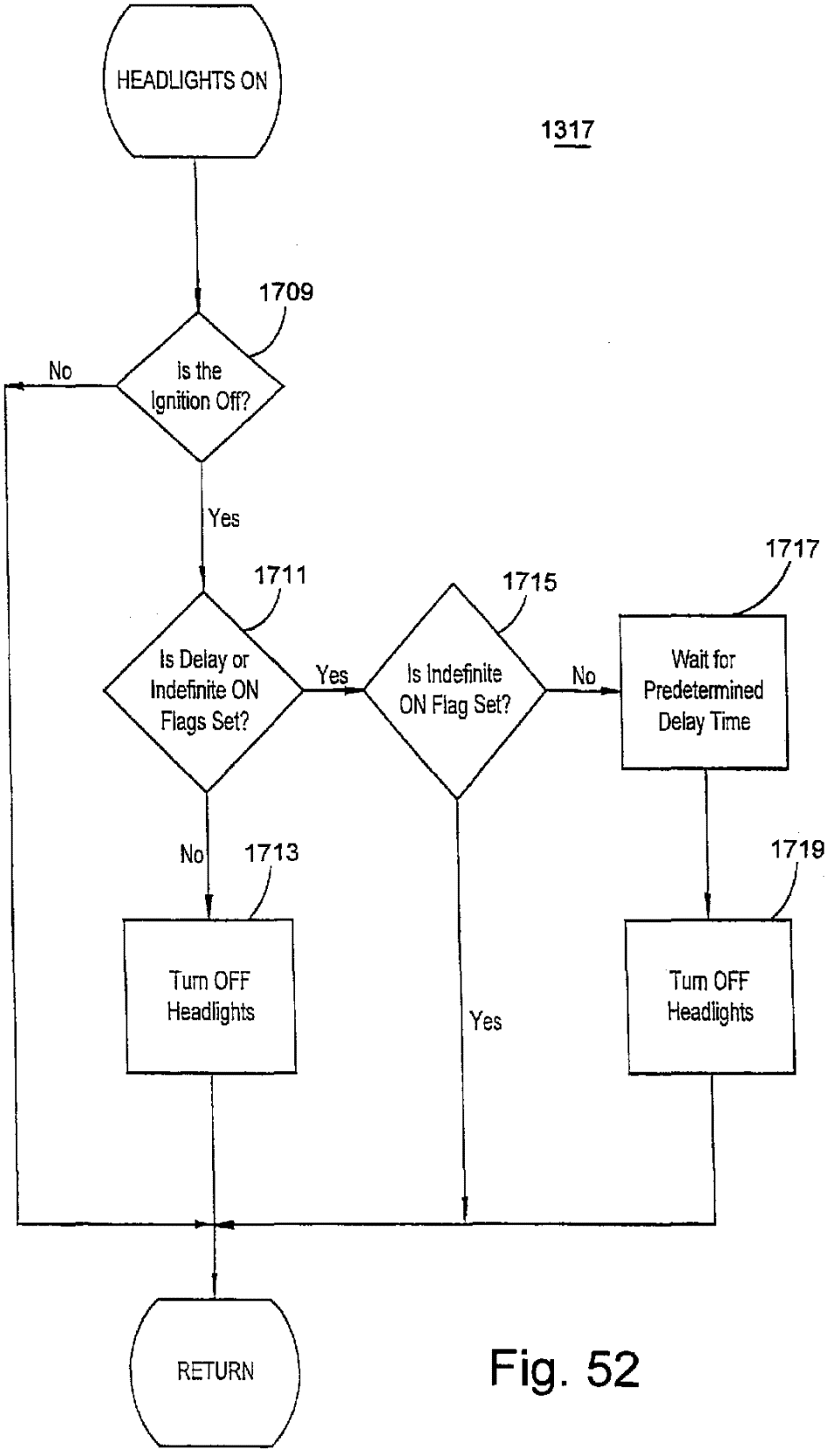

HEADLIGHTS ON
1317
1709
Is the Ignition Off?
No
Yes
1711
Is Delay or Indefinite ON Flags Set?
Yes
1715
Is Indefinite ON Flag Set?
No
1717
Wait for Predetermined Delay Time
No
1713
Turn OFF Headlights
Yes
1719
Turn OFF Headlights
RETURN

Fig. 52

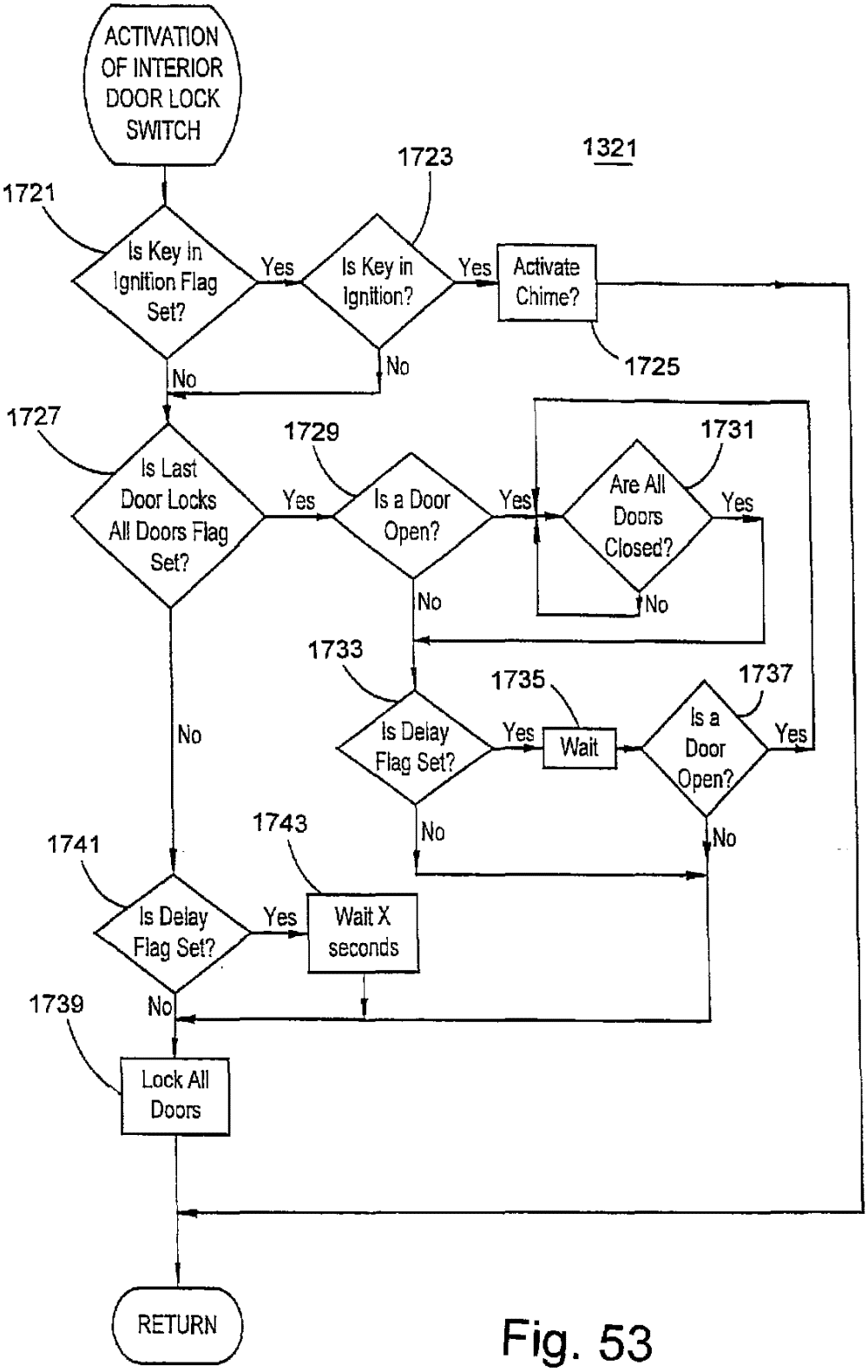

ACTIVATION OF INTERIOR DOOR LOCK SWITCH
1321
1721
Is Key in Ignition Flag Set?
Yes
1723
Is Key in Ignition?
Yes
Activate Chime?
1725
No
No
1727
Is Last Door Locks All Doors Flag Set?
Yes
1729
Is a Door Open?
Yes
1731
Are All Doors Closed?
Yes
No
No
1733
Is Delay Flag Set?
Yes
1735
Wait
1737
Is a Door Open?
Yes
No
No
1741
Is Delay Flag Set?
Yes
1743
Wait X seconds
No
1739
Lock All Doors
RETURN

Fig. 53

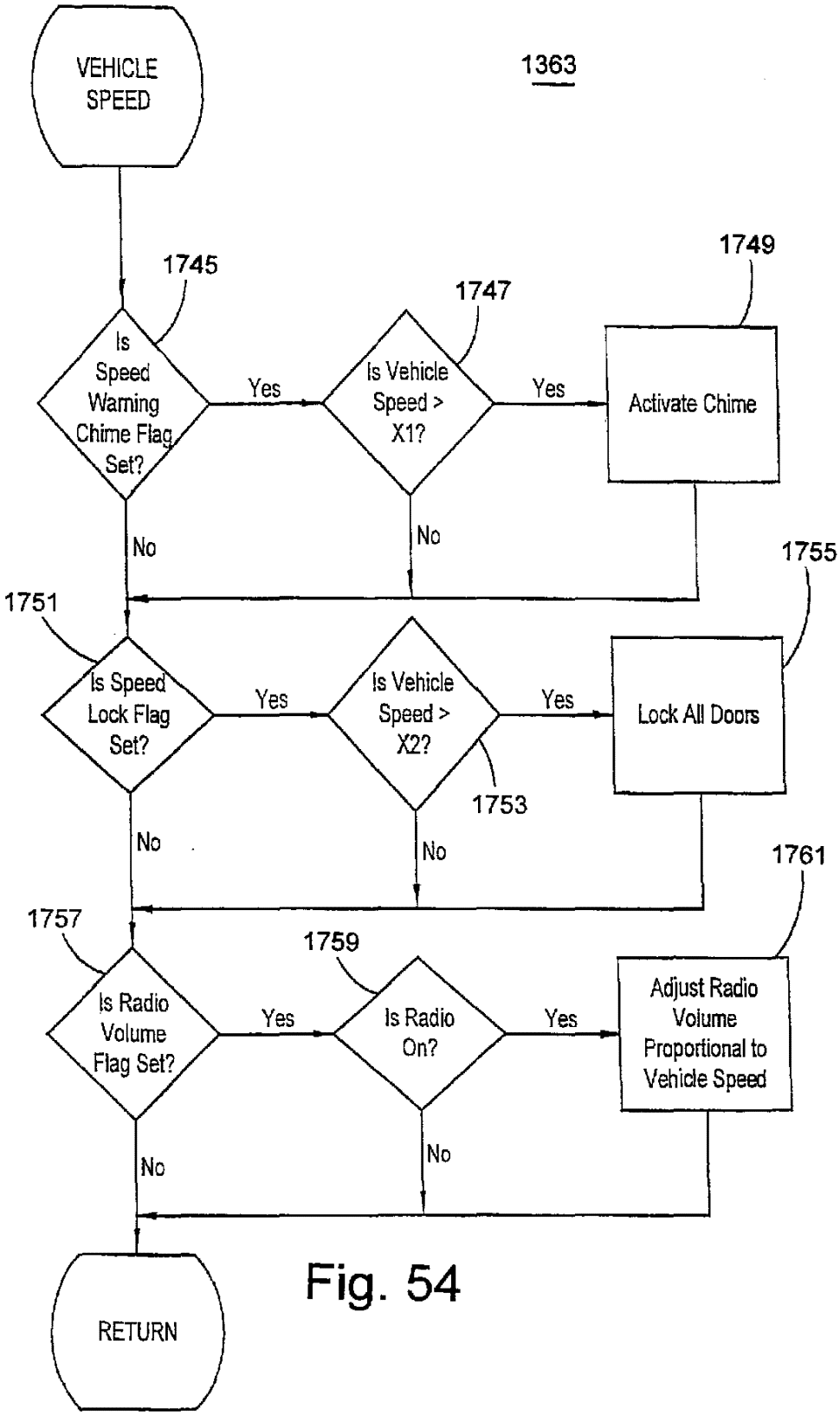

VEHICLE SPEED
1363
1745
Is Speed Warning Chime Flag Set?
Yes
1747
Is Vehicle Speed > X1?
Yes
1749
Activate Chime
No
No
1755
1751
Is Speed Lock Flag Set?
Yes
Is Vehicle Speed > X2?
Yes
Lock All Doors
1753
No
No
1761
1757
Is Radio Volume Flag Set?
Yes
1759
Is Radio On?
Yes
Adjust Radio Volume Proportional to Vehicle Speed
No
No
RETURN

Fig. 54

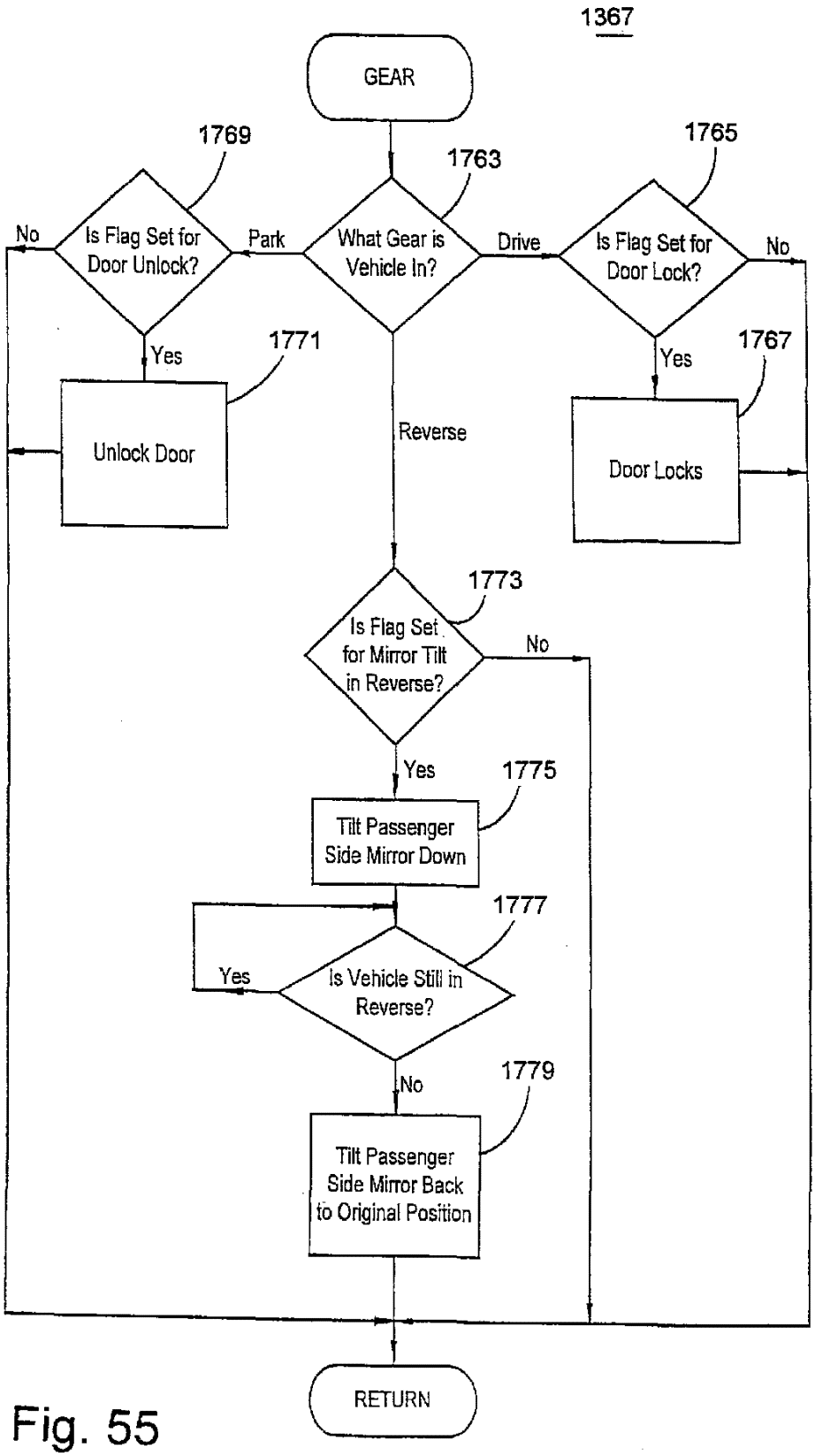

1367
GEAR
1769
1763
1765
No
Is Flag Set for Door Unlock?
Park
What Gear is Vehicle In?
Drive
Is Flag Set for Door Lock?
No
Yes
1771
Yes
1767
Unlock Door
Reverse
Door Locks
1773
Is Flag Set for Mirror Tilt in Reverse?
No
Yes
1775
Tilt Passenger Side Mirror Down
1777
Yes
Is Vehicle Still in Reverse?
No
1779
Tilt Passenger Side Mirror Back to Original Position
RETURN

Fig. 55

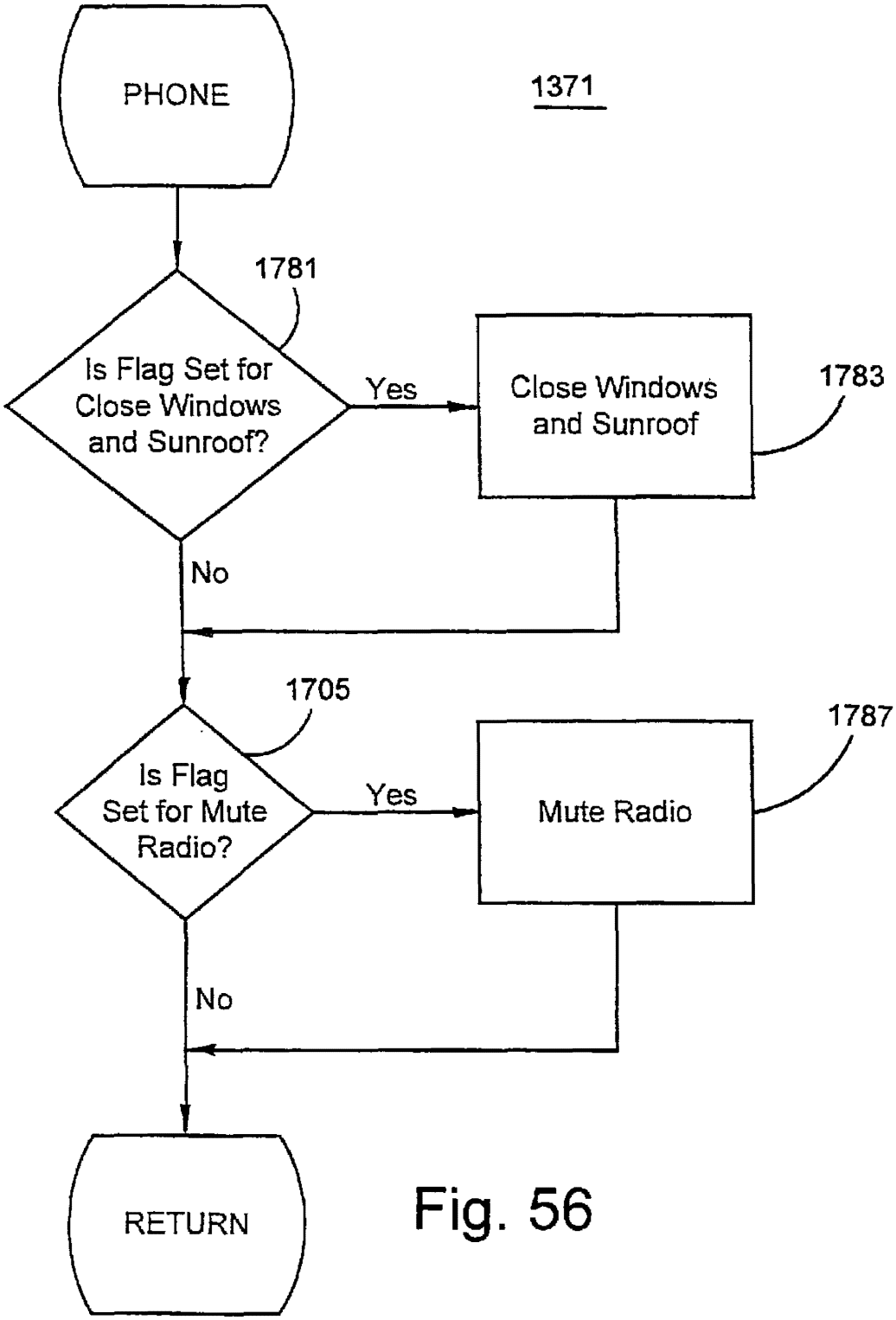

PHONE
1371
1781
Is Flag Set for Close Windows and Sunroof?
Yes
Close Windows and Sunroof
1783
No
1705
Is Flag Set for Mute Radio?
Yes
Mute Radio
1787
No
RETURN

Fig. 56

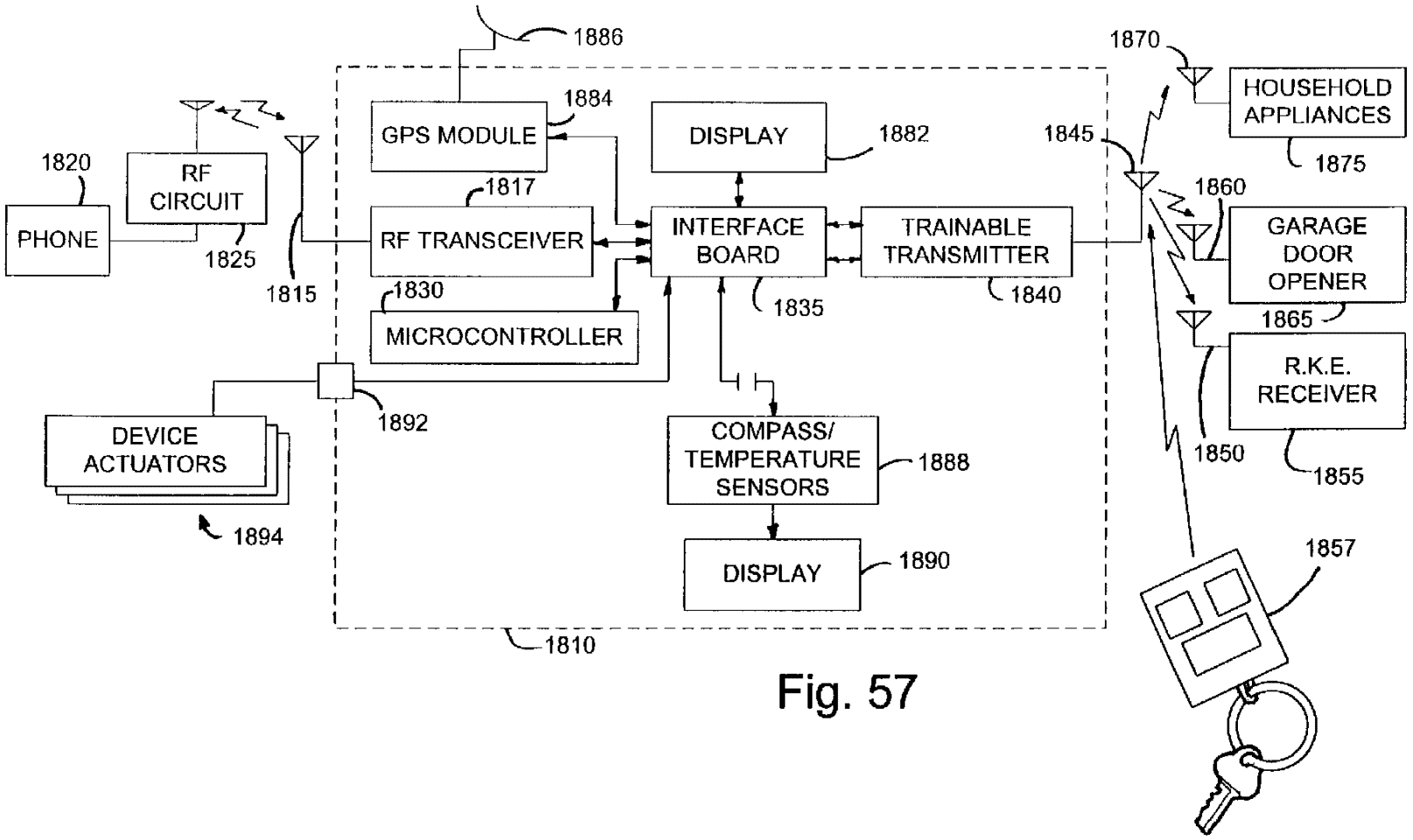

1886
1884
GPS MODULE
DISPLAY
1882
1870
HOUSEHOLD APPLIANCES
1875
1820
RF CIRCUIT
1845
1817
1860
PHONE
1825
RF TRANSCEIVER
INTERFACE BOARD
TRAINABLE TRANSMITTER
GARAGE DOOR OPENER
1815
1830
1835
1840
1865
MICROCONTROLLER
R.K.E. RECEIVER
1892
1850
1855
DEVICE ACTUATORS
COMPASS/ TEMPERATURE SENSORS
1888
1857
1894
DISPLAY
1890
1810

Fig. 57

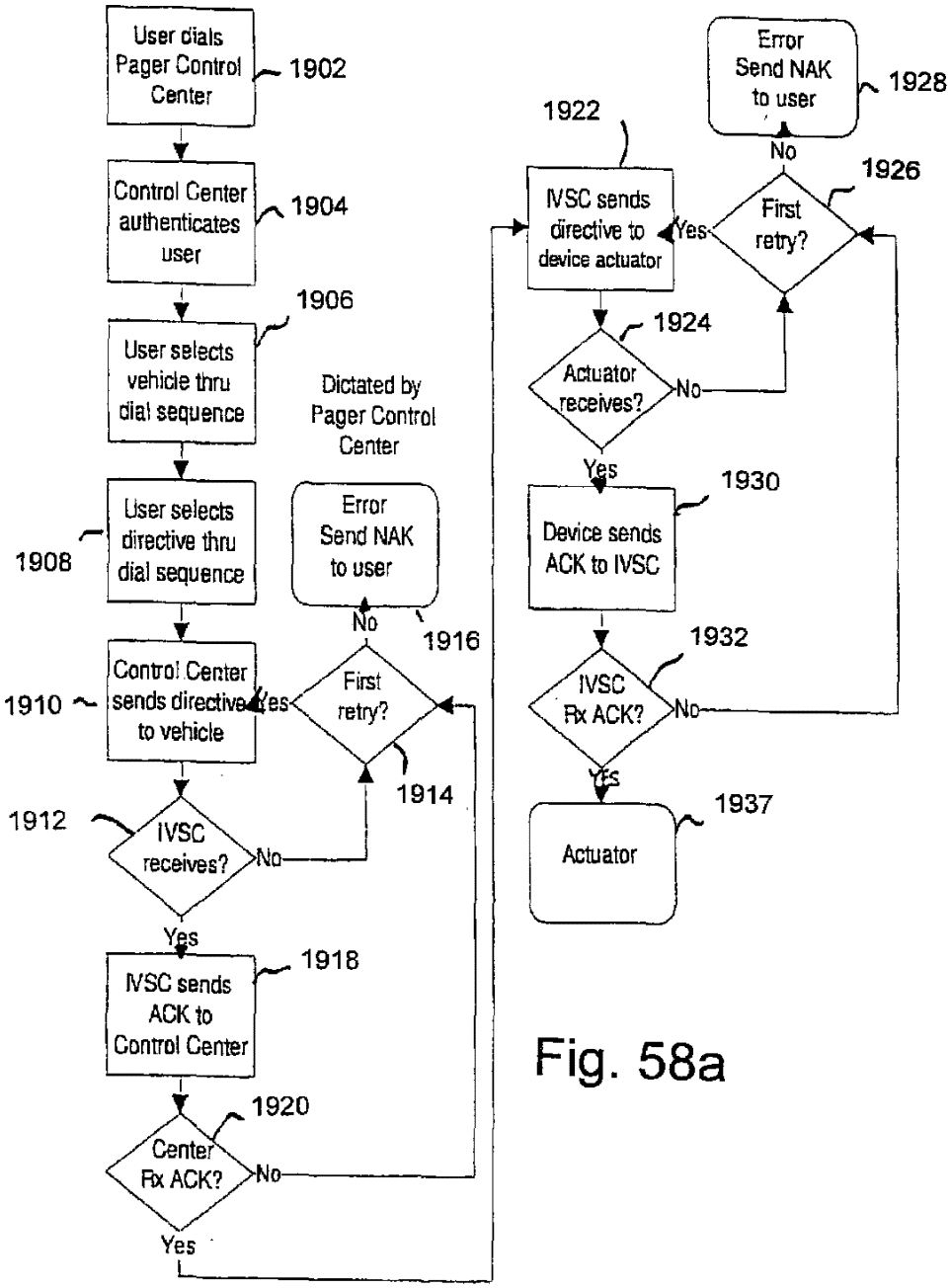

User dials Pager Control Center
1902
Control Center authenticates user
1904
User selects vehicle thru dial sequence
1906
Dictated by Pager Control Center
User selects directive thru dial sequence
1908
Error Send NAK to user
No
1916
Control Center sends directive to vehicle
1910
Yes
First retry?
1914
1912
IVSC receives?
No
Yes
IVSC sends ACK to Control Center
1918
Center Rx ACK?
1920
No
Yes
Error Send NAK to user
1928
1922
No
1926
IVSC sends directive to device actuator
Yes
First retry?
1924
Actuator receives?
No
Yes
1930
Device sends ACK to IVSC
1932
IVSC Rx ACK?
No
Yes
1937
Actuator

Fig. 58a

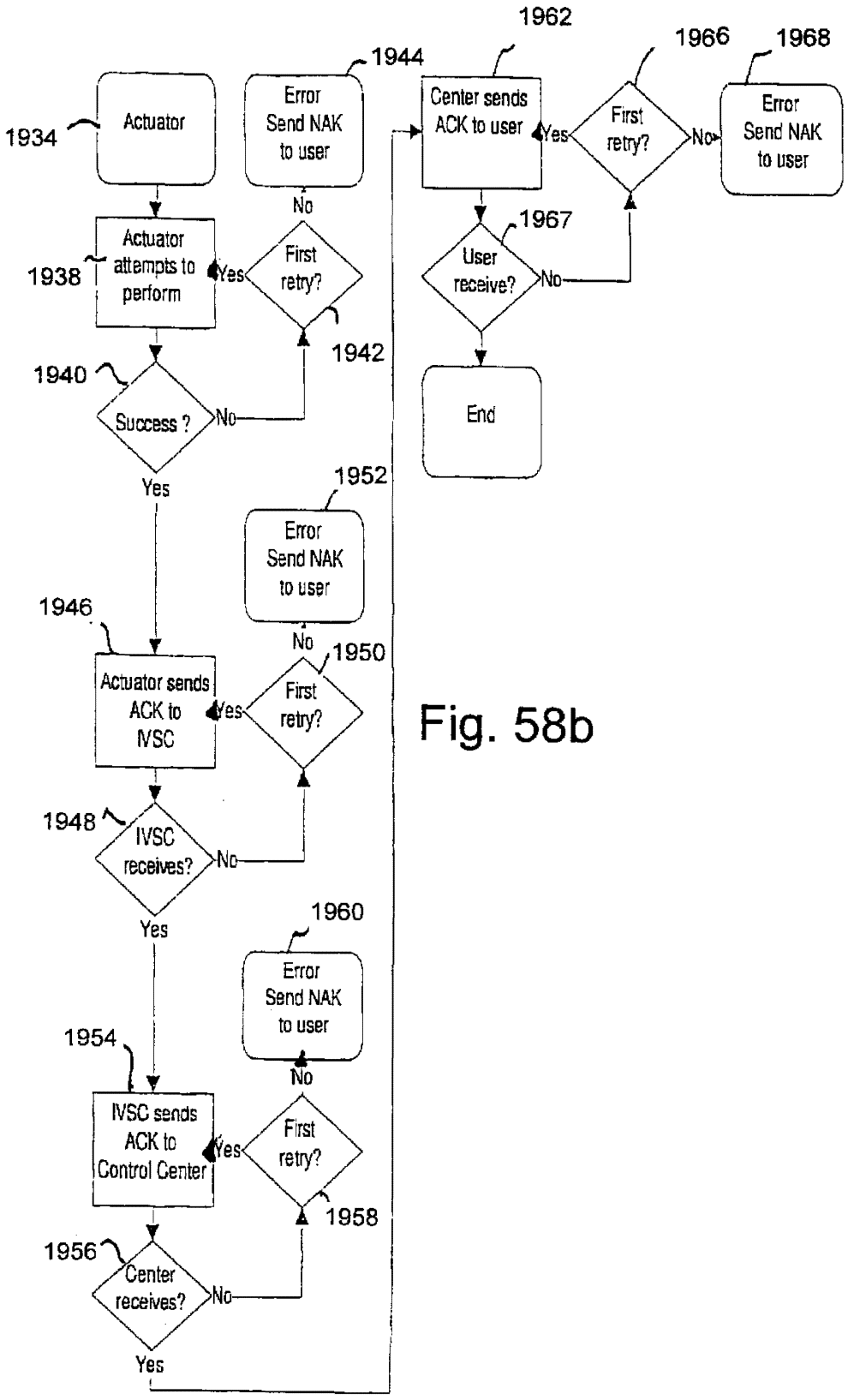

1962
1966
1968
1944
1934
Actuator
Error Send NAK to user
Center sends ACK to user
First retry?
Error Send NAK to user
Yes
No
No
1967
1938
Actuator attempts to perform
Yes
First retry?
User receive?
No
1942
1940
Success ?
No
End
Yes
1952
Error Send NAK to user
1946
No
1950
Actuator sends ACK to IVSC
Yes
First retry?
1948
IVSC receives?
No
Yes
1960
Error Send NAK to user
1954
No
IVSC sends ACK to Control Center
Yes
First retry?
1958
1956
Center receives?
No
Yes

Fig. 58b

VEHICLE COMMUNICATION AND REMOTE CONTROL SYSTEM

CROSS-REFERENCE TO RELATED APPLICATIONS

This application claims priority under 35 U.S.C. §119(e) on U.S. Provisional Patent Application No. 60/019,773 entitled VEHICLE COMMUNICATION AND REMOTE CONTROL SYSTEM, filed on Jun. 14, 1996.

BACKGROUND OF THE INVENTION

The present invention generally relates to a vehicle communication system having various message and control functions. More specifically, the present invention relates to a system for a vehicle capable of providing various combinations of automatic emergency response, theft deterrence, vehicle tracking and immobilization, two-way communication, remote vehicle accessory control, vehicle personalization, navigational guidance, and location-based information services.

Although various communication systems and various remote control systems have been disclosed for implementation in a vehicle, very few of these systems have, in fact, been integrated within a vehicle so as to provide both a two-way communication system and a remote control system that is capable of performing a large variety of functions. Because of the cost and complexity of the prior systems that have been proposed, many of the disclosed systems have never been actually implemented in a vehicle. In addition, given the cost that is passed along to the consumer, such systems must be capable of providing a large number of functions and yet be relatively easy to use. Further, most of these prior systems do not allow a vehicle owner to control, reprogram, and track their vehicle from a home or office personal computer (PC).

SUMMARY OF THE INVENTION

One aspect of the present invention is to provide a display and user interface in a vehicle-installed accessory such that the vehicle driver may easily manipulate the input keys and view the display with minimal distraction while driving. Another aspect of the present invention is to provide a two-way messaging system permanently installed in a vehicle and interfaced with the vehicle power supply, and preferably the vehicle system bus to allow for remote control and programming of vehicular components and accessories.

Yet another aspect of the present invention is to provide a system for providing quick access and communication with an emergency service center, such as 911, either by simply pressing a 911 button, or automatically upon deployment of an air bag. Such an emergency service system would also preferably provide information to the emergency service center indicating the vehicle's current location. Another aspect of the present invention is to provide a two-way communication system that will allow an occupant to request roadside assistance and to receive a confirmation that an assisting vehicle has been dispatched, and to provide an occupant with an estimation of when the assistance vehicle will arrive at the vehicle's current location.

An additional aspect of the present invention is to provide a system that will identify the location of the vehicle to the police, in the event that the vehicle is stolen. In this regard, the present invention preferably is passively activated when the vehicle's alarm is tripped. Further, the present invention may be used to immobilize and disable the vehicle in response to an appropriate command delivered in a radio frequency (RF) paging signal.

Yet another aspect of the present invention is to provide a vehicle locating system that allows the vehicle owner to determine the location of the vehicle when the vehicle has been loaned to a friend or family member. In this regard, the present invention may also be used by the manager of a fleet of commercial vehicles, such as taxis, police cars, trucks, or other delivery vehicles, to track the location of each vehicle in the fleet.

An additional aspect of the present invention is to provide a system capable of informing the vehicle occupants of the location of the nearest automatic teller machine (ATM), hospital, freeway on-ramp, etc., based upon the current location of the vehicle and to provide step-by-step audio or textual instructions on how to find such a location. In this respect, the present invention may also be used to provide a warning to the driver when the last exit is approaching from which the driver may obtain fuel before the fuel tank is empty. Further, the present invention may provide traffic reports, road conditions, and weather reports to the vehicle's occupants that are particularly relevant to the vehicle's current location.

It is an additional aspect of the present invention to provide a system allowing for remote control of vehicle functions and accessories using an RF signal. Thus, vehicle owners may lock their vehicle doors, roll up their windows, or activate an alarm system from any location in response to an RF signal. Further, the vehicle owner may use the system of the present invention to immobilize a vehicle to insure safe storage of the vehicle.

Still yet another aspect of the present invention is to provide vehicle personalization to be remotely affected by a service provider using an RF signal transmission system. In this regard, a vehicle owner wishing to reprogram a vehicle, calls the service provider who effects reprogramming of the control of an accessory by transmitting RF signals to the vehicle. Further, the present invention allows for vehicle personalization for each person who may operate the vehicle.

Additionally, it is an aspect of the present invention to provide a system that receives and displays text or audio messages providing step-by-step directions to reach a desired location based upon the current location of the vehicle whereby each step may be separately read from memory in response to each subsequent command, which may be generated by activation of a switch or by a global positioning system (GPS). Further, the present invention allows a user to inform the system that they are lost and to subsequently receive and display revised directions based upon the vehicle's current location. Additionally, the present invention may be used to suggest alternate routes based upon traffic delays between the current location of the vehicle and the desired destination. Further, the present invention may display or play back specific navigation steps corresponding to the current location of the vehicle.

Still another aspect of the present invention is to provide a system allowing for remote diagnostic evaluation of the vehicle by a service technician. Additional features and advantages of the present invention will be set forth in part in the description which follows and in part will be apparent from the description, or may be learned by practice of the invention.

To achieve these and other advantages, and in accordance with the purpose of the invention, the vehicle communication and remote control system preferably comprises various

combinations of the following: a two-way communication module for transmitting and receiving RF messages to/from a land-based transmitter/receiver station; a microprocessor coupled to the communication module for performing functions and generating messages in response to a received RF signal; a GPS module coupled to the microprocessor for receiving GPS signals and sending the location information signals to the microprocessor; a display interface and display coupled to the microprocessor for displaying messages and other information generated by the microprocessor to the system user; the compass module coupled to the microprocessor for providing and displaying vehicle heading information; a vehicle bus interface coupled between the vehicle's bus and the microprocessor for receiving information from and transmitting control signals to various accessories in the vehicle; a database stored in a memory coupled to the microprocessor for maintaining information pertaining to the vehicle and its occupants for manipulation by the microprocessor; and a driver interface coupled to the microprocessor for receiving input signals generated from various user interface buttons.

These and other features, advantages, and objects of the present invention will be further understood and appreciated by those skilled in the art by reference to the following specification, claims, and appended drawings.

BRIEF DESCRIPTION OF THE DRAWINGS

In the drawings:

FIG. **1A** is a schematic diagram depicting a system including a land-based transmitting station in communication with a vehicle having a communication and control system according to the invention;

FIG. **1B** is a schematic diagram depicting a paging system including a land-based transmitting station in communication with a vehicle having a communication and control system according to the invention;

FIG. **2** is an electrical circuit diagram in block form of the land-based facility illustrated in FIGS. **1A** and **1B**;

FIG. **3** is an electrical circuit diagram in block form of a vehicle communication and control system constructed in accordance with a first embodiment of the present invention;

FIG. **4** is a pictorial representation of a rearview mirror constructed in accordance with one embodiment of the present invention;

FIG. **5** is an electrical circuit diagram in block form of a vehicle communication and control system according to a second embodiment of the present invention;

FIG. **6** is a pictorial representation of an overhead console constructed in accordance with one embodiment of the present invention;

FIG. **7** is a fragmentary perspective view of an armrest console embodying the data entry system of the present invention;

FIG. **8** is an enlarged front elevational view of the data entry switches shown in FIG. **7**;

FIG. **9** is a fragmentary perspective view of an overhead display incorporated in the system of the present invention;

FIG. **10** is a schematic circuit diagram of the data entry switches shown in FIGS. **7** and **8** and in block form;

FIG. **11** is a diagram showing the various displays of an embodiment of the invention;

FIG. **12** is a diagram showing the selectable displays for one of the subroutines shown in FIG. **11**;

FIG. **13** is a diagram of a display for the stereo features subroutine;

FIG. **14** is a flow diagram of the program subroutine for controlling the data entry circuit using the display method shown in FIGS. **13** and **14**;

FIG. **15** is a diagram of another display for the stereo features subroutine;

FIG. **16** is a diagram of a display for the phone subroutine shown in FIG. **11**;

FIG. **17** is a diagram of the display for the phone list of the phone subroutine;

FIG. **18** is a diagram of the display of information for the entry of data using another data entry technique according to the present invention;

FIG. **19** is a flow diagram for the program subroutine for data entry using the display format seen in FIG. **18**;

FIG. **20** is a diagram of another display used for the entry of data in the phone dial number subroutine;

FIG. **21** is a diagram of the displays for the messaging subroutine;

FIG. **22** is a fragmentary perspective view of the overhead console showing an example of a message being displayed;

FIG. **23** is a diagram of the displays used for the compass subroutine;

FIG. **24** is a diagram of the displays used for the navigation subroutine;

FIG. **25** is a fragmentary perspective view of the windshield area of a vehicle including a message display system according to another embodiment of the invention;

FIG. **26** is a block electrical circuit diagram of a vehicle message display system according to an embodiment of the invention;

FIG. **27** is a perspective view of a vehicle interior including a message display system located in the A-pillar of the vehicle according to an alternate embodiment of the invention;

FIG. **28** is a perspective view of a vehicle interior including a message display system in an overhead console according to another alternate embodiment of the invention;

FIG. **29** is a fragmentary perspective view of a vehicle including a visor embodying the system of the present invention;

FIG. **30** is a perspective view of the visor shown in FIG. **29**, shown with a display housing in a lowered use position;

FIG. **30** is an enlarged fragmentary view of the display shown in FIG. **30**;

FIG. **31** is a fragmentary perspective view of the visor shown in FIG. **30** with the display housing in a stored position;

FIG. **32** is a rear perspective view of the visor shown in FIGS. **29–31** with the display housing pivoted to a lowered position showing the display window formed through the visor;

FIG. **33** is a front perspective view of the visor of FIGS. **29–32** shown in a lowered use position with the vanity mirror cover in an open position;

FIG. **34** is an enlarged fragmentary, front elevational view of the visor display shown in FIG. **33**, showing the display information thereon;

FIG. **35** is an enlarged fragmentary cross section view of the visor display taken along section line VII—VII of FIG. **34**;

FIG. **36** is a front elevational view of the visor shown in a lowered use position with the mirror cover in a closed position;

FIG. **37** is an electrical circuit diagram in block form of the display system;

FIG. **38** is a fragmentary perspective view of a vehicle interior showing an alternative visor display with the visor in a lowered use position;

FIG. **39** is a fragmentary perspective view of the visor display shown in FIG. **38**, shown with the visor in a raised stored position against the vehicle headliner;

FIG. **40** is a enlarged fragmentary, cross-sectional view taken along section XII—XII of FIG. **39**;

FIG. **41** is a diagrammatic view of a vehicle and a highway map showing exits and service locations to be employed;

FIG. **42** is a fragmentary perspective view of the interior of the vehicle showing a rearview mirror including the system of the present invention;

FIG. **43** is a flow diagram of the software programming for the microprocessor employed in an embodiment of the system of the present invention;

FIG. **44** is an electrical circuit diagram in block form of the vehicle electrical circuit embodying the present invention which may be used in association with the system shown in FIGS. **2** and **3**;

FIG. **45** is an electrical circuit diagram in block form of an optional interface circuit associated with the electrical circuit shown in FIG. **44**;

FIGS. **46**A–**46**K are flow diagrams of the program employed with the microprocessor shown in FIG. **44**;

FIG. **47** is an electrical circuit diagram in block form of an optional interface circuit associated with the electrical circuit shown in FIG. **44**;

FIGS. **48**A–**48**K are flow diagrams of the main control program employed with the microprocessor shown in FIG. **44**;

FIGS. **49**A and **49**B are flow diagrams of a first subroutine that may be called by the main control program;

FIG. **50** is a flow diagram of a second subroutine that may be called by the main control program;

FIG. **51** is a flow diagram of a fourth subroutine that may be called by the main control program;

FIG. **52** is a flow diagram of a fifth subroutine that may be called by the main control program;

FIG. **53** is a flow diagram of a sixth subroutine that may be called by the main control program;

FIG. **54** is a flow diagram of a seventh subroutine that may be called by the main control program;

FIG. **55** is a flow diagram of an eighth subroutine that may be called by the main control program;

FIG. **56** is a flow diagram of a ninth subroutine that may be called by the main control program;

FIG. **57** is an electrical schematic diagram of an integrated vehicle systems controller constructed in accordance with another embodiment of the present invention; and

FIGS. **58**A and **58**B are flow diagrams illustrating the flow of operations utilizing the integrated vehicle systems controller shown in FIG. **57**.

DETAILED DESCRIPTION OF PREFERRED EMBODIMENTS

1. Preferred Configurations

Referring initially to FIG. **1**, there is shown a land-based system for communicating with the vehicle communication and remote control system of the present invention as implemented in a vehicle **20**. The system shown in FIG. **1** also allows remote control signals and other commands to be issued to and from a system of the present invention within vehicle **20** via its antenna **22**. In a preferred construction, the infrastructure that enables communications to be sent to and received from the vehicle communication system, utilizes a cellular/paging network **2** which includes a plurality of base stations **19** that transmit and receive RF signals to/from vehicle **20**. Further, in a conventional manner, communications may be initiated or received through a public-switched telephone network (PSTN) **1** for transmission to or from a vehicle through cellular/paging network **2**. Further, such communications may be routed through a computer network such as the Internet **3** which is typically accessed through PSTN **1**. Because infrastructure including PSTN **1** and cellular/paging network **2** are in existence and well-known in the art, the structure and function thereof are not discussed further.

Depending upon the form and nature of communication and any command signal sent to or received from the vehicle communication and control system of the present invention, different techniques for enabling transmission of such communications and control signals, may be employed. For example, if an individual wished to place a telephone call to the vehicle communication system in vehicle **20**, the individual could place the telephone call on any conventional telephone **15** such that the call is routed to the vehicle in the conventional manner used to route a telephone call to a cellular telephone. Similarly, a call originating from the communication system in vehicle **20** may be routed to telephone **15** in any conventional manner. If, on the other hand, a 911 emergency call is originated using the vehicle communication system in vehicle **20**, the call would preferably be initially routed to a network service center **11** where a service operator could utilize a computer **13** to identify the vehicle's location based upon a vehicle location signal generated by the vehicle communication system and transmitted with the 911 distress call. The service operator could then establish a two-way communication link with the vehicle occupants using a conventional telephone **12**, while at the same time placing a call through PSTN **1** to establish a conference call with an operator using a telephone **6** or computer **7** at a 911 dispatch center. Similarly, if the vehicle occupant requests roadside assistance, the initial call and vehicle location signal would be transmitted to network service center **11** where an operator would subsequently contact a dispatch center **8** to have the appropriate form of assistance dispatched to the vehicle at the location identified in the location signal.

If an individual wished to transmit a text message to the vehicle communication system in vehicle **20**, the individual could do so in a number of different ways. For example, the user could type in the message on a personal computer **5** and transmit it using the computer's modem through PSTN **1** and cellular network **2** to vehicle **20** for display via a cellular communication link. Such a message originated through computer **5** could also be sent to vehicle **20** via a server on the Internet **3** operated by a network service center **11** or the like. Yet another method would be to send the text message originating from computer **5** either directly through PSTN **1** to a computer **13** at the network service center **11** or through Internet **3**. Network service center **11** would then put together an appropriately-formatted text message for transmission through PSTN **1** and cellular/paging network **2** to the vehicle. This message could also be formatted as a paging signal that may be received and displayed on a display device of the vehicle communication system. Fur-

ther still, an individual could place a call on a conventional telephone **15** and reach a network service center operator on telephone **12** to request that a specific text message be transmitted to vehicle **20**.

By utilizing PSTN **1** and Internet **3**, various features of the Internet may be accessed in the vehicle. For example, a driver may access e-mail or may receive periodic stock prices or news items through the use of the present invention.

As will be apparent from the description of the various functionalities that may be performed using the vehicle communication and control system of the present invention in connection with the infrastructure disclosed in FIG. **1A**, various techniques may be used to establish the appropriate form of communication or signaling such that the desired function is ultimately performed.

As shown in FIG. **1B**, the land-based facility that sends and receives messages and commands to and from the vehicle may be directly connected to the cellular/paging network. The land-based facility can be a car dealership, for example, or an independent facility which includes a service department **11** for providing the transmission and reception of control and communication signals to and from vehicles subscribed to the system. The service department includes an operator **12** with access to a computer terminal **13** with a keyboard **14** (FIG. **2**). The terminal can be a typical PC with an RS-232 data output port coupled to a modulator **16***a*, which, in turn, is coupled to a transmitter **18***a* for transmitting address and control or message signals A by an antenna **19** (FIGS. **2** and **3**) to the receiving antenna **22** of a vehicle **20**. The terminal is also coupled to a demodulator **16***b* that demodulates signals received from receiver **18***b* via antenna **19**. It is understood that nationwide, there will be a sufficient number of land-based facilities to service vehicles in the system. As satellite communications improve, it will be possible for a single facility to send such information using DBS (Direct Broadcast Satellite) in which the vehicle antenna is a satellite receiving antenna. Alternatively, satellite communications can be used as one link through several land-based relay stations.

As but one example, in the system shown in FIG. **1B**, the service operator will receive a request from a vehicle owner, typically by a normal telephone request, that a certain vehicle option is either to be enabled or disabled. Such an operation may, for example, be the activation or deactivation of a "LAST DOOR LOCKS ALL DOORS" feature. The service operator responds to the request which identifies the vehicle either by owner or vehicle identification number (VIN) (or both) by entering in keyboard **14**, the vehicle code which is typically an address associated with the particular vehicle and a reprogramming command associated with the requested personalization of the vehicle option change for such vehicle. This information may be modulated onto an RF signal. This RF signal is transmitted by the service department **11** using the equipment shown in FIG. **2** and received and demodulated by the vehicle system as described in greater detail below in connection with FIGS. **44**, **45**, and **47**, which respond to the reprogramming command to carry out the reprogramming control function. Also, the land-based station may transmit messages including communications and other information to the vehicle. Further, signals may be received from the vehicle, in the form of requests for information, roadside assistance, emergency services, directions to a particular location, and for various other types of information or services.

A variety of modulation schemes can be used for the transmission of information between land-based facilities and vehicles, however, a cellular link is presently preferred. Also possible are standard commercially available GSC, POCSAG, or two-way paging systems. An example of a two-way paging system is described in U.S. Pat. No. 5,153,582, issued to Davis, the entire disclosure of which is incorporated herein by reference. In the FIG. **2** schematic diagram shown, a reprogramming command can be two 23-bit words in the standard GSC paging format which uniquely identifies each vehicle in the system. Following the address for the vehicle, the actual reprogramming command data is sent, which in this paging format can be up to eight words or fifteen bits each. Other paging formats such as the POCSAG format can also be employed which also provides address code words and message code words. A description of these two formats is set forth in detail in Appendix A to this Specification.

Because many of the features of the present invention described below require the ability to transmit information and requests for information or services from the vehicle using RF signals, two-way communication is preferred. However, depending upon the specific features and services that are selected, the present invention may be implemented using conventional one-way communication formats.

In the example shown in FIG. **1B**, the vehicle operator has requested that the memory seat be disabled and the necessary RF signal including the reprogramming command is transmitted to the vehicle electrical control system **730** as shown in FIG. **44**, which includes the vehicle antenna **22** and a receiver and demodulator shown by block **724** for receiving the vehicle address and reprogramming command and applying it to a microcontroller **735**. Once received and decoded, the reprogramming command is executed as described below, and an indication that the command has been received and executed is provided on an alpha-numeric display in the vehicle.

In the installation shown in FIGS. **1B** and **2**, the modulator **16***a* responds to the vehicle identification code and the reprogramming command signal or message entered on keyboard **14** and transmitted by conventional commercially-available modulator **16***a* and transmitter **18***a* to provide the desired address and reprogramming in the GSC or POCSAG paging formats or in a format that may be otherwise recognized by the vehicle-installed system. Transmitter **18***a* typically operates on a frequency within the 137–175 MHz (VHF band) or within the 405–513 MHz (UHF band), while the modulator provides FM FSK tone modulation for the RF carrier signal to provide a composite output signal at transmitting antenna **19** which provides the address and reprogramming information to vehicles which are part of the system. Typically, the vehicle receiver and transmitter will be integral parts of the vehicle when purchased, and the dealer can either include the options select control system as part of the vehicle cost or can provide it as a monthly subscription service to the vehicle owner. Access to the unique vehicle identification code address for controlling options, however, will typically only be available to the vehicle dealer or associated service centers.

Turning now to FIG. **3**, there is shown the electrical circuit of a first embodiment of the present invention which is mounted in vehicle **20**. The vehicle **20** includes a data bus line **42** which is coupled to a vehicle bus interface circuit **36**, which is a multiplex circuit coupled to a variety of system sensors and provides signals to a bus **24** coupling the circuits of the present invention. The bus interface circuit **36**, therefore, receives signals from, for example, the vehicle's fuel gauge, the speedometer input, the air bags, and other vehicle operating parameters. The vehicle itself may con-

ventionally include a computer for providing signals such as distance-to-empty signals on bus **42**, or such information can be easily calculated based upon the sensor inputs. The interface circuit **36** provides information in the form of serial data to a microprocessor **26** through a serial data line included on bus **24**. Bus **24** also includes a clock line, an enable signal line and power supply conductors for coupling power from supply **32** coupled to the vehicle's battery via conductors to the remaining circuit elements. The information on vehicle bus **42** may also be selectively displayed to the vehicle operator by a display **28**. As will be described in further detail below, display **28** may be a conventional alpha-numeric digital display mounted in either a vehicle overhead console, an A-pillar, a sun visor, a rearview mirror, or on the instrument panel. The display circuitry **28** may also include a suitable audible alarm for alerting the driver.

The vehicle control circuit also includes driver command control switches, such as a keyboard or push-button switches **46**, **48**, **50**, **52**, **54**, **56**, and **58** coupled to microprocessor **26** via a driver interface **44** and bus **24**. As shown in FIG. **4**, these switches may be employed on a rearview mirror **45** near a display **62** formed adjacent the mirror surface **64**. Such switches are commonly employed in vehicles for selecting and controlling the display and entry of data in a vehicle. The driver may thus select information to be displayed directly or enter a command to microprocessor **26** which responds to calculate and subsequently display the desired information. As will be described in greater detail below under the heading "Alternate Vehicle User Interface System," the switches may be located remotely from the vehicle accessory in which the display **28**, **62** is located.

In addition, the vehicle includes a compass module **30** such as the type disclosed in U.S. Pat. No. 4,953,305, which may include its own display or may be coupled by bus **24** as shown to provide a display through the vehicle display circuit **28**. The power supply **32** provides suitable operating power for the components, which may include plus and minus Vcc supplies for the electronic circuits employed. The microprocessor **26** can be any number of commercially-available microprocessors such as a Motorola 68HC11, which includes internal RAM and ROM memories for providing the program control functions including that of the present invention which is described below.

The vehicle communication and control system according to the first embodiment of the invention includes a pager module **34**, which is coupled to a two-way antenna **36** for receiving and transmitting digital paging messages and coupled to bus **24**. Such a paging module can be of the type disclosed in U.S. Pat. No. 5,153,582, the disclosure of which is incorporated herein by reference. As shown in FIG. **4**, it may be uniquely mounted in the vehicle rearview mirror housing **45** and utilizes display **62** for displaying incoming paging messages. Transmitted responses to incoming information requests can be sent automatically under the control of microprocessor **26** or by the operator actuation of one or a predetermined sequence of switches **46**, **48**, **50**, **52**, **54**, **56**, and **58**. The vehicle-installed pager **34** receives power from the vehicle's power source through supply **32**. The pager module **34** allows automatic or vehicle operator requested communication of various information including the locations of available service areas from a database at a central station to which the vehicle operator subscribes and which makes such information available to the vehicle operator and vehicle electronic system through the pager module **34**. In addition, the vehicle communication and control system includes a navigation module **38** coupled to a suitable receiving antenna **40**. In the preferred embodiment, module **38** is a commercially-available GPS module of the type manufactured by a number of suppliers including Motorola, Inc., Trimble Navigation, Ltd., or the like.

The serial data line of bus **24** is coupled to an SPI port for each of the circuit modules of FIG. **3**. Also, the clock line is coupled to each of the circuits of FIG. **3** for receiving clock pulses from microprocessor **26** to synchronize the transfer of data between the modules. Finally, an enable line is coupled to each of the circuits for receiving enabling signals from the microprocessor to initiate the synchronized transfer of serial data between the microprocessor and each of the modules. The connection and data flow scheme for such interconnection is conventional, as is the coupling of the microprocessor **26** to the vehicle bus line **42** through the interface **36**. The specifics of the coupling to the vehicle bus line **42** and the various vehicle accessories and input lines are described in more detail below.

FIG. **4** shows a construction of a rearview mirror **45** in which the present invention may be installed. Rearview mirror **45** is preferably a mirror having adjustable reflectivity levels, such as an electrochromic mirror, and has a control circuit for automatically varying the reflectivity of the mirror in response to an ambient light level detected by a sensor **60**. As shown, rearview mirror **45** includes a display surface **62** for displaying various information to the user. With reference to FIG. **3**, it can be seen that display **62** corresponds to display **28**. Rearview mirror **45** also includes various push-buttons to allow a user to enter information into the system and to otherwise interface with microprocessor **26**.

Some of the push-buttons that may be provided are a back arrow **48** and a forward arrow **50** used to move a cursor or selections in a display window back and forth. An "option" button **52** may be provided to cause various selectable options to be displayed. Also, a "yes" button **54** and a "no" button **56** may be provided to answer a yes or no inquiry displayed on display **62**. A "back" button **58** may also be provided to allow the user to back up to a previously-displayed message.

A second embodiment of the vehicle communication and control system of the present invention is shown in FIG. **5**. As shown in FIG. **5**, the second embodiment differs from the first embodiment in that it utilizes a two-way cellular telephone RF link rather than a paging link. More specifically, the communication and control system according to the second embodiment includes a first microprocessor **66** that works in communication and cooperation with a second microprocessor **67**, which monitors inputs and provides outputs in a user interface portion **69** of the system of the present invention. First microprocessor **66** and second microprocessor **67** may be connected by bus **68** that may be a serial or parallel common interface. Together, first and second microprocessors **66** and **67** monitor incoming messages and communications from a cellular telephone transceiver **70** and from various vehicle accessories and components coupled to microprocessor **67** via a vehicle bus interface **85** that is coupled to a vehicle bus **86**.

Cellular telephone transceiver **70** may be a standard cellular transceiver that receives and transmits RF signals to and from a conventional cellular telephone antenna **71**. Cellular telephone transceiver **70** is coupled to first microprocessor **66** for receiving control data and other data to be transmitted thereby.

Transceiver **70** is also preferably coupled to a handset connection port **72** to which a telephone handset **73** may optionally be connected. With the handset connected to port

72, a user may place and receive calls using handset 73 in a conventional manner. Handset connection port 72 is also preferably coupled to an audio multiplexer 74 which, in turn, is coupled to a DTMF decoder 75 and a cellular modem 76. Cellular modem 76 is provided for transmitting and receiving data and text messages through cellular telephone receiver 70. DTMF decoder 75 and cellular modem 76 are preferably coupled to first microprocessor 66.

Similar to the first embodiment, the second embodiment also includes a location identifying sensor, such as a GPS or differential GPS module 77 having a GPS antenna 78. The GPS/DGPS module 77 is coupled to first microprocessor 66 to provide an indication of the vehicle's location, which may be used for a variety of purposes as discussed below.

The system may further include a voice recognition unit (VRU) 79 which is coupled to audio multiplexer 74 for recognition of voice commands that may be delivered from handset 73, cellular telephone transceiver 70, or from a microphone 82 provided in user interface 69. By providing VRU 79, the system may be controlled by hands-free voice commands to perform its many and various functions.

By providing a speaker 81 along with microphone 82 in user interface 69, and by coupling microphone 82 to audio multiplexer 74 and coupling speaker 81 to audio multiplexer 74 through an amplifier 80, two-way voice communication may be provided without requiring handset 73.

User interface 69 may further include one or more switches that may perform various functions in different modes of operation or may perform discrete functions regardless of the mode of operation. For example, as shown in FIG. 6, the invention may be implemented with the user interface 69 provided in an overhead console 100 that includes a dedicated switch 104 for requesting emergency assistance, a dedicated switch 105 for requesting roadside assistance, and an information request switch 107 which is a dedicated switch for requesting information from an operator at a network service center. Also included in the exemplary interface shown in FIG. 6, a two-way toggle switch 94 that is provided for adjusting the volume of the audio output produced by a speaker 81 provided behind a grid 103 forming part of the exterior surface of console 100. Also provided is a two-way toggle switch 108 provided for playing either the previous or the next navigational step required to reach a selected destination. A record switch 96 and a play back switch 97 are also provided which are used to record and play back dictated memos. The manner by which this operation is performed is described below. Also provided is a switch 93 for deleting recorded messages. As shown in FIG. 6, overhead console 100 may further provide a pivotable cover 106, which may be transparent, translucent, or opaque, for covering up switches 104 and 105, which are used to request emergency or roadside assistance, so as to prevent inadvertent activation of one of these switches. Console 100 may also include map lamps 101*a* and 101*b* which are selectively illuminated using switches 102*a* and 102*b*, respectively. Additionally, other switches may be provided on overhead console 100, such as a sunroof open and close switch 95.

Referring back to FIG. 5, the system according to the second embodiment further includes a voice digitizing circuit 91 coupled to audio multiplexer 74 and also coupled to a memory 92 for receiving voice messages, digitizing them, and storing them in memory 92. Voice digitizer 91 and memory 92 are also preferably coupled to second microprocessor 67 which controls the recording and play back of voice messages.

User interface 69 may further include a display 84 which is coupled to second microprocessor 67 for the display of various control menus and received text messages. As stated above, a vehicle bus interface circuit 85 may be coupled to second microprocessor 67 to send control signals to various vehicle accessories and components coupled to vehicle bus 86 and for receiving signals from various components coupled to vehicle bus 86, to which microprocessor 67 is to respond. For example, second microprocessor 67 may receive a signal through bus 86 and vehicle bus interface 85 indicating that the vehicle's air bags have been deployed. Microprocessor 67 would then respond to this indication by instructing microprocessor 66 to transmit a distress signal through transceiver 70 that would include the vehicle's last known location as determined by GPS/DGPS module 77.

On the other hand, if a command message received through transceiver 70 and demodulated using cellular modem 76 instructs the system to lock the vehicle doors, first microprocessor 66 would recognize the command and instruct second microprocessor 67 to send the appropriate control signal through vehicle bus 86 to the door lock actuators to lock the doors. Given that a modem is provided within this system, it will be readily apparent to those skilled in the art that various control and communication functionalities may be implemented in a manner that would be similar to having two computers communicating via their modems.

The system may further include an electronic compass 87 coupled to second microprocessor 67 for providing the vehicle's heading that may in turn be displayed on display 84 or may be transmitted in a communication signal through transceiver 70.

Instead of connecting VRU 79 to audio multiplexer 74, a VRU 88 may optionally be coupled directly to microphone 82 and to second microprocessor 67 for again serving as a hands-free interface to initiate various control functions which the system is capable of performing.

The system is preferably powered by a power supply module 89 that receives its power from the vehicle's battery or alternator. Power supply circuit 89 may also be powered by an auxiliary battery 90 that is provided to power the system in the event that power is interrupted from the vehicle battery. This would allow the system to transmit a distress signal even when an accident has occurred that is so severe that it has interrupted the supply of power from the vehicle's battery.

It will be apparent to those skilled in the art that various other buttons or combinations thereof may be provided to enable a user to readily manipulate the information displayed and to enter data using these buttons. Some alternative approaches and graphic user interfaces are described in detail below.

2. Preferred System Functions

Preferably, one of the push-buttons described above includes a "911" button 46 or 104 that a user may push in the event of an emergency. Because many drivers have difficulty determining their precise location when calling 911 from a vehicle using a cellular telephone, and because most cellular telephones do not transmit any information pertaining to current location, emergency service vehicles may have great difficulty locating the vehicle from which a 911 call was made. By providing a GPS module 38 in the system of the present invention, microprocessor 26 or 66 may ascertain the precise location of the vehicle and transmit the location in a distress paging message from paging module 34 or transceiver 70. In this manner, emergency service personnel may use the received location information to generate a map having the location highlighted thereon and immediately dispatch an emergency vehicle to the

location. If the emergency vehicles also have the system of the present invention installed therein, the emergency service personnel receiving the distress message and dispatching the emergency vehicles may track the location of the available vehicles and dispatch that vehicle that is closest to the vehicle sending the distress signal. Further, the emergency service personnel may transmit a message back to the vehicle confirming that the distress signal was received and provide an estimate as to when the dispatched emergency vehicle will arrive.

With the second embodiment, two-way voice communication may be established using microphone **82** and speaker **81** so that the emergency dispatcher may speak with the vehicle occupants if they are conscious.

Because most cellular telephones are not interfaced with the vehicle's electronic control system, one of the vehicle occupants must be able to dial 911 on the cellular telephone to obtain emergency assistance. This may or may not be possible if they are rendered unconscious in an accident. To solve this problem, the present invention is connected to the vehicle bus **42** or **86** to receive a signal indicative of whether any of the vehicle's air bags have been deployed. If any of the air bags are deployed, microprocessor **26** or **66** will respond by generating and transmitting a distress paging message including the vehicle's current location in the same manner in which the system would operate when the 911 button **46** or **104** is actuated. Thus, the present invention can automatically summon an ambulance even when the vehicle occupants are unconscious, therefore increasing emergency service response time and increasing the likelihood that the occupants will survive an accident.

By proper manipulation of the provided buttons and any information displayed on display **28** or **84**, a vehicle occupant may also summon a tow truck or other roadside assistance vehicles by transmitting an appropriate signal to a nearby central service center. The request for roadside assistance is handled in a similar manner that a 911 request is handled, such that GPS module **38** may provide the vehicle's current location. Additionally, a service technician may access the vehicle's diagnostic database through the system's vehicle bus interface to ascertain what may be wrong with the vehicle, and thus, what parts and tools may be required. The system may also transmit the make, model, and model year of the vehicle to the technician.

The system of the present invention may further include a database **27** stored in the RAM of microprocessor **26** or **66** or in a separate memory module. This database may include information pertaining to the driver of the vehicle, such as medical information, and information identifying the vehicle, such as the vehicle's color, make, model, and license number. Thus, the present invention may transmit the medical information stored in database **27** to a responding ambulance or it may transmit the information identifying the vehicle to the police if the vehicle is stolen.

In the event a vehicle is stolen that incorporates the present invention, the police may transmit a signal to the vehicle, causing the vehicle to transmit a signal back to the police identifying its current location and heading. The current location may be provided by GPS module **38** or **77** and the heading may be provided from compass module **30** or **87** or from information obtained from GPS module **38** or **77** over a course of time utilizing a triangulation method. Thus, the police may pinpoint and track the location of a stolen vehicle and determine its speed using the system of the present invention. The police may also transmit information identifying the location of the stolen vehicle to their police cars in the area if they are equipped with the system of the present invention. Further, utilizing the interface to vehicle bus **42** or **86**, the present invention may immobilize the stolen vehicle upon receipt of a proper control signal sent from the police. Thus, the present invention provides significant improvements in vehicle security and retrieval of stolen vehicles. Preferably, microprocessors **26** and **66** are appropriately programmed to respond to an activation of the vehicle's alarm system via vehicle bus **42** and **86** so as to immobilize the vehicle or otherwise alert the police and/or owner if the vehicle alarm has been tripped.

For vehicle owners that loan their vehicle to friends and family members, the present invention offers the advantage of allowing the vehicle owner to track the location of their vehicle. Thus, a parent loaning their vehicle to a child may track the location of the vehicle and hence the location of the child using the vehicle location tracking features of the present invention. For example, an owner may send a signal to the vehicle's communication and control system via the owner's home or office PC **5** (FIG. 1A) and subsequently receive a signal back from the vehicle identifying its location. The location may then be displayed on a map on PC **5**.

The present invention further allows for the receipt and display of text messages on displays **28** and **84** and allows for responses to be transmitted back to the source from which they are generated. Predetermined responses such as "I am running late," "I am stuck in traffic," or "I will call you later," etc. may be stored in memory for ease of selection in responding to a text message. Further, voice messages recorded using the second embodiment may be played back in response to incoming text messages or telephone calls. Thus, in addition to the above features, the present invention provides a means of two-way communication at a lower cost than could be obtained with a cellular telephone. Further, one does not need to answer a telephone to receive a text message, and therefore, the present invention provides advantages over the use of a system that solely relies upon a cellular telephone for two-way communication. As will be described below, a paging system and a cellular telephone may be used in combination to obtain all the benefits of using each form of communication in a single system. For example, a paging or text message having a telephone number may be received at any time whereby the driver may subsequently press a single button causing the paging module to download the number to the cellular telephone over the vehicle bus **42** or **86** and cause the cellular telephone to automatically dial the number contained in the received paging message.

The present invention additionally allows for the receipt and transmittal of location-specific information services. For example, the driver may cause the system to transmit a message to a central service center requesting the location of the nearest ATM, hospital, or freeway on-ramp or exit, whereby the central service center determines the location of the nearest ATM, hospital, or freeway on- or off-ramp to the vehicle based upon the received vehicle location information provided through the use of GPS module **38** or **77** and pager module **34** or transceiver **70**. Further, the central service center may transmit step-by-step instructions on how to get to the nearest ATM or hospital based upon the vehicle's current location. Other location-specific information that could be relayed to the vehicle occupants includes traffic reports and weather and road conditions relevant to the vehicle's current location. Additionally, in the manner described in more detail below under the heading "Detailed Description of the Last Exit Warning Function," the vehicle's fuel level may be determined and the distance-to-empty mileage computed such that the system then transmits

the signal to a central service center identifying the vehicle's location and distance-to-empty and receives information back identifying the last exit on a highway at which fuel may be found before the vehicle's fuel tank is empty. Thus, the vehicle driver may be warned when he or she is approaching the last exit to obtain fuel.

The present invention may also be used for providing navigational information to the driver based upon the vehicle's current location and upon a desired destination. In this manner, the driver may identify the desired destination and transmit this destination in an RF signal that also includes the vehicle's current location derived from the GPS module **38** or **77**. A central service center receiving this message may then generate a step-by-step set of directions for reaching the desired destination and transmit this information to the vehicle in a return RF signal. The information may then be displayed one step at a time on display **28** or **84** in the view of the driver or if not in text form, may be played back over speaker **81**. This information may be continually updated by transmitting additional location identifying signals to the central service center so that the driver may be warned if he or she is about to miss a turn or exit. Alternatively, location codes may be transmitted with each step of the step-by-step instructions such that the steps may be displayed or played back when the vehicle has reached a location requiring a new instruction, such as "turn left here," as determined by GPS **38** or **77**. Further, in the event the driver is lost, the driver may inform the vehicle's system of this fact such that the system transmits an RF signal to a central service center which identifies the location of the vehicle and provides step-by-step instructions to the desired destination from the vehicle's current location. Additionally, the system may store the directions in memory such that upon selection by the user, the directions back from the vehicle's location to its original location will be displayed on display **28** or **84** or played back over speaker **81**. The system may further store directions for frequently traveled routes such that the driver may simply recall them from memory and have them displayed on display **28** or **84**. By obtaining traffic reports, the present invention may be used to warn the vehicle driver of traffic delays and to provide step-by-step alternate routes to any desired location.

As can be seen from the foregoing, the present invention provides many desirable features for businesses that have fleets of vehicles. Specifically, the ability to interactively receive traffic reports on demand and the ability to track the fleet's vehicles would provide a competitive advantage to businesses such as taxi cab companies. Further, by providing the vehicle systems with a remote assistance button that may be actuated in the event of an emergency, taxi cab drivers will feel more secure while driving in unsafe areas.

In the event the vehicle is provided with a self-diagnostic system that is connected to vehicle bus **42** or **86**, the present invention may be used to allow for remote diagnostics to be performed on the vehicle. Thus, for example, when a vehicle has broken down along side a remote highway, a service station may transmit an RF signal to the vehicle prompting the vehicle's system to transmit an RF signal back including any self-diagnostic information such that the tow truck responding to a request for roadside assistance may be properly equipped with the right tools to provide for the most-appropriate roadside assistance on the particular make and model vehicle requesting service.

The present invention may also provide for remote control of the vehicle's accessories in response to an appropriate RF signal. For example, in the event the driver has accidentally locked his or her keys in the vehicle, the driver may simply call the service center to have a control signal transmitted to their vehicle causing their doors to unlock. Further, if the vehicle owner has parked his or her vehicle in an airport parking lot and subsequently realized the doors were not locked, the owner may call the service center and have the center transmit an RF signal causing the doors to lock or possibly causing the windows to be rolled up in the event it begins to rain. Another remote control function that may be advantageous is to have a signal transmitted to the vehicle causing its horn to honk at periodic intervals to allow its owner to find it in a crowded parking lot. The detailed operation of the present invention for performing these functions is described below under the heading "Detailed Description of Vehicle Personalization and Remote Control Functions."

Yet another function performed by the present invention is to allow vehicle accessories to be reprogrammed in response to an RF signal such that the vehicle accessory operations may be personalized for each individual driver. For example, the vehicle may be programmed so as to recognize different drivers based upon a signal transmitted from a remote keyless entry (RKE) key fob and thereby move the seats and mirrors into a position last used for that particular driver. Due to the increasing number of available electronic options in vehicles, a large number of possibilities exist for controlling vehicle accessories and the need for personalizing the operation thereof dramatically increases. The manner by which the present invention reprograms the manner in which various vehicle accessories and functions are controlled is described below under the heading "Detailed Description of Vehicle Personalization and Remote Control Functions."

3. Alternative Display/User Interface Configuration

With the increasing use of microprocessors in vehicles for a variety of vehicle control functions, interaction between the vehicle operator and the microprocessor for programming options and the like is frequently necessary. Although a keyboard can be employed, it requires an excessive amount of space in a vehicle such as an automobile. If a numerical keypad is employed, such a data entry system requires the operator to understand for each command to be entered the corresponding numerical entry number or numbers to carry out the desired command. Further, the use of a keyboard or keypad, particularly if the vehicle in operation is very distracting, could result in inattentiveness to driving functions.

A voice-actuated control system has been proposed and is represented by U.S. Pat. No. 4,827,520 issued on May 20, 1989, and assigned to the present assignee. Although such a system provides hands-free control of a variety of vehicle options utilizing a microprocessor, it requires training to each one of the vehicle operator's voices and somewhat complicated and expensive electronics at current levels of technology.

The system of the present invention overcomes the difficulty of entering data or vehicle control commands for vehicle programming and operation by providing a visual display of either icons, alphabet letters, numerals or a combination of visual and alpha-numeric information and allows the user, by using a reversible control, to select an icon or other displayed control or data element and subsequently enter the element with a push-button switch. This information entry sequence thus provides a vehicle operator with a display of selectable information, allows the operator to easily select the desired information and subsequently enter such information for carrying out the associated function.

In an embodiment of the invention, the information displayed is provided in an overhead console and the operation information entry controls are located at the forward edge near the top of an armrest console where they are conveniently located and readily available to the operator. In one embodiment, a rotary left-right switch is provided to allow the operator to move a cursor or display information in a display window to select a desired command function before entering the command to be executed. In some embodiments of the invention, an array of icons or alpha-numeric displays are simultaneously displayed and the operator moves a cursor to the selected item after which an enter switch is actuated to carry out the command selected. In other embodiments, a window is provided in which different alpha-numeric characters are selectively displayed utilizing the rotary switch. When the desired window shows the command function to be carried out, the enter switch is actuated.

Central to each of the different types of data entry, however, is the utilization of a conveniently located control for selecting information which is displayed to the operator without the necessity of utilizing operator manuals or the like thereby providing a user-friendly data and command control entry system for vehicle programming such as personalization of accessories, telephone operation, reading of messages received from a paging system, the selection of compass and trip information or navigational instructions.

Referring to FIGS. **7** and **8**, there is shown the interior of a vehicle such as an automobile **110** including a centrally-located armrest console **112** having a switch assembly **120** which is conveniently located for use by the operator in selecting information to be displayed and entered in cooperation with the display **170** mounted in an overhead console **150** (FIG. **9**). The armrest console includes an upper arm supporting surface which may be in the form of a padded cover **114** pivotally mounted to the walls defining a storage compartment **115** located below cover **114**. The armrest console **112** is centrally located between the front seats of the vehicle. The armrest console may also include a collapsible cupholder assembly **116** shown in an extended use position and which slides into and out of the storage compartment **115** for use.

The armrest console integrally includes a forward housing **118** located at the front upper edge of the console **112** and which houses a switch assembly **120** comprising four switches **121**, **122**, **123**, and **124**. Housing **118** includes a forwardly and downwardly inclined wall **119** into which the switch assembly **120** is mounted. Each of the switches, which are shown in greater detail in FIG. **10**, include exposed switch control surfaces with switch **121** having a push-button **131** with the letters "ENT" for "enter" embossed thereon upside down so it can be read by the vehicle operator looking downwardly on the switch assembly **120** from above. The enter switch provides an enter command for currently displayed data or command information selected by the operator using switch **122**. Switch **122** is a rotary switch and includes a rotary knob **132** for controlling the motion of the switch to the left or right as viewed in FIG. **8** which in turn moves a cursor on the display **170** or otherwise changes displayed data or control information to be acted upon by the operator. Switch **123** includes a push-button surface **133** which is embossed by the letters "PREV" standing for "previous screen," the function of which is to control the display to display the previous screen as described in greater detail below. Finally, switch **124** includes a push-button surface **134** with "EXIT" embossed thereon for providing an exit command function for the system. The facing edges of switch contact surfaces **131** and **133** are concavely recessed at **135** as seen in FIG. **8** to provide greater accessibility to the disc-shaped control knob **132** for switch **122**.

As seen in FIG. **9**, the vehicle **110** also includes an overhead console **150** which is mounted to the roof **152** of the vehicle near the front windshield **113** and between the front window visors such as visor **111** which is the passenger side visor as seen in FIG. **9**. Console **150** includes a pair of covered storage compartments **154** and **156** with compartment **154** providing sunglass storage and compartment **156** housing, for example, a universal garage door opening transmitter. The console **150** may also include map reading lamps **153** and **155** and provides at its forward end a downwardly inclined bezel **160** housing a display **170** and a four push-button switch assembly **220** which parallels to some extent the switch assembly **120** on the armrest and can be used for the same or similar control functions interchangeably. Thus, a push-button select switch **222** is provided which moves a cursor of the display **170** only to the right as opposed to moving the display left or right as provided by the counter-part rotary switch **122**. An "enter" switch **221** corresponds to switch **121** for the entry of a selected command while to the right of the display **170** is a "previous" switch **233** and an "exit" switch **234**. The display is preferably a vacuum fluorescent or LCD display capable of providing alpha-numeric display information as well as providing graphic displays such as the icons shown in FIG. **9** or the text message shown in FIG. **22**.

In FIG. **9**, for example, there is displayed the "home" screen display which is five icons **161**–**165** with icon **161** corresponding to personalization, icon **162** corresponding to a telephone control subroutine, icon **163** corresponding to a page message reading subroutine, icon **164** corresponding to a compass and odometer display subroutine, and icon **165** corresponding to a navigation and route information subroutine. As can be seen in FIG. **9**, icon **165** which comprises a pictorial representation of the earth in a rectangular field has the background field illuminated indicating that this icon is currently being highlighted and therefore selected by the operator. Movement of switch **122** by the rotary knob **132** will cause the highlighted icon to change with movement of the switch **122** to the left or right scrolling around to the other end if passing the endmost icon. Switch **222**, if actuated, will continually move the icon highlighted to the right and which scrolls around to the left edge after icon **165**. Display **170** can provide the display not only of the icons programmed into memory to correspond to subroutines for computer operation but also alpha-numeric information describing the selected or highlighted icon as for example shown in FIG. **11**.

The electrical circuit for implementing this data entry system is disclosed in U.S. Pat. No. 5,555,172. Switch **122** is a rotary switch which provides sequential contact closure signals on conductor **125** (FIG. **10**) as the knob **132** is rotated to the left by the operator and sequential contact closure signals on conductor **127** as the knob **132** is rotated to the right. The knob can be continuously rotated to provide as many movement control signals for the cursor associated with display **170** as desired and as described below. Switch **122** can be a commercially-available Alps Model No. RK09710H. The display is a 32×128 pixel vacuum fluorescent display which has sufficient resolution to provide the display icons as shown in FIG. **9** as well as other data such as the text message shown in FIG. **22** and the other various screens as explained in greater detail below.

Turning now to FIG. **10** there is shown the switch assembly **120** which is mounted to the armrest **112** as seen

in FIGS. 7 and 8. The switch assembly includes momentary push-button switches 121, 123, and 124 corresponding to the "ENTER," "PREVIOUS," and "EXIT" commands and the rotary momentary make and break switch 122 which, depending on the direction of rotation, either provides a momentary left to ground circuit or right to ground circuit to the conditioning circuit and subsequently to a microprocessor. The microprocessor responds to command signals from switch assembly 120 to provide the desired information or control functions as now described in conjunction with the display screens and flow diagrams of FIGS. 11–24. The microprocessor provides stored display information written into a ROM memory when called upon. The program loops through the main program checking the closure status of each of the switches of switch assemblies 120 as well as checking for input data from either a compass circuit, text messages which may be received by the RF transceiver, or navigational data received through a navigation circuit module coupled to the microprocessor.

Upon receipt of operator inputted commands as described in connection with FIG. 16, the microprocessor outputs control signals for the operation of the cellular telephone. As one of these data interrupts occurs, the appropriate subroutine is called up for processing and storing the data. A compass circuit which can be employed with the microprocessor is disclosed in greater detail in U.S. Pat. No. 4,953,305 issued on Sep. 4, 1990, the disclosure of which is incorporated herein by reference. The personalization circuit and RF transceiver circuits and their programming are also disclosed in detail below.

Initially, the main program displays the home panel which is seen in FIG. 9 as the primary display with the five icons representing personalization, telephone, page, compass, and navigation. One of the icons will be backlighted or highlighted indicating that it is the selected icon which can be controlled by actuation of the "ENTER" switch 121. Rotation of the left/right switch 122 or alternatively depressing switch 222 causes the next adjacent icon on either side to be illuminated for selection upon actuation of the entry button.

Upon selecting one of the desired subroutines 300, 302, 304, 306, or 308 shown in FIG. 11, the program will move to the subroutine called for by actuation of the "ENTER" switch 121 or its corresponding switch 221 located in the overhead console 150. The subroutine performs the functions as controlled by the actuation of the switches in the switch assembly 120 with the display 170 providing prompting information to the operator with the use of icons or other alpha-numeric or symbolic displays. If, for example, the operator would like to select the personalization subroutine from the home panel display 290 (FIG. 11) which as seen in FIG. 9 is currently in the navigation selection position, rotary switch 122 can either be moved to the right to move the selected highlighted icon to the wrap-around position showing the personalization icon or moved to the left through the compass, pager, and telephone to the personalization icon. The "ENTER" switch 121 is then actuated to call up the personalization subroutine 300 (FIG. 11) shown in greater detail in FIG. 12.

Turning now to FIG. 12 which shows the display screen and an outline of the programming for the personalization subroutine 300, upon selection of the personalization icon from the home display 290, the program reads the stored information which is applied to display 190 to display the personalization selections indicated by block 310 in FIG. 12. This display information is stored in ROM memory and switch 122 is rotated to select either user 1, user 2, or the train fob icons which are displayed in display 190 as indicated by panel 310 of FIG. 12. Once the desired highlighted selection is made, the "ENTER" switch 121 is actuated to inform the computer which of the three subroutines to call up to train for personalization functions. These include in the embodiment shown, user 1 subroutine 312, user 2 subroutine 314, or training for use of the RF keyless entry fob 316. At this time, the display 190 will display the personalization icons identified in block 318 of FIG. 12 which may be, for example, graphic representations similar to that shown in FIG. 9 except displaying, for example for seat personalization, a pictorial representation of a seat, a lock for the door lock/unlock personalization function, a radio for the stereo select functions and a thermometer for the climate control functions.

Thus, actuation of the "ENTER" switch 121 when display 170 is displaying the selections shown in block 310 will advance the display to the next displayed screen 318 displaying to either user 1 or user 2, the selections available. The train fob subroutine 316 shown in FIG. 12 is selected if it is desired to train a keyless entry-type RF transmitting key fob such that various codes available by the actuation of switches on the key fob can be programmed to control various vehicle personalization functions. The programming for training the keyless entry fob and the various personalization functions can be done using a variety of conventional programming methods. One programming system for the personalization of the various vehicle options and training of a key fob is disclosed in U.S. Pat. No. 5,278,547 issued Jan. 11, 1994, the disclosure of which is incorporated herein by reference.

At any time during the programming of the vehicle personalization features, the programming can be terminated storing the selected features by pressing the "EXIT" switch 124 which returns the program to display the home panel 290 (FIG. 11). The data selections entered prior to such time by the actuation of "ENTER" switch 121 in response to displayed operational choices will have been stored in the computer RAM memory. Decisions which are made can be reversed by pressing the "PREV" switch 123 which allows the operator to return to a display prompted decision and enter the desired choice of data.

In response to the displayed icons at block 318, the operator, who may either be user 1 or user 2 in the embodiment disclosed, selects one of the four example categories by rotating select switch 122 or pressing its corresponding switch 222 on the overhead console to highlight the selected icon and then presses switch 121 for controlling the computer to move to the subroutine selected. The subroutines shown in the preferred embodiment include seat personalization 320, door lock and unlock 322, preset radio control functions (i.e. stereo features) 324, and climate control presets 326. Other personalization options such as rearview mirror, side view mirror controls and the like also can be incorporated in the system of the present invention utilizing conventional programming techniques. If the seat personalization subroutine 320 is called for, the computer will, upon receiving a command signal from the information corresponding to the highlighting of the seat personalization icon by movement of switch 122 and the entry command signal from the actuation of switch 121, display to the vehicle operator prompting information necessary to preset electrically operated and adjustable vehicle seats where desired.

Thus, display 170 may prompt the operator to manually adjust the seat by actuation of the normal electrical seat control switches to a desired position and once that has been accomplished actuate switch 121 to store the seat position information obtained from the movement of the seat to the

desired position in computer memory. When this is accomplished, the entry of the seat position information by the computer will allow the program to move back to the personalization loop looking for new input commands from switch assembly **120** while displaying display screen **318** to allow the operator such as user **1**, to select another item for personalization. As will be described herein in greater detail below, the data entry system available through the use of rotary switch **122** and display **170** however provides greater flexibility than merely highlighting an icon for entry and the subsequent entry of data selected.

The utilization of the rotary switch **122** also can be employed for providing specific alpha-numeric messages which can be stored in the computer and subsequently recalled, for example telephone numbers, addresses, and the like, for use in connection with the cellular telephone and navigation systems of the vehicle. As an example of the data entry available with the system of the present invention, for example with the stereo features subroutine **324** which can be called up from the personalization icon display **318**, preset frequencies can be entered into the system utilizing switch assembly **120** as described in connection with FIGS. **13–15**. Referring to FIG. **13**, there is shown one display for providing operator prompting information to the vehicle operator for selecting any programming preset frequencies in the vehicle's stereo system. Selection of the stereo features icon from block **318** of FIG. **12** will display a new menu of options to the operator including volume presets, bass and treble controls and other control functions including the frequency band and station presets illustrated in FIGS. **13–15**. Preset stereo system receivers are well-known and as is the presetting of a variety of frequencies therein, this system however provides for the use of the relatively easily operable rotary switch **122** and display system in connection with the data entry system for presetting AM and FM frequencies.

Referring initially to FIG. **13**, there is shown a typical operator prompting display for preset number **1** for receiver programming. The display prompts the operator to select AM or FM bands by providing at least one predetermined location on the display **170** defining a display window **328** which contains initially the letter "A" therein as called from the computer memory look-up table associated with the programming subroutine for the stereo receiver. As seen in FIG. **14**, this subroutine is started as indicated by block **332** and actuation of rotary switch **122** can move the alphabet characters up the alphabet (to the right) if rotated to the right as indicated by block **334** or down (to the left) as indicated by block **336**. Inasmuch as only two choices are required (an "A" or an "F") only these two letters need be available for this subroutine, it being understood that for other subroutines, the microprocessor memory provides for the scrolling through a selected window the entire alphabet. With "A" being displayed in window **328**, if the operator wants to select an FM band preset for position **1**, switch **122** is rotated in this case in either direction to display an "F" in window **328**. At this time, the operator actuates "ENTER" switch **121** and the program enters the selected data into memory and responds to the selected "F" to provide the next selected display screen of FIG. **15** for FM frequencies. The program subroutine for scrolling through the available or necessary letters or number is shown in FIG. **14** where the initial character to be selected is controlled by the operator actuated switch **122**.

The program looks for an alphabet right command **334** and when received, the next available letter is highlighted or entered into the window **328**. It then moves through the loop again looking for closure of one of the switch contacts for switch **122** in either direction or actuation of the "ENTER" switch **121** storing the highlighted letter or number. Thus, the program loops through decisional blocks **334–344** by which the program looks for the movement of rotary switch **122** to move the displayed letter of the alphabet either up or down in the alphabet and entering the selected letter or other character. When the desired letter is being displayed in block **328**, "ENTER" switch **121** is actuated as indicated by block **342** and this data is entered into the computer memory corresponding in the example to the first letter of the selected frequency band. In the case of the second letter, since it will always be an "M," "M" will be automatically displayed. Upon entry of the "A" or "F" in window location **328** and the subroutine will then move to the next subroutine setting forth the digital information corresponding to the FM frequency selection in a similar fashion prompting blocks of numbers corresponding to four-digits for FM or three-digits for AM are displayed. Thus, upon actuation of the "ENTER" switch **121**, the highlighted letter is entered into computer memory as indicated by block **344**, and the program exits the loop of FIG. **14** and goes to another similar subroutine for selecting the desired FM frequency and displays the selection screen shown in FIG. **15**.

In FIG. **15** four blocks of frequency indicating numbers are displayed and the subroutine prompts the operator to select an appropriate digit for each location in the display for subsequent entry into the computer in a manner similar to that described in connection with the band selection of FIGS. **13** and **14**. Thus, initially window **329** will be highlighted and switch **122** moved left or right to increase or decrease the digit displayed. Upon entry of the data by actuation of switch **121**, the next window **331** will be highlighted and the process repeated until data for the four possible frequency selection windows **329**, **331**, **333**, and **335** are selected. The program will provide a test to determine when the last frequencies digit has been entered and when completed increment a counter to initiate programming of preset number **2** by returning to the subroutine of FIG. **14**.

Thus, the select and entry system available with the use of rotary switch **122** provides a highlighted display window through which alpha-numeric or other character information can be scrolled by the actuation of switch **122** either by increasing or decreasing numbers displayed in the select block or by going up or down the alphabet for alphabetical information being displayed. Upon actuation of the enter switch, the selected information is entered into the computer memory for use either in controlling the desired operation or, for example, providing message information or, for example also, phone listing information, address information, or the like. Any desired alpha-numeric information may thereby be entered into the computer (i.e., the microprocessor memory **198**) using the data entry system and the select and enter method described in connection with FIGS. **13–15**. As will be described hereinafter, another operator prompting and data entry technique is also available employing the data entry system of the present invention.

As can be appreciated in connection with the entry of preset frequencies as shown in FIGS. **13–15**, once the selected frequency has been entered, the last digit entered will inform the computer to move to the next available preset address and once the last address is completed, the display prompt will so indicate to the operator and allow the selection of the other frequency band or ask if any of the presets need to be changed which, again, can be selected by scrolling through a display of a number corresponding to a particular preset or particular display frequency band.

Another of the selectable options from the home panel **290** shown in FIG. **11** is the phone control subroutine **302**. This subroutine is selected by the highlighting of the phone icon by rotating switch **122** and the actuation of the entry switch **121** or **221**. This causes the program to display to the vehicle operator either icons or words as indicated by block **350** of FIG. **16** either showing a list of telephone numbers or a telephone number to be dialed. Upon selection, for example, the phone listing icon, a subroutine **352** is called up which provides a pre-programmed listing of stored telephone numbers which can be automatically dialed by the microprocessor cellular telephone interface or which list can be initiated, added to, or deleted utilizing the other data entry technique now described in connection with FIGS. **17–20**.

The phone list may take the form of display as shown in FIG. **17** with the first three names and numbers being displayed on three lines of display in display **170**. Movement up and down of the display which may include any desired number of entries depending on the available memory, can be selected by rotating switch **122** to the right for scrolling down in the list or to the left scrolling up in the list or wrapping around for example entry **125**, the phone list can give the name of the person to be called as well as the calling number. By controlling switch **122** and highlighting number **1** and then pressing "ENTER," the first number on the list can be automatically dialed through the coupling of the microprocessor to the cellular telephone transceiver in a conventional fashion. Entry of numbers on the list can be achieved by the data entry system shown in FIGS. **18** and **19** which is somewhat similar to the data entry system described in connection with FIGS. **13–15** in terms of ease of operation but utilizes a somewhat different display and data entry technique.

As seen in FIG. **18**, display **170** will initially display a series of letters corresponding to adjacent sections of the alphabet. Rotation of switch **122** will move a cursor to highlight a desired letter for entry into the phone list. Thus, rotation switch **122**, for example, to the letter "J" for the first number on the phone list will cause a cursor to highlight the letter "J" and actuation of switch **121** will enter the letter J into the first position on the phone list which can be, upon entry, displayed below line **352** and on display line **354** shown in FIG. **18**. Subsequently, other letters are similarly highlighted and entered to complete the spelling of the name of the person to be called. Rotating switch control knob **132** for switch **122** to the right beyond the letter "K" as shown in FIG. **18** will cause the next successive letter or letters to appear at the right end while the preceding letters are dropped off of the left end of the displayed alphabet sequence. Actuating the "EXIT" switch **124** after the completion of the person's name will cause the display line **352** shown in FIG. **18** to display numbers corresponding to area code and telephone numbers with, instead of the alphabet being displayed the numbers **0–9** being displayed, and selectively highlighted and entered utilizing switches **122** and **121**, respectively. In this manner, the operator can relatively easily spell out a person's name and number for addition to the pre-programmed phone list for subsequent auto dialing. The software programming for providing the data entry function for the phone list or other subroutine is disclosed briefly in the flow diagram of FIG. **19**.

Turning now to FIG. **19**, the subroutine starts as indicated by block **360** by displaying the letters "A" through "K" in the order shown in line **352** of FIG. **18**. If it is desired to move the alphabet to the right or left, switch **122** is rotated as indicated by block **362** or **364**, respectively, which causes the highlighting of the next or previous letters as indicated by blocks **366** and **368**, respectively. Once the desired letter has been highlighted, the "ENTER" switch **121** is actuated as indicated by block **370** and that data corresponding to that selected letter is entered into the text as indicated by block **372**. The process is then repeated until the desired name is completed at which time the "EXIT" switch is actuated causing the program to exit to the next screen display where the number line is displayed for similarly selecting the desired telephone number. Upon completion of the desired number, the program will move to the next entry in the phone list so it can be similarly programmed.

If the operator, however, desires to directly enter a number for dialing without reference to the phone list, the subroutine shown in FIG. **16** as block **374**, if selected, allows the direct entry of a number utilizing a similar data entry system as shown in FIG. **20** in which the digits **0–9** are displayed on line **376** and the cursor highlights a selected number as, for example, number **6**, for entering into the number-to-dial line **378**. Once the desired number has been so entered, the "dial" icon can be highlighted and the enter switch actuated to effect dialing of the cellular phone for placing the desired call. The interface circuitry for coupling to the cellular telephone is well-known and conventional.

If desired, display **170** can be employed for displaying received text messages. Further, the vehicle may include a small dot matrix printer for providing a hard copy of a text message. If the operator selects the text messaging subroutine from the home panel **190** (FIG. **11**), the text messaging subroutine **304** shown in FIG. **21** is called up. This will cause the display **170** to display an initial current text message panel **382** which will list a number of text messages received by the RF transceiver and highlight whether or not the text message has been received. This can be done, for example, by blinking the paging number corresponding to an unread text message. The switch **122** can be rotated to highlight any one of the received text messages for reading. This is achieved by actuating the "ENTER" button to display the selected text message as indicated by block **384** in FIG. **21**. FIG. **22** is an example of a text message which has been received and is being displayed. Rotation of switch control knob **132** and actuating the enter switch provides the microprocessor with data as to which block of the program sequence is performed next. As indicated by block **382**, unread text messages can be indicated by the blinking of the text message number for such text messages.

Once the text message has been read, upon highlighting the desired icon shown in FIG. **22** and actuation of the "ENTER" switch, the text messaging option panel **386** allows the operator to delete the text message, which provides a redundant decisional display indicated by block **388** asking the operator a second time whether he or she wishes to actually delete the message. Thus, the text message will not be deleted unless two conscious decisions are made to delete the message. The operator may also opt to have the alpha-numeric message printed by a printer. Moving the cursor to highlight the icon of display panel **386** for the printer or the word "Print" and actuation of the "ENTER" switch **121** will effect the printing of the message by the printer which can also be installed in the console **112** near the switch assembly **120**.

As shown in FIG. **23**, the vehicle operator can select the compass subroutine **306** which allows the selection of compass, temperature, and trip display information as indicated by block **390**, calibration control as indicated by block **392** which may include prompting calibration messages as indicated by block **394** or variation correction as indicated by block **396** allowing for variation correction of the com-

pass according to a variation zone prompting message **398**. The compass selection primary display **305** allows the selection of these various subroutines.

Finally, the operator may select the navigation subroutine **308** shown in FIG. **24** which in its elemental form may include a route display selection **402**, a delete route selection **404**, or a print route selection **406**. The navigation circuitry **250** may include a suitable memory for storing navigation information and include, for example, a CD reader with CD stored maps and route information which can be selectively accessed using switch assembly **120** including the rotary switch **122** for controlling the displayed selection according to either of the two data entry techniques described above, that is providing a window through which either alpha or numeric information can be scrolled for selection or entry or by displaying a sequence of alpha-numeric information and moving the cursor to a selected one for entry to control subsequent information provided on the display or enter commands into the microprocessor for control or storage. The navigation system **250** may also include a GPS receiver so that the vehicle's actual location can be known and routing information to, for example, a selected address provided by entering the address in one of the manners set forth in FIGS. **13–17** to provide a desired route display as indicated by block **402**. If a route has been used and it is desired to delete the route, it can be deleted by selecting the delete route icon of block **400** and actuating the "ENTER" switch **121** for deleting the route which will require two actuations to make certain that the route is not inadvertently deleted. Finally, the directions for providing routing information can also be printed by selecting the print icon and actuating the "ENTER" switch to print the sequential directions for the route using printer **280**.

The data entry system of the present invention provides a user-friendly structure and method by which data can be selected for entry into a microprocessor for a variety of control and informational purposes. By providing a rotary switch or equivalent control, data can be more easily entered without the need for an alpha-numeric keyboard which would require excessive space in the vehicle for permanent installation and provides relatively easy and understandable operation for those who otherwise may not be familiar with data entry systems. It accomplishes this by providing a selectable prompting display and data entry in response to the display to provide control and informational data to and from a microprocessor for use in controlling and programming vehicle options and accessories. As described in the section immediately below, the display may be mounted in various other locations in the vehicle and may be a heads-up display that projects the displayed information in the driver's line of sight.

4. Alternative Display Configurations

It is desirable to provide the vehicle communication and control system with a message display system which is readily visible to the vehicle driver and does not interfere with the driver's field of vision. It is also desirable to provide such a display which is easy to read in all ambient light conditions. The present invention provides a message display system including a display positioned in the vehicle windshield area at a location which is readily visible to the vehicle driver while not interfering with the driver's field of vision.

According to one aspect of the invention, the message display system is provided in a housing adapted to be mounted in the windshield area of a vehicle. The system includes a display device positioned on a housing, a receiver which demodulates a detected RF signal, and a controller which generates display control signals responsive to the output of the receiver. The display device is responsive to the control signals for displaying the message.

According to other aspects of the invention, the display device is positioned on a rearview mirror housing, an A-pillar housing, an overhead console, or a visor. The display device may be implemented using a vacuum fluorescent display or a dot matrix display.

The message display system is thus adapted to be mounted in a vehicle such that the message is displayed in the area generally in front of the driver and does not interfere with the driver's field of view. The message display system may be provided as part of a vehicle accessory, such that the message display system is assembled to the vehicle with the accessory. The message display utilizing a vacuum fluorescent display is readily visible in all ambient light conditions.

Vehicle **412** includes a message display system **416** (FIG. **26**) in rearview mirror assembly **418** (FIG. **25**), which includes a housing **430**. The vehicle also, conventionally, includes an A-pillar **421**, a steering wheel **423**, an instrument panel **427**, a windshield **425**, sun visors **429**, **431**, and a headliner **438**. The mirror assembly **418** includes a support **437** which may be connected to a connector **434** in the vehicle roof structure.

The message display system **416** includes a RF receiver **420** (FIG. **26**) which demodulates the RF signal A from land station **410** and outputs a digital control signal. A microcontroller **422** is coupled to receiver **420** and is responsive to the digital control signals output from the receiver for generating display control signals when a message such as a paging message is received. A display source **424** is coupled to the microcontroller **422** and receives display control signals therefrom. Receiver **420**, microcontroller **422**, and display source **424** are mounted in housing **430** of rearview mirror assembly **418**. Accordingly, a message display system **416** is provided in rearview mirror assembly **418** to display a message for the driver.

The RF signals A are of the type conventionally utilized for RF signals transmitted from a land-based station **19** (FIG. **1A**). The message may include only numerical information if it is originated at a conventional telephone subscriber station **15**. Alternatively, if the message is generated at a telephone subscriber station **15** having an alpha-numeric input (e.g., a computer keyboard), the message may include alpha-numeric message information from the originating party. The RF signals A typically have a frequency range from 137 to 175 MHz (VHF band) or within the frequency range 405 to 513 MHz (UHF band). The signal format and land-based station are described in greater detail below under the heading "Detailed Description of the Vehicle Personalization and Remote Control Functions."

Receiver **420** (FIG. **26**) includes an antenna **426** which detects the RF signals from land-based station **19**. RF receiver **420** demodulates the signals detected by antenna **426** and conditions the demodulated signal to have digital levels appropriate for decoding in the microcontroller **422**. Microcontroller **422** is preferably implemented using a Motorola MC68HC05 microcontroller, which is commercially available from Motorola Corporation. However, any suitable microcontroller may be utilized. In general, microcontroller **422** receives and decodes the data signals output from the RF receiver **420**. If the message is a text message for the vehicle in which the system is mounted, the microcontroller is responsive to the text message for generating a serial display control signal which is communicated to display source **424** through a serial data link **428**. Additional details of RF receiver **420** and microcontroller **422** are

described below under the heading "Detailed Description of the Vehicle Personalization and Remote Control Functions." System **416** may be a two-way pager as described in U.S. Pat. No. 5,153,582.

Display **424**, according to this embodiment, is a vacuum fluorescent alpha-numeric display. The alpha-numeric display may be advantageously implemented using a commercially-available Noritake CU2055CPB-52A, which is a reconfigurable 20-character vacuum fluorescent display. The Noritake display includes a serial input and integral display driver components. Although the Noritake display includes integral display driver components, those skilled in the art will recognize that any suitable commercially-available vacuum fluorescent display may be utilized. If the display does not include an integral display driver circuit, a suitable commercially-available driver circuit may be used to generate appropriate signal levels for the display. A vacuum fluorescent display is preferred because it generates a particularly bright image which is clearly defined and readily decipherable in all ambient light conditions. However, other display devices could be utilized, such as LED and/or back-lit LCD displays.

With reference now to FIGS. **25** and **26**, RF receiver **420**, microcontroller **422**, and display source **424** are positioned in the housing **430** of rearview mirror assembly **418**. A particularly advantageous rearview mirror assembly which may be utilized is disclosed in U.S. Pat. No. 5,475,366, the disclosure of which is incorporated herein by reference thereto. This rearview mirror assembly may be advantageously implemented using the modular mirror connector disclosed in U.S. Pat. No. 5,455,716, the disclosure of which is also incorporated herein by reference. A detailed description of the rearview mirror assembly **418** is found in the above-incorporated patent. However, a general description of rearview mirror assembly **418** follows.

Assembly **418** includes at least one circuit board (not shown) positioned within the mirror housing **430** and on which receiver **420**, microcontroller **422**, and display source **424** are conventionally mounted. A reflective surface **432** is positioned above the display (e.g., the vacuum fluorescent display **424**) at an angle of approximately 45° with respect to the plane of the display surface of the display. The image from display **424** is reflected on surface **432** such that a driver looking at the reflective surface can read the reflected image. The paging message display system **416** mounted in housing **430** is connected through a wiring harness **434** to vehicle bus **436**, which is positioned in the vehicle roof structure above headliner **438**. If the mounting assembly disclosed in U.S. Pat. No. 5,455,716 is utilized, the rearview mirror assembly **418** includes a mirror support **437** removably connected to connector **440**. The mirror assembly is attached to the vehicle as an optional accessory by plugging the rearview mirror support **437** into connector **440**. Details of the mirror assembly and the electrical connector are found in the above-identified patents incorporated hereinabove by reference, and accordingly, they are not described in greater detail herein.

To assemble rearview mirror assembly **418**, RF receiver **420**, microcontroller **422**, and display **424** are mounted on at least one circuit board (not shown). The circuit board is assembled into the rearview mirror housing **430**. The wire harness **434**, including the control inputs and outputs of microcontroller **422** and power supply conductors connected to the vehicle power supply, are connected to the paging message display system **416**. The wiring harness is extended outwardly from rearview mirror housing **430** through mirror support **437** for connection with wiring in the vehicle roof structure when support **437** is connected to connector **440** in the vehicle roof structure. The rearview mirror assembly **418** is fully assembled to vehicle **412** when mirror support **437** is connected to connector **440**.

In operation, vehicle **412** may be paged from land-based station **19** (FIG. **1A**) by a person dialing the number for vehicle **412** (FIG. **20**) using telephone **15**. The page signal will be communicated from telephone **15** to land-based station **19** through the telephone system. Land-based station **19** transmits an RF signal A to vehicle **412**. Receiver **420** demodulates the RF signal A and outputs a control signal to microcontroller **422**. Microcontroller **422** is responsive to the demodulated page signal for indicating that a paging message is received. The driver may control when the message is displayed on display **424** using a READ switch **448** (FIGS. **25** and **26**) on rearview mirror housing **430**. Microcontroller **422** is responsive to actuation of the READ switch **448** to communicate a control signal to the alpha-numeric display such that the paging message is displayed. If the driver wishes to immediately call the party back, and vehicle **412** has a cellular telephone, the driver pushes the TRANSMIT switch **450**. Responsive to depression of the TRANSMIT switch, microcontroller **422** will control the cellular telephone to call the number indicated in the paging message. This process of control is described in greater detail below under the heading "Detailed Description of the Vehicle Personalization and Remote Control Functions."

According to an alternate embodiment of the invention, message display system **416** is provided in a housing **452** (FIG. **27**) mounted over a vehicle A-pillar **421** (FIG. **25**). The message display system **416** shown in the circuit of FIG. **26** is mounted to housing **452**. The RF receiver **420** (FIG. **26**), microcontroller **422** and display **424** also can be mounted in the housing by conventional means (not shown) such as snap connectors, threaded fasteners, adhesives, or the like. The A-pillar housing **452** including display system **416** the circuit board (not shown) is assembled to A-pillar **421** using suitable threaded fasteners, snap connectors, adhesive, or the like. The housing may be manufactured from plastic, metal, or other suitable materials conforming to the interior of the vehicle. The message display system **416** is located within the housing **452** at the lower end such that the display surface of the display **424** is readily visible to the vehicle driver. The alpha-numeric display may include two rows of ten characters or a vertically oriented display in this embodiment of the invention.

According to another alternate embodiment of the invention, message display system **416** is mounted in an overhead console **454**, as described above. The overhead console includes a housing **456** attached to the vehicle roof structure in a conventional manner. The overhead console housing may be of any suitable, conventional construction. The message display system **416** is mounted on a circuit board (not shown) which, in turn, is mounted in overhead console housing **456** by conventional means. Display **424** is positioned on overhead console housing **456** such that the display source image is directly visible to the vehicle driver. According to one advantageous embodiment of an overhead console pager display system, the display device may be implemented using the focus at infinity display system for an overhead console disclosed in U.S. Pat. No. 5,469,298, the entire disclosure of which is incorporated herein by reference thereto. If the focus at infinity display is used in the overhead console display, a mirror (not shown) is positioned in overhead console housing **456** and display source **424** is spaced from the mirror, as disclosed in U.S. Pat. No. 5,469,298.

It can thus be seen that a message display system is disclosed herein which is readily visible to the vehicle driver. The message display system is conveniently located in a housing in the windshield area of the vehicle so the vehicle driver can view the displayed message without taking his or her eyes completely off of the road for an extended period of time. The message display system may be integral with a vehicle accessory and is readily visible to the driver in all ambient light conditions.

Displays of vehicle parameter information and other information such as compass headings and the like have become commonplace with a variety of locations being employed for such displays, typically within the instrument panel of the vehicle itself. Displays have also been located in the A-pillar of a vehicle as, for example, described above and disclosed in U.S. Pat. No. 5,415,554 and in rearview mirrors as, for example, described above and disclosed in U.S. Pat. No. 5,475,366. Such displays usually provide the vehicle operator with information desired for the operation of the vehicle. An incidental display is employed on a visor-mounted telephone as disclosed in U.S. Pat. No. 4,870,676, which shows a telephone and its display viewable only when the visor is in a lowered position for use of the telephone.

It has been discovered that a visor provides a desirable location for the mounting of a trainable transmitter which is commercially available in many vehicles now on the market. Visors also provide a convenient location for the mounting of illuminated vanity mirrors of the type disclosed in U.S. Pat. No. 4,760,503.

In order to more fully utilize the beneficial location of the visor as well as its ability to move from a raised stored position to a lowered use position, the present invention may utilize the visor as a mounting location for a unique display for information such as text messages, compass and temperature information, vehicle operating parameter information, and the like. It is desirable, however, to have the display visible regardless of the visor position which can change depending upon its use for blocking sun for which it is primarily designed. Thus, in visor displays embodying the present invention, the visor body includes a window to which a display is movably mounted such that the display, when the visor is in one of a raised or lowered use positions, is visible through the window and, when the visor is moved to the other of the raised or lowered positions, the display can be moved to be directly visible.

In one embodiment of the invention, a visor display includes a display housing to which a display is mounted. Such housing is pivotally mounted to a visor body and movable from a closed position where the display is aligned with a window formed through the visor body to an open position where the display is visible when the visor window is adjacent the vehicle roof. In an another embodiment of the invention, the visor window was formed through a vanity mirror in an area of the vanity mirror which is otherwise covered with a reflective material to provide a mirror such that the display is viewed through the front surface of the mirror window. In another embodiment of the invention also, a visor body includes a housing which extends to opposite sides of the visor and presents a display on such opposite sides to be visible regardless of the visor position.

With the present invention, therefore, a single display, such as vacuum florescent display, can be employed and viewed through an illuminated vanity mirror with sufficient contrast to readily view the display with the visor in a lowered use position with the vanity mirror in use. The display is equally visible when the visor is in a raised stored position by pivoting the display housing downwardly to a position for direct viewing.

Referring to FIG. **29**, there is shown a vehicle **510**, such as an automobile, which includes a roof **512** of sheet-metal construction to which a molded composite headliner **514** is mounted for providing an attractive vehicle interior. Several pillars including an A-pillar **515** provide support for the roof **512**. Pillar **515** divides the windshield **516** from the driver's side window **518** of the vehicle. The vehicle typically will include a rearview mirror assembly **519** and a pair of visor assemblies with the driver's side visor **520** incorporating the present invention being shown.

Visor assembly **520** comprises a visor body which can be of a molded polymeric material such as polypropylene or other material such as fiberboard which can be preformed in a butterfly shape and folded over in a clam-shell design to complete the visor body construction. The visor body is mounted to the vehicle roof **512** by means of an elbow bracket assembly **530** which can be of conventional construction and includes a pivot rod **532** extending into the body of the visor. A torque fitting (not shown) mounted within the visor body engages the pivot rod **532** for allowing the visor to be held in a raised stored position as illustrated in FIG. **29** to a lowered sun-blocking use position as illustrated in FIGS. **33** and **34**. The bracket assembly also allows the visor to be moved from the front windshield position to a side window position in a conventional manner. A remote support clip **534** may be mounted to the roof near the rearview mirror **519** and receive auxiliary visor rod **536** for supporting the end of the visor body remote from the bracket assembly **530** to the vehicle roof as illustrated in FIG. **29**. The visor body may also include a pocket for receiving a slide-out auxiliary visor panel **521** as illustrated in FIGS. **29** and **30** for extending the effective width of the visor when in use.

For purposes of discussing the invention, the rear-facing surface **524** of visor **520**, when in the raised stored position shown in FIG. **29**, will be referred to as the rear of the visor with the opposite side of the visor being referred to as the front **522** of the visor. Formed in the rear **524** of the visor body is a pocket **526** as best seen in FIGS. **30** and **32** for storing a movably mounted display assembly **540** therein. Display assembly **540** includes a housing **542** which is pivotally mounted to the visor body on an edge of pocket **526** formed therein by means of a conventional pivot axle assembly **544** to be moved from a stored position substantially flush with the rear surface **524** of visor **520** as seen in FIG. **29**, with the outer surface **541** of display assembly **540** being textured with an upholstery material to conform to that of the visor. The inner surface of housing **540** includes a polymeric panel **543** having an elongated rectangular window **545** (FIG. **30A**) formed therein behind which there is mounted a digital display **546** which is electrically coupled to a display information source **548** (FIG. **37**) by means of suitable conductors **547** extending through the visor body and the hollow pivot rod **532** to the electrical circuit comprising the display information source **548**. The display information source **548** may be, for example, a digital compass such as disclosed below under the heading "Detailed Description of the Vehicle Personalization and the Remote Control Functions" and in U.S. Pat. No. 4,953,305, the disclosure of which is incorporated herein by reference; a paging receiver as disclosed in U.S. Pat. No. 5,479,157 the disclosure of which is incorporated herein by reference; or other vehicle information such as disclosed above.

For purposes of pivoting the display assembly **540** from its stored, concealed position shown in FIG. **29** to its

lowered use position as shown in FIG. **30**, a handle **549** is provided along the upper edge of the display. Display **546** can be any number of commercially-available digital displays such as a vacuum florescent display, an LCD display, an LED display, or the like, which provide an alpha-numeric or other suitable display of information to be displayed to the driver. It is conventionally mounted within the hollow body of housing **542** in alignment with window **545** such that information to be displayed is visible through the window.

The visor pocket **526** includes, as best seen in FIG. **32**, a rear panel **550** also having a rectangular window **552** extending therethrough and which is aligned with the display **546** when the display assembly **540** is in its stored position, as seen in FIGS. **29** and **31**. In one embodiment of the invention, the window **552** extends entirely through the visor body and is exposed on the front surface **522** such that when the visor is in its lowered use position, the display can be viewed through the window **552** in panel **550** of the visor. In the preferred embodiment of the invention, however, the front surface **522** of the visor includes an illuminated vanity mirror assembly **560**, as seen in FIGS. **33–36**. Vanity mirror assembly **560** can be constructed generally as disclosed in U.S. Pat. No. 5,428,513, the disclosure of which is incorporated herein by reference, with a modification to provide a window through the mirror of the assembly such that the display **546** can be viewed through the mirror when in the position shown in FIGS. **33** and **34**. A brief description of the visor assembly **560** follows.

Mirror assembly **560** includes a mirror frame **562** mounted to the visor body and including a mirror **564** mounted therein. Near the upper portion of the mirror, there is formed a generally rectangular window **566** of a shape substantially conforming to and aligned with window **552** in panel **550** (FIG. **32**). Window **566** is formed, as best seen in FIG. **35**, on the rear surface of mirror **564** by not coating the rectangular area of the rear surface of the mirror glass **561** with the normal reflective coating **563**. Alternatively, this coating **563** could be removed to define window **566**. Thus, the area defining window **566** provides clear glass **561** which is aligned with the display **546** mounted in display housing **540**, as seen in FIG. **35**. Therefore, the display assembly **540**, when in the position shown in FIGS. **29** and **31**, is within the pocket **526** in the rear surface **524** of visor **520**, and information displayed by display **546** is visible through the window **566** in mirror **564**, and window **552** in rear panel **550** form through the visor body. FIG. **34** illustrates how the information on display **546** appears through the mirror window. The mirror assembly **560** also includes a cover **568** which can be selectively moved from a closed position as shown in FIG. **36** to the open position shown in FIGS. **33** and **34** for exposure of the mirror **564** and display **546** therethrough. Illumination means **569** is mounted on the inside of cover **568**. The intensity of the illumination can be controlled by a variable resistance control **565** mounted to the frame **562** of the illuminated vanity mirror assembly.

The pocket **526** into which the display assembly **540** is pivotally mounted provides light shielding for the display **546** such that it is readily visible through the front surface of mirror **564** even when the illumination means **569** is in the high brightness position. The display is recessed in the darkened area of pocket **526** behind the reflective surface **552** of the mirror **564**. Thus, with the system of the preferred embodiment of the invention, a single display **546** is viewable either with the visor in a raised stored position, as illustrated in FIG. **30**, or when in a lowered position with the vanity mirror exposed, as seen in FIGS. **33** and **34**. In some embodiments, the vanity mirror will not have a cover so that the display is visible at all times instead of selectively as in the embodiment shown including a vanity mirror cover **568**.

In the alternative embodiment shown in FIGS. **38–40**, the same vehicle **510** is shown with corresponding parts bearing the same reference numerals as in the previous embodiment. The vehicle includes a pair of visors **570, 580** on the driver and passenger sides, respectively. The driver's side visor **570** includes a dual display assembly **590** (FIG. **40**) which includes a first display **592** which is visible when the visor is in a lowered position as seen in FIG. **38** and a second display **594** mounted to the visor to be visible and readable when the visor is in a raised stored position as shown in FIG. **39**. Displays **592** and **594** can be commonly coupled to the source of display information **548** (FIG. **37**) via conductors **547**. Displays **592** and **594** are mounted in a housing **596** which includes a front bezel **595** surrounding and receiving display **592** and an angled bezel **597**. Bezel **597** positions the face of display **594** to extend at an acute angle of approximately 45° to the planar surface **571** of visor **570** such that when the visor is in a raised stored position, as illustrated in FIG. **40**, the display is readily visible by the vehicle driver. Housing **596** is shaped to fit within an aperture **574** in the visor body. Displays **592** and **594** are positioned preferably in one corner of the visor which may include an illuminated vanity mirror package in the center area, if desired. Displays **592** and **594** may be of the same general type as display **546**. In some embodiments, the dual display can be provided utilizing a single display source located within housing **590** and suitable prismatic reflectors to provide the display surfaces **592, 594**. The visor display system of FIGS. **38–40**, therefore, also provides a display on opposite sides of the visor, such that the information is readily visible and accessible to the driver regardless of the operational position of the visor.

5. Detailed Description of the Last Exit Warning Function

Many vehicles currently include computers which calculate not only fuel economy but also, based upon the remaining fuel, a distance-to-empty estimation for preventing running out of fuel. Although the vehicle operator can readily select the distance-to-empty information for display, the operator may not be aware of the nearest service station at which fuel can be purchased nor the distance to such a service station. Therefore, and particularly when driving on limited access highways, the vehicle operator can still encounter an out-of-fuel crisis. This can be particularly troublesome in isolated areas where help is not readily available or in some urban areas where having a disabled vehicle is undesirable. Although motorist aids including frequent roadway signs and on-board navigational systems are available, there remains a need for a warning system which will notify the vehicle operator to exit, for example, a limited access highway to obtain fuel or other desired services prior to the time the vehicle is caught between two exits beyond the point of no return where insufficient fuel remains to reach the nearest service station.

The system of the present invention accommodates this need by providing a warning system which will automatically alert the vehicle operator to the fact that the next available exit should be taken for a desired or necessary service such as refueling.

In one embodiment of the invention, the system includes a source of information providing the current vehicle location as well as a source of information identifying the location of available selected service locations closest to each of the next two exits of, for example, a limited access highway. The system in a preferred embodiment includes a source of information indicating the available range of the

vehicle (distance-to-empty) and a microprocessor for calculating when the driver should take the next available exit to reach the desired service.

In most instances the service would be a service station for providing fuel, although the desired service may involve other parameters such as the time for stopping for lunch or dinner or checking into an available hotel. The system includes a suitable alarm which may be an audible alarm, a visual alarm, or both, to alert the vehicle operator that the next available exit should be taken. Such a system, therefore, provides the vehicle operator with the assurance that the vehicle will not run out of fuel prior to the availability of a service station at a forthcoming exit. Likewise, the vehicle parameter can alert the vehicle operator to exit to achieve a desired arrival time for certain other services, such as dining or checking into hotels, and forewarn the vehicle operator to exit for such facilities. In one embodiment, a vehicle mounted housing includes the electrical circuits of the invention which receive operating power from the vehicle's battery. Such circuits preferably include the two-way communication system of the present invention thereby permitting the vehicle operator to receive and transmit messages.

Referring initially to FIG. **41**, there is shown a map which pictorially illustrates a vehicle **20** traveling in the direction of arrow A along a limited access highway **612** having an exit A and an exit B spaced farther along highway **612**. Along exit A is a service facility S_1 which is located a distance from the current position of vehicle **20** of, for example, 7 miles. Exit B includes a service facility S_2 which is 32 miles from the vehicle's present location. Vehicle **20**, such as an automobile, conventionally includes a fuel computer which provides, on a vehicle data bus, distance-to-empty data which, in the example shown, indicates the distance-to-empty is 28 miles. Although the vehicle operator may be aware of the fact that exit A is, for example, 3 miles ahead and exit B is 20 miles ahead, the vehicle operator may not be aware of the fact that the only open service location S_2 is beyond the range of the vehicle and, therefore, the vehicle will run out of fuel prior to reaching service station S_2, which is the closest service facility from the otherwise reachable exit B. Thus, it is desired, in order to forewarn the vehicle operator of an impending out-of-fuel situation, to provide information to the vehicle operator as to the vehicle's present location and the locations of facilities S_1 and S_2 and their distance such that, prior to going beyond exit A, the vehicle operator receives a warning signal allowing the operator to exit at exit A and utilize the services of facility S_1.

Referring to FIG. **42**, there is shown a housing **611**, such as a rearview mirror housing, adapted to be attached to the roof structure **613** of a vehicle **610**. Mounted within the mirror housing are the electrical components of FIGS. **3** or **5**, which are electrically connected to the vehicle electrical system through suitable electrical conductors **615** for receiving operating power from the vehicle's battery. Housing **611** includes an alpha-numeric display **619** for selectively displaying messages from the RF transceiver (FIGS. **3** and **5**) and other information to the vehicle operator. Also, a plurality of control switches **621** are mounted to housing **611** at various locations for the operator to input control signals to the circuit shown in FIGS. **3** or **5**. The display and control switches are illustrated by blocks **28**, **46**, **48**, **50**, **52**, **54**, **56**, and **58** in FIGS. **3** or **5**. The details of construction of the rearview mirror assembly **617**, including the housing **611** and its mounting to the vehicle, are disclosed in detail in U.S. Pat. No. 5,455,716, the disclosure of which is incorporated herein by reference.

The operation of the system is best understood by reference to FIG. **43** which shows the subroutine for the last exit warning, which subroutine **650** is part of the overall programming for the microprocessor **626** which forms no part of the present invention. The subroutine **650** can be inserted at any suitable location in the program and includes an input **651** to test at block **652** whether the last exit flag is set. If it is not set, the subroutine is not called up and the main program proceeds from port **653** of block **652**. In the event the last exit flag is set, which can either be automatic, if desired, or can be operator enabled by the actuation of a control switch **621** in interface circuit **628**, the microprocessor first retrieves the current vehicle position as indicated by block **654**. It does this by interrogating the GPS module **638** which provides the current latitude/longitude information to the microprocessor, which then stores the current vehicle position.

Next, as indicated by block **656**, the microprocessor obtains location information for the next two exits of the limited access highway on which the operator is traveling for the desired services, as, for example, fuel availability. Such information will include not only the location of the service facility but also the availability of such facility (i.e., whether it is open at the time of the requested information). This information can be accessed in a variety of manners by, for example, a database **27** (FIG. **3**) contained on the vehicle in mass storage memory such as a CD-ROM, which includes the highway information on which the vehicle is traveling in memory, as well as the available services. The database **27** will thus include the data storage medium, a reader such as a CD-ROM drive, and a controller coupled to the microprocessor for transferring data to the microprocessor. The programming for the transfer of location data for, for example, service locations S_1 and S_2 based on the vehicle's current position, can be conventional. Such a system is described in U.S. Pat. Nos. 5,172,321 and 5,229,947, the disclosures of which are incorporated herein by reference. Preferably, however, microprocessor **26** or **66** obtains such service location information from an inquiry to a subscription service through two-way paging module **34** or transceiver **70**. It accomplishes this by initiating an information request utilizing paging module **34** or transceiver **70** and receiving such data from a centrally-located base station having a database of such information via a paging network service such as is commercially available from SkyTel Corp., located in Jackson, Miss. Both the paging module **34** and transceiver **70** can transmit the current vehicle location to the subscription service upon operator request or automatically on a repeating time cycle. Pager **34** or transceiver **70** receives the location information as, for example, S_1 and S_2 of FIG. **41**, and provides such information in a digital signal format to the microprocessor **26** or **66**, which is conventionally programmed to calculate the distance from the current vehicle location to the S_1 and S_2 available service facilities at the forthcoming two exits.

This information is stored by the microprocessor and compared with the distance-to-empty data which is retrieved as indicated by block **658** from the vehicle bus interface circuit **36**. The program then compares the distance from the vehicle's current location to each of the service areas S_1 and S_2 of FIG. **41** to determine if the remaining fuel is sufficient to reach the second service area S_2 represented by distance X in the test block **660** of FIG. **43**. If this distance is greater than the range available to the vehicle, a notification signal is sent to the driver as indicated by block **662**. This notification signal can take the form of an audible alarm tone, a visual message in alpha-numeric format on a vehicle digital

display contained within circuit **28**, or both. In the example of FIG. **41**, the notification signal alerts the driver that he or she should exit the limited access highway at exit A such that the first service area S_1 can be accessed prior to running out of fuel. Depending on the location information obtained as indicated by block **656**, it is possible that service area S_2, which is on the second exit, is actually closer than service area S_1, and assuming it is less than the distance-to-empty, no notification signal would take place and the testing cycle is repeated as indicated by the connecting line **664** as the vehicle continues to travel along the highway. A notification or alerting alarm would then be sent, most likely between exits A and B and before the vehicle passed exit B.

In place of the automatic system described, the vehicle operator may input specific desired services in addition to or in place of a distance-to-empty last exit service. Thus, for example, the operator may wish to exit the limited access highway to have dinner within a prescribed period of time or at a preferred restaurant. In such case, the system allows the operator to request the locations of such services as shown in phantom in block **655** of flow diagram **650**. The vehicle operator is requested to input information as to a desired available service through two-way pager module **34** or transceiver **70**. This can be done by the operator sequentially receiving one-line messages scrolled on display **619** and actuating a switch **621** when the desired service facility is identified to transmit such selection to the subscription database through pager **34** or transceiver **70**. The database would then send the service facility location back to the vehicle. The microprocessor stores this information and compares it with vehicle location information from GPS receiver **38** to alert the driver to exit when appropriate for the selected service facility. Such information is input to the microprocessor from its receipt from the pager module **34**, transceiver **70** or, alternatively, the on-board database **27** for such service location information as indicated by block **656**. The distance for the selected service can be calculated by the same calculations provided in block **660** to alert the driver as indicated by block **662** to exit the highway at the next exit.

With such a system, therefore, the microprocessor notifies the vehicle operator with a suitable warning that the service necessary or desired should be sought at the forthcoming exit in the case of a limited access highway, or the next crossroad, for example, on a non-limited access highway. As can be appreciated, the system has greater need in situations where a limited access highway is being traveled and exits are spaced at long distances. The system of the present invention automatically assists the vehicle operator in preventing the vehicle from ruing out of fuel and/or assists the vehicle operator in seeking desired services within a prescribed time or other parameter. The unique use of the GPS receiver in combination with an automatically operated or operator prompted two-way pager or transceiver allows location information to be communicated to and from the vehicle from a subscription service database to achieve such an alerting system.

6. Detailed Description of the Vehicle Personalization and Remote Control Functions

As vehicle electronic systems and options become more sophisticated, vehicle owners have many new options for vehicle accessories from which to choose. The rapidly increasing number of new options has led to a nearly infinite number of combinations of options for vehicle accessories that are available. This extremely large number of combinations of vehicle accessory options existing on any one vehicle makes it much more difficult for a buyer to find a vehicle on a dealer's lot having the exact combination of vehicle accessory options that the buyer desires. Further, this wide array of vehicle accessory options that may exist in a particular vehicle increases the likelihood that no two drivers who share the vehicle will be able to agree on which options the vehicle should have. These concerns have given rise to the need for a programmable vehicle personalization system that allows an operator to select accessory operation for that vehicle according to their preferences at any time following the manufacture of the vehicle. U.S. Pat. No. 5,040,990 issued on Aug. 20, 1991, discloses one such system in which selected vehicle options can be programmed by the vehicle operator. U.S. Pat. No. 5,113,182 also discloses a programmable vehicle personalization system. Although programmable vehicle personalization systems exist, there remains a need for a system that does not require extensive effort by the vehicle operator to reprogram the manner in which the vehicle's accessories are controlled.

The present invention provides vehicle personalization to be remotely effected by a service provider using an RF system such as a paging or cellular system. According to one aspect of the present invention, a vehicle owner wishing to reprogram a vehicle, calls the service provider who effects reprogramming of an option control by transmitting RF control signals to the vehicle from a land-based transmitter to a receiver mounted in the vehicle. Thus, because the service provider effects vehicle personalization, the vehicle owner need not have any technical knowledge as to how to operate the vehicle programming system. Another aspect of the present invention is to provide vehicle personalization for each person who may operate the vehicle.

To achieve these aspects and other advantages, the vehicle accessory control system of the present invention includes a plurality of electrically-operated vehicle accessories, a receiver to be mounted in a vehicle for receiving RF signals from a land-based transmitter, and a control circuit coupled to the receiver and to the vehicle accessories for controlling the operation of the vehicle accessories in accordance with a control program. The RF signals include an address uniquely identifying the vehicle and a reprogramming signal for reprogramming the operation of at least one of the vehicle accessories. The control circuit includes an input interface for receiving information regarding a plurality of sensed conditions, control means for controlling the operation of the vehicle accessories in accordance with the control program and in response to sensed conditions received from the input interface. The control circuit further includes reprogramming means for selectively reprogramming the control program in response to the detection of an RF signal including an address identifying the vehicle and the reprogramming signal, to selectively change the manner in which the control means controls the operation of at least one of the vehicle accessories.

Preferably, the vehicle electrical control system for performing the above functions is that described above and shown in FIGS. **3** or **5**. An alternative vehicle electrical control system **730**, is shown in FIGS. **44** and **45**, and include, as shown in FIG. **44**, a microcontroller **735** such as a Motorola MC68HC05, which receives demodulated signals from the receiver **724** shown enclosed within dotted lines in FIG. **44** via a data bus **727**. The receiver **724** may be the receiving portion of the two-way pager module described above or the receiving portion of cellular transceiver **70** (FIG. **5**), but may alternatively be a typical duo-conversion receiver having first and second local oscillators **721** and **723**, appropriate bandpass filters and amplifiers, and a demodulator circuit **725** which provides digital data output on a data bus **727** to an input of micro-

controller **735**. Microcontroller **735** includes an integral non-volatile memory for retaining data when the vehicle is not in operation. In vehicles including a single wire multiplex bus **742**, an output terminal **743** of microcontroller **735** is coupled to the input of a multiplex communication circuit **744** comprising a **728** pin integrated circuit which is coupled by output conductor **747** to a single wire data bus **742**. The average data rate for the multiplex circuit **744** is 10.4 kilobits per second. Microcontroller **735** communicates with circuit **744** through its SPI serial interface port **743**. When circuit **744** receives a message over the bus **742**, it interrupts the microprocessor, which in turn initiates communication with the circuit through its SPI port. Microprocessor **735** then reads the data from the SPI register and acts upon the information. The multiplexing scheme is set forth in SAE standard J1850 and is universally used in the automotive industry.

The vehicle control system **730** includes a power supply **732** which supplies regulated 5- and 12-volt DC to the various individual circuit blocks shown in FIGS. **44** and **45** with the conventional power circuit interconnections not being shown for the sake of simplification of the drawings. Circuit **730** also includes a power control circuit **734** which is coupled to power supply **732** and between the microcontroller and receiver **724** to selectively activate and deactivate the receiver periodically in order to save power as described in greater detail below in connection with the flow diagram of FIG. **46**. The vehicle electrical control circuit **730** further includes an alpha-numeric vacuum fluorescent-type display circuit **740** which is coupled to the microcontroller **735**. Display circuit **740** includes suitable driver circuits as well as the display itself. A push-button lead switch **741** is coupled to microcontroller and a transmit control push-button switch **745** is also coupled to microcontroller **735**. As will be described below, switches **741** and **745** are operator actuated switches which selectively scroll the information displayed on the display **740** and allow memory control of such information. In the case of an automatic telephone dialing system, the transmit switch **745** can be employed for activating a sequence of controls which cause a cellular telephone, if installed in the vehicle, to automatically dial a number displayed on the vacuum fluorescent display **740**.

Coupled to the microcontroller are a plurality of input/output ports **750–764** which provide control output signals or receive input status signals from a variety of vehicle interface controls and circuits identified in the drawings. Depending upon the specific microcontroller used, conventional interface circuits between the microcontroller and the input/output lines **750–764** may be required as is well-known in the art. In the system shown in FIG. **44**, the output terminals **750–764** can be coupled directly to one or more of the variety of control systems shown such as the electrical fuel pump system shown by data bus **762**, the ignition switch input **756**, and the like. Similarly, instead of directly coupling the microcontroller as shown through the data buses **750–764**, many vehicles will include a single wire data bus **742**, which as seen in FIGS. **45** and **47**, intercouples the same control information from microcontroller **735** in receipt of information through the data bus **742** instead of directly through conductors **750–764**. In this instance, many of the conductors **750–764** can be eliminated and the controls are accomplished through an interface microcontroller **770** of the type disclosed in U.S. Pat. No. 5,113,182, the disclosure of which is incorporated herein by reference. For the sake of comparison, the output conductors of microcontroller **770** corresponding to those of microcontroller **735** are identified by similar reference numerals carrying a superscript prime symbol. Thus, the vehicle control circuit **735** shown in FIGS. **44**, **45**, and **47** will be capable of communicating through the data bus **742** or directly from microcontroller **735** to the various interface controls. Microcontroller **770** is coupled by conductor **772** to bus **742** through a multiplex chip **773** of the same type as circuit **744** to provide two-way communication between the two microcontrollers. In the event it communicates through the data bus **742**, additional control circuits as now described are employed.

In the FIG. **45** embodiment of the control circuit **730**, a cellular telephone **775** (FIG. **45**) is mounted in the vehicle and communicates with bus **742** through a data link **774** and a multiplex interface chip **776**. Similarly, the vehicle includes an AM/FM radio **780** coupled to bus **742** through data line **782** and also includes a multiplex interface chip **786**. The vehicle may include a voice recognition system **790** of the type described in U.S. Pat. No. 4,827,520, issued May 2, 1989, and entitled VOICE ACTUATED CONTROL SYSTEM FOR USE IN A VEHICLE, the disclosure of which is incorporated herein by reference. In the event the system includes such a voice recognition and control system, data bus **742** is employed in connection with the voice recognition circuitry which operates in conjunction with microcontroller **770** to provide the desired control of the various vehicle functions. Voice recognition circuit **790** is coupled to a multiplex circuit **796** and conductor **795** to bus **742**. The vehicle may also include an electronic climate control system **792** which has a multiplex interface chip **797** which couples to bus **742** via the conductor **798**.

The software programming of the microcontroller **735** is shown in FIGS. **46A–46K**. The main program routine includes an interrupt timer which periodically interrupts the main program routine to run an interrupt service routine shown in FIG. **46A**. The interrupt service routine is initiated by block **800** upon expiration of the program timer and upon such event the power is applied to the receiver **724** as indicated by block **802** for sampling incoming signals for a period of 250 milliseconds. The demodulator looks for a preamble signal indicated by block **804**. The RF signaling formats preferably provide a preamble digital signal and if one is not detected by the microcontroller, the interrupt counter is reset as indicated by block **806** and the interrupt subroutine and the program returns to the main program as indicated by block **808**. The main program routine starts at block **852** as described below in connection with FIGS. **46E–46K**. In the event a preamble is detected, however, as indicated by an affirmative decision in block **804**, the receiver remains activated as indicated by block **810** for receiving one of two different vehicle addresses uniquely associated with the vehicle. If either of these addresses is received, as indicated by block **812**, a correction subroutine as shown in FIG. **46B** is conducted to assure that the address has been correctly received. The first vehicle address is one in which a vehicle option is to be changed by a subsequently-transmitted control signal. The second address is one which is followed by a telephone number or alpha-numeric message to be displayed. Each of these addresses is uniquely associated with a single vehicle.

The error correction routine is a standard subroutine for the different RF messaging systems. The bit error correction subroutine is initiated as indicated by block **813** of FIG. **46B**. The error correction subroutine **812** reads an address or message data block as indicated by block **814** and divides binary format constants indicated in block **816** for the respective paging formats and stores the remainder which is known as the syndrome as indicated by block **818**. Then a

test is conducted, as indicated by block **820**, to determine whether the syndrome is zero. If it is, the data is correct and the program returns to the interrupt service routine from the bit error correction subroutine as indicated by block **822**. If, however, the syndrome is not zero, the data is corrected by the bit indicated by the syndrome as shown by block **824** and the data is retested through the loop including blocks **816–820**.

Once the bit error correction subroutine has been completed and a correct preamble detected, the interrupt service routine proceeds to test as indicated in FIG. **46**C, block **830**, whether one of the vehicle's addresses has been detected. If no address is received for the particular vehicle into which the preprogrammed addresses of microcontroller **735** are installed, the program returns to port B of FIG. **46**A as indicated by block **832** and the interrupt counter is reset and the program returns to the main information display program described below.

If, however, one of the vehicle's addresses has been detected, the program tests, as indicated by block **834** (FIG. **46**C), whether the address is an information address or an option personalization address. If the vehicle owner or operator has called the service dealer asking that an option be activated or deactivated, the transmission of the address corresponding to the personalization code (i.e., first address) and the data corresponding to the activation of the option selected will be received and the control command decoded to provide a control signal to effect the option change as indicated by block **836** of FIG. **46**C. The signal is then either outputted by one of the conductors **750–764** shown in FIG. **44** of microcontroller **735** or through the multiplex circuit **744** to the multiplex bus **742** for subsequent receipt by the vehicle's microcontroller **770** shown in FIG. **45** to effect the change in the vehicle option. The details of changing a vehicle option are described below with reference to FIGS. **48–56**. In most instances, a bit or bytes are set into the NVM of microcontroller **735** to cause the vehicle option to respond as requested. Thus, for example, line **760** may send a control signal upon the selection of the "express window" feature to cause the driver's window to fully lower or raise in response to the activation of the window control switch for a predetermined period of time. This feature can be activated or deactivated by the setting of a switch in the microcontroller memory. As indicated by block **838**, the microcontroller also provides a display output signal which is applied to the alpha-numeric display **740** to indicate to the owner that the option requested has been changed as requested. The program then returns to the interrupt service routine input B of FIG. **46**A.

The anti-theft feature of the system operates in the same manner as one of the vehicle option changes. Typically, if a vehicle is stolen, the owner will call the service center **11** indicating the theft. The service center operator then will transmit the first vehicle address and an anti-theft control command signal which the microcontroller responds to by outputting a signal on line **762** (FIG. **45**) to deactivate the vehicle's fuel pump. For safety, the program responds to the anti-theft command to output the fuel pump disabling signal only after the ignition switch has been deactivated and thus the vehicle has come to rest. Alternative or additional anti-theft commands are also possible. Thus, a theft alarm signal output on line **759** (FIG. **45**) could be activated to enable the vehicle's audible alarm. Also, instead of deactivating the vehicle's fuel pump, the vehicle's ignition could be interrupted. In some areas, the police department may provide the anti-theft signal transmission facilities such that the owner can report the theft and take affirmative action to protect the vehicle from damage through one telephone call.

If the vehicle address received is not a first address for an option change or anti-theft control but instead is an address identifying a text message (i.e., a second address) as opposed to a vehicle option control signal, the test in block **834** indicates an address and the program receives and decodes a text message as indicated by block **840** in FIG. **46**C. Again, the bit error correction subroutine **812** of FIG. **46**B is rum to assure the accuracy of the incoming preamble and subsequent address and data as indicated by the block **812** subroutine. Once the subroutine of FIG. **46**B has been completed, the message of the incoming signal is placed in the memory as indicated by block **842** of FIG. **46**C. The program then proceeds to scan the text message to determine whether or not a telephone number has been received as indicated by block **842** of FIG. **46**D.

If a telephone number is detected in the incoming message as indicated by an affirmative response to the test of block **844**, the number is stored in the stack as described below and the number received flag is set as indicated by block **846**. The program then proceeds to block **848** and if a telephone number was present, it is displayed on the alpha-numeric display **740** of FIG. **44** in addition to being stored. This operation is indicated by block **848** of the flow diagram. Next, the microcontroller outputs a signal through the microcontroller indicated by block **850** to alert the owner that a message has been received. This can be a chime coupled to a vehicle multiplex bus **742** which is also used, for example, to alert the driver that a door is open with the key in the ignition, etc., or can be a flashing LED or the like. Subsequent to alerting the driver that a page has been received, the program proceeds to the interrupt routine at input B of FIG. **46**A as previously described. In the event a two-way communication system is used, the microprocessor will display any choices of responses that were transmitted with the message, and will allow the user to select one of the predetermined responses to transmit back to the service center and to the originator of the first message.

The microcontroller program includes a main program routine which provides a variety of informational displays and message storing, erasing and display features for the vehicle operator in addition to the automatic remote vehicle option control described above. Thus, in addition to the interrupt routine described in connection with FIGS. **46**A–**46**D, the main program routine for the microcontroller provides a variety of message storing, displaying, and controlling functions as now described.

Referring to FIG. **46**E, the main program routine of the microcontroller starts as indicated by block **852** upon power-up and initializes memory pointers and flags as indicated by block **854**. The input port A from the interrupt routine indicated in FIG. **46**A precedes the program test indicated by block **856** of the status of transmit and reads switches **745** and **741**, respectively (FIG. **44**). The program first tests to determine whether or not the transmit push-button switch was depressed as indicated by block **858** and if it was, it scans the information displayed to determine whether or not a telephone number exists. This is indicated by block **860** whereupon the program tests to determine whether a telephone number was found in the message as indicated by block **862** of FIG. **46**F. It is noted that in FIGS. **46**A–**46**K, the interconnections of the flow diagram ports are identified by corresponding letters.

If no telephone number was found, display **740** displays the no telephone number message as indicated by block **864** for three seconds and redisplays the current information, whereupon the program proceeds to input A of FIG. **46**E and recycles. If a telephone number was found, as indicated by

an affirmative test in block **862**, and the vehicle includes a cellular telephone which is coupled through the multiplex bus **742** to the microcontroller **735**, the vehicle operator can automatically dial the displayed telephone number. For this purpose, the program presents a dialing message to the vehicle operator as indicated by block **866**. If the operator wants to auto-dial the displayed number, the transmit or call button was actuated as previously indicated by the test of block **858** in FIG. **46**E and the detection and display of a telephone number in the message. The program then tests to determine whether or not telephone connection was made by the cellular telephone and if not, the program proceeds to block A of FIG. **46**E and cycles through the test loop again. If a telephone call was successfully placed, the call message is advanced to the old stack as described in connection with FIG. **46**G now described and the display pointer is reset thereupon the program returns to port A of FIG. **46**E.

FIG. **46**G illustrates the memory mapping for incoming messages. The program permits the vehicle operator to lock desired messages into a block of memory, for example, memory space for five alpha-numeric pages **871–875** is provided. These messages will be, depending upon the desired degree of sophistication for the system, numeric, or alpha-numeric messages having 24 characters. The information can displayed in the 20-character display **740** of FIG. **44** by sequentially displaying 12 characters at a time. This can be done automatically if desired, or the read switch **741** can be activated for scrolling to the second half of the displayed message. Incoming messages are displayed at the current memory location **876** while the system includes five old message memories in a first-in-last-out (FILO) storage system indicated by memory blocks **877–881**. Locked messages, as discussed below, will remain in memory for future reference regardless of the number of incoming messages while the old messages, unless locked, will be sequentially dumped from the last memory location **881** upon receipt of incoming messages which bump the incoming message from the previous message from block **876** to block **877**. This is indicated by block **870** of FIG. **46**F of the flow diagram.

Returning now to FIG. **46**E, if the transmit button has not been actuated as indicated by a negative decision on block **858**, the program tests to determine whether or not the read switch **741** of FIG. **44** has been actuated as indicated by block **882**. If the read switch was not depressed, the program cycles through tests **856**, **858**, and **882** with the periodic interrupt routine set forth in FIGS. **46**A–**46**D being conducted to the interrupt to this main routine and checks for incoming option control or messages. If the read switch has been actuated, a three-second counter for locking the message is reset as indicated by block **884**. The program then proceeds to port E of FIG. **46**H. How long the read switch is being depressed determines a variety of functions of the system. If the read switch is momentarily depressed (i.e., released within three seconds as indicated by the test of block **886**), the display stack pointer is incremented and the next message is displayed as indicated by block **888**. If, however, the switch is held down beyond three seconds, as indicated by a negative test at block **886** and a positive result of test block **890**, the program displays to the vehicle operator a lock message inquiry asking the operator if the message (i.e., displayed message) should be placed in one of the locked message memory locations **871–875** shown in FIG. **46**G. If upon receiving this prompt the vehicle operator releases the read switch, the previously-displayed message information will be placed in a locked message memory location. At the time the lock message is displayed, the three-second counter for a delete message is reset as indicated by block **894** and the program proceeds to port F of FIG. **46**I to determine whether or not the operator continues to depress the read switch. If the read switch has been released indicating the operator would like to lock the message into memory, test **896** of FIG. **46**I will be affirmative and the program proceeds to port G of FIG. **46**J.

The program then tests to determine if the locked stack (i.e., memory locations **871–875**) is full as indicated by block **898**. If not, the incoming message being displayed is stored in memory block **871** and the remaining locked memory messages are shifted downwardly as indicated by block **900** (FIG. **46**J). The program then returns to port A of FIG. **46**E. If the locked message memory stack is fall, an affirmative test at block **898** causes the message locked memory full to be displayed as indicated by block **902** to the vehicle operator and then the program returns to port A of FIG. **46**E. This all occurs within the three- to six-second interval while the vehicle operator is holding the read button in a depressed condition.

If the read switch remains depressed beyond six seconds, as indicated by block **904** of FIG. **46**I, the program tests to see if the previously reset three-second timer has timed out, if not, it continues testing to determine whether or not the read switch has been released. If the three seconds (now six seconds total) has expired, the delete message indicator is displayed on the display **740** as indicated by block **906**. This presents the vehicle operator a three-second interval between the six-and nine-second time period in which to, as described below, delete the message from the memory. Initially, the three-second counter for the "cancel" message is reset as indicated by block **908**. The program proceeds to input H of FIG. **46**K. At this time, the operator has held the read switch in for a period of six seconds and a message "delete message" is being displayed. If the read switch is released, as indicated by block **910** of FIG. **46**K, the displayed message is deleted from memory and the remaining memory messages are advanced as indicated by block **912** and the program proceeds to port A of FIG. **46**E. If the displayed message is not desired to be deleted, the operator can hold the read switch down, as indicated by block **914**, until the six- to nine-second time period has been exceeded and the three-second timer again times out presenting a "cancel" message to the vehicle operator as indicated by block **916**.

At this point in time, the vehicle operator can release the read switch **741** as indicated by block **918** and the current message is again displayed and the program returns to port A of FIG. **46**E thus allowing the vehicle operator to cycle through the memory to determine whether or not the operator desires to insert a message into a locked memory location if the memory is full. Thus, by using a single switch **741**, the vehicle operator can sequence through stored messages of display information including locked messages and insert messages into the locked message memory as desired. By only momentarily depressing the read button, the sequence of messages shown in FIG. **46**G are displayed to the vehicle operator and, if desired, any telephone number contained in any of such messages can be automatically dialed by actuating the transmit button when the message is currently displayed on display **740**.

Thus, the system of the present invention provides a vehicle with a receiver for receiving a vehicle option control address and command signals for changing a vehicle option remotely and one which can also receive a paging address and paging message. In one embodiment, the system is capable of both functions and the receipt of alpha-numeric

messages which can be employed for automatically dialing a cellular telephone if the vehicle has a telephone installed and connected to the multiplex bus or otherwise directly wired to a serial data port such as an RS-232 port of microcontroller **735**. Cellular telephones typically include input ports for such purpose. Similarly, the microcontroller interfaces with a plurality of vehicle accessories indicated by conductors **750–764** or through the multiplex computer **770** of FIG. **45** to such systems for activation or deactivation of a variety of vehicle options.

As shown in FIG. **47B**, the vehicle may also include a plurality of other control modules $\mathbf{1000}_1$-$\mathbf{1000}_N$ each associated with a controlled vehicle accessory and having a multiplex interface chip $\mathbf{1010}_1$-$\mathbf{1010}_N$ coupled to bus **742** via conductors $\mathbf{1020}_1$-$\mathbf{1020}_N$, respectively. Control modules $\mathbf{1000}_1$-$\mathbf{1000}_N$ may be associated with one or more of the following vehicle accessories in various combinations thereof. The associated vehicle accessories may include: a door locking actuator for each door; a window opening actuator for each movable window; a sunroof actuator; vehicle headlights; horn; seat position actuators; seat heaters; mirror position actuators; a rearview mirror reflectivity adjusting circuit; a compass; vehicle gauges; vehicle displays; interior lighting; a rear defrost circuit; a fuel door locking mechanism; a trunk locking mechanism; and various circuits for producing an audible chime within the vehicle's interior.

In addition to those inputs to microcontroller **735** or microcontroller **770** as shown in FIGS. **44**, **45**, and **47**, respectively, various other input signals may be provided including input signals from the following: each of the window switches; a circuit for detecting whether a key is in the ignition; a speedometer; an RPM detecting circuit; a battery voltage detecting circuit; a fuel level sensor; the turn signal circuit; ambient light sensors; a reverse gear switch input; a drive gear switch input; a park gear switch input; a rain sensor; an interior thermometer; an exterior thermometer; an engine temperature sensor; an oil pressure sensor; a rear defrost switch; door open/closed sensors; a driver's exterior door lock sensing circuit; and a headlight switch. As will be apparent from the following description of the operation of the foregoing system, microcontroller **735** and microcontroller **770** utilize various combinations of these input signals to control the various vehicle accessories associated with the control modules connected to multiplex bus **742** in a manner defined by a control program stored in a non-volatile memory of the respective microcontroller.

FIGS. **48–56** show an example of a main control program and its various subroutines that may be used to control the operation of various combinations of vehicle accessories. Upon reading this Specification, those skilled in the art will recognize that such a control program may be implemented in many different forms taking into account the large number of possible combinations of vehicle accessories that the main control program is responsible for controlling. Further, those skilled in the art will recognize that various functions of the exemplary main control program may be delegated to microcontroller **770** and/or the various control modules associated with the vehicle accessories. It should be noted that the previously-described main pager program routine described above with respect to FIGS. **46A–46K**, may be incorporated into the main control program described below as an integral part or called subroutine.

In general, the main control program utilizes a modifiable data structure to determine which of several possible subroutines to execute in response to a given input signal. As exemplified in the main control program as described below, such a data structure may take the form of a plurality of tables, each associated with one of several vehicle operators, including a plurality of entries corresponding to flags read from these tables by the main control program to determine the desired accessory control operations to be executed in association with the current vehicle operator.

Referring to FIG. **48A** during system initialization, microcontroller **735** begins the execution of the main control program by clearing its RAM, recalling the last user ID by reading the same from the non-volatile memory, and reading a flag table associated with the last ID (step **1201**). Initially, the associated flag table may be set in the factory or by the dealer to specify default values. As described below, the flags in the flag table may subsequently be modified by a reprogramming signal included in either a paging signal or a cellular RF control signal having the vehicle's ID.

Following initialization, microcontroller **735** periodically wakes from a sleeping state to turn on its RF receiver to determine whether a signal is received from an RKE transmitter (step **1203**). If the RKE transmitters associated with the vehicle each transmit different user IDs, microcontroller **735** may be programmed to read the ID from the signal transmitted from the RKE transmitter and compare the received ID with that stored in memory in association with the last user ID (step **1205**). If a new ID has been received, microcontroller **735** selects the flag table associated with the new ID and sets a new ID flag for subsequent reference (step **1207**) prior to executing an RKE subroutine (step **1209**). On the other hand, if the received ID is the same as the last ID, or if the transmitted signal does not include a user ID, microcontroller **735** proceeds directly to the steps defining the RKE subroutine **1209**.

Referring to FIGS. **49A** and **49B**, which show the steps performed in RKE subroutine **1209**, microcontroller **735** first will determine whether the person activating RKE transmitter double-clicked any of the RKE transmitter buttons (step **1401**). If microcontroller **735** detects a double-click, it then checks a predefined location within the flag table associated with the user ID to determine whether a flag has been set to instruct microcontroller **735** to perform a panic routine in which microcontroller **735** responds to a double-click by honking the horn and flashing the headlights (step **1405**) prior to returning to the main control program at step **1211** (FIG. **48A**). If microcontroller **735** does not detect a double-click, or if the double-click panic flag is not set, microcontroller **735** determines whether the signal received from the RKE transmitter corresponds to a door lock signal (step **1407**).

In the example shown in FIG. **49A**, there are two options that may be set to change the manner by which the microcontroller **735** controls the vehicle accessories in response to an RKE lock signal. The first option prevents the user from locking the vehicle when a key is detected in the ignition. To implement this option, the RKE subroutine **1209** first checks whether the associated flag has been set in the flag table (step **1409**) and then checks whether an input signal is received from an ignition key sensor (step **1411**). If a key is in the ignition, microcontroller **735** will not lock the doors and will proceed to step **1211** in the main control program. If a key is not in the ignition, or if the flag is not set for this option, microcontroller **735** proceeds to lock all the doors of the vehicle (step **1413**).

The second option associated with an RKE lock signal is to honk the horn after the doors have been locked as a confirmation to the vehicle operator. Thus, after locking all the doors in step **1413**, microcontroller **735** next determines whether the flag associated with this second option has been

set (step **1415**). If the flag has not been set, microcontroller **735** proceeds to execute step **1211** in the main control program and the routine for honking the horn after locking all the doors would remain a dormant subroutine which could not be executed unless the flag associated with this option has been set in the flag table associated with the user.

If in step **1407** microcontroller **735** determines that the transmitted RKE signal is not a lock signal, it will then determine whether the receive signal is an unlock signal (step **1419**). If the receive signal is an unlock signal, microcontroller **735** determines whether a flag has been set to instruct microcontroller **735** to unlock the driver's door (step **1421**). If the flag has been set, microcontroller **735** only unlocks the driver's door in response to the RKE unlock signal (step **1423**). However, if this flag has not been set, microcontroller **735** unlocks all the doors in response to a received RKE unlock signal (step **1425**).

RKE subroutine **1209** provides for several selectable control routines that microcontroller **735** may execute in response to receiving an RKE signal from a third button on the RKE transmitter. Thus, if in steps **1407** and **1419**, microcontroller **735** determines that the received RKE signal is not a lock or unlock signal, it assumes the receive signal is associated with a third RKE button and determines in steps **1427, 1431, 1435, 1439, 1443,** and **1451** which control operation is to be performed in response to the received RKE signal by checking the associated flags at predetermined locations in the flag table. In response to a signal corresponding to the third RKE button, microcontroller **735** may unlock the fuel door (step **1429**), unlock the trunk (step **1433**), turn on and off the headlights (step **1437**), honk the horn (step **1441**), lock the doors (step **1449**), or unlock either the driver's door (step **1455**) or all the doors (step **1457**). If the flag is set for the third RKE button to lock the doors, microcontroller **735** may determine whether the flag is set (step **1445**) to honk the horn (step **1447**) to confirm that all the doors have been locked (step **1449**). Further, if the flag is set for the third RKE button to unlock the doors, microcontroller **735** can determine whether to unlock only the driver's door or all the doors by checking whether a flag is set in the flag table (step **1453**).

Referring back to FIG. **48**A, if microcontroller **735** determines in step **1203** that a signal has not been received from an RKE transmitter, or following completion of the RKE subroutine **1209**, microcontroller **735** checks whether an input is received from a circuit detecting whether the driver's door is being unlocked from the exterior with a key (step **1211**). If a user ID may be input from a keypad on the exterior surface of the door or from a key itself, microcontroller **735** determines whether a detected ID is different from the last ID stored in memory (step **1213**). If the ID is not different, microcontroller **735** selects the flag table associated with the last ID stored in memory and proceeds to execute subroutine **1217**. Otherwise, microcontroller **735** selects a flag table associated with the new ID (step **1215**) prior to executing subroutine **1217**.

Subroutine **1217** is shown in FIG. **50** and begins with step **1501** in which microcontroller **735** checks whether an unlock all doors flag has been set. If this flag has been set, microcontroller **735** unlocks all the vehicle's doors (step **1503**) in response to a door unlock signal received through the keyslot or keypad on the exterior of the driver's door. Alternatively, if the unlock all doors flag is not set, microcontroller **735** unlocks only the driver's door (step **1505**).

In association with the keyslot on the driver's door, three different options may be selected upon a detection of a second rotation of the key in the keyslot (step **1507**). If an unlock trunk flag is set (step **1509**), microcontroller **735** unlocks the trunk (step **1511**). If the unlock trunk flag is not set, but an unlock fuel door flag is set (step **1513**), microcontroller **735** may unlock the fuel door (step **1515**). If neither the unlock trunk nor the unlock fuel door flags are set, microcontroller **735** may do nothing in response to a detection of a second rotation of the key in the keyslot. If a second rotation is not detected, or after the preprogrammed function has been executed, microcontroller **735** proceeds to execute step **1219** in FIG. **48**B.

In step **1219** of FIG. **48**B, microcontroller **735** checks whether a new driver ID signal has been received. Because various mechanisms may be used to input a driver's ID such as a keypad or a user ID dedicated push-button, it may be appropriate for microcontroller **735** to monitor such input mechanisms to determine whether a new driver ID signal has been received. If a driver ID signal is received that is the same as the last user ID stored in memory, or if no new driver ID signal is received, microcontroller **735** leaves all the settings in the vehicle to those last used by the driver with the last ID stored in memory (step **1221**) and the program advances to step **1281** shown in FIG. **48**F. If a new driver ID signal is received, microcontroller **735** executes a routine (steps **1223–1279**, FIGS. **48**B–**48**E) to initialize various vehicle accessories to those preferred and set by the driver with the received new driver ID utilizing the flag table associated with this new ID (step **1223**).

A first vehicle accessory that may be initialized is the position of the driver's seat. Thus, if the driver with the new ID has selected the last seat position memory feature, microcontroller **735** will determine in step **1225** that the associated flag has been set and will set the seat position to that last used by the driver with the new ID by reading seat positioning parameters stored in non-volatile memory the last time this driver used the vehicle (step **1227**). Next, microcontroller **735** will check whether a flag is set for a last mirror position feature (step **1229**) which, if selected, causes microcontroller **735** to set the mirror positions to that last used by the driver with the new ID (step **1231**). If this flag is not set, the routine for setting the mirror positions is dormant with respect to the driver with the newly detected ID.

If the vehicle includes mirrors with electronically adjustable reflectivity, microcontroller **735** may check whether a flag has been set for a last mirror reflectivity feature (step **1233**). If the flag has been set for this feature, microcontroller **735** sets the mirror reflectivity to that last used by the driver with the new ID in step **1235**.

In step **1237** (FIG. **48**C) microcontroller **735** determines whether the vehicle ignition is on. If the vehicle ignition is not on, microcontroller **735** advances to step **1281** in FIG. **48**F and skips the remaining portion of the new user initialization routine. If the ignition is on, microcontroller **735** proceeds in step **1239** to determine whether a flag has been set for a last temperature setting feature. If the flag has been set for this feature, microcontroller **735** will set the interior temperature for the climate control system to that last used by the driver with the new ID by retrieving the last used temperature setting from the non-volatile memory (step 1241).

If the vehicle includes a compass that allows for selection of a feature that computes variations in heading based on the geographic location of the vehicle, microcontroller **735** may determine in step **1243** whether the flag associated with this feature has been set. If the flag has been set, the compass will be initialized for variation based on geographic location (step **1245**). Otherwise, the compass will be initialized for operation without variation for geographic location (step **1247**).

Next in step **1249** (FIG. **48**D), microcontroller **735** may check whether a flag has been set for a last radio volume feature (step **1249**). If the last radio volume feature has been selected by the user with the detected ID, microcontroller **735** sets the radio volume to that last used by the driver with the new ID (step **1251**).

If a flag has been set for a last radio station feature, microcontroller **735** will detect if the flag has been set (step **1253**) and set the radio station to that last used by the driver with the new ID (step **1255**). Similarly, if microcontroller **735** detects that a flag has been set for a radio preset memory feature (step **1257**), microcontroller **735** sets the radio station presets to those last used by the driver with the new ID (step **1259**).

If the vehicle radio includes a display that displays either the radio station or the time of day, a vehicle operator may wish to select what is displayed on the radio display as a default condition. Thus, microcontroller **735** may look for a flag corresponding to a radio station display default in step **1261** and display the radio station as a default on the radio display (step **1263**) if the flag is set. Otherwise, the time of day will be displayed on the radio display as a default.

As vehicle sophistication improves, more and more vehicles will include alpha-numeric displays to convey information to the vehicle operator. Because such vehicles may be used in countries having different primary languages, it is advantageous to allow for different languages to be displayed on the vehicle's alpha-numeric display. Moreover, it would be even more advantageous to provide for a vehicle alpha-numeric display that can be programmed to display different languages for different drivers that may use the vehicle. To this end, the main control program includes a step (**1265**) that causes microcontroller **735** to check whether a flag for a non-default language (i.e., English) has been selected for the vehicle displays. If the flag has been set, microcontroller **735** sets the display language to that last used by the driver with the new ID (step **1267**) by setting a pointer to a set of memory addresses at which the selected language display messages are stored.

A related feature provided by the present invention permits the vehicle operator to select display parameters such as Fahrenheit or Centigrade, miles or kilometers, miles per hour or kilometers per hour, and/or gallons or liters, to be displayed in the vehicle's gauges and other display screens. Thus, in step **1269**, microcontroller **735** first checks whether a flag has been set for a non-default display parameter and then sets the display parameters to those last used by the driver with the new ID (step **1271**) if the flag has been set.

The present invention further allows each vehicle operator to customize the vehicle's displays by reconfiguring message screens and, if desired, the message screen location. Thus, if a vehicle includes several message screen displays, a vehicle operator may reconfigure these displays such that a compass heading is displayed on a different message screen than that used in a default condition. Therefore, if microcontroller **735** determines in step **1273** that a flag is set for a non-default display configuration, it will set the display configuration to that last used by the driver with the new ID (step **1275**).

If the vehicle employs a reconfigurable instrument panel display, the present invention allows for the vehicle operator to reconfigure the display gauges on the instrument panel display by changing their location, size, color, or existence as displayed on the instrument panel. To allow various vehicle operators to select their desired preference, microcontroller **735** determines in step **1277** whether a flag has been set for a non-default gauge configuration and sets the gauge configuration to that last used by the driver with the new ID in step **1279** if the flag has been set.

After completing steps **1277** and **1279**, microcontroller **735** has completed the steps associated with initializing the vehicle for a driver having a new ID that is different from that of the last ID stored in memory. It will be appreciated by those skilled in the art that the settings associated with the last driver will be maintained and utilized during initialization provided a new user ID is not received. Following this initialization process, microcontroller **735** monitors a timer to determine when to interrupt the main program to look for an RF signal (step **1281**). If it is time to interrupt the main program, microcontroller **735** executes interrupt service routine **1283**, which is described above with reference to FIGS. **46**A, **46**B, and **46**C.

If an RF signal is received and the detected address corresponds to a personalization address, microcontroller **735** receives and decodes the RF signal and corrects errors therein using the bit error correction subroutine and subsequently defines the function in the reprogramming signal that is to be changed (step **836**). Microcontroller **735** may determine from the received reprogramming signal which function is to be changed by accessing a look-up table and identifying which flags correspond to the commands included in the reprogramming signal. After identifying the flags corresponding to these commands, microcontroller **735** modifies the data structure it utilizes in determining the manner in which to control vehicle accessories by setting or resetting the flags in the flag table corresponding to a user ID also transmitted in the personalization RF signal. In this manner, microcontroller **735** reprograms the main control program as used to control vehicle accessories for a particular vehicle operator.

As apparent from the foregoing and following description of the control program, the main control program includes both active and dormant subroutines which may be activated or deactivated by the setting or resetting of its associated flag. Upon reading this disclosure, those skilled in the art will recognize that various other data structures or mechanisms may be employed to reprogram the manner in which a vehicle accessory control system controls the operation of the vehicle accessories in response to detected conditions, parameters, or vehicle operator initiated activation signals. For example, the various selectable routines defining manners in which a vehicle accessory can be operated may be separately stored and executed by the control module associated with that vehicle accessory whereby the main control program either alters the data structure used by the routines in the control module or relays the reprogramming signal to the appropriate control module, which alters the data structure used by its associated control routine. In such a case, the various control modules may directly receive and act upon a sensed condition, parameter, or vehicle operator initiated activation signals. Thus, the various routines and subroutines of the main control program may be separated and delegated to the various accessory control modules and be independently executed. Alternatively, the main control program could modify the data structure it uses itself to determine a particular command to issue to a vehicle accessory control module to activate the desired one of the subroutines stored in the control module.

If it is not time for the interrupt service subroutine to be executed or if the interrupt service routine has been executed, microcontroller **735** proceeds to execute step **1285** in FIG. **48***f*. In step **1285**, microcontroller **735** checks whether a flag has been set to turn off the headlights if the

battery voltage is low. If the flag is set, microcontroller **735** reads the detected battery voltage VB and compares the detected battery voltage VB to a threshold voltage V to determine whether the battery voltage is below a low voltage threshold (step **1289**). If the battery voltage is below this threshold, microcontroller **735** will turn off the headlights if they were on (step **1291**) to prevent further drain on the vehicle's battery.

Another feature that may be selected is to open the windows or a sunroof if the temperature in the interior of the vehicle exceeds a threshold temperature T1 to keep the interior of the vehicle relatively cool. Although this feature may be desirable for some individuals, it may be undesirable to other individuals who, for example, may frequently park their vehicles in a high crime area. Thus, the present invention provides the flexibility for each vehicle operator to select how microcontroller **735** will respond when (in block **1293**) the interior temperature of the vehicle exceeds a threshold temperature T1. To prevent the windows or sunroof from being opened when it is raining, microcontroller **735** may first determine whether rain is sensed by a rain sensor in step **1295**. If it is raining, microcontroller **735** will not open the windows or sunroof. However, if it is not raining, microcontroller **735** will then check whether a flag has been set to open the windows when the interior temperature exceeds the threshold (step **1297**). If the flag has been set, microcontroller **735** will open the windows by a predetermined amount (step **1299**). If the flag for opening the windows has not been set, microcontroller **735** will check whether the flag has been set to open the sunroof (step **1301**). If the flag has been set, microcontroller **735** will issue the appropriate signal via multiplex bus **742** to an actuator for opening the sunroof (step **1303**). If the flag has not been set, microcontroller **735** will proceed to step **1305** (FIG. **48**G) without opening the windows or the sunroof.

If the interior temperature of the vehicle is below a lower, second temperature threshold T2, as may be the case during winter time (step **1305**), microcontroller **735** checks whether a flag has been set to heat the vehicle seats when the interior temperature falls below the second threshold T2 (step **1307**). If the flag has been set, microcontroller **735** will cause the vehicle's seats to heat (step **1309**). If the flag is not set, the routine associated with heating the seats is effectively disabled and the program advances to step **1311** where microcontroller **735** determines whether the rain sensor has detected rain. If rain is detected, microcontroller **735** executes a rain subroutine **1313** which will now be described in detail with reference to FIG. **51**.

If rain is detected, microcontroller **735** checks whether a flag is set to close the windows (step **1701**). If the flag is set, microcontroller **735** will issue the appropriate control signals to the window actuators to close the windows (step **1703**). Then, microcontroller **735** will check whether a flag has been set to close the vehicle's sunroof (step **1705**). If the flag has been set, microcontroller **735** will issue the appropriate command to close the sunroof (step **1707**). Following execution of the rain subroutine **1313**, microcontroller **735** executes step **1315** (FIG. **48**G) to determine whether the vehicle's headlights are presently on. If the headlights are on, microcontroller **735** executes a headlights ON subroutine **1317**, which is described in detail below with reference to FIG. **52**.

In the headlights ON subroutine **1317**, microcontroller **735** first tests whether the vehicle ignition is off (step **1709**). If the ignition is off, microcontroller **735** exits the headlights ON subroutine and returns to step **1319** (FIG. **48**G) of the main control program. If, on the other hand, the vehicle ignition is off and the headlights are on, microcontroller **735** determines in step **1711** whether a delay flag or an indefinite ON flag has been set. If neither flag has been set, microcontroller **735** turns off the headlights (step **1713**) and returns to the main control program. If one of these flags are set, microcontroller **735** then determines whether the flag that is set is the indefinite ON flag (step **1715**). If the indefinite ON flag is set, microcontroller **735** returns to the main control program without turning off the headlights. If the indefinite ON flag is not set, microcontroller **735** assumes that the delay flag has been set and waits for the predetermined delay time (step **1717**) before turning off the headlights (step **1719**) and returning to the main control program.

The next step in the main control program instructs microcontroller **735** to determine whether an interior door lock switch has been depressed (step **1319**). If an interior door lock switch has been depressed, microcontroller **735** executes an associated subroutine **1321**, which is described below with reference to FIG. **53**.

The subroutine **1321** associated with the activation of an interior door lock switch begins with step **1721** which causes microcontroller **735** to determine whether a flag has been set for a feature preventing the doors from being locked when a key is in the ignition. If this flag is set, microcontroller **735** determines whether there is a key in the ignition (step **1723**). If a key is in the ignition, microcontroller **735** activates a chime (step **1725**) and returns to the main control program without locking the doors in response to the activation of the interior door lock switch. If the key is not in the ignition or if the flag associated with this feature has not been set, microcontroller **735** next determines whether a flag has been set for a last door locks all doors feature (step **1727**). If this flag has been set, microcontroller **735** determines whether a door is presently open (step **1729**). If a door is presently open, microcontroller **735** will wait until all the doors are closed (step **1731**) before advancing to step **1733** in which microcontroller **735** determines whether a flag is set to delay the activation of the locks for a predetermined time after all of the doors are closed. If this flag has been set, microcontroller **735** will wait for this predetermined time period (step **1735**) and again check whether a door has subsequently been opened (step **1737**). If a door has been reopened, microcontroller **735** returns to step **1731** where it waits until all doors are closed. Once all the doors are closed and remain closed for the predetermined time period, microcontroller **735** locks all the doors (step **1739**) and returns to the main control program. If, in step **1733** the delay flag is not set, microcontroller **735** immediately proceeds to step **1739** and locks all the doors without rechecking whether a door is subsequently opened.

If, in step **1727** microcontroller **735** determines that the flag for the last door locks all doors feature has not been set, microcontroller **735** then checks whether a flag has been set to delay the locking of the doors following the activation of an interior door lock switch (step **1741**). If the delay flag has not been set, microcontroller **735** immediately locks all doors (step **1739**). On the other hand, if the flag has been set, microcontroller **735** waits a predetermined time period (step **1743**) before locking all doors (step **1739**) and returning to the main control program.

The main control program resumes at step **1323** (FIG. **48**H) where it is determined whether the vehicle ignition is on. If the vehicle ignition is on, the main control program advances to step **1337** in FIG. **48**I and if the ignition is off, microcontroller **735** determines whether the ignition was just turned off (step **1325**). If the ignition was not just turned

off, the main control program returns to its beginning at step **1203** in FIG. **48**A as denoted by connection port A.

If the vehicle ignition was just turned off, microcontroller **735** checks whether a flag has been set for controlling the interior lights in response to the vehicle ignition being turned off (step **1327**). If the flag has not been set, the main control program returns to step **1203** (FIG. **48**A) of the main control program. If, however, the flag has been set, microcontroller **735** turns on the vehicle's interior lights (step **1329**) and starts a timer. The interior lights remain on until one of the following events takes place—the expiration of a predetermined time period of, for example, thirty seconds (step **1331**) or the detection that a door has been opened and subsequently closed (step **1333**). Once one of these events has occurred, microcontroller **735** turns off the interior lights (step **1335**) and the program returns to step **1203** at the beginning of the main control program.

As described above, if the vehicle ignition is detected as being on in step **1323**, the main control program advances to step **1337** in FIG. **48**I where microcontroller **735** determines whether a flag has been set for a low fuel level warning chime. If this flag has been set, microcontroller **735** checks the fuel level on the associated input line and determines in step **1339** whether the detected fuel level is below a low fuel level threshold F. If the fuel level is low, microcontroller **735** will activate a warning chime (step **1341**) which may chime once or at a predetermined interval of, for example, once every five minutes.

Next, microcontroller **735** checks whether a flag has been set for an engine temperature warning chime (step **1343**). If this flag has been set, microcontroller **735** obtains the detected engine temperature from the associated input terminal and determines whether the engine temperature exceeds a threshold temperature T3 (step **1345**). If the detected engine temperature T3, microcontroller **735** will activate a warning chime (step **1347**) once or at periodic intervals.

Another warning chime that may be set corresponds to a low oil pressure. Because this feature is optional, as are the other features relating to warning chimes, microcontroller **735** first determines whether the flag has been set for the oil pressure warning chime (step **1349**). If the flag has been set, microcontroller **735** reads the detected oil pressure from the associated input terminal and determines whether the detected oil pressure is less than a predetermined threshold P (step **1351**). If detected oil pressure is less than this threshold pressure, microcontroller **735** activates a warning chime (step **1353**).

Yet another feature that may be selected is to have your headlights automatically turn on at dusk or whenever an exterior ambient light level falls below a threshold level. To perform this feature, microcontroller **735** first checks whether a flag has been set for this feature (step **1355**) and retrieves the detected ambient light level from an associated input terminal and determines whether the detected ambient light level is below a threshold level L (step **1357**). If the detected level is below threshold L, microcontroller **735** will turn on the vehicle's headlights (step **1359**).

The present invention allows various accessories to be controlled in response to a detection of the vehicle speed. Thus, as the next step, microcontroller **735** may check whether any of the flags have been set that are related to the vehicle speed (step **1361**). If any of these flags have been set, microcontroller **735** will execute a vehicle speed subroutine **1363**, which is described below with reference to FIG. **54**.

The vehicle speed subroutine **1363** begins at step **1745** at which microcontroller **735** determines whether a flag has been set for a speed warning chime. If this flag has been set, microcontroller **735** reads the vehicle speed from the associated input terminal and determines whether the speed exceeds a first speed threshold X1 (step **1747**). If the vehicle speed exceeds this threshold, which may be set manually to correspond to the speed limit, for example, microcontroller **735** activates a warning chime (step **1749**), which chimes periodically until the vehicle speed falls back below the first speed threshold X1.

Next, microcontroller **735** may check whether a flag has been set for a feature by which the doors lock when the speed of the vehicle exceeds a threshold level (step **1751**). If the flag has been set, microcontroller **735** reads the vehicle speed from the associated input terminal and determines whether this speed exceeds a second speed threshold X2 (step **1753**). If the second speed threshold X2 is exceeded, microcontroller **735** proceeds to lock all the doors of the vehicle (step **1755**). Typically, the second speed threshold X2 will be set at a relatively low speed to insure the safety of the vehicle's occupants.

As the vehicle's speed increases, the interior noise level within the vehicle will also increase. Therefore, another feature that may be selected adjusts the radio volume proportional to the vehicle's speed. If, in step **1757** microcontroller **735** determines that the radio volume flag has been set, it will then determine whether the radio is on in step **1759**. If the radio is on, microcontroller **735** will obtain the vehicle speed from the appropriate input line and adjust the radio volume proportionally to any changes in vehicle speed and will return to the main control program at step **1365** in FIG. **48**J.

In step **1365**, microcontroller **735** checks whether any flags have been set relating to gear position. If any such flags have been set, microcontroller **735** executes a gear position subroutine **1367**, which is shown in detail in FIG. **55**. In the gear position subroutine **1367**, microcontroller **735** first determines what gear the vehicle is in (step **1763**). If the vehicle is in drive, microcontroller **735** next determines whether a flag has been set for a feature in which the doors are automatically locked when the vehicle is put in drive (step **1765**). If the flag has been set, microcontroller **735** locks all the doors (step **1767**) before returning to step **1369** (FIG. **48**J) of the main control program.

If the vehicle is in park, microcontroller **735** checks whether a flag has been set to automatically unlock the doors (step **1769**). If this flag has been set, microcontroller **735** automatically unlocks the doors when the vehicle is in park (step **1771**).

If the vehicle is in reverse, microcontroller **735** determines whether a flag has been set to automatically tilt the passenger side exterior mirror downward when the vehicle is in reverse (step **1773**). If this flag has been set, microcontroller **735** tilts the passenger side mirror downward to a predetermined angle (step **1775**) and determines whether the vehicle is still in reverse (step **1777**). When the vehicle is no longer in reverse, microcontroller **735** tilts the passenger side mirror back to its original position (step **1779**) before returning to the main control program. This mirror tilting feature is particularly suited for vehicle operators who frequently parallel park their vehicles next to a curb.

At the next step in the main control program, microcontroller **735** checks whether there is an incoming telephone call (step **1369**). If there is an incoming telephone call, microcontroller **735** executes a phone subroutine **1371** that identifies several selectable features relating to vehicle accessory operation in response to an incoming telephone call. Phone subroutine **1371** is shown in FIG. **56** and begins

with microcontroller **735** determining whether a flag is set for a closed windows and sunroof feature (step **1781**). If this flag has been set, microcontroller **735** will close the windows and sunroof in response to an incoming telephone call (step **1783**). By automatically closing the windows and sunroof when an incoming telephone call is received, the vehicle operator will not have to fumble around to close all the windows and sunroofs to cut down on the interior noise so that the vehicle operator may subsequently answer the incoming telephone call.

Another option that may be selected to make receiving a telephone call much easier for a vehicle operator is a feature which automatically mutes the radio when an incoming telephone call is received. If microcontroller **735** determines in step **1785** that the flag is set for this feature, microcontroller **735** will automatically mute the radio (step **1787**) in response to the detection of an incoming telephone call.

After determining that there is no incoming telephone call or executing the phone subroutine **1371**, microcontroller **735** continues in the main control program by determining whether a window down switch has been depressed (step **1373**, FIG. **48J**). If the vehicle operator has depressed the window down switch, microcontroller **735** will check a flag to determine the manner in which the window actuator is to be controlled in response to this vehicle operator-initiated activation signal associated with a window down function (step **1375**). If the flag has been set for an express window feature, microcontroller **735** will automatically open the window all the way without regard to the length of time the button is depressed (step **1377**). If the flag has not been set, microcontroller **735** opens the window an amount proportional to the length of time the switch is depressed (step **1379**). Similarly, if a window up switch is depressed (step **1381**), microcontroller **735** determines whether a flag has been set for an express window up feature (step **1383**). If this flag has been set, microcontroller **735** closes the window all the way (step **1385**). Otherwise, microcontroller **735** will close the window an amount proportional to the length of time the switch is depressed (step **1387**).

The main control program then advances to step **1389** in FIG. **48K**, in which microcontroller **735** determines whether the rear defrost switch has been depressed. If this switch has been depressed, microcontroller **735** will turn on the rear defrost and start a timer (step **1391**) and will check whether a flag has been set for a non-default ON time (step **1393**). If the flag has been set, microcontroller **735** will set and store an ON time value to the selected ON time (step **1395**). Otherwise, the stored and set ON time value will correspond to the default ON time for the rear defrost circuit. Then, microcontroller **735** will check whether the rear defrost ON time has expired (step **1397**) and will turn off rear defrost if the time has expired (step **1399**).

Next, microcontroller **735** checks whether a turn signal is on (step **1401**) and checks the flags for features associated with the turn signal. The first feature that may be selected increases the volume of a chime associated with the turn signal as the time the turn signal is on increases. Thus, if the associated flag is set for this feature (step **1403**), microcontroller **735** will increase the volume of the chime as the length of time that the turn signal is on increases in order to alert the driver if the turn signal did not turn off following a turn or lane change. If the flag is not set for this feature, microcontroller **735** will check whether a flag is set for a feature which activates a chime after a turn signal has flashed twenty times without a steering wheel correction being made (step **1407**). If this flag is set, microcontroller **735** will count the number of times the turn signal has flashed and will activate a chime after twenty flashes without a steering wheel correction being made (step **1409**).

Next, microcontroller **735** checks a flag associated with a feature for activating a chime upon the detection of a low exterior temperature (step **1411**). If the flag has been set, microcontroller **735** reads the external temperature from the associated input terminal and determines whether this temperature is less than a threshold **T4**, which may be, for example, 32° F. or 0° C. (step **1413**). If the external temperature is less than threshold **T4**, microcontroller **735** will activate a chime and display "ICE" on one of the vehicle's displays (step **1415**). The control application then returns to step **1203** in FIG. **48A** as denoted by connection port A.

Those skilled in the art will recognize that the main control program described above may be modified to include or eliminate or rearrange various steps associated with the control of the vehicle's accessories to accommodate various combinations of vehicle accessories and their control options. Further, the control program may be reprogrammed by invoking a program editing routine in response to a reprogramming signal, which edits the main control program by adding or deleting command lines in the main control program that call the various subroutines relating to selectable control functions. Also, a vehicle owner may personalize his or her vehicle using a home or office PC that is connected to the Internet or programmed to allow the owner to select certain options in a user-friendly manner.

7. Alternative Integrated Vehicle Systems Control

In some vehicles, not all devices and accessories are connected to the vehicle system bus and in these and other vehicles, it is conceivable that the circuitry of the present invention as described above will not have access to the vehicle system bus. If the system of the present invention does not have access to the vehicle system bus, or if the door locks cannot be activated via the vehicle system bus, there would be no way to remotely lock or unlock the vehicle's doors from a remote location using a paging signal or cellular RF signal. Thus, in this event, if the vehicle owner accidentally locked their keys in the car, or if the vehicle owner wished to make sure the vehicle's doors are locked from a remote location, the present invention as described above would be incapable of serving these needs. To this end, an alternative embodiment of the present invention includes a trainable transmitter coupled to the above-described system that may be used to learn the frequency and code of the signal transmitted from an RKE transmitter, such that upon reception of an appropriate RF command signal, the trainable transmitter may be instructed to transmit the RKE control signal to the RKE receiver in the vehicle causing the doors to lock or unlock depending upon the instructions provided in the RF control signal.

The integrated vehicle systems controller constructed in accordance with this alternative embodiment of the present invention includes an RF receiver or transceiver module **1817** coupled to an antenna **1815** for receiving RF signals sent over a telephone **1820** via a transmitter station **1825**,

and for transmitting signals back to the transmitter station **1825** provided the receiver module is a two-way transceiver. Receiver module **1817** may be coupled to a microprocessor **1830** via an interface board **1835** for sending received RF messages to microprocessor **1830**. A trainable transmitter **1840** is coupled to receiver module **1817** and microprocessor **1830** via interface board **1835**. Thus, when an RF control signal is received by receiver module **1817**, instructing the system to lock or unlock the doors, microprocessor **1830** sends a control signal to trainable transmitter **1840** causing it to transmit a control signal having learned characteristics via antenna **1845** to an antenna **1850** of a RKE receiver/actuator **1855**. When RKE receiver/actuator **1855** receives this control signal, it unlocks or locks the vehicle's doors in accordance with the control signal in the same manner that it would operate when receiving the control signal from a key fob transmitter **1857**.

Trainable transmitter **1840** preferably is constructed in accordance with the teachings of U.S. Pat. No. 5,661,804 entitled TRAINABLE TRANSMITTER CAPABLE OF LEARNING VARIABLE CODES, filed on Jun. 27, 1995, the disclosure of which is incorporated herein by reference. Alternatively, trainable transmitter **1840** may be the trainable transmitter disclosed in U.S. Pat. No. 5,442,340, U.S. Pat. No. 4,479,155, or U.S. Pat. No. 5,475,366, the disclosures of which are incorporated herein by reference. Because the trainable transmitter may be used to learn and transmit RF signals to garage door openers, gates, house light modules, house appliances, and any RF actuated door locks, the integrated vehicle system's controller may be used to remotely close or open a garage door or turn lights on or off in response to an RF cellular or paging signal, provided the vehicle is parked in the near vicinity of these devices.

As shown in FIG. **57**, the integrated vehicle system's controller **1810** may further include a display **1882** for displaying received messages, a GPS module **1884** connected to a GPS antenna **1886** and to interface board **1835**, a compass/temperature circuit **1888**, which may optionally include its own display **1890**. Integrated vehicle systems controller **1810** may optionally include a vehicle system bus interface **1892** to couple the device other vehicle accessories and devices **1894** coupled to the vehicle system bus. Optionally, microprocessor **1830** may be eliminated by programming the microprocessor in the trainable transmitter **1840** to perform the functions recited above in the preceding sections.

If receiver module **1817** is a two-way communication transceiver, a confirmation signal may be transmitted back to transmitting station **1825** after trainable transmitter has transmitted the control signal to the RKE receiver/actuator. Further, if the remotely actuated device is capable of transmitting a confirmation signal back to the trainable transmitter, a microprocessor in the trainable transmitter may be programmed to look for such a confirmation signal after transmitting a control signal and to cause a confirmation RF signal to be transmitted back to the transmitting station **1825** to confirm that the desired function has been carried out.

The integrated vehicle systems controller circuit **1810** may be mounted in a rearview mirror, sun visor, overhead console, or other accessory. As such, the integrated vehicle systems controller **1810** may be sold as an after-market device and allow for the remote locking and unlocking of the vehicle's doors using an RF signal provided the vehicle is equipped with an RKE receiver.

Having described the structure of this alternative embodiment of the present invention, a more detailed description of the operation thereof is provided below.

The process begins in step **1902**, when a user dials the service control center to request, for example, that the vehicle's doors be unlocked. The control center would first authenticate the user's identity (step **1904**) and the user would subsequently select the vehicle to which the RF signal is to be transmitted through a dialing sequence (step **1906**). Then, the user selects a directive (i.e., unlocking the vehicle's doors) through a dialing sequence in step **1908**. The control center then sends the directive to the vehicle (step **1910**) via the transmitting station **1825**. Upon receiving this RF control signal, the integrated vehicle systems controller **1810** would transmit back an acknowledgement that the RF control signal was received (steps **1912** and **1918**). If, on the other hand, the integrated vehicle systems controller did not receive the RF control signal and no acknowledgement is received by the control center between a predetermined time period, the control center will retry to transmit the control signal in step **1910** provided that it is a first attempt to retry to transmit the signal (step **1914**). If the control center unsuccessfully attempts to transmit the RF control signal more than twice, the control signal will send an error signal indicating that no acknowledgement was received to the user (step **1916**). Also, if the integrated vehicle system controller **1810** sends the acknowledgement to the control center, but the center does not receive the acknowledgement (step **1920**), the control center will retransmit the control signal to the vehicle. After transmitting an acknowledgement to the control center, the integrated vehicle system controller **1810** sends a directive to the device actuator **1855** (step **1922**). If the actuator **1855** receives the directive (step **1924**), the device actuator sends an acknowledgement back to the integrated vehicle system controller **1810** (step **1930**). If the actuator does not receive the directive or if the acknowledgment is not received by the integrated vehicle system controller, the integrated vehicle system controller will attempt to retransmit the directive (step **1922**) provided it has not already attempted to retransmit the directive (step **1926**). If, after a second attempt, the actuator device does not receive the directive or an acknowledgement is not received back from the actuator device, the integrated vehicle system controller sends the signal back to the control center informing the control center that an acknowledgement had not been received (step **1928**).

If the actuator device receives the directive and selectively sends the acknowledgement back to the integrated vehicle system controller, the actuator attempts to perform the directive (step **1938**), and if successful (step **1940**), the actuator sends a second acknowledgment signal back to the integrated vehicle system controller (step **1946**). If the actuator device is unsuccessful in performing the directive, it will reattempt to perform it (step **1938**) provided it is only the second attempt to do so (step **1942**). If it is subsequently unsuccessful in performing the directed function, the actuator transmits a signal to the integrated vehicle system

controller representative of this fact whereby the integrated vehicle system controller then sends a signal to the control center indicating that no acknowledgement has been received. If, following step **1946**, the integrated vehicle system controller does not receive a second acknowledgement from the actuator that it performed its function (step **1948**), the actuator will attempt to resend the acknowledgement to the integrated vehicle system controller in step **1946** provided it is only its second attempt to do so (step **1950**). Again, if it is unsuccessful in transmitting this acknowledgment to the integrated vehicle system controller, the end user is informed that an error occurred in step **1952**.

If the integrated vehicle system controller receives the second acknowledgement that the actuator device successfully performed the directed function, it sends the acknowledgement to the control center (step **1954**). If the control center does not receive this acknowledgement signal (step **1956**), the integrated vehicle system controller will again send the acknowledgement to the control center (step **1954**) provided it is not its second attempt to do so (step **1958**). If the control center does not receive an acknowledgement within a predetermined time period, it notifies the end user that an error has occurred (step **1960**). On the other hand, if the control center receives this acknowledgement signal (step **1956**), the control center sends an acknowledgement to the user (step **1962**) which the user may then acknowledge receiving. If the user does not acknowledge receiving this acknowledgement (step **1964**) the control center will resend the acknowledgement to the user provided as a first attempt to do so (step **1966**), otherwise it may send an error signal to the user (step **1968**).

8. Transceiver Wake-Up System

Vehicle communication systems such as that described above with reference to FIGS. **3**, **5**, and **57** and cellular telephones include transceivers that consume significant amounts of energy while in a standby mode. To conserve power, these transceivers may be shut down completely when the vehicle ignition is turned off. However, a party sending a paging message or making a call to the cellular telephone will not know whether the vehicle's ignition is on or off and will send the message regardless of whether the transceiver is capable of receiving the message. Thus, a trade-off exists between keeping the receiver in a standby mode at all times to receive all messages that are sent, or to tarn off the receiver with the vehicle ignition to conserve energy and prevent undue drain on the vehicle's battery.

It is therefore an object of the present invention to provide a transceiver wake-up system that prevents the transceiver from unnecessarily consuming power when no one is in the vehicle to receive the message while operating in such a manner that any messages that originated during such period are not lost. Additional features and advantages of the present invention will be apparent from the following description.

To achieve these features and advantages, the transceiver wake-up system includes at least the microprocessor **26**, vehicle bus interface **36**, pager module **34**, antenna **22**, power supply **32**, and bus **24** of the system shown in FIG. **3**. As will be appreciated by those skilled in the art, the additional elements shown in FIG. **3** may also be included in this system. In operation, microprocessor **26** selectively connects and disconnects power supply **32** from pager module **34** depending upon the mode of operation. Specifically, a sleep mode is entered when microprocessor **26** determines that the vehicle ignition has been turned off for a predetermined time period or that all of the vehicle occupants have exited the vehicle and closed the doors. Alternatively, the sleep mode could also be entered when the vehicle alarm is activated. Microprocessor **26** would receive signals representing the occurrence of these events over the vehicle bus via vehicle bus interface **36**.

In the sleep mode, microprocessor **26** disconnects power supply **32** from pager module **34** via any appropriate switching mechanism. Microprocessor **26** then monitors inputs received from vehicle bus interface **36** to determine whether one of the vehicle's door handles has been moved. If one of the vehicle's door handles has been moved, microprocessor **26** wakes up pager module **34** by supplying power from power supply **32** through the pager module **34**. By keying upon these inputs, microprocessor **26** may disable the pager module when it is unlikely that there is anyone in the vehicle to receive a paging message while activating the pager module just prior to someone entering or attempting to enter the vehicle. Thus, any transmitted messages will be received and available to the vehicle occupant as the occupant enters the vehicle.

In the event a third party attempts to transmit a paging signal to the sleeping pager module **34**, the pager transmitting station **19** (FIG. **1A**) will initially attempt to transmit the paging signal while awaiting an acknowledgment signal from the two-way paging module **34**. If such an acknowledgement signal is not received, transmitting station **19** will store the paging message for later retrieval and transmission to pager module **34**. Subsequently, upon being woken up by microprocessor **26**, pager module **34** transmits a signal to transmitting station **19** to inform it that the pager module **34** is now awake. Upon receiving such a signal, transmitting station **19** retrieves and transmits any stored messages to pager module **34**.

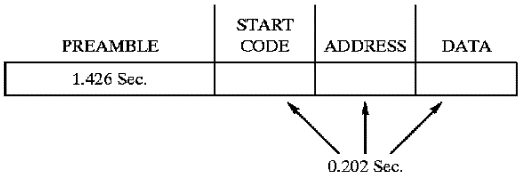
In an alternative implementation, microprocessor **26** would instruct pager module **34** to transmit a paging signal to transmitting station **19** to inform transmitting station **19** that pager module **34** is about to enter a sleep mode prior to disrupting the power supply to pager module **34**. Transmitting station **19** would then store all messages received until a paging message is subsequently received indicating that pager module **34** is no longer in a sleep mode. In the event that pager module **34** is not a two-way pager module and a cellular telephone is coupled in some manner to microprocessor **26**, microprocessor **26** may cause the cellular telephone to call the transmitting station **19** to inform it when the paging receiver has entered and been awaken from a sleeping mode.

The above description is considered that of the preferred embodiments only. Modifications of the invention will occur to those skilled in the art and to those who make or use the invention. Therefore, it is understood that the embodiments shown in the drawings and described above are merely for illustrative purposes and not intended to limit the scope of the invention, which is defined by the following claims as interpreted according to the principles of patent law, including the doctrine of equivalents.

APPENDIX A

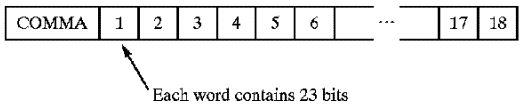
GSC Paging Format

The GSC code format consists of a preamble, a start code, an address and one or more blocks of data. The blocks of data are transmitted at twice the bit rate as the start code and address.



Preamble

The preamble begins with a comma which is 14 bits of a reversal pattern, alternating zeroes and ones. The comma is followed by 18 repetitions of the same 23-bit pattern. There exist 10 different bit patterns in use today. This divides the population of GSC receiving pagers into ten groups. If a pager detects the bit pattern of its group, it will continue to receive the address otherwise it will return to its low current mode. This way, the receiver need only sample often enough to assume that the preamble is detected and pages won't be missed.

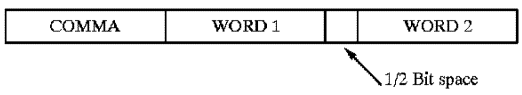


Start Code:

The start code marks the end of the preamble and signals that an address is to follow. It also provides timing information when pages are being sent in batches.

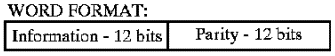
Address:

The start code and address begin with a comma followed by two 23-bit words. These bits are transmitted at 300 bits per second. The two words provide enough data to uniquely define 100,000 different addresses and correct errors in transmission.



Word Format:

Each 23-bit word begins with 12 information bits followed by 11 parity bits. The parity bits are included to provide a way of detecting bit errors and correcting them. Eleven parity bits are sufficient to correct at most 3-bit errors per word.

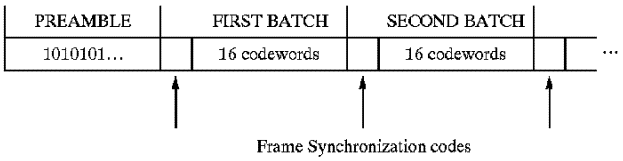


Data Block Format:

Each block of data begins with a half bit space followed by 8 words of 15 bits each. These bits are transmitted at 600 bits per second which is twice as fast as start code and address bits. The information in each word contains error detection and correction bits but only allows for upper case characters when sending alpha-numeric data.

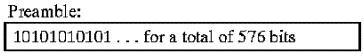
POCSAG Paging Format:

The POCSAG code format consists of a preamble and one or more batches of data codewords. The batches are separated by a frame synchronization code.



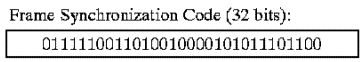
Preamble:

The preamble is 576 bits of a reversal pattern, alternating zeros and ones. It is included to alert the receiver that data is to follow. This way, the receiver need only sample often enough to assure that the preamble is detected and pages won't be missed.



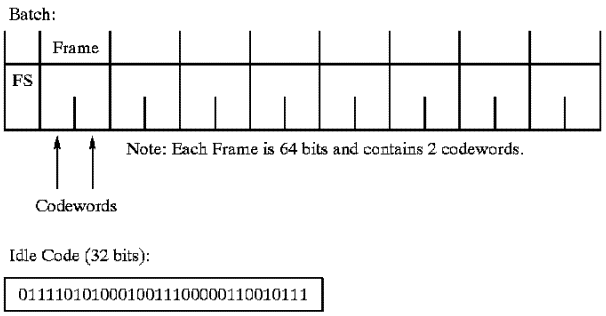
Frame Synchronization Code:

The frame synchronization (FS) code is a unique combination of 32 bits. The FS is used to identify the beginning of each batch of and to provide a starting point by which the frames of data within each batch can be counted.



Batch:

Each batch of data begins with a FS and is followed by 8 frames of data. Each frame of data must contain 2 codewords. Each codeword is 32 bits long. If a page requires an odd number of codewords, an extra idle codeword is used to complete the frame. The idle codeword is a unique pattern like the FS.



Codeword Structure:

Each codeword is 32 bits in length. The first bit indicates the type of data that the codeword contains. A zero in the first bit indicates that the codeword contains address data. A one in the first bit indicates that the codeword contains message data. In each type of codeword, the data is in bits **2** through **21**. Bits **22** through **32** are used as parity bits for error detection and correction algorithms.

Codeword Bit number:

1	2 through 19	20	21	22 through 31	32

Address Codeword:

0	Address bits	Source Id	Parity bits	Even

Message Codeword:

1	Message bits	Parity bits	Even

Address Codeword:

This codeword contains an address in bits **2** through **19** which makes this page specific to one pager within the population of pagers. Included in the 18-bit address are three bits which define the frame (0 through 7) in which the next codeword will be found. The next 2 bits **20** and **21**, identify the source as being from one of four groups of sources within an area. The next 10 bits (**22** through **31**) are included for error detection and correction and the last bit (**32**) provides even parity.

Message Codeword:

This codeword contains a 20-bit message of any information in bits **2** through **21**. The integrity of these information bits is protected by the error detection and correction routines as the address codewords above. The information bits contain alpha-numeric data encoded as 7-bit ASCII characters.

The invention claimed is:

1. A vehicle communication and control system comprising:

a transceiver for sending and receiving RF signals including messages, location data, information requests, and control codes;

a processor coupled to said transceiver for supplying messages, location data, information requests, and control codes to said transceiver for transmission from the vehicle, and for receiving and processing messages, location data, information requests, and control codes intended for the vehicle;

a location identifying sensor coupled to said processor for supplying vehicle location data representing a current detected location of the vehicle;

a user interface coupled to said processor for providing information to a user, and for enabling a user to input commands to be executed by said processor; and

vehicle bus interface for coupling said processor to a vehicle bus to enable said processor to issue and receive commands and other information from vehicle accessories and components coupled to the vehicle bus,

wherein said processor is adapted to:

transmit an emergency message in response to a received command through said transceiver, the emergency message including the vehicle location data received from said location identifying sensor,

transmit vehicle location data through said transceiver in response to a tracking request signal received by said transceiver,

request and receive diagnostic data from a diagnostic database connected to the vehicle bus through said vehicle bus interface and transmit the received diagnostic data through said transceiver in response to a request for such diagnostic data,

transmit a request for roadside assistance through said transceiver in response to a roadside assistance command, the request including the vehicle location data received from said location identifying sensor,

transmit an accessory control signal through said vehicle bus interface to control a designated accessory connected to the vehicle bus in response to a command received from a remote source through said transceiver.

2. The system as defined in claim **1**, wherein said transceiver includes a cellular transceiver for enabling two-way voice and data communication over a cellular network.

3. The system as defined in claim **2**, wherein said user interface includes a speaker coupled to said cellular transceiver for enabling audio messages to be heard by a user.

4. The system as defined in claim **2**, wherein said user interface includes a microphone coupled to said cellular transceiver to allow a user to communicate with a remote location.

5. The system as defined in claim **2** and further including audio recording means coupled to said processor and said cellular transceiver for digitizing, storing, and playing back audio messages received through said cellular transceiver.

6. The system as defined in claim **5**, wherein said user interface includes a microphone for receiving audio messages from a user and recording received audio messages in said audio recording means.

7. The system as defined in claim **2** and fixer including a cellular modem coupled between said processor and said cellular transceiver.

8. The system as defined in claim 1 and further including audio recording means coupled to said processor for digitizing, storing, and playing back audio messages.

9. The system as defined in claim 8, wherein said user interface includes a microphone for receiving audio messages from a user and recording received audio messages in said audio recording means.

10. The system as defined in claim 9, wherein said user interface includes a dedicated user-actuated switch for commanding said audio recording means to begin recording an audio message received through said microphone.

11. The system as defined in claim 8, wherein said user interface includes a dedicated user-actuated switch for commanding said audio recording means to play back stored audio messages.

12. The system as defined in claim 1, wherein said user interface includes a speaker for enabling audio messages to be heard by a user.

13. The system as defined in claim 1 and further including a handset coupling port for coupling a telephone handset to said transceiver for making and receiving telephone calls through said transceiver.

14. The system as defined in claim 1, wherein said processor is further adapted to transmit a request for navigational routing instructions through said transceiver in response to a command received from said user interface, said request including a destination and the vehicle location data received from said location identifying sensor, and to generate and supply navigational routing instructions to said user interface for review by a user in response to the receipt of such navigational routing instructions through said transceiver.

15. The system as defined in claim 1 and further including an electronic compass coupled to said processor for generating vehicle heading data, wherein said processor supplies vehicle heading information to said user interface for output to a user.

16. A vehicle communication and control system comprising:

a transceiver for sending and receiving RF signals including messages, location data, vehicle-identification data, information requests, and control codes;

a processor coupled to said transceiver for supplying messages, location data, vehicle-identification data, information requests, and control codes to said transceiver for transmission from the vehicle, and for receiving and processing messages, location data, vehicle-identification data, information requests, and control codes intended for the vehicle;

a location identifying sensor coupled to said processor for supplying vehicle location data representing a current detected location of the vehicle;

memory means coupled to said processor for storing and supplying vehicle-identification data to said processor for transmission;

a user interface coupled to said processor for providing information to a user, and for enabling a user to input commands to be executed by said processor, said user interface including a display coupled to said processor for displaying information to a user;

an electronic compass system coupled to said processor for generating vehicle heading data, wherein said processor supplies vehicle heading information to said user interface for output to a user; and

vehicle bus interface for coupling said processor to a vehicle bus to enable said processor to issue and receive commands and other information from vehicle accessories and components coupled to the vehicle bus,

wherein said processor is adapted to:

transmit an emergency message in response to a received command through said transceiver, the emergency message including the vehicle location data received from said location identifying sensor,

transmit vehicle location data through said transceiver in response to a tracking request signal received by said transceiver,

request and receive diagnostic data from a diagnostic database connected to the vehicle bus through said vehicle bus interface and transmit the received diagnostic data through said transceiver in response to a request for such diagnostic data,

supply text messages that are received through said transceiver to said user interface for retrieval by a user,

transmit text messages through said transceiver in response to commands received from said user interface,

transmit a request for roadside assistance through said transceiver in response to a roadside assistance command, the request including the vehicle location data received from said location identifying sensor,

transmit an accessory control signal through said vehicle bus interface to control a designated accessory connected to the vehicle bus in response to a command received from a remote source through said transceiver, and

transmit vehicle-identification data stored in said memory means through said transceiver in response to a received command.

17. The system as defined in claim 16, wherein said transceiver includes a cellular transceiver for enabling two-way voice and data communication over a cellular network.

18. The system as defined in claim 17, wherein said user interface includes a speaker coupled to said cellular transceiver for enabling audio messages to be heard by a user.

19. The system as defined in claim 17, wherein said user interface includes a microphone coupled to said cellular transceiver to allow a user to communicate with a remote location.

20. The system as defined in claim 17 and further including audio recording means coupled to said processor and said cellular transceiver for digitizing, storing, and playing back audio messages received through said cellular transceiver.

21. The system as defined in claim 20, wherein said user interface includes a microphone for receiving audio messages from a user and recording received audio messages in said audio recording means.

22. The system as defined in claim 16 and further including audio recording means coupled to said processor for digitizing, storing, and playing back audio messages.

23. The system as defined in claim 22, wherein said user interface includes a microphone for receiving audio messages from a user and recording received audio messages in said audio recording means.

24. The system as defined in claim 23, wherein said user interface includes a dedicated user-actuated switch for commanding said audio recording means to begin recording an audio message received through said microphone.

25. The system as defined in claim 22, wherein said user interface includes a dedicated user-actuated switch for commanding said audio recording means to play back stored audio messages.

26. The system as defined in claim 16, wherein said user interface includes a speaker for enabling audio messages to be heard by a user.

27. The system as defined in claim 16 and further including a handset coupling port for coupling a telephone handset to said transceiver for making and receiving telephone calls through said transceiver.

28. The system as defined in claim 16, wherein said processor is further adatped to transmit a request for navigational routing instructions through said transceiver in response to a command received from said user interface, said request including a destination and the vehicle location data received from said location identifying sensor, and to generate and supply navigational routing instructions to said user interface for review by a user in response to the receipt of such navigational routing instructions through said transceiver.

* * * * *

US006330499B1

(12) **United States Patent**
Chou et al.

(10) **Patent No.: US 6,330,499 B1**
(45) **Date of Patent: Dec. 11, 2001**

(54) **SYSTEM AND METHOD FOR VEHICLE DIAGNOSTICS AND HEALTH MONITORING**

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(*) Notice: Subject to any disclaimer, the term of this patent is extended or adjusted under 35 U.S.C. 154(b) by 0 days.

(21) Appl. No.: **09/357,840**

(22) Filed: **Jul. 21, 1999**

(51) **Int. Cl.**[7] **G01M 17/00**; H04B 1/38

(52) **U.S. Cl.** **701/33**; 701/32

(58) **Field of Search** 701/29, 33, 32, 701/207; 342/357.09; 709/203; 340/539

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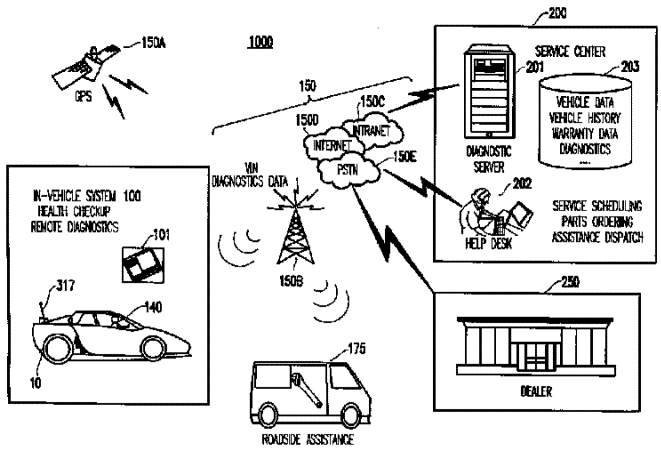
* cited by examiner

Primary Examiner—Michael J. Zanelli
(74) *Attorney, Agent, or Firm*—Stephen C. Kaufman, Esq.; McGinn & Gibb, PLLC

(57) **ABSTRACT**

A system and method for vehicle diagnostic and health monitoring includes a client computer device within the vehicle, coupled to the vehicle's monitoring systems, for data management, remote session management and user interaction, a communication system, coupled to the client computer device, for providing remote communication of data including data derived from internal monitoring systems of the vehicle, and a remote service center including a vehicle data store, a server computer, a diagnostic engine, and a communicator for communicating the results of analysis of vehicle information to the client computer device via the communication system.

24 Claims, 5 Drawing Sheets



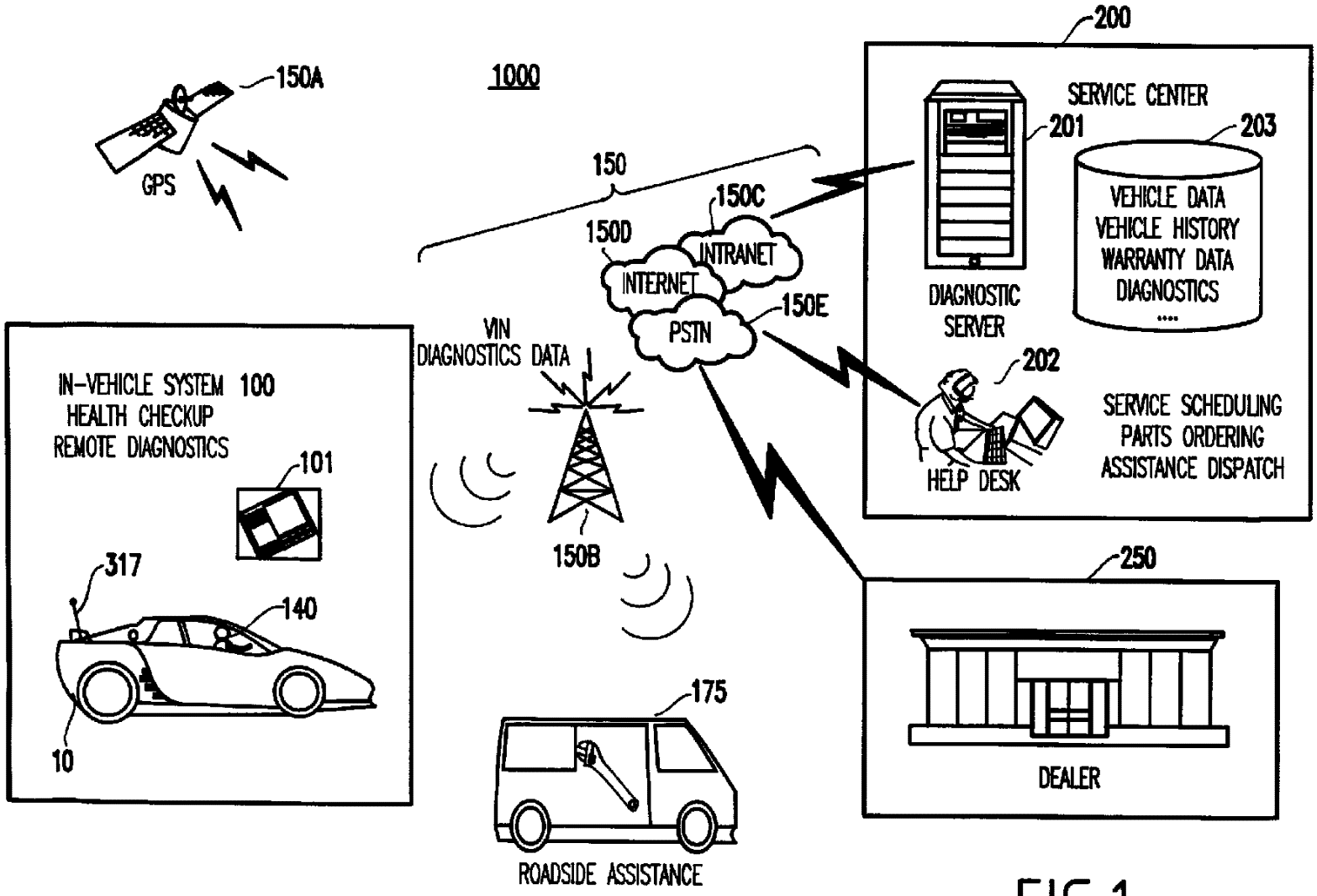

1000
150A
GPS
150
150C
150D
INTRANET
INTERNET
150E
PSTN
VIN
DIAGNOSTICS DATA
150B
200
SERVICE CENTER
201
203
VEHICLE DATA
VEHICLE HISTORY
WARRANTY DATA
DIAGNOSTICS
....
DIAGNOSTIC
SERVER
202
HELP DESK
SERVICE SCHEDULING
PARTS ORDERING
ASSISTANCE DISPATCH
IN-VEHICLE SYSTEM 100
HEALTH CHECKUP
REMOTE DIAGNOSTICS
101
317
140
10
250
DEALER
175
ROADSIDE ASSISTANCE

FIG.1

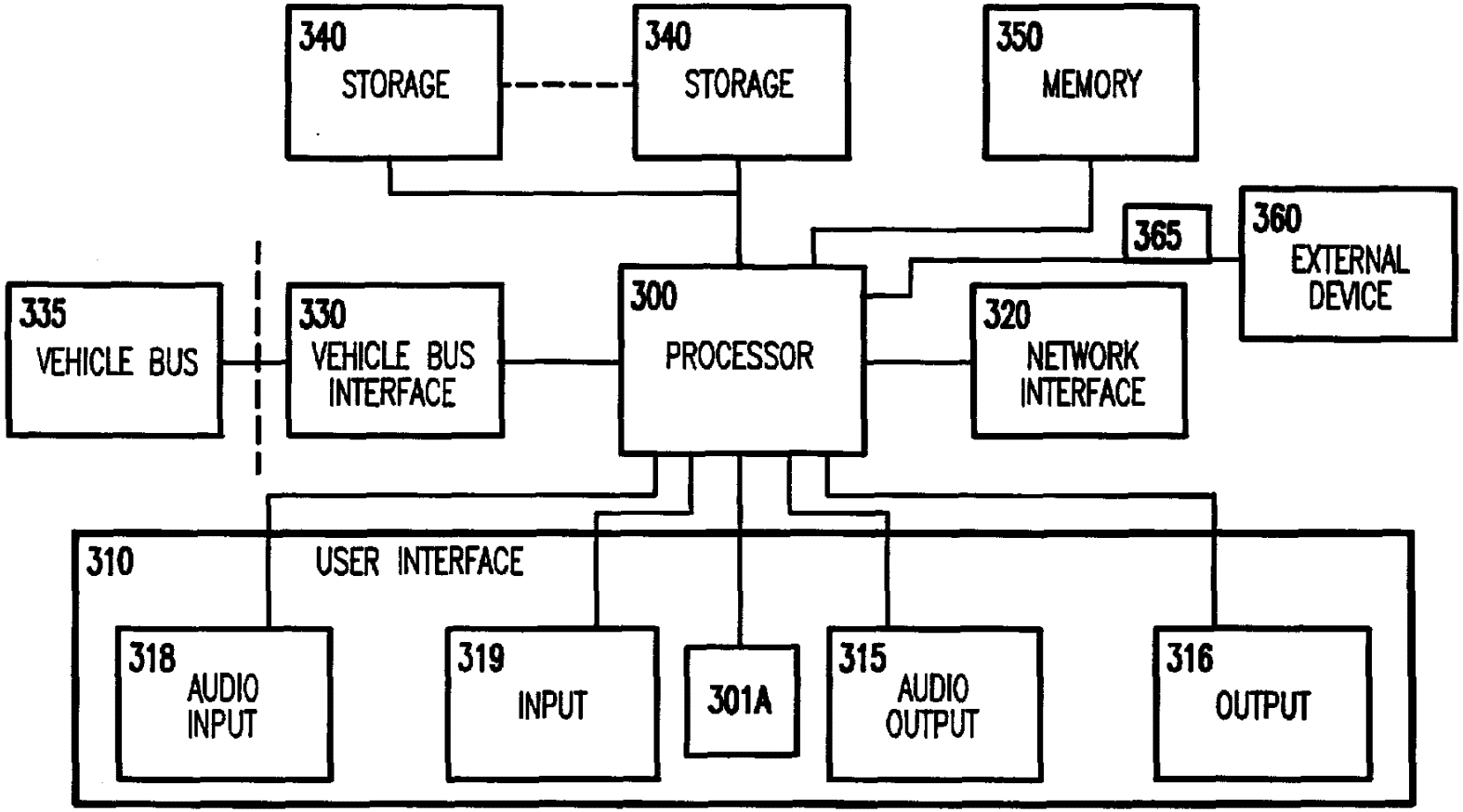

340
STORAGE
340
STORAGE
350
MEMORY
365
360
EXTERNAL DEVICE
335
VEHICLE BUS
330
VEHICLE BUS INTERFACE
300
PROCESSOR
320
NETWORK INTERFACE
310
USER INTERFACE
318
AUDIO INPUT
319
INPUT
301A
315
AUDIO OUTPUT
316
OUTPUT

FIG.2

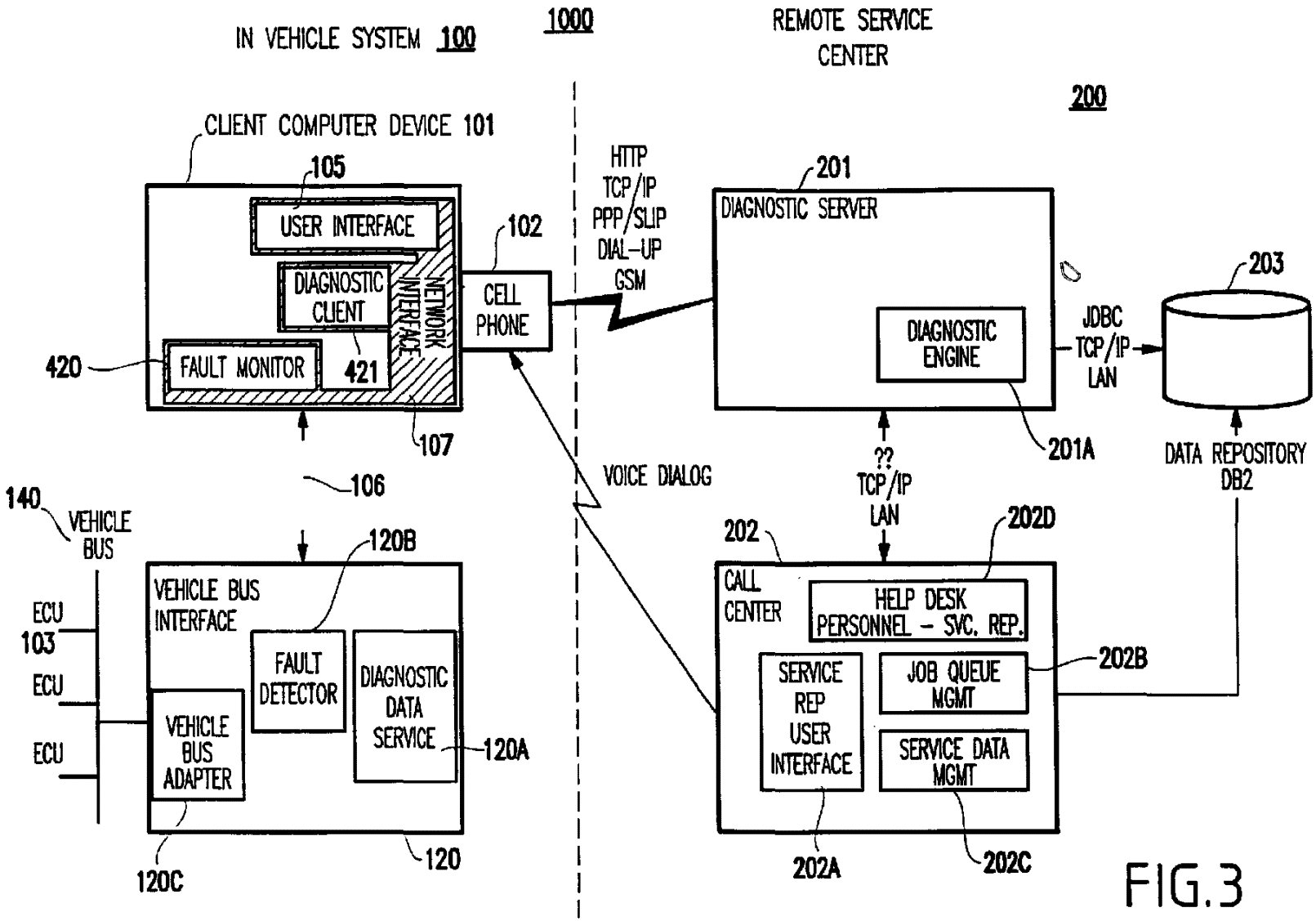

IN VEHICLE SYSTEM 100
1000
REMOTE SERVICE CENTER
200
CLIENT COMPUTER DEVICE 101
105
USER INTERFACE
DIAGNOSTIC CLIENT
NETWORK INTERFACE
102
CELL PHONE
420
FAULT MONITOR
421
107
106
HTTP
TCP/IP
PPP/SLIP
DIAL-UP
GSM
201
DIAGNOSTIC SERVER
DIAGNOSTIC ENGINE
201A
JDBC
TCP/IP
LAN
203
DATA REPOSITORY DB2
VOICE DIALOG
??
TCP/IP
LAN
140
VEHICLE BUS
ECU
103
ECU
ECU
120B
VEHICLE BUS INTERFACE
FAULT DETECTOR
DIAGNOSTIC DATA SERVICE
120A
VEHICLE BUS ADAPTER
120C
120
202
CALL CENTER
202D
HELP DESK PERSONNEL - SVC. REP.
SERVICE REP USER INTERFACE
JOB QUEUE MGMT
202B
SERVICE DATA MGMT
202A
202C

FIG.3

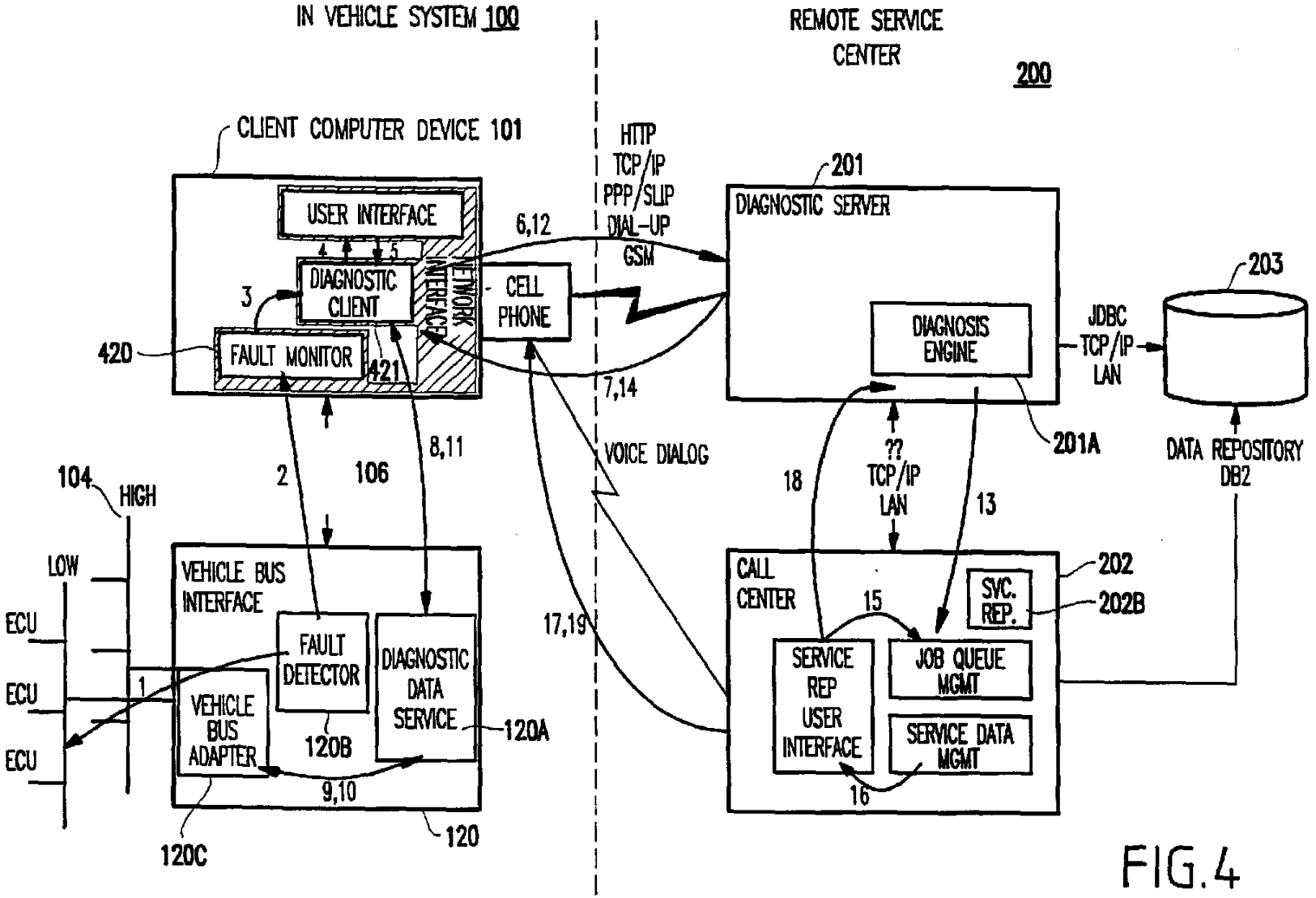

IN VEHICLE SYSTEM 100
REMOTE SERVICE CENTER
200
CLIENT COMPUTER DEVICE 101
USER INTERFACE
DIAGNOSTIC CLIENT
FAULT MONITOR
NETWORK INTERFACE
CELL PHONE
420
421
3
4
5
6,12
7,14
8,11
2
106
HTTP
TCP/IP
PPP/SLIP
DIAL-UP
GSM
VOICE DIALOG
201
DIAGNOSTIC SERVER
DIAGNOSIS ENGINE
201A
JDBC
TCP/IP
LAN
203
DATA REPOSITORY
DB2
??
TCP/IP
LAN
18
13
104
HIGH
LOW
ECU
ECU
ECU
1
VEHICLE BUS INTERFACE
FAULT DETECTOR
DIAGNOSTIC DATA SERVICE
VEHICLE BUS ADAPTER
120B
120A
9,10
120C
120
17,19
CALL CENTER
202
SVC. REP.
202B
15
SERVICE REP USER INTERFACE
JOB QUEUE MGMT
SERVICE DATA MGMT
16

FIG.4

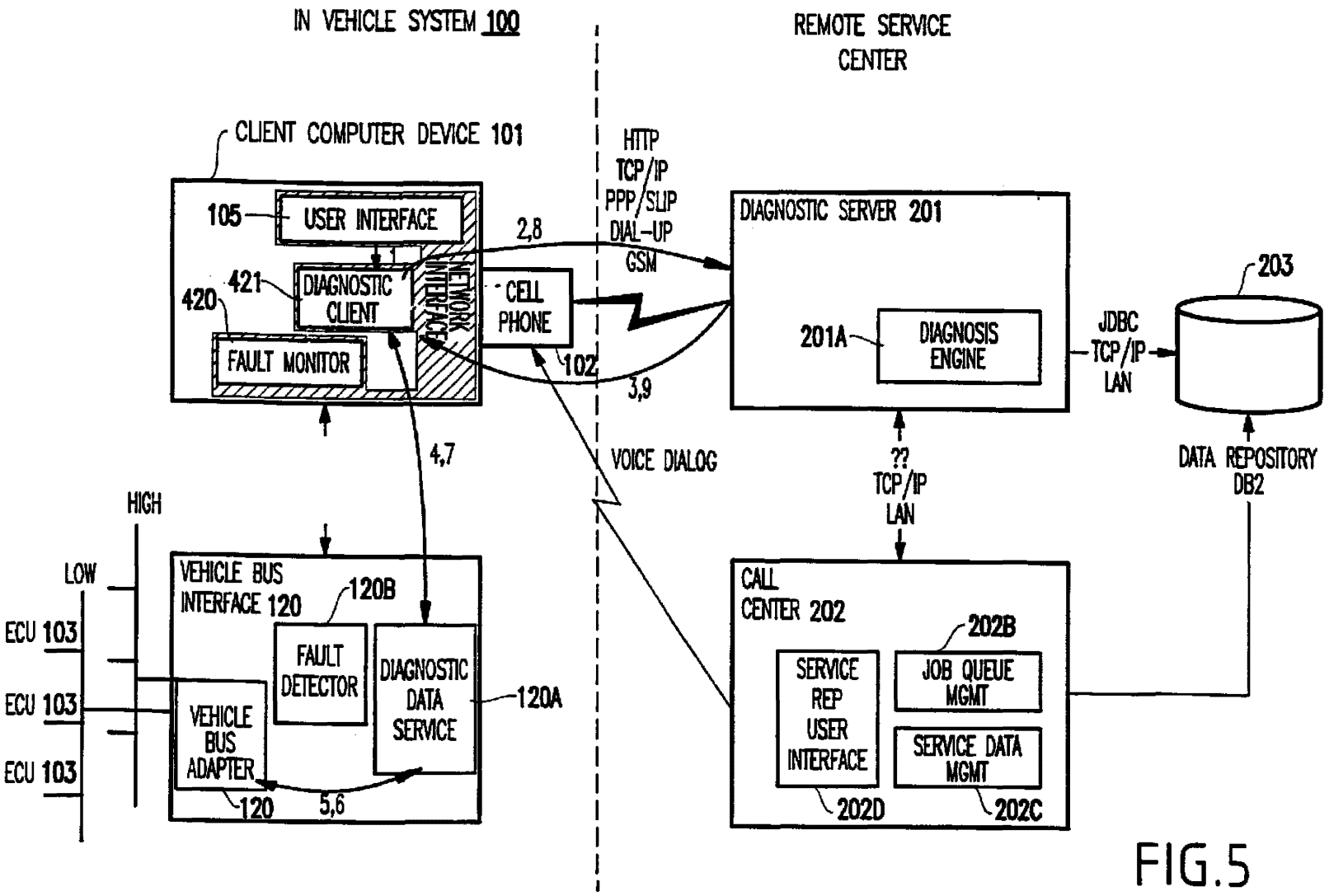

IN VEHICLE SYSTEM 100
REMOTE SERVICE CENTER
CLIENT COMPUTER DEVICE 101
105
USER INTERFACE
421
DIAGNOSTIC CLIENT
420
FAULT MONITOR
NETWORK INTERFACE
CELL PHONE
102
2,8
3,9
4,7
HTTP
TCP/IP
PPP/SLIP
DIAL-UP
GSM
VOICE DIALOG
DIAGNOSTIC SERVER 201
201A
DIAGNOSIS ENGINE
JDBC
TCP/IP
LAN
203
DATA REPOSITORY DB2
??
TCP/IP
LAN
HIGH
LOW
ECU 103
ECU 103
ECU 103
VEHICLE BUS INTERFACE 120
120B
FAULT DETECTOR
DIAGNOSTIC DATA SERVICE
120A
VEHICLE BUS ADAPTER
120
5,6
CALL CENTER 202
202B
SERVICE REP USER INTERFACE
JOB QUEUE MGMT
SERVICE DATA MGMT
202D
202C

FIG.5

SYSTEM AND METHOD FOR VEHICLE DIAGNOSTICS AND HEALTH MONITORING

BACKGROUND OF THE INVENTION

1. Field of the Invention

The present invention generally relates to a vehicle monitoring system and method, and more particularly to a method and system for vehicle diagnostics and health monitoring.

2. Description of the Related Art

Motor vehicles contain complex mechanical systems that are monitored and regulated by computer systems such as electronic control units (ECUs) and the like.

Such ECUs monitor various components of the vehicle including engine performance, carburation, speed/acceleration control, transmission, exhaust gas recirculation (EGR), braking systems, etc.

However, vehicles perform such monitoring typically only for the vehicle driver and without communication of any impending results, problems and/or vehicle malfunction to a remote site for trouble-shooting, diagnosis or tracking for data mining.

Systems that provide for remote monitoring do not have a means for automated analysis and communication of problems or potential problems and recommendations to the driver.

As a result, the vehicle driver or user is often left stranded, or irreparable damage occurs to the vehicle as a result of neglect or driving the vehicle without the user knowing the vehicle is malfunctioning until it is too late.

SUMMARY OF THE INVENTION

In view of the foregoing and other problems of the conventional methods and structures, an object of the present invention is to provide a method and structure to extract information provided by the vehicle's internal monitoring systems, to transfer that information to a remote service center, to provide a means and method for comparison and analysis of the information, and to provide timely information to the driver of the vehicle.

In a first aspect of the present invention, an information system for a vehicle includes an electronic data collector (e.g., preferably for obtaining electronic data from the vehicle's internal monitoring systems), a client computer device within the vehicle (e.g., preferably for data management, remote session management and user interaction), a communication unit (e.g., preferably coupled to the client computer device, for providing remote communication for the client computer device), a remote service center (e.g., including a vehicle data store, a server computer, and a call center for communicating with the client computer device via the communication unit).

With the unique and unobvious structure and method of the invention, information can be reliably extracted from a vehicle's internal monitoring systems, and the information can be transferred to a remote service center. Further, the information can be compared and analyzed, to provide timely information for the driver of the vehicle to avoid the vehicle driver being stranded or the vehicle being irreparably damaged. Additionally, the ability of a driver to initiate health checkups brings the driver assurance of the proper functioning of his vehicle as well as reminders for preventive maintenance which will prevent the development of problems.

This system and method benefits the vehicle manufacturer and service provider by enhancing customer loyalty and providing timely feedback to solve engineering and manufacturing problems.

BRIEF DESCRIPTION OF THE DRAWINGS

The foregoing and other purposes, aspects and advantages will be better understood from the following detailed description of a preferred embodiment of the invention with reference to the drawings, in which:

FIG. **1** illustrates an upper level environment in which the present invention is utilized;

FIG. **2** illustrates exemplary in-vehicle hardware components for the system shown in FIG. **3**;

FIG. **3** illustrates an exemplary architecture of a fault monitoring and diagnosis system according to the present invention;

FIG. **4** illustrates a fault monitoring and diagnosis event operation flow; and

FIG. **5** illustrates a health checkup event operation flow according to the invention.

DETAILED DESCRIPTION OF PREFERRED EMBODIMENTS OF THE INVENTION

Referring now to the drawings, and more particularly to FIGS. **1–5**, there are shown preferred embodiments of the method and structures according to the present invention.

FIG. **1** illustrates an upper level environment of a system according to the present invention.

As shown in FIG. **1**, the system **1000** includes a vehicle **10** with a vehicle driver or user **140**, having an in-vehicle computing system **100**, a client computer device **101** installed to enable vehicle health checkup and remote diagnostics, a communication link **150** (e.g., via wireless base stations **150**B, or the like) for communicating vehicle information (e.g., vehicle identification number, (VIN), diagnostic data, and the like). Such a link may be interfaced with an intranet **150**C, the Internet **150**D, or a public (or private) switch telephone network (PSTN) **150**E. Further shown, the vehicle location is established, for example by a device **317** (e.g., antenna or the like) for receiving positioning information from orbiting Global Positioning System (GPS) satellites **150**A.

Further shown is a roadside assistance unit **175** for assisting the vehicle based on a signal received over the communication link **150**.

A remote service center **200** is also provided having a diagnostic server **201**, a help desk **202** and a data repository **203**. The help desk **202** schedules services, orders parts, and dispatches assistance through the roadside assistance unit **175**.

Further, a dealer **250** is shown communicating with the remote service center **200** and optionally with the vehicle **10**.

FIG. **2** is a block diagram providing an exemplary component overview for the in-vehicle hardware. The in-vehicle hardware provides a platform for the client computer device **101** and for the system functions shown in the architectural design in FIG. **3**. As shown in FIG. **2**, the in-vehicle hardware includes a processor **300** coupled with memory **350**, a user interface **310**, a network interface **320**, a vehicle interface **330**, at least one persistent storage device **340**, and optional external devices **360**.

The processor **300** may be of a conventional type or it may be an embedded system depending upon the designer's requirements. Examples include an Intel Pentium®, or the Hitachi SH-4 for an embedded system.

The user interface includes one or more input means such as an audio input **318** capability for speech recognition, speaker identification, or voice recording. For this a microphone such as those manufactured by AKG or Sony can be used. Other input means **319** may include a touch screen for, as an example, entering menu selections by pressing a particular area of the screen, and actuator buttons **301A** such as a push-to-talk (PTT) button to initiate audio input to the processor or a "911" button for triggering a call for emergency help. The user interface also includes a plurality of output means such as an audio output capability **315** for generating auditory signals, text-to-speech, and prerecorded voice playback. The audio output may be coupled to the vehicle's speakers. The output means **316** may also include a display screen and indicator lights.

The processor is integrated with a network interface **320** to provide communication capability with the remote service center **200**. Preferably, the network interface comprises a removable wireless telephone such as the Motorola i1000+ and a docking facility for the wireless phone integrated with the client computer device. Both voice and data connections can be supported by interfacing the processor **300** and the wireless phone. The telephone integration provides basic communication functions. It establishes a data (e.g. TCP/IP) connection with a remote service center (e.g., remote service center **200**). Wireless technologies such as GSM (Global System for Mobile Communications), CDMA (Code Division Multiple Access), TDMA (Time Division Multiple Access), iDEN™ (a TDMA-based Motorola technology), and AMPS (Advanced Mobile Phone System) can all be supported. The phone may also be used for wireless voice communications.

The processor **300** is coupled to a vehicle bus **335** through a vehicle bus interface **330**. The coupling between the client computer device and the vehicle bus interface **106** of FIG. **3**, may be one of RS-232, USB (Universal Serial Bus), IDB (ITS Data Bus), Ethernet, and the like. The vehicle bus interface may support one of vehicle bus standards such as CAN (Controller Area Network) and the Society of Automotive Engineers' SAE J1850 - Class B Data Communication Network Interface. Alternatively, the processor supports some or all of the functions of the vehicle bus interface and connects directly to the vehicle bus **335**. The vehicle bus shown in FIG. **2** is an inherent part of all new automobiles. The dotted line is used as an indication that the vehicle bus is built into the vehicle.

The in-vehicle hardware includes at least one persistent storage device **340** such a hard disk, CD-ROM, flash memory, and the like coupled to the processor. The processor may also be coupled by additional interface means **365** such as infrared, RF, serial and parallel ports and the like, to communicate with external devices **360** such as printer, fax, personal digital assistant (PDA), notebook computer, etc. Optionally, the processor **300** may be coupled to a location sensing device such as a GPS receiver **317** (FIG. **1**) to provide vehicle location information. The system may or may not assume the availability of the automatic vehicle position information. Location-related scenarios, such as emergency help dispatch may use automatic vehicle positioning or may depend on the driver to provide position information.

In an exemplary system, such capabilities have been provided. Further, other computing devices such as a laptop computer or personal data assistant (PDA) may be used to perform the function of the processor **300** and some or all of the additional hardware components and to provide the hardware platform for the client computer device **101**.

In-Vehicle Computing System

FIG. **3** depicts a more detailed system architectural view of a preferred embodiment of the system **1000** according to the present invention for fault monitoring and diagnosis. The system includes the in-vehicle system **100** (including client computer device **101**) and the remote service center **200**.

The application software that makes up the in-vehicle computing system **100** includes an in-vehicle client computer device **101** and a vehicle bus interface **120**. The vehicle bus interface may run on a hardware component separate from that of the client computer device **101**, such as those manufactured by Vetronix Inc. or DigiTech Inc., or may have some or all of its functions contained within the client computer device **101**.

The vehicle bus interface **120** is responsible for replying to requests for parametric data. It is also responsible for continuously monitoring the vehicle bus **104** for any fault reported by the ECUs **103**, in terms of diagnostic trouble codes (DTCs).

The vehicle bus interface **120** includes the following modules: vehicle bus adapter **120C**, fault detector **120B**, and diagnostic data service **120A**. The fault detector **120B** polls the vehicle bus **104** through the vehicle bus adapter **120C** checking for fault codes reported by the vehicle ECUs **103**. The vehicle bus adapter **120C** translates the messages received from the vehicle bus into the language of the fault detector. It also translates messages from the fault detector into the language of the vehicle bus. The fault code specifications and protocols of the vehicle may be Original Equipment Manufacturer (OEM) and model dependent. The term "vehicle fault codes" is meant to be synonymous with the term "trouble code" or "diagnostic trouble code". A listing of such codes may be found in the publication of the Society of Automotive Engineers, "SAE On-Board Diagnostics for Light and Medium Duty Vehicles Standards Manual". The diagnostic data service **120A** accepts request for vehicle parametric data and retrieves the data using the vehicle bus adapter.

The client computer device **101** performs several functions including communicating to the remote service center **200** by means of the network interface **107** using the cell phone **102**. It sends requests for diagnostic services such as health checkup and fault diagnosis to the service center.

In support of this function, it sends diagnostic trouble codes (DTCs) and vehicle information to the service center. It handles incoming requests for data from the service center. It communicates through the user interface **105** to the driver using a combination of audio, indicator lights, and text. The severity, and optionally the description, of the reported trouble codes may be so communicated. Proper recommended actions such as "stop now", "go to a service station immediately", or "contact the service center for further help by . . . " are spoken to the driver using text-to-speech (ITS).

The client computer device **101** handles DTCs by listening for vehicle faults through the fault monitor **420**, classifies the severity of the faults (e.g. alarm or warning), provides a description of the DTCs and a recommended course of action. The client computer device also manages the state of active requests, vehicle status, and other relevant information handling functions, e.g. including bootup and stored information or data.

Further, the client computer device may initiate a remote health checkup upon a user request. The driver or user may request a comprehensive, remote health checkup if the driver or user feels that the vehicle is behaving abnormally, is alerted by the application of potential trouble, or simply wants to get a checkup before a long trip.

The in-vehicle system establishes a data connection, using a cellular phone **102**, with a diagnostic server **201** at the service center **200**, collects diagnostic data using the diagnostic data service **120**A, and uploads a snapshot of the vehicle data (e.g. VIN, test data with time-stamp) to the diagnostic server **201**. The in-vehicle system may need to interact with the server **201** throughout a diagnosis or health checkup session, collecting and providing additional vehicle information as requested by the server **201**. The result from the server **201** indicates either that the vehicle is in good health with no urgent action required, or that one or more problems requiring immediate attention are detected.

When the vehicle is deemed to be in good health, a report enumerating the items checked and the conditions of those items is provided to the client computer device and reported to the driver or user using TTS and the display.

When the vehicle is deemed to have a problem, the client computer device informs the driver or user to expect a callback from service center help desk personnel—customer service representative (CSR) **202**D for further information. The in-vehicle system may also provide the capability to allow the driver or user to talk to a customer service representative (CSR) at the call center **202**. Through the user interface **105**, the driver or user may initiate a request that will result in a call back by a CSR at a later time.

Similar to the health checkup request, the in-vehicle system collects and uploads a snapshot of the vehicle data, including any trouble codes reported by the ECUs, to the diagnostic server **201**. The system may also provide additional diagnostic data at the request of the diagnostic server. The driver or user may be notified that he or she will be receiving a call from the service center. The driver is also given an estimate of the time to expect the call.

Remote Service Center and Server

The remote service center **200** of FIG. **3** comprises a diagnostic server **201** that has access to data related to the vehicle such as as-built, history, diagnostics, warranty, service information and failure mode data. The diagnosis server **201** is linked to the data repository **203** via a TCP/IP link, LAN, or the like.

Further, the service center may be operatively coupled to a call center system **202** via a local area network (LAN), TCP/IP, or the like. The call center system **202** includes a service representative user interface **202**A, a job queue management unit **202**B, and a service data management unit **202**C. The call center system **202** is linked to the data repository **203**. It may be staffed with help-desk personnel (e.g. customer service representatives). Alternatively, the remote service center **200** may be completely automated.

The center **200** is optionally connected to the dealer's network (as shown in FIG. **1**) to provide additional services such as dispatching service vehicles, service scheduling, parts ordering, dealer references and the like.

Within the diagnostic server **201** at the service center **200** is a diagnosis engine **201**A. The main function of the diagnosis engine **201**A is to provide a health checkup or a diagnosis using the data obtained from the vehicle, the vehicle's past history, and the diagnostics information about the particular model of the vehicle. It is also possible to incorporate qualitative symptom descriptions from the driver as part of the diagnostic input.

The diagnosis engine **201**A may deploy a combination of technologies, ranging from model-based monitoring to case-based reasoning, to determine the health of the vehicle, identify potential troubles, and diagnose existing problems. The diagnostic server **201** also includes components that interact with the vehicle client **101**, the vehicle data repositories **203**, and the call-center **202** system.

An exemplary operation of the server center is described below. Upon receiving a request from the client, the server **201** establishes a diagnosis session, and collects data from the in-vehicle system **100** and the data repository **203**, as guided by the diagnosis engine **201**A.

The diagnosis engine **201**A first determines if a fault or a potential of a fault is present by checking if any trouble code is reported by the client, and checking a predetermined list of vehicle attribute values against their normal operating characteristics. If no fault is found and the vehicle data appears normal, the diagnosis engine **201** A returns a health report to the server **201**. The server **201** in turn returns the report to the client computer device **101** via the data connection, and terminates the session.

If a fault or potential of a fault is identified, the diagnostic server **201** informs the vehicle client computer device about the presence of trouble, and then terminates the data connection. Server **201** then compiles the relevant data and creates a case for the call center system **202** to handle.

An available customer service representative **202**D picks up the case from the to-be-responded job queue and initiates a voice call to the vehicle. Assisted by diagnosis tools (e.g., on-line manuals, rule-based diagnosis or case-based reasoning), the customer service representative (CSR) **202**D analyzes the problem and may identify the cause of the fault. The driver or user also may describe certain symptoms not captured by the diagnostic data (e.g. noise, vibration, etc.) to the CSR. The CSR in turn feeds the symptom descriptions to the diagnostic server **201** to conduct further analysis. Through voice dialogs with the driver or user, the CSR can explain the diagnosis and provide advice on what to do with the problem. Finally, the case is logged by the system with case resolution input from the CSR.

In a preferred embodiment, no voice communication call is made to the driver unless such a request has been made by the driver through use of the user interface buttons or speech recognition. Information may otherwise be returned to the driver through the use of data communications.

In an exemplary implementation, only a subset of data, such as vehicle information and diagnostics for the vehicle model (e.g., 1999 Mercedes ML 320), and functions, such as fault determination and health checkup, necessary for supporting various scenarios, as described below, are made available at the service center. Of course, the designer can include any or all of the above data in combination with different data, as determined by the designer's constraints and requirements.

Exemplary Implementations

The invention may be employed with great utility in a large variety of situations. Several exemplary scenarios are discussed in detail below.

Fault Monitoring and Diagnostics

Referring to FIG. **3**, the system can be employed for fault monitoring and diagnostics.

In such a case, for example, one or more diagnostic trouble codes, generated by the vehicles' ECUs **103**, are detected in the vehicle bus interface **120** by the fault detector **120**B. These trouble codes are sent to the fault monitor **420** component of the vehicle client computer device **101**. The fault monitor may further process these trouble codes and finally sends them to the diagnostic client **421**.

Thereafter, the diagnostic client **421** classifies the severity of trouble codes into a predetermined severity class (e.g. a warning of a pending problem or an alarm indicating immediate attention needed because of a severe malfunction) and also determines an associated set of recommended actions for the driver (or other user, e.g. passenger or navigator) of

the vehicle **140** (shown in FIG. 1). It is to be understood that the terms "driver" or "user" indicate any vehicle user who employs the invention.

The driver is informed by the user interface **105**, by audio (e.g., TTS, prerecorded, or synthesized sounds) and/or visual display output using the output devices **315** and **316** of the user interface **310** shown in FIG. **2**, that a vehicle fault, characterized by the reported trouble codes, has been detected and whether the fault is a warning or an alarm. The driver is also advised to take appropriate action based on the severity of the fault (e.g. "pull over" to a safe area). At the same time, a "Call Me" button and an "Acknowledge" button appear on the touch screen display. These buttons may also be physically installed buttons **301**A., as shown in FIG. **2**.

The driver or user may acknowledge this fault message by pressing the "Acknowledge" button. In this case, the diagnostic client can assume that the driver has been informed and take appropriate action (e.g. stop playing audio alert message, alter visual display, etc.). If the driver does not acknowledge the fault message, the diagnostic client may take some action on behalf of the driver, based on the prior classification of the received vehicle fault(s). For example, if the vehicle fault indicates that the air bags have been deployed, the diagnostic client **421** may automatically initiate requests to the service center **200** to notify police, dispatch emergency medical assistance and roadside service.

The driver may initiate a vehicle diagnostics request by pressing the "Call Me" button (from the driver point of view, pressing the "Call Me" button will result in a call to the driver by a service representative from the service center), or by pressing the PTT button **301**A shown in FIG. **2** and issuing a equivalent spoken command. In this case, a data communication link is established through the network interface **320** to the service center **200**, and data containing fault codes, DTCs, vehicle parameter values, and vehicle ID information, is sent to the diagnostic server **201**. The size of the data stream is estimated to be on the order of 1 kilobyte. Optional information includes a callback number, GPS coordinates, etc. The exchange of information may be repeated more than once before the data link is closed.

The call center server **202** receives this information, in addition to the analytical results of the diagnostic server (e.g., diagnosis of vehicle problem and recommended actions for repair), displays the information for the help desk personnel (including service representatives) **202**D, and fetches stored vehicle information from the data repository **203** for the service representative. A voice call is simultaneously placed to the vehicle, connecting the service representative **202**D to the vehicle driver or user **140**.

The service representative at the help desk **202** greets the driver and suggests a course of action. For severe vehicle-disabling malfunctions, the service representative may take various assisting actions (e.g., telephone a garage, alert roadside assistance, dispatch help immediately). For less severe vehicle faults, the service representative may arrange for vehicle service by consulting the driver and dealer service center, schedule and parts availability. Out-of-stock parts may be ordered and repair scheduled based on part lead-times. All or some of these options may be incorporated into the inventive system.

Turning to FIG. **4**, a process flow will be described with reference to step numbers shown in FIG. **4**.

In FIG. **4**, the fault detector **120**B periodically polls the vehicle bus **104**, checking for fault codes reported by the vehicle ECUs (step 1).

Then, in step 2, the fault detector **120**B reports newly detected fault codes along with associated information (e.g. time stamp, etc.) to the fault monitor **420** on the vehicle client computer device. (An alternative implementation is that the fault detector **120**B is a part of the fault monitor **420** which periodically polls the ECUs through the vehicle bus adapter **120**C.) In step 3, the fault monitor notifies the diagnostic client about the occurrence of the faults detected along with the fault codes.

Thereafter, the diagnostic client determines the severity of the faults by looking in the predefined fault code/severity/recommendation table (step 4). It communicates with the driver through the user interface **100** about the detected faults, their severity and recommended driver actions. There are a plurality of severity levels such as a warning and/or an alarm.

In step 5, the driver triggers a request for further information about the faults and guidance. For example, the driver may press the "Call Me" button (or the like on the touch screen). Then, the diagnostic client **421** initiates a diagnosis session with the diagnostic server **201** (step 6). The diagnostic client **421** passes the fault codes, vehicle identification and other relevant information to the server **201**.

In step 7, the diagnostic server requests additional information (e.g. vehicle parametric data) from the diagnostic client **421**. Then, in step 8, the diagnostic client requests the data from the diagnostic data service **120**A.

In step 9, the diagnostic data service interrogates the ECUs **103** via the vehicle bus adapter **120**C for the requested data.

Then, in step 10, the ECUs **103** provides the requested data. In step 11, the data is returned to the diagnostic client **421**, and thereafter, in step 12, the data is in turn transmitted to the diagnostic server **201**. Steps 7 through 12 may be repeated to obtain all of the relevant vehicle data.

In step 13, the diagnostic server places the request on a job queue for the call center **202** to process and simultaneously initiates the diagnosis engine **201**A analysis. The diagnostic analysis may consist of comparing the diagnostic data with a standard data set containing a list of known faults and recommended actions or may include a more complex fault classification analysis using techniques such as a neural network, classification trees, expert systems, case-based reasoning, and pattern recognition.

Then, in step 14 the diagnostic server **201** provides the diagnostic client **421** with an estimate of when to expect a call back from the customer service representative, and terminates the data connection. The diagnostic client **421** then conveys this information to the driver through the user interface **105**. After the diagnosis engine **201**A has completed its analysis and posted the results, a service representative can pick up the job from the queue using the service representative user interface **202**A. (In step 15)

In step 16, all information relevant to this diagnosis transaction is gathered and presented to the representative, and then, in step 17, the service representative places a call to the driver, through, for example a phone network to a cellular telephone located in the vehicle. If the cause of the faults cannot be identified based on the available data, the service representative may ask the driver for qualitative descriptions of the symptoms.

In step 18, the service representative may use this newly provided information and reinvoke the diagnostic server **201** to investigate the problem further. Finally, in step 19, the service representative communicates with the driver, and provides guidance.

Vehicle Health Checkup

The inventive system also may be employed to advise of the health of the vehicle.

In this scenario, the driver initiates an automated health checkup by using the touch-screen or speech recognition user interface **310** of the vehicle client **101**.

Then, vehicle information, estimated to be on the order of 1 kilobyte in size, including, for example, vehicle identification number (VIN), any trouble codes, and/or a snapshot of the vehicle data, are retrieved by the vehicle client **101** through the vehicle bus interface **120**.

The vehicle client **101** combines vehicle ID information with the information from the vehicle bus interface **120** and sends the data to the Diagnostic Server **201** over a data link. The data link is kept open.

The diagnostics server **201** retrieves vehicle information from the data repository **203** and compares the data from the vehicle with the repository data. Then, the diagnostic server **201** prepares a report listing any out-of-range parameters and actions required (e.g., "coolant level is low"). Trend analysis on the parameters may also be performed, based on the present and historical data collected from the vehicle, to detect any drifting of the performance characteristics and to provide early guidance for preventive maintenance (e.g., "change oil in 1500 miles").

The report is sent to the client computer device **101** over the data link. The client computer device stores the results in memory **350**, displays them on the touch screen, and reads them to the driver via TTS. The driver is given the option of placing a call to speak to a service representative **202**D at the call center **202**.

Referring now to FIG. **5**, a health checkup event flow is presented. The numbers of the steps refer to the numbers found in the flow, as shown in FIG. **5**.

First, in step 1, the driver triggers a request (e.g., presses the "Checkup" button) for an automated vehicle health checkup by using the touch-screen or speech recognition user interface **105** of the vehicle client.

Then in step 2, the diagnostic client **421** initiates a health checkup session with the diagnostic server **201**, and in step 3, the diagnostic server instructs the diagnostic client to gather vehicle data, such as VIN, malfunction codes, and/or a snapshot of the vehicle data.

Then in step 4, the diagnostic client **421** requests the data from the diagnostic data service **120**A at the vehicle bus interface **120**. Then, in step 5, the diagnostic data service interrogates the ECUs **103** via the vehicle bus adapter **120**C for the requested data.

In step 6, the ECUs **103** provide the requested data, and in step 7, the data is returned to the diagnostic client **421**. Then, in step 8, the data is in turn transmitted to the diagnostic server **201**. The diagnostic client may use a visual interface, such as a progress bar to inform the driver that processing is in progress.

In step 9, the diagnostic server **201** compares the vehicle data with the stored nominal values. The diagnostic server **201** prepares a report and transmits it to the client computer **101**. The report may be displayed on the client's display using indicator icons that are easily understandable by the driver at a glance while operating the vehicle. For example, a "thumbs up", a "thumbs down", or a flat hand or the like, and a summary of the report, may be displayed on the output device **316**. Thereafter, the data connection is terminated.

The above-described health checkup process may be completely automated without intervention or involvement by a person at the remote service center.

The present invention is not limited to the scenarios and embodiments listed above, but instead may be practiced with a plurality of modifications and extensions.

For example, remote health monitoring and diagnostics shares many features with other automotive applications and services. It may be desirable to bundle the remote health monitoring and diagnostics with other services or to extend it with related application functions. For example, the remote diagnostics service could certainly be offered on top of an Emergency/Mayday service (e.g., "OnStar"). Other applications and services that can be developed or bundled as extensions of the diagnostics services include: breakdown service, network diary, vehicle user manual update, OEM Callback Services, fleet management, theft prevention, vehicle parameter update/change, remote vehicle access, concierge services, etc.

While the invention has been described in terms of several preferred embodiments, those skilled in the art will recognize that the invention can be practiced with modification within the spirit and scope of the appended claims.

What is claimed is:

1. An information system for a vehicle, comprising:

a client computer device within the vehicle, coupled to the vehicle's monitoring systems, for data management, remote session management and user interaction;

a communication system, coupled to said client computer device, for providing remote communication of data including data derived from said monitoring systems of the vehicle; and

a remote service center including a vehicle data store, a server computer, a diagnostic engine, and a communicator for communicating the results of analysis of vehicle information to said client computer device via said communication system,

wherein said data communicated comprises vehicle identification information, and

wherein said communication system provides for voice communications.

2. The system according to claim **1**, wherein said data further comprises at least one of vehicle location data and diagnostic data.

3. The system according to claim **1**, wherein said client computer device comprises a processor system including a processor, a memory coupled to said processor, input/output (I/O) ports, a user interface, and a communication device.

4. The system according to claim **3**, wherein said user interface includes an input device comprising at least one of speech recognition, speaker identification, voice recording, touch screen display, and actuator buttons.

5. The system according to claim **3**, wherein said user interface includes an output device comprising at least one of text-to-speech, voice playback, auditory signals, display screen, and indicator lights.

6. The system according to claim **1**, wherein said client computer device comprises at least one of an embedded computer, a laptop computer and a personal data assistant (PDA).

7. The system according to claim **1**, wherein the client computer device is coupled to a vehicle bus through a vehicle bus interface.

8. The system according to claim **7**, wherein said vehicle bus interface uses one of an RS-232 interface, a universal serial bus (USB), an ITS Data Bus (IDB), and Ethernet.

9. The system according to claim **7**, wherein said vehicle bus comprises one of a controller area network (CAN) and Society of Automotive Engineers' SAE J1850 data communication network interface.

10. The system according to claim **1**, wherein said client computer device is integrated with a telephone to provide establishment of at least one of a data connection and a voice connection with said remote service center.

11. The system according to claim **1**, wherein said remote service center includes a call center which is automated.

12. An information system for a vehicle, comprising:

a client computer device within the vehicle, coupled to the vehicle's monitoring systems, for data management, remote session management and user interaction;

a communication system, coupled to said client computer device, for providing remote communication of data including data derived from said monitoring systems of the vehicle; and

a remote service center including a vehicle data store, a server computer, a diagnostic engine, and a communicator for communicating the results of analysis of vehicle information to said client computer device via said communication system,

wherein said remote service center includes a call center including help-desk personnel.

13. The system according to claim 12, wherein the call center performs at least one of diagnostic analysis, provides recommendations, schedules services, orders parts, and dispatches assistance.

14. The system according to claim 12, wherein said client computer device is integrated with a telephone to provide establishment of at least one of a data connection and a voice connection with said remote service center.

15. The system according to claim 12, wherein said call center help-desk personnel access data related to the vehicle.

16. The system according to claim 12, wherein said call center includes a service representative user interface, a job queue management unit, and a service data management unit linked to a data repository of the service center.

17. The system of claim 12, wherein said communication system provides for voice communications.

18. The system of claim 12, wherein said remote service center includes a call center including help-desk personnel.

19. A method of remote diagnostics of a vehicle, comprising:

detecting, by a fault monitor, one or more fault codes generated by an electronic control unit of said vehicle;

notifying a diagnostic client of said fault codes;

checking, by said diagnostic client, the codes against a stored list to distinguish warning codes from a severe malfunction;

based on said checking, advising a user whether a warning code or a severe malfunction is present;

based on said advising, initiating a call to a remote service center using a data link;

forwarding data containing malfunction codes, vehicle parameter values, and vehicle identification information to a diagnostic server of said remote service center; and

receiving, by the diagnostic server, said data, and fetching stored vehicle information from a data repository, and displaying said data and the stored vehicle information for a service representative, while simultaneously placing a call to the vehicle.

20. The method according to claim 19, wherein for a predetermined malfunction, said service representative communicates with a service facility to dispatch assistance.

21. The method according to claim 19, wherein said detecting, notifying, and checking is performed more than one time.

22. The method according to claim 19, wherein said call to said remote service center is initiated by the user.

23. The method according to claim 19, wherein said call from said remote service center to said vehicle connects said service representative to the vehicle user.

24. The method according to claim 19, wherein said call to said vehicle connects said diagnostic server to said diagnostic client within the vehicle.

* * * * *

Exhibit A

US008032278B2

(12) **United States Patent**
Flick

(10) **Patent No.: US 8,032,278 B2**
(45) **Date of Patent: Oct. 4, 2011**

(54) **VEHICLE TRACKING UNIT WITH DOWNLOADABLE CODES AND ASSOCIATED METHODS**

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(*) Notice: Subject to any disclaimer, the term of this patent is extended or adjusted under 35 U.S.C. 154(b) by 840 days.

(21) Appl. No.: **11/773,272**

(22) Filed: **Jul. 3, 2007**

(65) **Prior Publication Data**

US 2007/0279283 A1 Dec. 6, 2007

Related U.S. Application Data

(63) Continuation-in-part of application No. 11/076,259, filed on Mar. 9, 2005, now Pat. No. 7,720,597, which is a continuation of application No. 10/383,496, filed on Mar. 7, 2003, now Pat. No. 7,149,623, which is a continuation of application No. 09/859,972, filed on May 17, 2001, now Pat. No. 6,606,561.

(60) Provisional application No. 60/264,811, filed on Jan. 29, 2001, provisional application No. 60/258,005, filed on Dec. 22, 2000, provisional application No. 60/251,552, filed on Dec. 6, 2000, provisional application No. 60/252,125, filed on Nov. 20, 2000, provisional application No. 60/236,890, filed on Sep. 29, 2000, provisional application No. 60/246,463, filed on Nov. 7, 2000, provisional application No. 60/222,777, filed on Aug. 3, 2000, provisional application No. 60/205,178, filed on May 17, 2000.

(51) **Int. Cl.**
G01C 21/00 (2006.01)

(52) **U.S. Cl.** **701/36**; 701/33; 382/104; 382/988; 455/575.9

(58) **Field of Classification Search** 701/36, 701/207–209; 340/500, 506, 515, 531, 533–534
See application file for complete search history.

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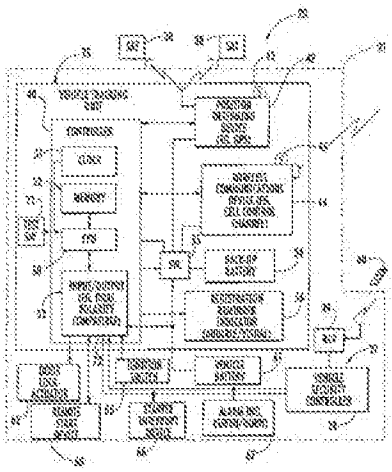
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(57) **ABSTRACT**

A multi-vehicle compatible tracking unit is for a vehicle including a vehicle data bus extending throughout the vehicle. The vehicle tracking unit may include a vehicle position determining device, a wireless communications device, and a multi-vehicle compatible controller for cooperating with the vehicle position determining device and the wireless communications device to send vehicle position information. The multi-vehicle compatible controller may be coupled to the vehicle data bus for communication therewith with at least one vehicle device using at least one corresponding vehicle device code from among a plurality thereof for different vehicles. A downloading interface may be included for permitting downloading of enabling data related to the at least one corresponding vehicle device code for use by the multi-vehicle compatible controller.

22 Claims, 13 Drawing Sheets



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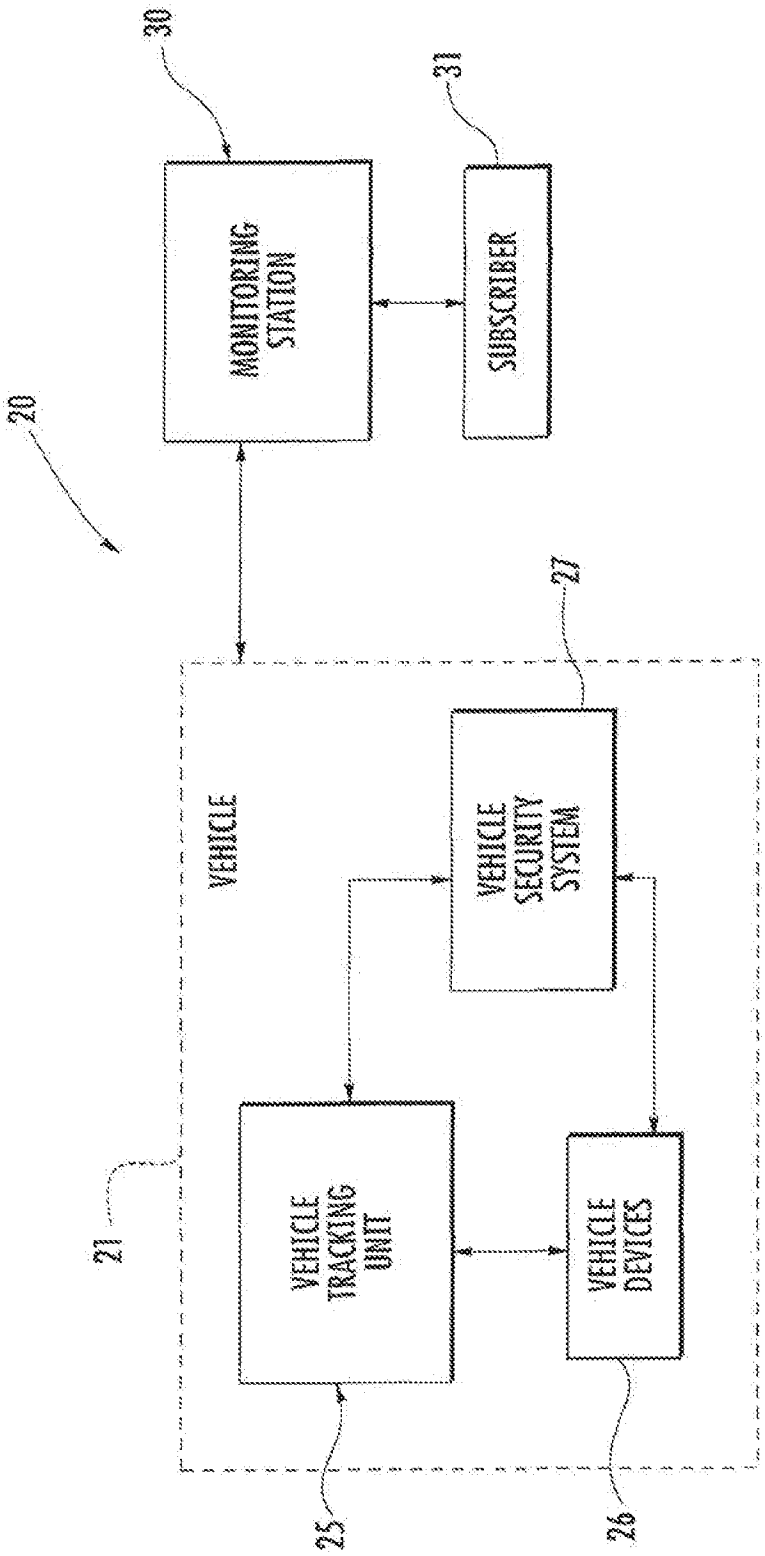

30
31
MONITORING STATION
SUBSCRIBER
20
27
VEHICLE
VEHICLE SECURITY SYSTEM
21
VEHICLE TRACKING UNIT
VEHICLE DEVICES
25
26

FIG. 1

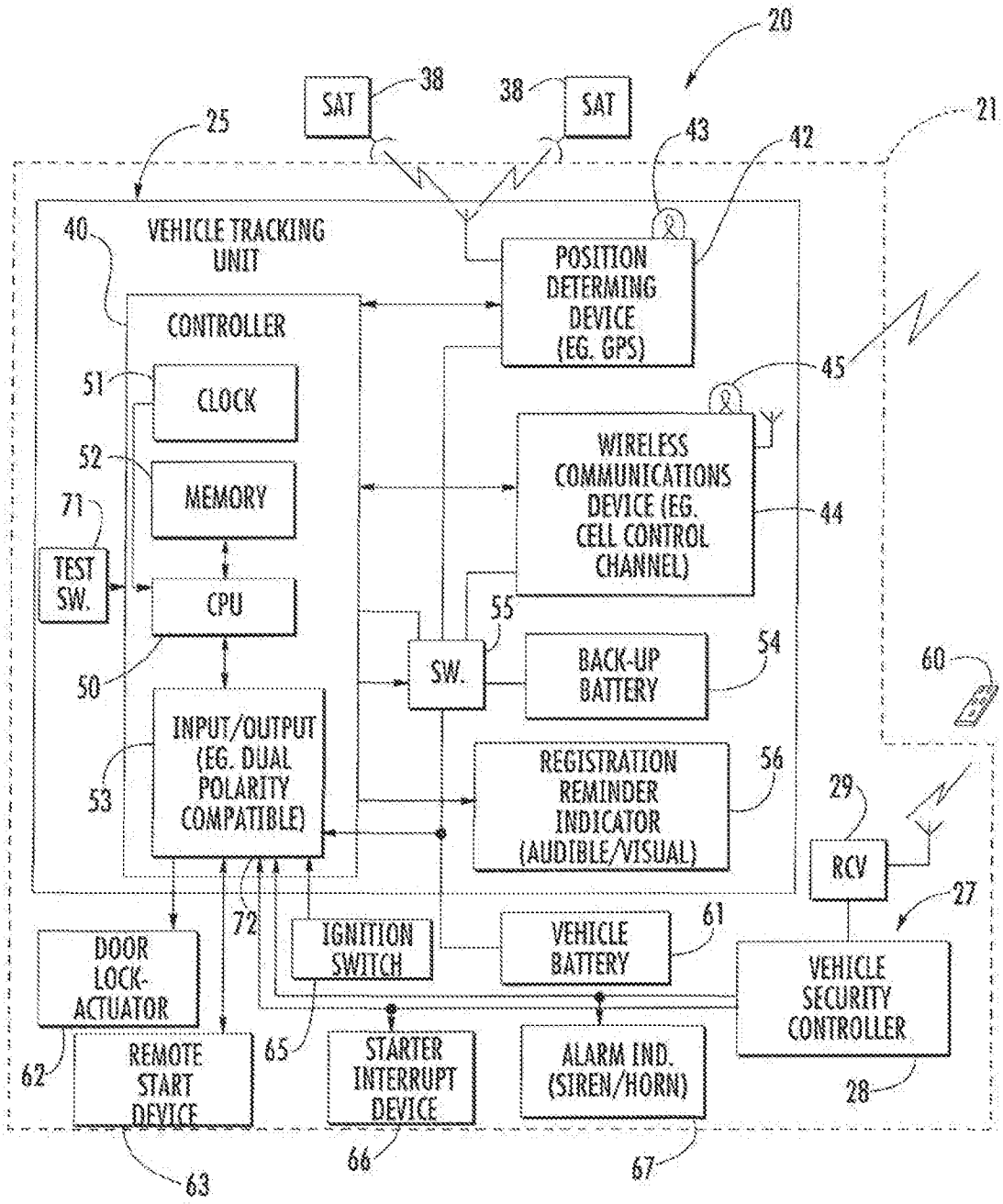

20
SAT
38
38
SAT
25
21
43
42
40
VEHICLE TRACKING UNIT
POSITION DETERMING DEVICE (EG. GPS)
CONTROLLER
45
51
CLOCK
WIRELESS COMMUNICATIONS DEVICE (EG. CELL CONTROL CHANNEL)
52
MEMORY
44
71
TEST SW.
CPU
55
SW.
BACK-UP BATTERY
54
60
50
INPUT/OUTPUT (EG. DUAL POLARITY COMPATIBLE)
53
REGISTRATION REMINDER INDICATOR (AUDIBLE/VISUAL)
56
29
RCV
27
72
IGNITION SWITCH
VEHICLE BATTERY
61
DOOR LOCK-ACTUATOR
VEHICLE SECURITY CONTROLLER
62
65
REMOTE START DEVICE
STARTER INTERRUPT DEVICE
ALARM IND. (SIREN/HORN)
28
63
66
67

FIG. 2

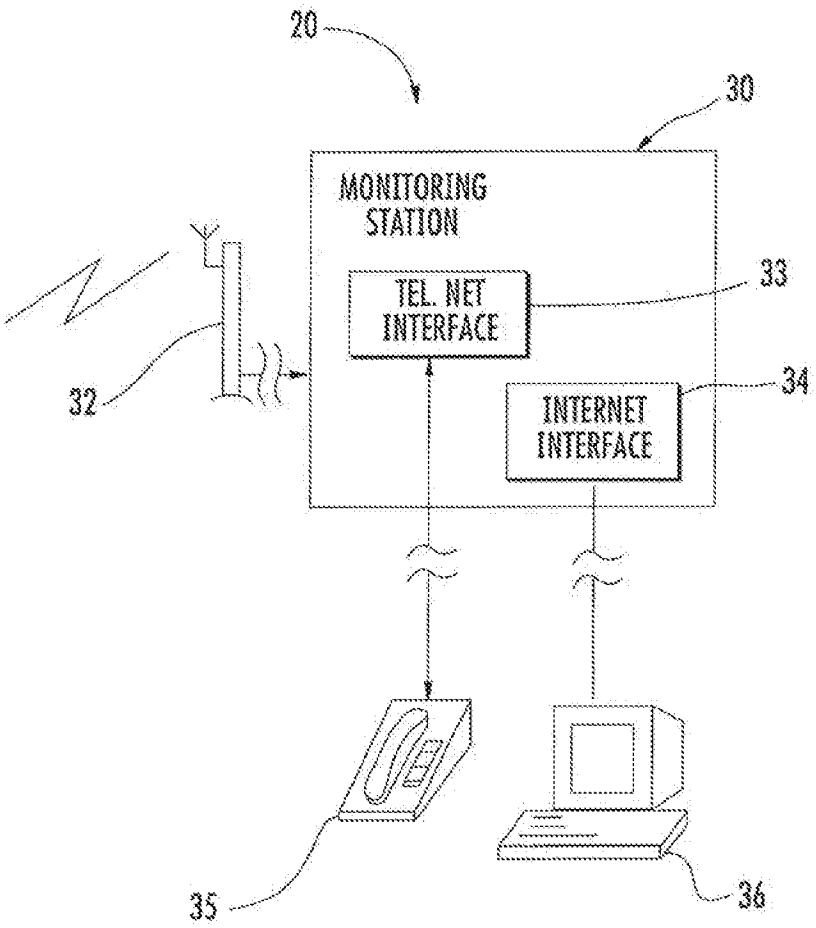

20
30
MONITORING STATION
TEL. NET INTERFACE
33
INTERNET INTERFACE
34
32
35
36

FIG. 3

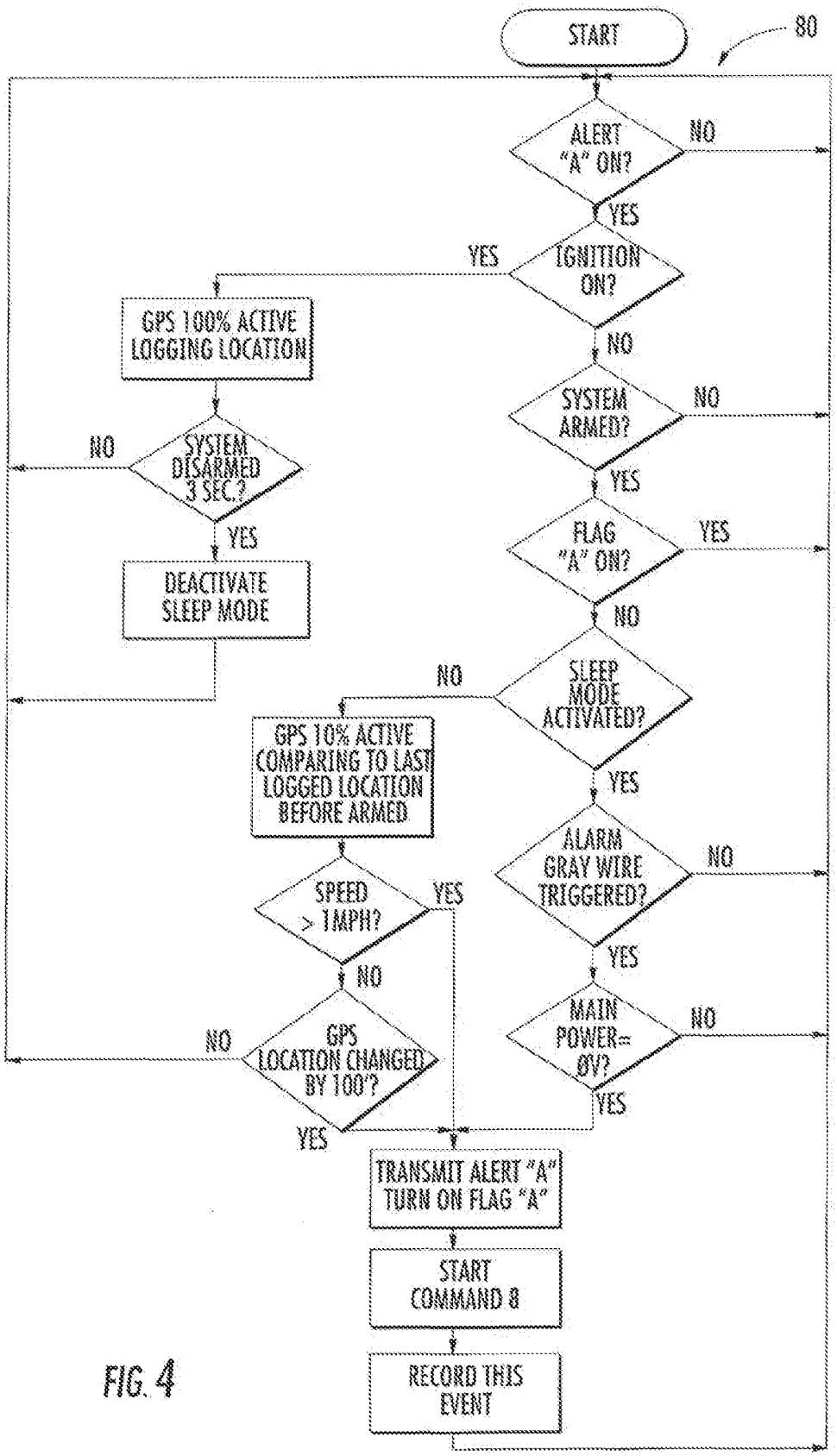

START
80
ALERT "A" ON?
NO
YES
IGNITION ON?
YES
GPS 100% ACTIVE LOGGING LOCATION
NO
SYSTEM ARMED?
NO
YES
SYSTEM DISARMED 3 SEC?
NO
YES
DEACTIVATE SLEEP MODE
FLAG "A" ON?
YES
NO
SLEEP MODE ACTIVATED?
NO
YES
GPS 10% ACTIVE COMPARING TO LAST LOGGED LOCATION BEFORE ARMED
ALARM GRAY WIRE TRIGGERED?
NO
YES
SPEED > 1MPH?
YES
NO
MAIN POWER= 0V?
NO
YES
GPS LOCATION CHANGED BY 100'?
NO
YES
TRANSMIT ALERT "A" TURN ON FLAG "A"
START COMMAND 8
RECORD THIS EVENT

FIG. 4

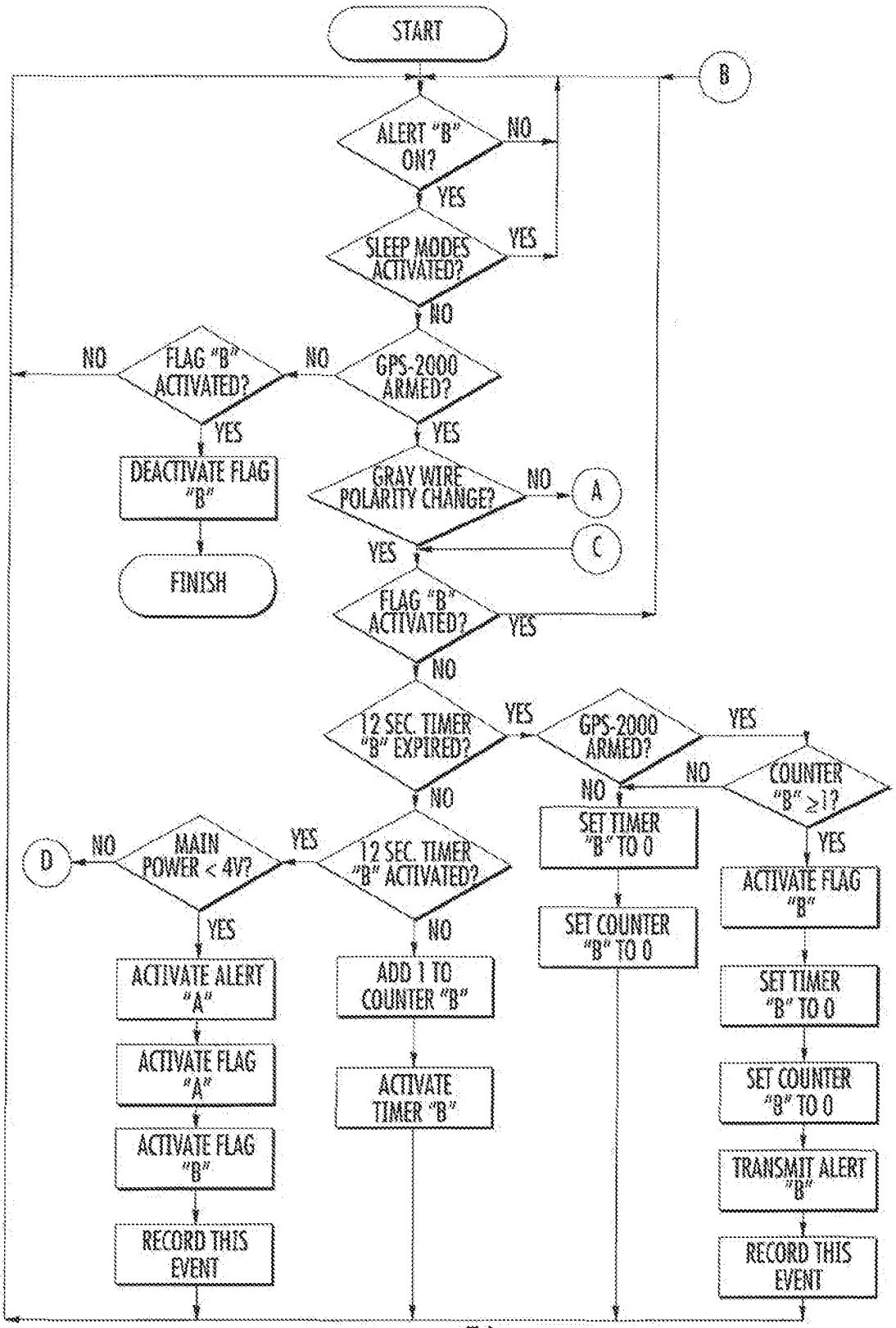

START
B
ALERT "B" ON?
NO
YES
SLEEP MODES ACTIVATED?
YES
NO
NO
FLAG "B" ACTIVATED?
NO
GPS-2000 ARMED?
YES
YES
DEACTIVATE FLAG "B"
GRAY WIRE POLARITY CHANGE?
NO
A
C
YES
FINISH
FLAG "B" ACTIVATED?
YES
NO
12 SEC. TIMER "B" EXPIRED?
YES
GPS-2000 ARMED?
YES
NO
NO
COUNTER "B" ≥1?
NO
YES
D
NO
MAIN POWER < 4V?
YES
12 SEC. TIMER "B" ACTIVATED?
SET TIMER "B" TO 0
ACTIVATE FLAG "B"
YES
NO
SET COUNTER "B" TO 0
ACTIVATE ALERT "A"
ADD 1 TO COUNTER "B"
SET TIMER "B" TO 0
ACTIVATE FLAG "A"
ACTIVATE TIMER "B"
SET COUNTER "B" TO 0
ACTIVATE FLAG "B"
TRANSMIT ALERT "B"
RECORD THIS EVENT
RECORD THIS EVENT

FIG. 5A

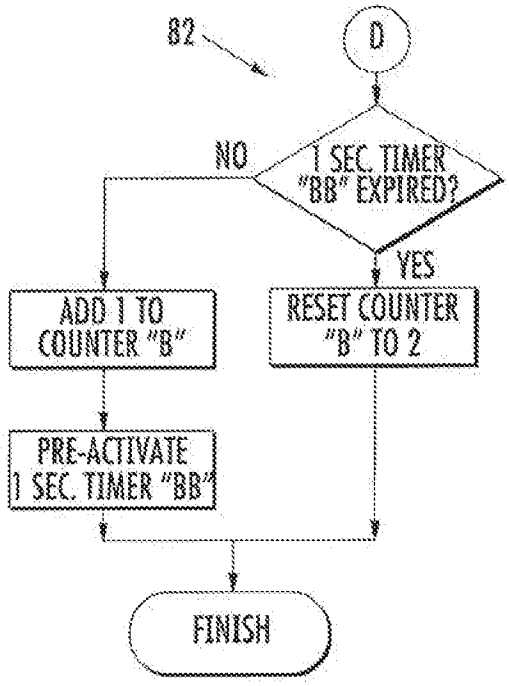

82
D
1 SEC. TIMER "BB" EXPIRED?
NO
YES
ADD 1 TO COUNTER "B"
RESET COUNTER "B" TO 2
PRE-ACTIVATE 1 SEC. TIMER "BB"
FINISH

FIG. 5B

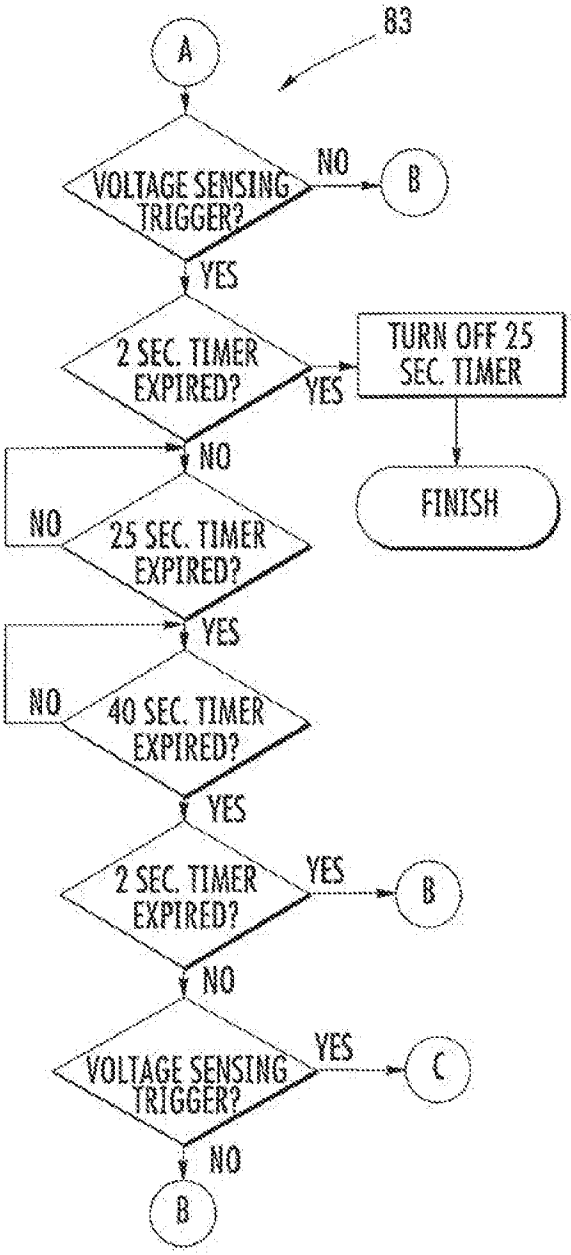

83
A
VOLTAGE SENSING TRIGGER?
NO
B
YES
2 SEC. TIMER EXPIRED?
YES
TURN OFF 2.5 SEC. TIMER
FINISH
NO
NO
2.5 SEC. TIMER EXPIRED?
YES
NO
40 SEC. TIMER EXPIRED?
YES
2 SEC. TIMER EXPIRED?
YES
B
NO
VOLTAGE SENSING TRIGGER?
YES
C
NO
B

FIG. 5C

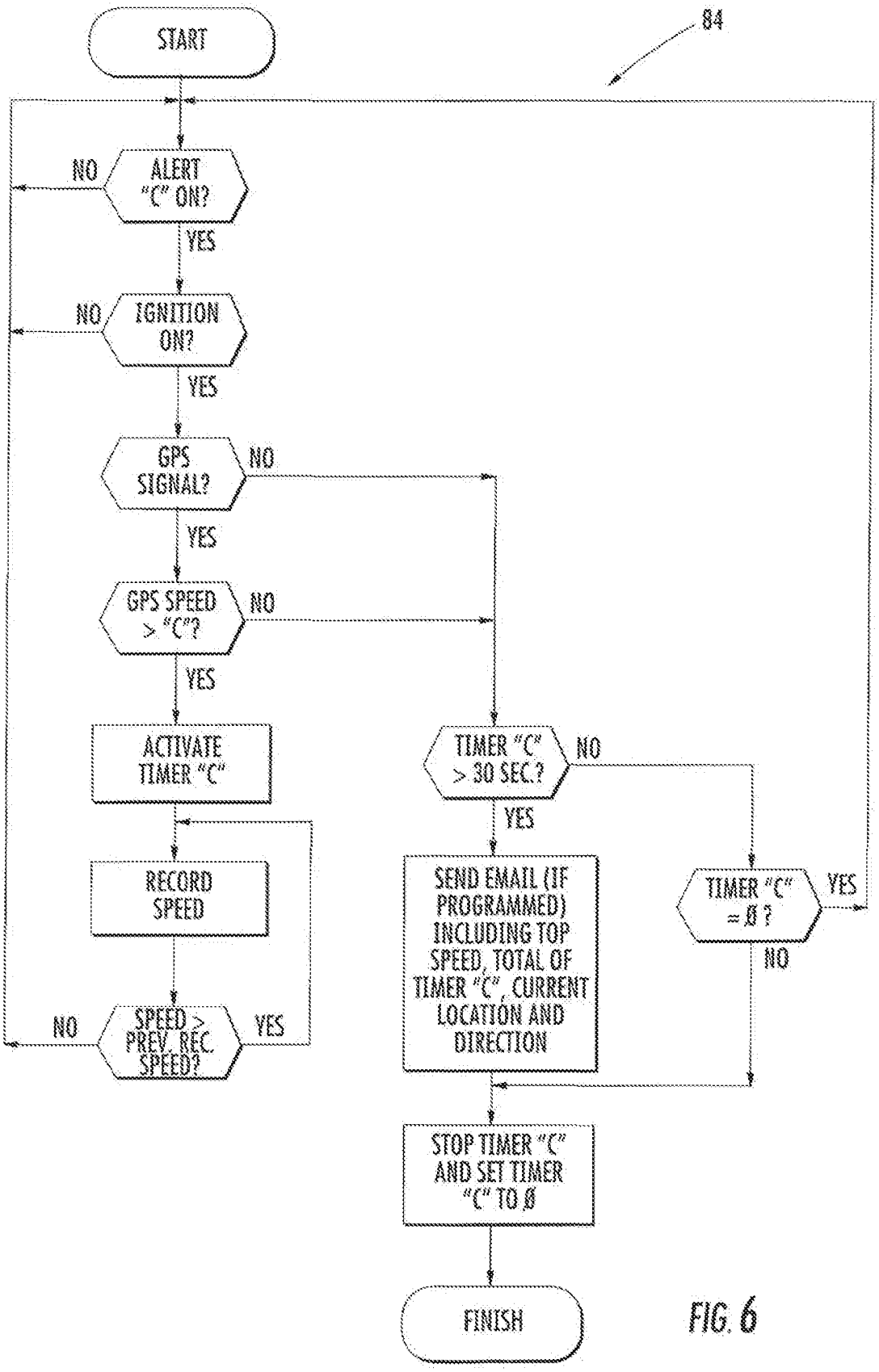

84
START
ALERT "C" ON?
NO
YES
IGNITION ON?
NO
YES
GPS SIGNAL?
NO
YES
GPS SPEED > "C"?
NO
YES
ACTIVATE TIMER "C"
RECORD SPEED
SPEED > PREV. REC. SPEED?
NO
YES
TIMER "C" > 30 SEC.?
NO
YES
SEND EMAIL (IF PROGRAMMED) INCLUDING TOP SPEED, TOTAL OF TIMER "C", CURRENT LOCATION AND DIRECTION
TIMER "C" = Ø ?
YES
NO
STOP TIMER "C" AND SET TIMER "C" TO Ø
FINISH

FIG. 6

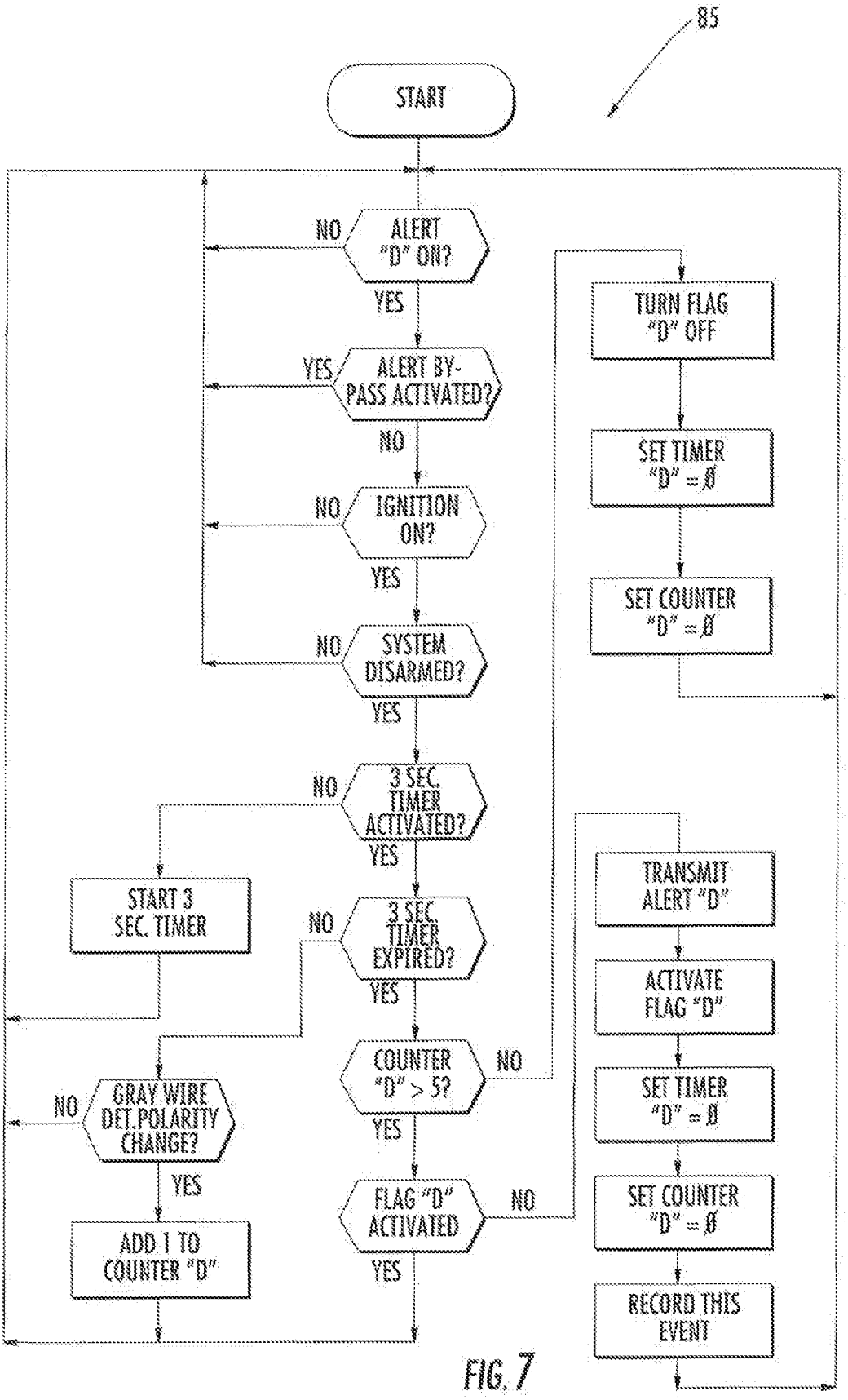

85
START
ALERT "D" ON?
NO
YES
ALERT BY-PASS ACTIVATED?
YES
NO
IGNITION ON?
NO
YES
SYSTEM DISARMED?
NO
YES
3 SEC. TIMER ACTIVATED?
NO
YES
START 3 SEC. TIMER
3 SEC. TIMER EXPIRED?
NO
YES
COUNTER "D" > 5?
NO
YES
GRAY WIRE DET. POLARITY CHANGE?
NO
YES
ADD 1 TO COUNTER "D"
FLAG "D" ACTIVATED
NO
YES
TURN FLAG "D" OFF
SET TIMER "D" = Ø
SET COUNTER "D" = Ø
TRANSMIT ALERT "D"
ACTIVATE FLAG "D"
SET TIMER "D" = Ø
SET COUNTER "D" = Ø
RECORD THIS EVENT

FIG. 7

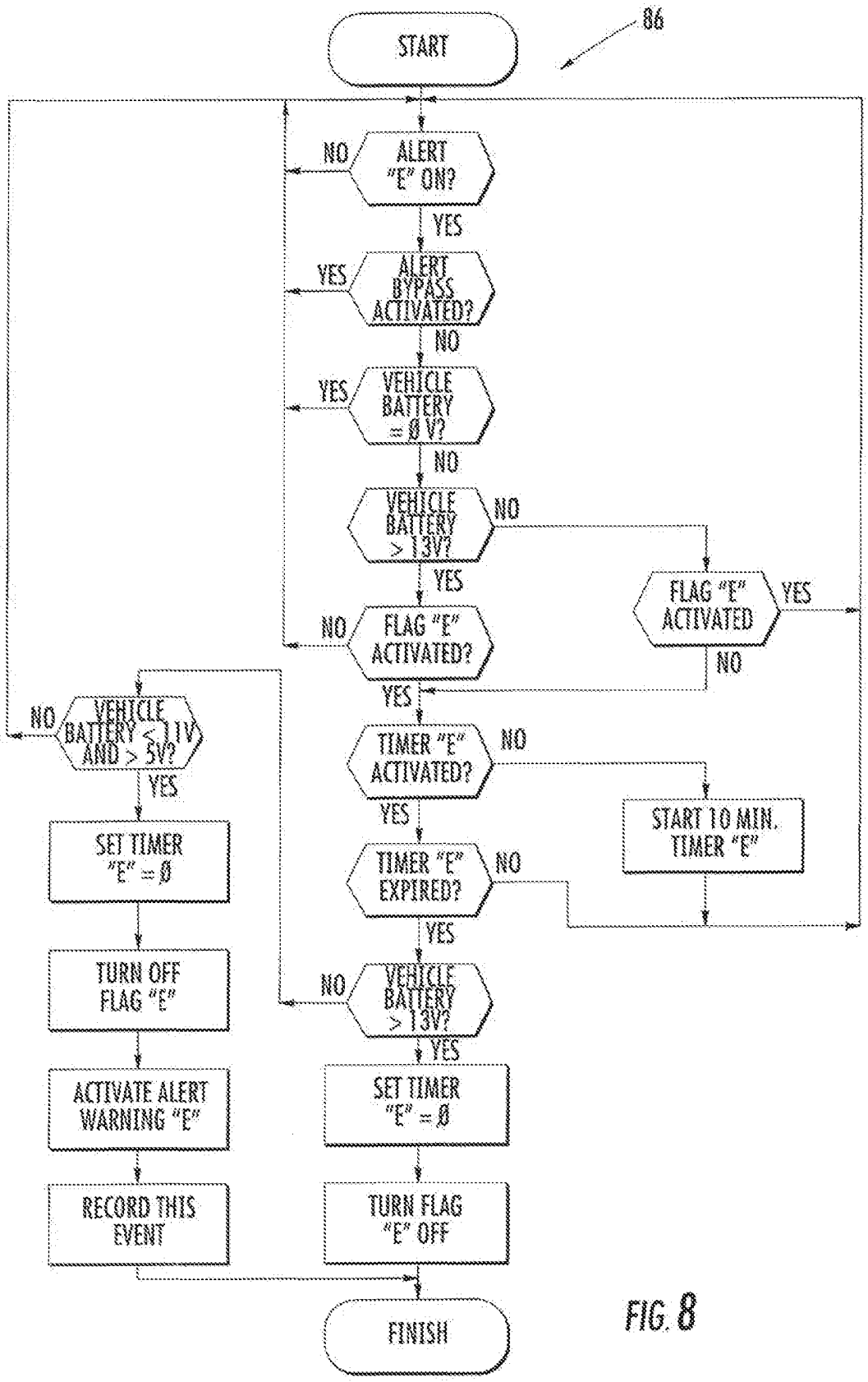

86
START
ALERT "E" ON?
NO
YES
ALERT BYPASS ACTIVATED?
YES
NO
VEHICLE BATTERY = Ø V?
YES
NO
VEHICLE BATTERY > 13V?
NO
YES
FLAG "E" ACTIVATED?
NO
YES
FLAG "E" ACTIVATED
YES
NO
TIMER "E" ACTIVATED?
NO
YES
START 10 MIN. TIMER "E"
TIMER "E" EXPIRED?
NO
YES
VEHICLE BATTERY > 13V?
NO
YES
SET TIMER "E" = Ø
TURN FLAG "E" OFF
VEHICLE BATTERY ≤ 11V AND > 5V?
NO
YES
SET TIMER "E" = Ø
TURN OFF FLAG "E"
ACTIVATE ALERT WARNING "E"
RECORD THIS EVENT
FINISH

FIG. 8

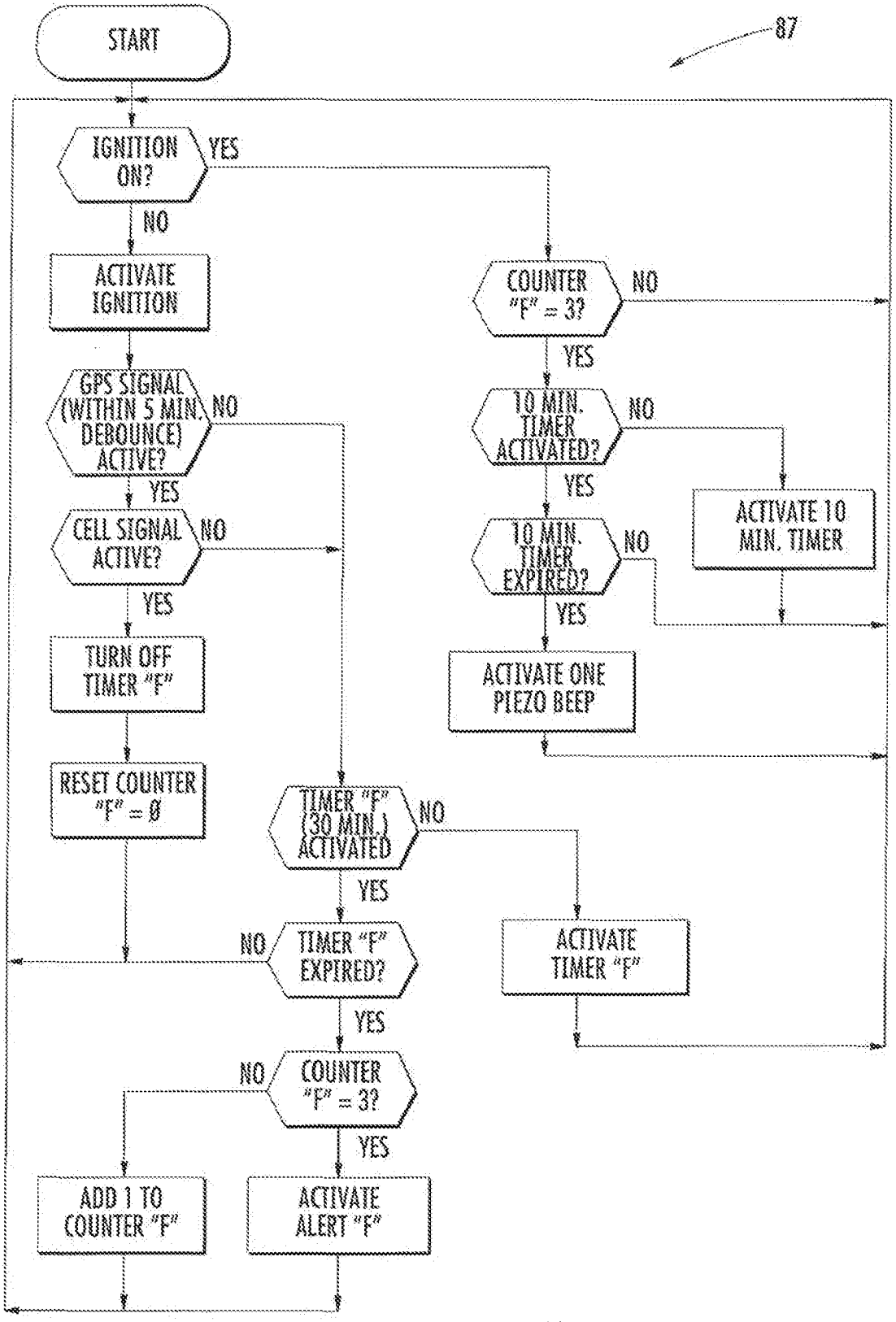

87
START
IGNITION ON?
YES
NO
ACTIVATE IGNITION
GPS SIGNAL (WITHIN 5 MIN. DEBOUNCE) ACTIVE?
NO
YES
CELL SIGNAL ACTIVE?
NO
YES
TURN OFF TIMER "F"
RESET COUNTER "F" = 0
TIMER "F" (30 MIN.) ACTIVATED
NO
YES
TIMER "F" EXPIRED?
NO
YES
COUNTER "F" = 3?
NO
YES
ADD 1 TO COUNTER "F"
ACTIVATE ALERT "F"
COUNTER "F" = 3?
NO
YES
10 MIN. TIMER ACTIVATED?
NO
YES
ACTIVATE 10 MIN. TIMER
10 MIN. TIMER EXPIRED?
NO
YES
ACTIVATE ONE PIEZO BEEP
ACTIVATE TIMER "F"

FIG. 9

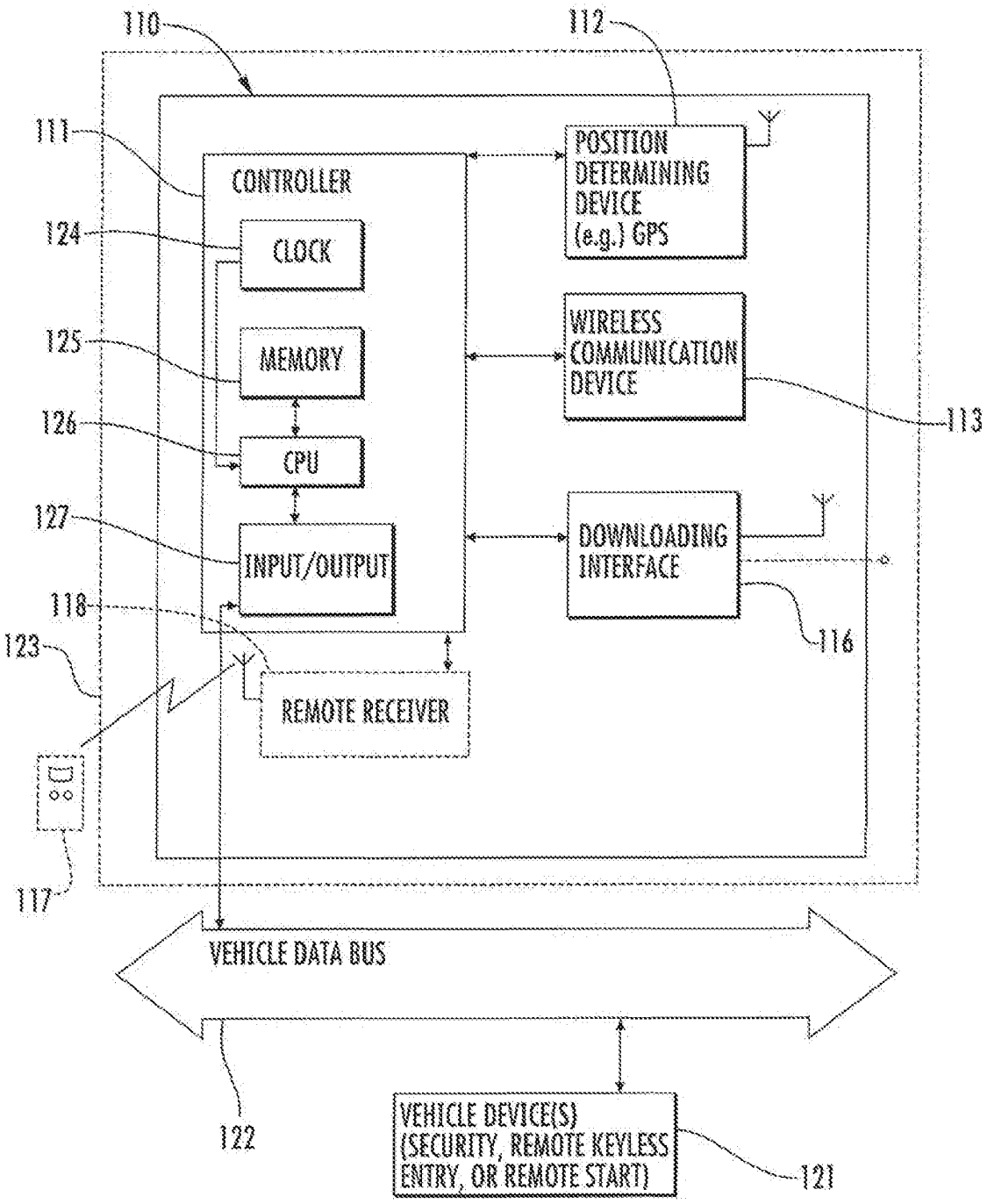

110
112
111
CONTROLLER
POSITION DETERMINING DEVICE (e.g.) GPS
124
CLOCK
125
MEMORY
WIRELESS COMMUNICATION DEVICE
113
126
CPU
127
INPUT/OUTPUT
DOWNLOADING INTERFACE
118
116
123
REMOTE RECEIVER
117
VEHICLE DATA BUS
122
VEHICLE DEVICE(S) (SECURITY, REMOTE KEYLESS ENTRY, OR REMOTE START)
121

FIG. 10

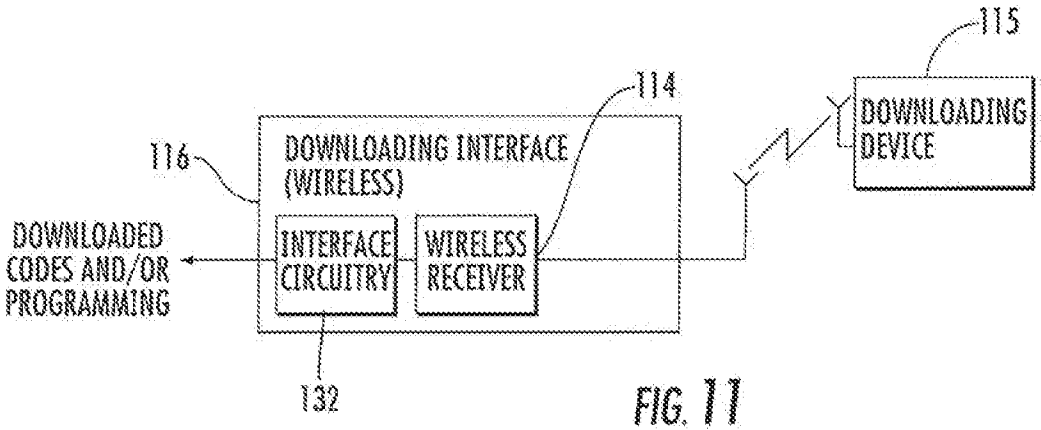


FIG. 11

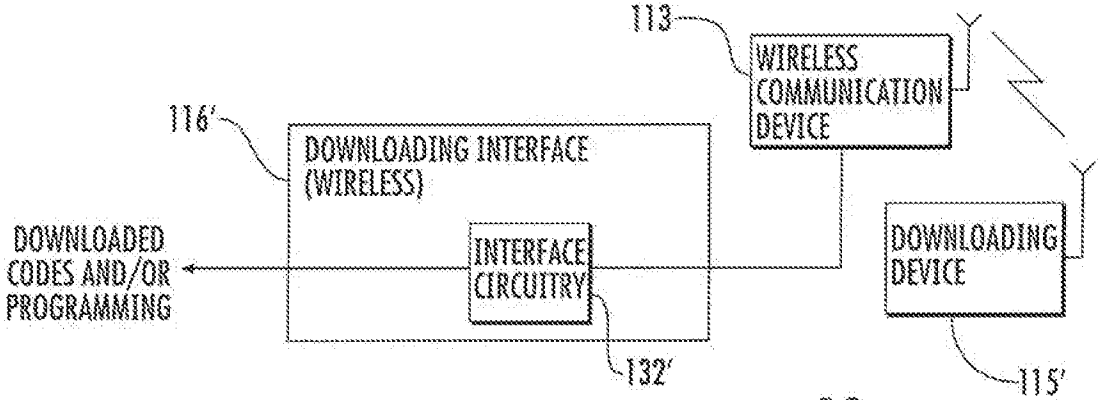


FIG. 12

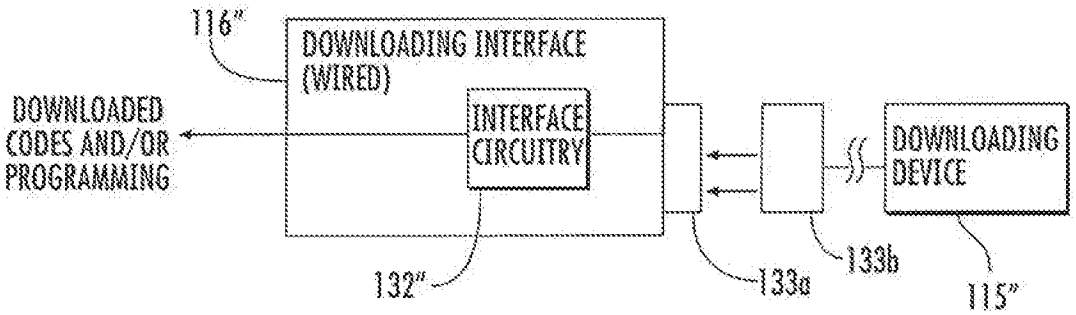


FIG. 13

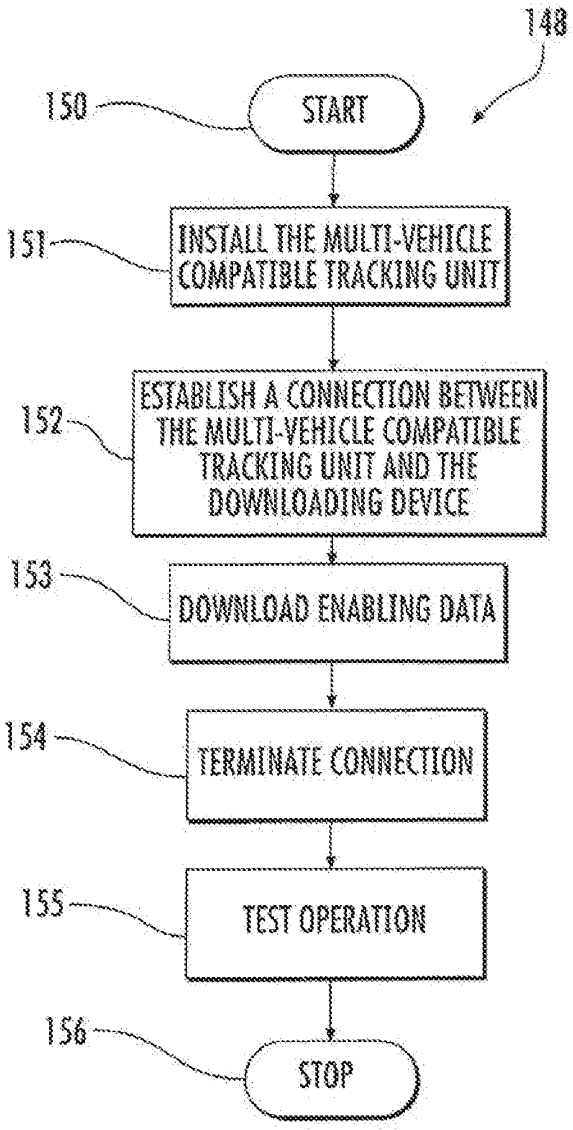

148
150
START
151
INSTALL THE MULTI-VEHICLE COMPATIBLE TRACKING UNIT
152
ESTABLISH A CONNECTION BETWEEN THE MULTI-VEHICLE COMPATIBLE TRACKING UNIT AND THE DOWNLOADING DEVICE
153
DOWNLOAD ENABLING DATA
154
TERMINATE CONNECTION
155
TEST OPERATION
156
STOP

FIG. 14

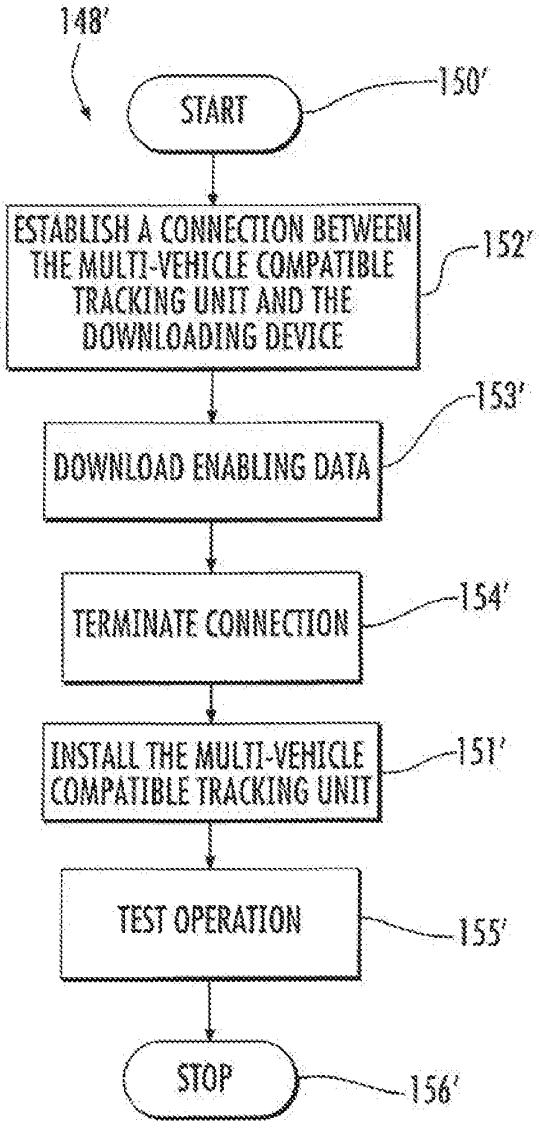

148'
150'
START
152'
ESTABLISH A CONNECTION BETWEEN THE MULTI-VEHICLE COMPATIBLE TRACKING UNIT AND THE DOWNLOADING DEVICE
153'
DOWNLOAD ENABLING DATA
154'
TERMINATE CONNECTION
151'
INSTALL THE MULTI-VEHICLE COMPATIBLE TRACKING UNIT
155'
TEST OPERATION
156'
STOP

FIG. 15

VEHICLE TRACKING UNIT WITH DOWNLOADABLE CODES AND ASSOCIATED METHODS

RELATED APPLICATIONS

The present application is a continuation-in-part of U.S. patent application Ser. No. 11/076,259 filed Mar. 9, 2005 now U.S. Pat. No. 7,720,597, which is a continuation of U.S. patent application Ser. No. 10/383,496 filed Mar. 7, 2003 now U.S. Pat. No. 7,149,623, which is a continuation of U.S. patent application Ser. No. 09/859,972 filed on May 17, 2001 now U.S. Pat. No. 6,606,561 which, in turn, was based upon provisional patent application Ser. Nos. 60/264,811 filed on Jan. 29, 2001; 60/258,005, filed Dec. 22, 2000; 60/251,552, filed Dec. 6, 2000; 60/252,125, filed Nov. 20, 2000; 60/236,890, filed Sep. 29, 2000; 60/246,463, filed Nov. 7, 2000; 60/222,777, filed Aug. 3, 2000; and 60/205,178, filed May 17, 2000, the entire contents of each of which are incorporated herein by reference.

FIELD OF THE INVENTION

The present invention relates to the field of vehicle devices, and, more particularly, to a tracking system for vehicles, and related methods.

BACKGROUND OF THE INVENTION

Motor vehicles, such as passenger cars, trucks, busses, fleet vehicles, etc. are widely used and knowing the locations of such vehicles is often desired. For example, should a vehicle be stolen, it would be beneficial to know the vehicle's location so that authorities could be promptly and accurately directed to retrieve the vehicle. Indeed, the tracking system could plot the getaway path of the thief.

For a company with hired drivers, it may be desirable to know the driver's whereabouts during the course of the day. Similarly, a rental car agency or other fleet operator, for example, may wish to know the whereabouts of its fleet of vehicles.

It may also be desirable to track the location of a vehicle as it is used throughout the course of a normal day. For parents of younger or older drivers, for example, knowledge of the vehicle's location may provide some assurance that the driver is at designated locations and following a prescribed route.

A number of patents disclose various systems and approaches to tracking vehicles. For example, U.S. Pat. No. 5,223,844 discloses a tracking system including a control center and a mobile unit installed in the vehicle. The mobile unit may send security warnings to the command center via a wireless transceiver. Position information for the vehicle is determined using a GPS receiver at the vehicle.

U.S. Pat. No. 5,515,043 discloses a similar system which may send one or more preprogrammed telephone messages to a user when away from the vehicle. The user may remotely access location information or cause certain commands to be carried out by entering a personal identification number (PIN).

The widespread availability and use of the Internet has prompted a number of vehicle tracking systems to also make use of the Internet. For example, TelEvoke, Inc. proposed such a system in combination with Clifford Electronics. The system was to provide notification, control and tracking services via the telephone or the Internet. Users could be notified via phone, e-mail, or pager of events such as a car alarm being triggered. Users could control the vehicle remote devices via phone, web, or PDA such as unlocking car doors. Additionally, users could track TelEvoke-enabled vehicles on the Internet or via the telephone. An Internet map could be viewed by the user showing the actual and prior vehicle locations. TelEvoke offered its services via a centralized fully automated Network Operations Center. To reduce the communications costs, it was proposed to use the control channel of the cellular telephone network.

There are, of course, a number of vehicles which come from the manufacturer with some form of security system already installed. In addition, a number of vehicles are also equipped with aftermarket security systems. Many conventional vehicle tracking units may not be readily installed in vehicles, particularly those vehicles already including a vehicle security system. In addition, complexity of installation may significantly increase the system costs.

A number of patents disclose various security and control systems that address data bus interoperability. For example, U.S. Pat. No. 5,719,551, assigned to Omega Patents, LLC, the assignee of the present invention, discloses a vehicle security system for a vehicle including a data bus connecting a plurality of vehicle devices. A signal enabling circuit enables the alarm controller to operate using a set of desired signals selected from a plurality of possible sets for different vehicles. U.S. Pat. No. 6,011,460, assigned to Omega Patents, LLC, discloses a similar system where the set of desired signals from the plurality of different sets of signals for different vehicles is obtained, such as by connection and communication with a downloading device. Additionally, U.S. Pat. No. 6,756,885, also assigned to Omega Patents, LLC, discloses a multi-vehicle control system whereby a multi-vehicle compatible controller stores a set of device codes for a given vehicle device for a plurality of different vehicles. Device codes are read from the data communications bus, and a match between a read device code and the stored device codes is determined to provide compatibility with different vehicles.

Unfortunately, such advanced techniques for dealing with multiple device codes for a vehicle having a data communications bus have not yet been developed for vehicle tracking units.

SUMMARY OF THE INVENTION

In view of the foregoing background, it is therefore an object of the present invention to provide a multi-vehicle compatible tracking unit which may be used to control operable vehicle devices, and/or read information therefrom via the vehicle data communications bus and related methods.

This and other objects, features, and advantages in accordance with the present invention are provided by a multi-vehicle compatible tracking unit for a vehicle comprising a vehicle data bus extending throughout the vehicle. The multi-vehicle compatible tracking unit may include a vehicle position determining device, a wireless communications device, and a multi-vehicle compatible controller for cooperating with the vehicle position determining device and the wireless communications device to send vehicle position information. The multi-vehicle compatible controller may be coupled to the vehicle data bus for communication therewith at least one vehicle device. The at least one vehicle device may use at least one corresponding vehicle device code from among a plurality thereof for different vehicles. The tracking unit may also include a downloading interface for permitting downloading of enabling data related to the at least one corresponding vehicle device code for use by the multi-vehicle compatible controller. Accordingly, the multi-vehicle compatible

tracking unit may be used to control operable vehicle devices, and/or read information therefrom via the vehicle data communications bus.

The downloading interface may comprise either a wired or wireless signal downloading interface. The wired signal downloading interface may comprise a connector for temporary connection to a downloading device, for example. The wireless signal downloading interface may include a wireless receiver for temporary connection to a downloading device. The wireless signal downloading interface may also be in the form of a connection to the wireless communications device used for sending position information. The downloading interface may also be for permitting downloading of at least one programming instruction for the multi-vehicle compatible controller, in some embodiments.

The corresponding at least one vehicle code may be for reading from the at least one vehicle device, and/or for writing to the at least one vehicle device. Further, the multi-vehicle compatible tracking unit may comprise a remote transmitter. At least one vehicle remote control function responsive to the remote transmitter may be performed by the multi-vehicle compatible controller. For example, the at least one vehicle remote control function may include at least one of a vehicle security function, a remote keyless entry function, and a remote engine starting function. Also, the wireless position determining device may comprise a Global Positioning System (GPS) receiver. A tracking unit may also include a common housing for its various components.

A method aspect is for using a multi-vehicle compatible tracking unit for a vehicle comprising a vehicle data bus extending throughout the vehicle. The multi-vehicle compatible tracking unit may include a vehicle position determining device, a wireless communications device, and a multi-vehicle compatible controller for cooperating with the vehicle position determining device and the wireless communications device to send vehicle position information. The multi-vehicle compatible controller may be coupled to the vehicle data bus for connection thereover with at least one vehicle device using at least one corresponding vehicle device code from among a plurality of thereof for different vehicles. The method may include downloading the enabling data related to at least one corresponding vehicle device code for use by the multi-vehicle compatible controller via a downloading interface.

BRIEF DESCRIPTION OF THE DRAWINGS

FIG. **1** is a simplified block diagram of a vehicle tracking system in accordance with the present invention.

FIG. **2** is a more detailed block diagram of the vehicle tracking unit as shown in FIG. **1**.

FIG. **3** is a more detailed block diagram of the monitoring station as shown in FIG. **1**.

FIG. **4** is a flowchart for operation of the vehicle tracking system as shown in FIG. **1** illustrating a vehicle stolen alert.

FIGS. **5A-5C** are a flowchart for operation of the vehicle tracking system as shown in FIG. **1** illustrating a vehicle alarm sounding alert.

FIG. **6** is a flowchart for operation of the vehicle tracking system as shown in FIG. **1** illustrating a vehicle speeding alert.

FIG. **7** is a flowchart for operation of the vehicle tracking system as shown in FIG. **1** illustrating an unauthorized transmitter learned alert.

FIG. **8** is a flowchart for operation of the vehicle tracking system as shown in FIG. **1** illustrating a low battery alert.

FIG. **9** is a flowchart for operation of the vehicle tracking system as shown in FIG. **1** illustrating a GPS or cellular unit failure alert.

FIG. **10** is a simplified block diagram of a multi-vehicle compatible tracking unit in accordance with the invention.

FIG. **11** is a more detailed block diagram of an embodiment of the downloading interface as shown in FIG. **10**.

FIG. **12** is a more detailed block diagram of another embodiment of a downloading interface as shown in FIG. **10**.

FIG. **13** is a more detailed block diagram of yet another embodiment of the downloading interface as shown in FIG. **10**.

FIG. **14** is a flowchart showing a method in accordance with the invention.

FIG. **15** is a flowchart showing another embodiment of a method in accordance with the invention.

DETAILED DESCRIPTION OF THE PREFERRED EMBODIMENTS

The present invention will now be described more fully hereinafter with reference to the accompanying drawings in which preferred embodiments of the invention are shown. This invention may, however, be embodied in many different forms and should not be construed as limited to the illustrated embodiments set forth herein. Rather, these embodiments are provided so that this disclosure will be thorough and complete, and will fully convey the scope of the invention to those skilled in the art. Like numbers refer to like elements throughout, and prime notation and multiple prime notation are used to indicate similar elements in alternate embodiments.

Referring to FIGS. **1-3**, the vehicle tracking system **20** in accordance with the invention is now initially described. The vehicle system **20** illustratively includes a vehicle tracking unit **25** to be mounted in the vehicle **21** and a monitoring station **30** which is remote from the vehicle and which is typically in a fixed location. In the illustrated embodiment, the vehicle tracking unit **25** interfaces with various vehicle devices, such as may include security sensors, door locks, etc. as will be appreciated by those skilled in the art.

The vehicle tracking unit **25** is also illustratively connected to a separate vehicle security system **27** as may already be installed in the vehicle **21**, from the factory or installed as an aftermarket product. Those of skill in the art will appreciate that in some embodiments of the vehicle tracking system **20** a separate vehicle security system **27** may not be needed, and/or various features thereof can be readily incorporated in the vehicle tracking unit **25**.

The monitoring station **30** may typically service a number of subscribers **31**. As shown perhaps best in FIG. **3**, the monitoring station **30** may include a user interface, such as the schematically illustrated telephone network interface **33** and the internet interface **34** which are schematically coupled to a telephone **35**, and a computer **36**, respectively. Of course in other embodiments, other interfaces may be used and only one of the illustrated interfaces may be needed. Those of skill in the art will also recognize that messages may be sent to a subscriber or user via preprogrammed voice messages, e-mail messages, facsimile messages, pager alerts, etc. In addition commands or instructions from the subscriber can also be input to the monitoring station **30** via the telephone network interface **33** and/or the internet interface **34**, from the subscribers telephone **35** or computer **36**.

The monitoring station **30** is illustratively connected to a cellular telephone tower **32** which, in turn, may communicate with the vehicle tracking unit **25** in some embodiments. Of course, in other embodiments other communications

approaches are also contemplated, such as, for example, including satellite communications.

The monitoring station **30** may typically include the necessary modems, and other communications electronics, and computers for its functions which are described in greater detail below. The configuration of such components and their details will be readily apparent to those skilled in the art. Accordingly, no further discussion of these details is needed.

Referring now more specifically to FIG. **2**, additional details of the vehicle tracking unit **25** and devices at the vehicle are now further described. The vehicle tracking unit **25** illustratively includes a controller **40**, a vehicle position determining device **42**, and a wireless communications device **44** connected together. The vehicle position determining device **42** may be provided by a GPS receiver, for example. The GPS receiver typically operates by receiving multiple signals from spaced apart satellites **38** as will be appreciated by those skilled in the art.

In other embodiments, the vehicle position determining device **42** may be provided based upon communications with the cellular telephone network, or based upon other satellite transmissions, for example. As a particular example, time of arrival techniques are available based upon multiple reception paths to determine position via the cellular telephone network as will be appreciated by those skilled in the art. The vehicle position determining device **42** also illustratively includes an indicator **43** associated therewith, such as for indicating an operating mode, or proper operation of the device as will be addressed in greater detail below.

The wireless communications device **44** may be provided by a cellular telephone transceiver configured to operate on a control channel of the cellular network. Such a control channel may provide nearly universal coverage for the tracking system **20** as will be appreciated by those skilled in the art. In addition, the control channel may offer relatively inexpensive communications between the monitoring station **30** and the vehicle tracking unit **25** as will be appreciated by those skilled in the art. The wireless communications device **44** also illustratively includes an optional status indicator **45** with a similar function as the indicator **43** for the vehicle position determining device.

The wireless communications device **44** in other embodiments, may transmit in the voiceband of the cellular network. Alternately, the wireless communications device may communicate over other networks, such as over satellite, or via wireless internet services, as will be appreciated by those skilled in the art.

The controller **40** illustratively includes a central processing unit (CPU) **50** or other logic circuitry which is connected to a clock signal generator **51** and a memory **52**. In other embodiments, the memory **52** may be an embedded memory in the CPU **50**. The controller **40** also includes schematically illustrated input/output circuitry **53** to interface with various vehicle devices. In particular the input/output circuitry **53** may provide dual polarity compatibility for one or more inputs or outputs as will be described in greater detail below. One or more of the terminals of the input/output circuitry **53** may also provide both input and output functions as will also be described in greater detail below. This may significantly simplify and accelerate installation of the vehicle tracking unit **25** in the vehicle **21**.

Also illustratively shown as part of the vehicle tracking unit **25** are a back-up battery **54**, and switch **55** connected thereto for selectively powering certain of the components based upon the controller **40**. Of course, the vehicle **21** also includes an electrical system including the vehicle battery **61**. Powering of the vehicle tracking unit **25** is described in greater detail below.

The vehicle **21** also includes a number of other components that may relate to vehicle tracking, security, and/or convenience features provided by the vehicle tracking system **20**. For example, the vehicle **21** may include one or more door lock actuators **62**, an optional remote starting device **63**, a starter interrupt device **66** and an alarm indicator **67**. For example, the alarm indicator may be provided by a vehicle horn or vehicle siren, and/or flashing of the lights.

The optional separate security system **27** illustratively includes a vehicle security controller **28** and a receiver **29** connected thereto. As is conventional, the vehicle security system **27** may be switched between armed and disarmed modes, for example, by one or more uniquely coded remote transmitters **60**. The vehicle security controller **28** may also be capable of learning a new uniquely coded remote transmitter **60** as will be appreciated by those skilled in the art. The vehicle security controller **28** also illustratively is connected to the starter interrupt device **66** and the alarm indicator **67**.

For ease of explanation, a number of the features of the vehicle tracking system **20** are now described. The vehicle tracking system **20** includes a number of features that may simplify installation and maintenance. For example, as shown in FIG. **2**, the vehicle tracking unit **25** may have a test switch **71** connected to the controller **40**.

In normal operation, the controller **40** may be called upon to operate at least one vehicle device. Of course, the controller **40** also cooperates with the wireless communications device **44** and the vehicle position determining device **42** to determine and send vehicle position information to the monitoring station **30**. Moreover, the controller **40** may be switchable to a test mode for test operation of the at least one vehicle device responsive to activation of the test switch **71**.

In some embodiments, the at least one vehicle device may be a plurality of vehicle devices that are tested by operation in sequence. For example, the at least one vehicle device may comprise at least one door lock actuator **62**. The at least one vehicle device may also comprise the starter interrupt device **66**, or the engine remote starter **63** if remote starting is an implemented feature. The at least one vehicle device which is tested, may also be the alarm indicator **67**. Accordingly, an installer, for example, can quickly check that the tracking unit has been properly installed.

To further provide for ready determination of proper operation of the vehicle tracking unit **25**, one or both of the position determining and wireless communications devices **42**, **44** may include associated indicators **43**, **45** as mentioned briefly above, and which provide an indication relating to proper operation. Each indicator **43**, **45** may indicate a mode of operation of the device, its proper operation, or a partial or complete failure of the device.

Another aspect of the invention is that the controller **40** may provide a selectable polarity for the at least one vehicle device based upon sensing thereof. Accordingly, a predetermined activation of the test switch **71** may cause the controller **40** to sense and select the proper polarity. Pressing the test switch **71** for a predetermined time or in a predetermined pattern may sense and set the polarity.

Another feature of the vehicle tracking unit **25** and vehicle tracking system **20** relates to conservation of the number of codes or messages that need to be sent to the vehicle tracking unit. In particular, the controller **40** may have a plurality of different controller states and respond differently to a same message from the monitoring station **30** at different times depending upon the controller state at a given time. Accord-

ingly, a number of codes or messages used by the system can be conserved. Various messages are described in greater detail below.

A controller state may change based upon several different occurrences or events. For example the controller may change states in response to a change in at least one vehicle device, or based upon a message received by the wireless communications device **44** from the monitoring station **30**, and/or based upon elapsed time. The controller states, for example, may include an alert sent state based upon an alert message being sent from the wireless communications device **44**. Thereafter, receipt of a predetermined message by the wireless communications device **44** when the controller **40** is in the alert sent state may confirm receipt of the alert message by the monitoring station.

Receipt of the predetermined message by the wireless communications device **44** when the controller **40** is in another state different than the alert sent state may thus cause a different response by the controller. The alert sent state may comprise at least one of a vehicle stolen alert sent state, a vehicle alarm sounding alert sent state, a vehicle speeding alert sent state, an unauthorized remote transmitter alert sent state, a low vehicle battery alert sent state, and a device malfunction alert sent state. The various alert messages and confirmation thereof are described in greater detail below.

The code or message conservation aspects of the vehicle tracking system **20** also permit sending a sequence of codes or messages within a predetermined time to also cause a different response at the vehicle tracking unit **25**. In other words, the plurality of controller states may comprise a received first message state based upon a first message being received by the wireless communications device **44** from the monitoring station **30**. Receipt of a second message by the wireless communications device **44** when the controller **40** is in the received first message state, such as within a predetermined time window, for example, may thus cause a different response by the controller than does receipt of the second message when the controller is in another state than the received first message state.

The plurality of controller states may comprise a vehicle finder state sounding an audible signal via the alarm indicator **67** at the vehicle **21**. In this state the controller **40** would bypass sending a vehicle alarm sounding alert to the monitoring station **30**.

Another aspect of the vehicle tracking system **20** is the provision of certain power conservation and management techniques, such as to permit extended periods where the vehicle **21** is not in operation. During such extended periods, the vehicle battery **61** provides power to the vehicle tracking unit **25** as well as other vehicle devices. Accordingly, the voltage of the vehicle battery **61** drops over time. The vehicle tracking unit **25** may provide a significant drain on the vehicle battery **61** because of the power consumed by the wireless communications device **44** during transmission as will be appreciated by those skilled in the art.

The vehicle position determining device **42**, the wireless communications device **44** and the controller **40** may be considered as defining a power load of the vehicle tracking unit **25**. The controller **40** may operate the schematically illustrated power switch **55** to isolate the back-up battery **54** from the power load as a voltage of the vehicle battery **61** drops until reaching a threshold. After or below the threshold the controller **40** may cause the back-up battery **54** to selectively power only a first portion of the power load while a second portion of the power load remains powered by the vehicle battery.

For example, the wireless communications device **44** may have a higher operating voltage than the vehicle position determining device **42**. The first portion of the power load that is selectively powered despite the low vehicle battery voltage may thus be the wireless communications device **44**. In particular, the wireless communications device **44** may be powered for transmission. Accordingly, the back-up battery **54** can be saved for limited communication using the higher voltage wireless communications device **44**. This provides useful features even after an extended period during which the vehicle **21** is left unattended and the vehicle battery **61** gradually discharges.

To further conserve power, the controller **40** may reduce operation of the power load as vehicle battery voltage falls. Conversely, the controller **40** may restore operation of the power load based upon the voltage of the vehicle battery **61** rising again, such as upon being recharged.

Also relating to power consumption, the controller **40** further causes transmission of a low vehicle battery voltage alert to the monitoring station **30** based upon the voltage of the vehicle battery **61** falling below the threshold. The user or subscriber may cause the monitoring station **30** to issue a remote start command. The controller **40** may then generate a remote start output to the remote start device **63** to thereby start the engine and recharge the vehicle battery.

Another feature of the vehicle tracking system **20** is that the vehicle tracking unit **25** may be readily installed and connected to a vehicle **21**, such as in the illustrated embodiment where the vehicle includes a starter interrupt device **66** and a separate vehicle security controller **28**. More particularly, the controller **40** may switch between an armed mode and a disarmed mode based upon operation of the engine starter interrupt device **66**. The controller **40** when in the armed mode may cooperate with the wireless communications device **44** to send an alert message to the monitoring station **30** and including vehicle position information, for example, based upon the vehicle position determining device **42**. The controller **40** is also for selectively operating the engine starter interrupt device **66** to provide additional security features.

In one advantageous embodiment, the controller **40** preferably comprises a combination input and output terminal for connection to the engine starter interrupt device. This terminal is at the input/output circuitry **53** and is schematically illustrated by reference numeral **72**. The controller **40** may switch to the armed mode when in the disarmed mode and based upon the engine starter interrupt device **66** being operated to disable engine starting. Conversely, the controller **40** may switch to the disarmed mode based upon the engine starter interrupt device **66** being operated to enable engine starting. In other words, the vehicle tracking unit **25** can piggyback its arming and disarming off the existing vehicle security system **27**, for example.

The controller **40** may also selectively operate the engine starter interrupt device **66** based upon a command message from the monitoring station **30**. The controller **40** may selectively operate the engine starter interrupt device **66** based upon a command message from the monitoring station **30**. Alternately, or in addition thereto, the controller **40** may selectively operate the engine starter interrupt device **66** based upon the ignition switch **65**.

The following descriptive portions relate to various user or subscriber notifications and features provided by the vehicle tracking system **20**. Of course, the controller **40** preferably cooperates with the wireless communications device **44** to send an alert message. The monitoring station **30** may comprise a user interface, such as one or both of the telephone

network or internet interfaces **33**, **34**, respectively (FIG. **3**), for generating a sequence of alert message notifications based upon receiving the alert message sent from the vehicle tracking unit **25**. More particularly, the monitoring station interface permits canceling any remaining alert message notification based upon a cancellation command response from a user or subscriber having already received the alert message notification. The user may send the cancellation response via the telephone **35** or computer **36** (FIG. **3**), for example. Thus, if the user may be reached at different telephone numbers or different users are desirably notified of the alert, this aspect of the vehicle tracking system **20** can make the notifications efficiently and without making unnecessary notifications.

The vehicle tracking system **20** may provide any of a number of very useful alerts, as discussed herein. For example, the alert message sent from the vehicle tracking unit may comprise at least one of a vehicle stolen alert message, and a vehicle alarm sounding alert message. The alert message may be one of a vehicle speeding alert message, and a vehicle acceleration alert message. In addition, the alert message may comprise an unauthorized remote transmitter alert message. Also, the alert message may be at least one of a low vehicle battery alert message, and a device malfunction alert message.

The speeding alert may be based upon exceeding a speed threshold for greater than a certain time, which may be user selectable. The acceleration alert may also be useful as such is also indicative of aggressive driving along with the speeding alert. The unauthorized remote transmitter alert increases overall security since a user will be notified if a would-be thief learns an unauthorized transmitter to operate the controller. These alerts are described in greater detail below.

The vehicle tracking system **20** may be implemented as a service to a subscriber. In other words, the subscriber pays a monthly fee for the service. Accordingly, it may be important to encourage a user to register. Similar subscriber or registrations systems in the past have suffered revenue losses since some users would wait to activate the system until the vehicle was stolen. In other words, the user would only subscribe or register and pay a single month's fee.

In accordance with this aspect of the vehicle tracking system **20** prompt user registration is encouraged. In particular, the vehicle tracking unit **25** may include the user registration reminder indicator **56** and the controller **40** may be switchable from an unregistered mode to a registered mode. In the registered mode, the controller **40** may cooperate with the wireless communications device **44** and the vehicle position determining device **42** to determine and send vehicle position information to the monitoring station **30**. In the unregistered mode, the controller **40** may activate the user registration reminder indicator **56** to encourage registration by the user.

The controller **40** may be switchable to the registered mode based upon an activation message from the monitoring station **30**. For example, when the registration payment has been received, the monitoring station can send one or more messages to the vehicle tracking unit **25** to stop activation of the registration reminder indicator **56**. The indicator **56** may be audible, visual or both. For example, the registration reminder indicator **56** could be a beeping sound generated by a small piezoelectric transducer every ten minutes or so when the ignition **65** is on.

In other words, the user registration reminder indicator **56** may provide a minor but irritating annoyance to the user to encourage registration. Upon successfully registering, the annoyance is abated. Accordingly, a relatively straightforward approach is provided to encourage user registration.

Along these lines, the controller **40** when in the unregistered mode may have reduced features compared to the registered mode. For example, the controller **40** when in the unregistered mode may be restricted or limited in sending messages with the wireless communications device **44**. Accordingly, usage of the wireless communications network may be reduced. Transmissions from the vehicle tracking unit **25** may also be beneficially suppressed during original installation, for example.

Returning again to features of the vehicle tracking unit **25** which facilitate installation, the controller **40** may send an alarm indication alert responsive to a continuous activation of the alarm indicator **67** for greater than a predetermined time. Alternately, or in addition thereto, the controller **40** may send an alarm indication alert responsive to a repetitive pattern of alarm indicator **67** activations. In other words, the controller may be configured to distinguish between normal operation of a vehicle horn by the driver, and activation of the horn by the security system **27**. As mentioned above, the controller **40** may also monitor signals of at least one of a first and second polarity. The controller **40** thus advantageously piggybacks off the alarm indication generated by the vehicle security system **27** to determine and send a vehicle alarm sounding alert to the monitoring station **30**.

In one variation, the controller **40** may monitor signals delivered directly to the vehicle alarm indicator by the vehicle security controller **28**. In another variation, the controller **40** monitors signals of voltage dips of the vehicle battery **61**. Circuitry is conventionally and readily available for both such functions, as will be readily appreciated by those skilled in the art.

The controller **40** may also include a dual polarity compatible output in the input/output circuitry **53** for a vehicle device, such as the vehicle alarm indicator **67**. The controller **40** may further monitor signals relating to activation of the vehicle alarm indicator **67** and send an alarm indication alert with position information from the vehicle position determining device and using the wireless communication device.

For the dual polarity output compatibility, the controller **40** may generate a first polarity output pulse followed by a second polarity output pulse. The controller **40** may also generate a repeating pattern of a first polarity output pulse followed by a second polarity output pulse on the dual polarity compatible output. In yet other embodiments, the controller **40** may sense an actual polarity of the device and thereafter use the actual polarity for the dual polarity compatible output.

Where the vehicle device is a vehicle horn, the controller **40** may typically be configured to generate a negative polarity output on the dual polarity compatible output. Conversely, wherein the vehicle device is a vehicle alarm indicator siren, the controller **40** may be configured to generate a positive polarity output on the dual polarity compatible output.

Another aspect of the vehicle tracking system **20** relates to conserving memory space and/or reducing transmission time over the communications network. In accordance with this advantageous feature, the controller **40** may determine the vehicle position information including a vehicle location and an associated stationary period for each occurrence of the vehicle remaining stationary for greater than a predetermined period. In one embodiment, the controller **40** may cooperate with the wireless transmission device **44** to send the vehicle position information to the monitoring station based upon each occurrence of the vehicle remaining stationary for greater than the predetermined period. In this embodiment, the monitoring station **30** may associate a time with each occurrence of the vehicle remaining stationary for greater

than the predetermined period. In other words, the monitoring station **30** may time stamp the received information.

In another embodiment, the controller **40** cooperates with the wireless transmission device **44** to send the vehicle position information to the monitoring station **30** for a plurality of occurrences of the vehicle remaining stationary for greater than the predetermined period. In this embodiment, the controller **40** may associate a time with each occurrence of the vehicle remaining stationary for greater than the predetermined period. In other words, the controller time stamps the position and stationary period information.

As an example, the predetermined time which determines whether the vehicle **21** is stationary and the position should be determined, may be less than about three minutes. This time may filter out vehicle stops in normal traffic, but which will keep track of stops where the driver likely leaves the vehicle **21**. Accordingly, only the important information necessary to track the vehicle need be stored and/or transmitted thereby reducing the system costs. If the vehicle **21** is stationary overnight, for example, unnecessary position information need not be determined, stored, and/or transmitted to the monitoring station **30**.

The controller **40** may comprise the memory **52** for storing the vehicle position information therein. In one configuration, the controller **40** downloads the vehicle position information from the memory **52** to the monitoring station **30** based upon a predetermined schedule. In another configuration, the controller **40** downloads the vehicle position information from the memory **52** to the monitoring station **30** based upon a predetermined event. In yet another configuration, the controller **40** downloads the vehicle position information from the memory **52** to the monitoring station **30** based upon a predetermined percentage of memory usage.

Having now described certain general features and advantages of the vehicle tracking system **20**, this description now turns to additional specific details which are provided as examples. In particular, vehicle tracking system **20** preferably implements one or more of the following features:

a. Detects the vehicle being stolen and transmits a signal to the monitoring station to contact up to 3 people, for example, predetermined by the user, of theft of the vehicle and then starts tracking the vehicle. The contact may be by one or more of the following: an e-mail message, a pager alert, a cellular telephone call, or other telephone call.

b. Detects an optional vehicle security or alarm system activation and transmits a signal to the monitoring station to contact up to 3 predetermined people to inform them the vehicle's alarm is being activated.

c. Detects an optional vehicle alarm system's remote PANIC activation and transmits a signal to the monitoring station to contact up to 3 predetermined people to inform them of the vehicle's PANIC being activated.

d. Detects a vehicle being programmed to operate from an unauthorized remote transmitter, key transponder, other transponder, or other device that has a unique coding, and the vehicle unit transmits a signal to the monitoring station to contact up to 3 predetermined people to inform them of this occurrence. The system can also make available information relating to a number of such coded devices, or a change therein, or when a change occurred. A message can be sent to the user or the information can be available to the user on the website. The vehicle would be equipped with a security system as disclosed in U.S. Pat. No. 5,654,688, for example, which determines an unauthorized transmitter and provides an alert feature. This patent is incorporated herein in its entirety by reference.

e. Detects the vehicle traveling over a predetermined speed, such as for a predetermined time, and transmits a signal to the monitoring station to send a message, such as an e-mail informing the user (and/or others) of this occurrence. Of course, the message could also be sent via a telephone call or page, should additional urgency be required. The vehicle's predetermined maximum speed limit and duration thereof can be selected by the user.

f. Detects a low battery voltage such as for a predetermined time and transmits a signal to the monitoring station to contact up to 3 predetermined people to inform them of vehicle's low battery voltage. This is especially advantageous during winter so that the vehicle could be started, for example, to prevent a problem before it happens. The time setting is preferably selectable by the user.

g. Detects the vehicle not moving for a predetermined time and transmits a signal to the monitoring station to send, for example, a nightly e-mail informing the user of all the vehicle's location and stationary time occurrences. The stationary time length is also selectable. This may be advantageous to encourage patrolling personnel not to remain for a long time in a same location.

h. The vehicle unit preferably includes a back-up battery system making it more reliable.

The vehicle unit may be relatively inexpensive. In addition, the monitoring fee that includes sending up to 60 e-mails and making up to 6 phone calls per month, may also be relatively low. The relatively low monitoring fee is based, at least in part, on the current relatively low rates charged for use of the control channel of the cellular telephone network. It is also noted that access to the control channel provides coverage for almost the entire U.S., for example.

The user or subscriber also preferably has access to an Internet site that will display a map and silently contact the vehicle to acquire its current location, speed, direction of travel, and previous multiple locations with speeds, for example, the user's personal identification number (PIN) can be quickly activated by a telephone call. No additional installation may be required.

Certain annual pre-pay package arrangements may be available. For example, up to 10 access entries per month can be provided on a low monthly billing. Up to 30 access entries could be provided also for a relatively low monthly fee.

The present invention provides a number of other significant advantages including optional access from any phone or from any computer to access the monitoring station internet site. The user may control various vehicle functions remotely via the telephone or the internet site. The only charge may be for additional equipment and installation.

Additional features can also be included with the system and subscribed to by the user in accordance with the invention. For example, these include Hijack, Car Finding, Unlock Doors and Unauthorized Transmitter Alert Features. The equipment and installation is relatively inexpensive. For the hijack feature: from any phone or computer, the user may activate vehicle starter interrupt and sound the horn until the vehicle is retrieved (Command 4).

For the Car Finding feature: from any phone or computer, the user may activate the vehicle's horn, or siren and sound same for 30 seconds. This allows the user to find his vehicle in a crowded parking lot (Command 5).

For the Lock/Unlock vehicle doors feature: from any phone or computer a predetermined command (Command 7)

activates unlocking of vehicle doors to retrieve keys, for example, that may have been accidentally locked inside the vehicle. Of course, the system can also be used to lock vehicle doors if this was forgotten (Command 6). The unauthorized transmitter alert feature is similarly selected as described above.

In addition, a remote vehicle start feature may also be provided, such as to start the vehicle's engine to heat or cool the vehicle prior to entry. The equipment and installation for remote starting may be relatively low. Some further details of a specific embodiment of the vehicle tracking unit **25** are provided below as relating to use of red and green LED indicators as may be coupled to the controller **40** and operated thereby. Also various representative wires, designated by color, are provided as an example embodiment.

The red LED verifies the GPS receiving signal. With a yellow wire having positive 12 volts, the red LED blinking indicates searching GPS location, constant indicates found location, and off indicates no GPS signal found. With the yellow wire not having positive 12 volts, if the red LED is off, the LED is not functioning.

The green LED verifies receiving the cell tower signal. With the yellow wire having positive 12 volts, blinking indicates the cell control channel signal is detected, constant indicates sending a micro burst signal (LED stays on 5 seconds after each transmission), and off indicates no cell tower signal received. With the yellow wire not having positive 12 volts, off indicates the green LED is not functioning.

An example of representative DIP switch feature selection is as follows. A first switch may be used for adding the orange wire for controlling arm/disarming of the system. When on, the orange wire controls arm/disarm as follows: to arm, the orange wire is grounded and the yellow wire does not have 12 volts positive. To disarm, the orange wire is not grounded. When the first switch is off, then only the yellow wire controls arm/disarm as follows: to arm, the yellow wire is without 12 volts positive, and 30 seconds after continued arm mode then the orange wire activates a constant 500 ma grounded output to operate an external starter interrupt relay until the system is disarmed. To disarm, the yellow wire is connected to 12 volts positive.

A main 5-pin plug may be provided on the vehicle unit and connected as follows:

a. The Red Wire is connected to the 12 vdc power. An alert warning "E" is given if the system is armed and the battery voltage becomes lower than 11 volts for longer than ## minutes. This alert feature "E" will not operate again until the voltage is above 12 volts to re-set this feature.

b. The black wire is connected to ground.

c. The yellow wire is connected to the ignition 12 volts so that if the key is on, 12 volts is supplied thereto and if the key is off, the yellow wire is connected to ground. Further: if the system is in an armed mode and the Lat/Long changes, then Alert "A" is given. If the system is disarmed and within 2.5 seconds after the yellow wire receives 12 volts and the gray wire detects 3 or more positive pulses the system activates Alert "D". If the first DIP switch is in the off position then: if 12 volts is on yellow wire, the system is disarmed and the orange wire discontinues from the 500 ma ground, and if the yellow wire sees ground or neutral, then the system is armed and 30 seconds after the continued arm mode the orange wire activates a constant 500 ma grounded output to operate an external starter interrupt relay until the system is disarmed.

d. The gray wire is for input and output, and can be connected to an alarm siren or horn positive terminal. In addition:

i. With the system armed and if the gray wire detects +12 v pulsing on/off or on constant for more than 10 seconds from an alarm siren or horn honking activation, then alert warning "T" alarm activation is given.

ii. With system disarmed and if the gray wire detects +12 v pulsing on/off or on constant for more than 10 seconds from an alarm siren or horn honking activation, then alert warning "C" panic activation is given.

iii. With system disarmed and if the Gray wire detects 3 or more 12 volt positive pulses within 2.5 seconds of yellow wire receiving +12 v and the gray wire by-pass not being activated, then alert warning "D" is given.

iv. The gray wire bypass operates as follows:

1. After alert warning "B" bypass all future alert "B" signals until system is disarmed.

2. After alert warning "C" bypass all future alert "C" signals until system is armed.

3. After alert warning "D" bypass all future alert "D" signals until no 12 volt pulses are detected on the gray wire within 3 seconds of the yellow wire having 12 volts.

v. With the system armed or disarmed. The Output: Internal +12 v, 1 amp transistor with pulses 1 second on and 1 seconds off to activate siren or honk car horn or flashing light relay.

1. Non-stop activation from (Command "4")

2. 30-second activation from (Command "5")

vi. Turn off the above alert "A" from (Command "1").

i. The orange wire is for the starter interrupt and arm/disarm system, and operates as follows:

i. If first DIP switch is in the:

1. On position and: the orange wire has 12 volts or neutral, the system switches to the disarmed mode; the orange wire is grounded, then the system is switched to the armed mode; and the starter interrupt output will not automatically operate. It can only be activated from "Command 4"

2. Off position and the orange wire does not effect the arming or disarming of the system; 30 seconds after system arms the orange wire will automatically activate constant 500 ma ground until the system is disarmed. And from "command #4", Connect to Starter interrupt relay output.

ii. Command 4 activates Orange wire to have 500 ma. negative until Command 1 is received.

iii. After alert warning "B" is activated the first time it is thereafter bypassed while the orange wire remains grounded. Alert warning "B" is re-set to operate again 3 seconds after orange wire becomes ungrounded.

The vehicle unit may also include a Door Lock Plug configured as follows, for example. A green wire provides a 250 ma. negative 1 second pulse for Lock Doors. (Command "6"). A red wire provides a constant 12 v output from the red power wire. A blue wire provides a 250 ma., negative 1 second pulse for Unlock Doors (Command "7"). A pink wire provides a 250 ma., negative 1 second pulse for remote Car Starter (Command "2").

An installation test button may also be provided to work as follows. Pressing the button activates the orange wire for 10-seconds (starter interrupt), with these circuits in sequence. First, it activates the gray wire for 1-second (siren/horn). After the first stops, it activates the green wire for 1 second to lock the doors. After the second stops, it activates the blue

wire for 1 second to unlock the doors. After the third stops, it activates the pink wire for 1 second to activate an optional item.

Representative warning alerts are as follows:

a. Alert Warning "A" (FIG. **4**): Automatic activation of "Command 8" and the vehicle unit contacts monitoring station to instantly call 3 phone numbers with the message "Your vehicle is stolen please confirm then call 911 to advise police of website and your pin # so police can locate the vehicle". This is detected with the system armed and the GPS indicating movement. Bypasses all future alert warning "A" signals until the system is re-armed.

b. Alert Warning "B" (FIGS. **5A-5C**): the vehicle unit contacts the monitoring station to instantly call 3 phone numbers with the following message "Vehicle alarm activated please confirm". This is with the system armed and detecting gray wire having 12 volts pulsing or on constant for longer than 10-seconds. After alert warning "B" is activated the first time, it is thereafter bypassed while the orange wire remains grounded. Alert warning "B" is re-set to operate again 3 seconds after orange wire becomes ungrounded.

c. Alert Warning "C" (FIG. **6**): the vehicle unit contacts the monitoring station to instantly send e-mail message "vehicle was traveling faster than your preset amount of "###" and time limit of "##" seconds. Indicates the vehicle speed and location that the speeding started and how long speeding accrued" (Detected from GPS). This aspect is further understood with reference to the enclosed flowchart **84** of FIG. **6**.

d. Alert Warning "D" (FIG. **7**): the vehicle unit contacts the monitoring station to instantly call 3 phone numbers with the message "Unauthorized remote transmitter was just programmed to operate your vehicle." This is with the system disarmed and the Gray wire detecting three or more 12 volt pulses within 2.5 seconds of the yellow wire having seen 12 volts positive. All future alerts "D" are bypassed until no 12 volt pulses are detected on the gray wire within 3 seconds of the yellow wire seeing 12 volts. This aspect is further understood with reference to the enclosed flowchart **85** of FIG. **7**.

e. Alert Warning "E" (FIG. **8**): the vehicle unit contacts the monitoring station to instantly call 3 phone numbers with the message "Vehicle has low battery voltage and system has changed to low voltage mode". This is with the system armed and detecting the red wire with lower than 11 volts for ## minutes. All future alerts "E" are bypassed until, first, more than 13.5 volts are detected on the red wire and, second, after the yellow wire stops having positive voltage the red wire then must detect more than 12 volts.

The following are representative commands for use in the system:

Command 1: Reset all circuits and system remains asleep until the ignition key is turned on. Resets the triggered mode and unit is asleep to prevent power drain on vehicle battery.

Command 2: (Accessory activation) monitoring station Command to the system to activate Pink wire to pulse 250 ma negative for 1 second.

Command 3: (Vehicle Location) website to indicate present location and past events in memory.

Command 4: (Hijack or Stolen) monitoring station Command to vehicle system to activate:

iv. Gray wire to pulse 1 sec on/1 sec off with 1 amp positive output and which continues until receive command # 1.

v. Orange wire to have 500 ma ground and which continues until receive command # 1.

Command 5: (Car Find) monitoring station Command to system activating Gray wire for 30 seconds pulsing 1 sec on/1 sec off with 1 amp positive output.

Command 6: (Lock Doors) monitoring station Command to system activating Green wire to pulse 1 second with 250 ma negative.

Command 7: (Unlock Doors) monitoring station Command to system to activate Blue wire to pulse 1 second with 250 ma negative.

Command 8: (Start Constant Vehicle Tracking) sends previous 2 events in memory and then every 120 seconds get update of location information sent to the Web site.

The system is also operable in a battery saver mode which operates as follows:

i. With the ignition key off, if the battery voltage drops below 11.5 volts for more than 5 seconds, the GPS verification wakes up to look:

ii. Once instantly.

iii. Once in 1 hour if at the same location.

iv. Once in 6 hours if at the same location.

v. Once in 12 hours if at the same location.

vi. Once every 24 hours if at the same location.

vii. Activate alert "E" when the battery saver mode is activated, and bypass sending all future Alert "E" until the battery voltage goes above 13 volts for 10 minutes to reset this feature.

Another aspect of the invention relates to automatic vehicle alert e-mails sent containing some or all of the previous system events. This sending can be triggered as follows:

a. At a user selected predetermined time ## (01-24) of each day, or

b. At a predetermined memory fill level, such as full or near full.

In addition, each system event may contain one or more of the following:

a. Vehicle Location

b. Vehicle total time at location

c. Time of day

d. Mph traveling

e. Total time traveling above MPH

f. Direction traveling

g. Delta

h. Special Alert messages, if any, including:

i. GPS signal not received for longer than 5 minutes.

ii) Traveling above ###MPH for ## minutes.

iii) Vehicle is stolen.

iv) Alarm activated.

v) Unauthorized remote transmitter alert.

vi) Battery saver mode activated

vii) Command 1: Reset all circuits and system remains asleep until the ignition key is turned on.

viii) Command 2: (Accessory activation)

ix) Command 3: (Vehicle Location was retrieved)

x) Command 4: (Hijack or Stolen mode activated)

xi) Command 5: (Car Find mode activated)

xii) Command 6: (Locked Doors)

xiii) Command 7: (Unlocked Doors)

xiv) Command 8: (Started 2-second incremental Vehicle Tracking)

Another feature of the invention relates to the selectable threshold conditions causing an event to be recorded into the memory of the vehicle unit. For example, this may include: while the yellow wire has 12 volts, record events every "?" default 15 minutes time if the GPS location has changed. If the GPS location is the same then only update stationary total

time. If the GPS antenna is not receiving any signal then enter last known GPS location and with an indication that this was the last known GPS location before the GPS signal stopped, how long no GPS signal was received, and the GPS location in the on-hold file, when the vehicle is traveling above ### MPH for ##-minutes.

The monitoring station may also provide a number of automated phone calls as described above. These may include:

The user's vehicle has issued a stolen alert:

If vehicle is stolen, after receiving the phone message the user then calls 911 to advise police of the theft, and gives the police the website address and an identification number, such as the user's PIN, to allow the police to locate where your vehicle has been, where it is now and keep tracking it until the police can retrieve the vehicle.

If this is a false alert due to vehicle being towed away for service, for example, then the user may press "1" to put the vehicle in an off mode. Once the ignition key is turned on again the system will reset back to its normal operation mode.

The user's vehicle has issued an alarm activated for more than 10 seconds alert. The system will not respond to this alert again until ignition key is turned on again to reset this feature.

The vehicle battery voltage is low or has been disconnected. The tracking system is in low voltage mode. The system will not respond to this alert again until the battery voltage goes above 13 volts for 10 minutes to reset this feature.

The backup battery may be sized according to the GPS receiver and processing power draw. In addition, the battery may also be sized based upon estimated micro burst transmitting power draw. Such transmissions are typically at about 3 watts power to the antenna.

The system according to the invention including the vehicle unit and monitoring station provides a number of significant advantages and features. For example, the police may be directly contacted by the user when the vehicle is stolen. The user receives the telephone message from the monitoring station, and this is done without requiring the intervention of a manual security monitoring operator, such as an ADT operator, for example. In addition, once in the stolen mode, the vehicle unit will periodically continue to send out its location, so that the police may track the vehicle via the WEB, for example. This location sending feature may begin immediately, that is, without requiring the user to contact the vehicle to begin tracking. Having the vehicle contacting the monitoring station is considerably less expensive than other schemes where the vehicle is periodically polled via the cellular network, for example.

The system may also be interfaced to a breath alcohol sensor at the vehicle, for example, and this information recorded in memory. The information could be passed along to the monitoring station, which, in turn, could send out a notification message (e-mail or telephone) that the vehicle is being operated by a driver who may be impaired by alcohol. The vehicle's location could then be tracked to permit the police to detain the driver.

Another aspect of the unit is that it may be able to recognize the desirability to bypass certain security breach triggers or other events. For example, a car finding feature can be provided that will allow the user to sound the horn or siren when near the vehicle to help locate the vehicle, as in a crowded parking area. Without the bypass feature, the unit could recognize the horn or siren as a security breach and transmit such information to the monitoring center. In accordance with this aspect of the invention, the unit would recognize the car finding feature was activated and thereby bypass sending a security breach transmission, for example. Again, false alarms and unneeded usage and expense of the communications infrastructure would be avoided.

Yet another aspect of the invention relates to thwarting a would-be thief who attempts to disable the alarm by cutting the battery cable or power supplied to the system. The unit preferably includes a back-up battery. More particularly, upon being in an armed mode and sensing a breach of security, such as the hood opening, for example, the unit will send out a signal indicating the alarm or security breach and while the alarm is indicated, if the battery is disconnected then the unit will send out a message indicating the vehicle is stolen, and also providing the vehicle's current position. Accordingly, the would-be thief is not able to defeat the security system by quickly disrupting power to the unit during an alarm indication or security breach. Also, to prevent additional alerts, this message is prevented from being transmitted again until the user returns to the vehicle to disarm the system and/or turn on the ignition so that the unit sees a voltage above 13 volts, indicating the vehicle has started using the owner's ignition key. This aspect is further understood with reference to the enclosed flowchart **80** (FIG. **4**).

Still another aspect of the invention relates to how the unit can discriminate between ordinary usage or honking of the horn as compared to a security system triggered alarm. Most vehicle security systems will provide a pattern of horn soundings as an alarm indication, and this can be determined and used to reduce false alarm transmissions from the unit. For example, the unit can look at the number of leading and trailing edges of the power pulse used to sound the horn. A single pressing of the horn switch by the user will cause two edges within a predetermined time, such as about 10 to 12 seconds. Accordingly, the unit can be configured to not send a security breach transmission to the control center based upon detecting two transitions. Since a number of vehicle security systems may have a continuous sounding of the horn within the predetermined time, the unit can send the transmission upon detecting only a single transition.

A number of other vehicle security systems provide a series of pulses or horn soundings within the predetermined time. Accordingly, the unit may also be configured to send a security breach transmission upon detecting greater than a predetermined number of transitions, such as greater than nine, for example. This number is also typically higher than a user would generate honking the horn several times within the predetermined time. In other terms, the number of transitions of the horn pulses can be counted, and if equal to one, or greater than nine, for example, the transmission is triggered, and otherwise the sounding of the horn is ignored. Also, to prevent additional alerts, this message is prevented from being transmitted again until the user returns to the vehicle to disarm the system and/or turn on the ignition so that the unit sees a voltage above 13 volts, indicating the vehicle has started using the owner's ignition key. This aspect is further understood with reference to the enclosed flowcharts **81-83** (FIGS. **5A-5C**).

Yet another feature of the invention relates to a low vehicle battery alert. For example, the unit may monitor the battery voltage over a predetermined time such as ten minutes. The ten minute window prevents false tripping, for example, when the voltage dips during engine cranking. In particular, the voltage can be sensed and it can be determined whether it is greater than zero (e.g. greater than six volts) and less than a high value (e.g. eleven or twelve volts), and, if so, a low battery voltage transmission can be communicated to the monitoring station, and ultimately to the vehicle user when away from the vehicle. If the vehicle is being serviced and the battery is disconnected, this will cause the battery voltage to

be equal to zero. Then, the low battery voltage transmission will not be communicated to the monitoring station. Also, to prevent additional alerts, this message is prevented from being transmitted again until the user returns to the vehicle to disarm the system and/or turn on the ignition so that the unit sees a voltage above 13 volts, indicating the vehicle has started using the owner's ignition key. Again, false triggerings are reduced. This aspect is further understood with reference to the enclosed flowchart **86** (FIG. **8**).

Yet another advantageous feature of some embodiments of the invention relates to the ability to conserve electrical power. More particularly, when the vehicle is stopped and in the armed mode, the GPS receiver may be periodically operated to determine the vehicle position. If the vehicle position changes, this is indicative that the vehicle is being moved or stolen. For example, the GPS receiver may be operated to generate new vehicle position information every 29 seconds. These relatively quick successive position determinations or readings are generally termed hot start. These are relatively less complicated than a cold start position determination which takes longer, since the cold start position determination requires greater time to acquire and receive data from multiple satellites, as will be appreciated by those skilled in the art.

Unfortunately, this relatively high repeated usage of the GPS receiver may cause unnecessary battery drain, especially when the vehicle is left armed and unattended by the user for an extended period. Accordingly, the power conserving feature of the invention permits the GPS receiver to be turned off when the vehicle is in the armed mode, and the GPS receiver is turned on only when needed. For example, a vehicle sensor, such as a shock sensor, motion sensor, ignition sensor, door sensor, or other sensor, or combinations thereof could be used to start the GPS receiver. This sensor could also be used to trigger an alarm if desired; however it need not be so used in all embodiments. The GPS receiver, once turned on, could operate in the normal periodic fashion as described above, or for a fixed period of time. The GPS receiver could also be turned off again after some predetermined time if no further sensor signal is received, or if the position fails to change on subsequent position readings or determinations.

Yet another feature relates to permitting more colorful audible alert messages to be generated for the user. The user can, in some embodiments, access an internet site to type or enter the text for a message to be sent, such as to alert the user that his vehicle is being stolen. The audible message then communicated by a telephone call to the user is generated by a speech message synthesizer based upon the entered text. In accordance with this aspect of the invention, the user could type in phonetically spelled words or phrases, such as to create more colorful messages including slang terms, various accents, and/or to mimic various dialects, for example. The speech synthesizer would then generate the desired message customized for the user. Of course, the system could also permit the user to test or preview the pronunciation generated by the speech message synthesizer based on the entered text message prior to its adoption.

Another aspect relates to requesting GPS position information from a vehicle. If a command is sent downstream to the vehicle requesting that GPS information in turn be sent upstream from the vehicle, and the GPS information is not received within a predetermined time, such as about four minutes, then another command may be sent to the vehicle requesting the GPS information. This may keep repeating until GPS information is received, for a predetermined number of tries, or until a user instructs stopping of the requests. This helps to ensure and confirm the activation and reception of GPS tracking coordinates from the vehicle.

Yet another aspect relates to reducing a frequency with which GPS information is sent from the vehicle. More particularly, the unit may be configured to activate GPS information transmission upstream every 2 minutes. To reduce system usage expense and power consumption at the vehicle, this rate of transmission of GPS information could be progressively decreased over time. For example, in one embodiment, upon activation the GPS location signals could be sent every 2 minutes during the first hour, then once an hour for the next 23 hours, after which only one signal would be sent per day.

Turning now to the flowchart **87** of FIG. **9**, still another aspect relates to warning the user of an inoperable or malfunctioning GPS or cellular telephone section. More particularly, if the GPS or cellular telephone antenna wire is cut or the mounting position of either is changed causing the antenna to stop receiving the signal the user would not ordinarily know of this problem quickly. In accordance with one embodiment, if the ignition is turned on a predetermined number of times, such as about three, and each time ignition turns on if no GPS or no cell signal is received for a minimum time, such as about 15 to 30 minutes or longer, an audible warning beeper may be activated in the vehicle. This beeper may be sounded once every 15-minutes. At anytime if the GPS or cell signal is received properly then the system re-sets automatically stopping the beeper sound.

As an example, if the ignition key is turned on and no GPS or no Cell signal is being received for 15-minutes, and the vehicle ignition stays on for 45-minutes and there is still no GPS or no cell signal, the unit counts one. Thereafter, if the ignition key is turned on and no GPS or no cell signal is being received for 15-minutes, and the vehicle ignition stays on for 60-minutes and there is still no GPS or no cell signal, a second count is determined. Thereafter, if the ignition is turned on and no GPS or no cell signal is received for 10-minutes, and the vehicle ignition stays on for only 10-minutes and there is still no GPS or no cell signal, no count is determined. Thereafter, if the ignition is turned on and no GPS or no cell signal is being received for 15-minutes, a third count is determined and the beeper is activated as described above. This beeping may continue every 15-minutes while the vehicle ignition stays on as long as the vehicle ignition stays on for 16-minutes and still no GPS or no Cell signal is being received. If thereafter, the ignition is turned on and no GPS or no cell signal is being received, the beeper beeps once and again beeps once every 15-minutes while vehicle ignition stays on. If in 10-minutes both GPS or cell signal is being received, the beeper system is turned off and the warning count is reset.

By way of example, if the ignition key is turned on and no GPS or no cell signal is being received for only 5, 10 or 12 minutes (with the threshold set at 15 minutes), then no count is determined.

In certain circumstances, the GPS signal may fail, but the cell signal may still be working. Accordingly, it may be desirable to send an indication of the failure of the GPS signal to the central monitoring station to thereby alert the user as described above. If the cell signal also failed, or if the cell signal failed by itself, in other embodiments a separate paging device would transmit the failure or loss of the cell signal information to the central monitoring station, to thereby alert the user.

Yet another feature is directed to efficient use of a relatively small number of codes available to communicate with the tracking unit from the cellular network and central station,

More particularly, a typical arrangement may provide eight basic codes and two Awildcard@ codes. The two wildcard codes are reserved for future or other uses. A particular tracking device will respond directly to any of the eight basic codes. For example, the doors could be locked or unlocked, a present location downloaded from the vehicle, etc.

In accordance with this feature, the tracking device may respond differently to the same code or command depending upon the state or condition of the tracking device. For example, if an alarm is triggered at the vehicle, it may be desired that the tracking device continue to send the alarm signal until confirmation is received that the central monitoring station has received the alarm signal. This confirmation can be sent using the same code as may provide another function if the device were not indicating an alarm. Any of a number of such tracking device conditions may trigger a different message to be interpreted from the received code. For example, if any of the above Alerts A-E were triggered, the receipt of a predetermined code, such as code eight, would confirm receipt of the alert by the central station, and this receipt of code eight would not cause the other response (no alarm triggered) in the tracking device. Of course this concept can be extended to other features as will be appreciated by those skilled in the art.

In accordance with another feature, the rate of sending the location or position data (or change in position data) from the vehicle may be varied to reduce system usage and thereby reduce expenses. More particularly, in one embodiment, the rate of sending may be based upon how long the vehicle has remained stationary. This time period may be selected by the user. For example, the selected time may be in the range of 15 minutes to six hours. If the vehicle has been stationary for the selected time period, then the rate of transmission may be reduced. This reduces or eliminates the need to send home position data and send all the over 15-minute stops made that day. Otherwise, that is when the vehicle is moving, the device may send data at a faster rate. Of course, a system user would not likely be interested in quick updates, especially where the position information is not changing. Conversely, if the vehicle is being moved, it may be desirable to receive more frequent position updates.

Another variation of this transmission rate conservation feature bases the rate of transmission on the vehicle position. For example, a reduced rate of transmission may be selected if the vehicle is in a predetermined area where the user has a lesser interest in quickly updated position information. The user may also have a reduced interest in an area that can be defined outside of a predetermined distance from a reference point.

Yet another variation of the vehicle position transmission rate conservation feature is based upon the vehicle's speed, such as the vehicle's average or maximum speed, for example. Accordingly, if the vehicle is traveling above a preset speed, the rate of transmission may be increased.

In accordance with another aspect of the invention, the tracking device may send the alert indication a predetermined number of times without receiving an acknowledgment as described above, and then wait until the vehicle position has changed before trying again or the cell re-registers or its RSS (received signal strength) changes. Thus, power is conserved. When the vehicle has moved to a new position, any obstructions may no longer be present thereby increasing the likelihood of a successful communication. In addition, the change in position may be determined when the vehicle is sensed to be moving about a predetermined relatively small speed, such as greater than 1 mph, for example.

In all of the embodiments and variations described herein, the tracking device may communicate with one or more other vehicle devices via a vehicle data communications bus. Further aspects of interfacing with a vehicle data communications bus are described in U.S. Pat. Nos. 5,719,551 and 6,011,460 assigned to the assignee of the present invention, the entire contents of which are incorporated herein by reference.

Yet another aspect relates to efficient use of available codes on the cellular telephone control channel. In one particular example, ten codes may be available to be transmitted from the monitoring station to the vehicle trackers. The first eight or nine codes are command codes that will cause a specific action by the tracking device at the vehicle. The other one or two codes may be wildcard codes as mentioned above, that may set a stand-by mode for one or a group of vehicles, for example.

It may be desirable to provide more than eight commands at the vehicle responsive to the corresponding eight available codes. For example, it may be desirable to set a feature on or off, or to set a different feature setting or threshold. In accordance with this aspect of the invention, the commands at the tracker are determined based upon a series of different command codes being received within a predetermined time window.

For example, the monitoring station may send code 9 that switches the tracker in the car into a stand-by mode for a predetermined time and which causes the tracker to respond with an upstream confirmation code 7 or 9 indicating receiving code 9. During the predetermined time of the stand-by mode another code follows that causes a system programmable feature or setting to change. Note that the second code would otherwise cause a different function at the vehicle. Note that system might operate a function 9 if another code 1-9 is not received in the predetermined time. The following list is exemplary for features resulting from second codes 1-9:

Code 1—Tracker will turn off feature of upstream code caused by vehicle alert being detected.

Code 2—Tracker will turn on feature of upstream code caused by vehicle alert being detected.

Code 3—Tracker deactivates cell receiver from operating due to a non-paying customer for monitoring service. That phone number can then be allocated to another customer.

Code 4—Turn on audio buzzer feature that will sound once each 10 minutes. The monitoring station need only send the command to activate the feature, as the tracker will time the period and drive the buzzer thereafter. The monitoring station will normally not need to send this command because the tracker will be configured out of the box with this feature activated to sound the buzzer every 10 minutes until the next command is received.

Code 5—Turn off the audio buzzer. This is to be sent by the monitoring station after a user has successfully activated his account.

Code 6—Turn on the 80 mph speed limit reporting. This will normally not be sent as this feature will be the default setting of the tracker.

Code 7—a Turn off the 80 mph speed limit reporting.

Code 8—Increase speed limit 5 mph and increase the time 5 minutes.

Code 9—Decrease speed limit 5 mph and decrease the time 5 minutes, and wait 5 minutes if another code number follows. It could operate this way to allow another set of codes to change more features.

In this example, in response to the tracker receiving the system code 1-9, the tracker sends an upstream code 7 to acknowledge receipt of the system code 1-9. Upon receipt of code 9 the tracker waits up to 5 minutes to determine if

another system code is received. If no code is received, then the tracker performs the code 9 operation. Of course, in other embodiments other features or settings can be selected. In general, it may be preferred that the first code sent in a series of two codes, for example, be a code that causes only a minor function to be performed at the vehicle. This is so because if the second code is sent from the monitoring station, but not received at the tracker, only a minor function is performed. For example, the first code may switch between armed and disarmed modes. This is in contrast to using a remote engine starting code or engine shutdown code as the first code. The vehicle may be moving or positioned in a marginal reception area, and the second command may not be received by the tracker within the predetermined time window. As will be appreciated by those skilled in the art, this concept of multiple digit codes, can be extended beyond two digits to three or more.

To further conserve cellular transmissions and as described above, the tracker may be set to record a position based upon a determined event. Only this recorded position information may be downloaded either by user request or at set times. It is desired that such events be relatively few, but that the information still be helpful to the user.

For example, an event for recording of position may be determined based upon the vehicle being stopped for greater than a first time and less than a second time. For example, the first time may be 15 minutes and the second time may be 6 hours. Determination of the vehicle being stopped can be made based upon one or both of the GPS position or the vehicle ignition being turned off. The second time prevents the recording of position information when the vehicle is stopped at the owner's home during the evening, for example. Accordingly, the important information of the vehicle stops being made is recorded and made available to the user, while system communications resources are conserved.

In another example, if the mode is selected to send the vehicle's location every 10 min and the vehicle is in the same location for greater than a set time, then no more vehicle locations are sent until the vehicle location has changed to start the every 10 min reporting again.

Now referring to FIGS. **10** and **11**, in yet another embodiment the potential difficulties of interfacing to a vehicle data bus and devices connected thereto are further discussed. The multi-vehicle compatible tracking unit **110** is for a vehicle comprising a vehicle data bus **122** extending throughout the vehicle. The multi-vehicle compatible tracking unit **110** includes a vehicle position determining device **112**, a wireless communications device **113**, and a multi-vehicle compatible controller **111** for cooperating with the vehicle position determining device and the wireless communications device to send vehicle position information. The vehicle position determining device **112** may be provided by a GPS receiver, for example, or any of the other such devices described in detail above.

The wireless communications device **113** may be provided by a cellular telephone transceiver configured to operate on a control channel of the cellular network, or any of the other such devices described in detail above.

The multi-vehicle compatible controller **111** is coupled to the vehicle data bus **122** for communication therewith with a vehicle device **121**. The controller **111** illustratively includes a central processing unit (CPU) **126** or other logic circuitry which is connected to a clock signal generator **124**, a memory **125**, and input/output circuitry **127** to interface with the vehicle device **121** using at least one corresponding vehicle device code from among a plurality thereof for different vehicles. The corresponding vehicle code may be for reading from the vehicle device **121**. Similarly, the corresponding vehicle code may be additionally or alternatively for writing to the vehicle device **121**.

The multi-vehicle compatible tracking unit **110** also illustratively includes a downloading interface **116** for permitting downloading of enabling data related to the at least one corresponding vehicle device code for use by the multi-vehicle compatible controller **111**. The enabling data may be the vehicle device code or codes, an instruction to select a code or codes from among those already stored, or the data or sequence to allow the controller **111** to generate the vehicle device code or codes, for example.

In the embodiment as shown in FIG. **11**, the downloading interface **116** is a category of wireless signal downloading interfaces that illustratively include a wireless receiver **114**, such as for temporary connection to the downloading device **115**. The wireless downloading interface **116** may communicate with the downloading device **115** via any one or more of a number of wireless technologies, such as cellular, satellite, IR, Bluetooth or WiFi technologies for example, as will also be appreciated by those skilled in the art. Interface circuitry **132** is included in the wireless signal downloading interface **116** for controlling communication with the downloading device **115**. The interface circuitry **132** may be logic circuitry or other control circuitry along with switching components.

In other embodiments, for example as shown in FIG. **12**, the wireless downloading interface **116'** does not include the wireless receiver **114**, as a temporary wireless communication link is instead provided by sharing the wireless communications device **113** that sends position data as described above.

The downloading interface may also be in the form of a wired signal downloading interface **116"** as shown in FIG. **13**. The wired signal downloading interface **116"** comprises a connector **133***a* for temporary connection to a downloading device **115"** with a mating connector **133***b*. Interface circuitry **132"** is provided for controlling communication with the downloading device **115"**. The wired downloading interface **116"** may connect directly to a downloading device **115"**, such as a laptop computer, via RS232/429 protocol, USB, FireWire, TCP/IP (Internet), or any other wired protocol as will be appreciated by those skilled in the art. The connector **133***a* of the wired downloading interface **116"** may alternatively be in the form of a socket to accept a memory card or other data storage medium capable of transferring data. The downloading interfaces **116**, **116'** and **116"**, may also advantageously be for permitting downloading of programming instructions for the multi-vehicle compatible controller **111**, to allow remote programming, for example, as will also be appreciated by those skilled in the art.

Referring again briefly to FIG. **10**, the multi-vehicle compatible tracking unit **110** further comprises a remote transmitter **117**, such as typically in the form of a small handheld device to be carried by a user when away from the vehicle. The multi-vehicle compatible controller **111** also performs at least one vehicle remote control function responsive to the remote transmitter **117**. The remote transmitter **117** illustratively communicates with the remote receiver **118**, which is coupled to the multi-vehicle compatible controller **111**. The vehicle remote control functions may include a vehicle security function, a remote keyless entry function, and a remote engine starting function, for example, implemental via the data bus **122** using one or more vehicle devices **121**. Such a vehicle device **121** may also include another vehicle controller, as well as a sensor, or actuator as will be appreciated by those skilled in the art.

The multi-vehicle compatible tracking unit **110** illustratively includes a common housing **123** for its various components. In other embodiments, more than one housing may be used for the various components.

Referring additionally to FIGS. **14** and **15**, several methods for using a multi-vehicle compatible tracking unit **110** for a vehicle comprising a vehicle data bus **122** extending throughout the vehicle are described with reference to the respective flowcharts **148**, **148'**. Beginning at Block **150**, the multi-vehicle compatible tracking unit **110** is installed in vehicle (Block **151**). At Block **152** a connection is then established between the multi-vehicle compatible tracking unit **110** and a downloading device **115** using a downloading interface **116**. Enabling data related to at least one corresponding vehicle device code for use by the multi-vehicle compatible controller **111** is downloaded via a downloading interface **116** (Block **153**). Once the enabling data is downloaded, the connection between the multi-vehicle tracking unit **110** and the downloading device **115** is terminated at Block **154**. Of course the multi-vehicle compatible tracking unit **110** may be optionally programmed via the downloading interface while the connection is established. The operation of the tracking unit may be tested at Block **155** before stopping at Block **156**. With particular reference to the flowchart **148'** of FIG. **15**, the multi-vehicle compatible tracking unit **110** may be connected to the downloading device **115** (Block **152'**), etc., before installation in the vehicle (Block **151'**) and testing (Block **155'**).

Other features relating to vehicle control systems are disclosed in copending patent applications entitled VEHICLE TRACKER INCLUDING STATIONARY TIME DETERMINATION AND ASSOCIATED METHODS, Ser. No. 09/859,727 filed May 17, 2001, now U.S. Pat. No. 6,512,465; VEHICLE TRACKER CONSERVING CODES AND RELATED METHODS, Ser. No. 09/859,673 filed May 17, 2001, now U.S. Pat. No. 6,522,267; VEHICLE TRACKER WITH POWER SAVING FEATURES AND RELATED METHODS, Ser. No. 09/859,728 filed May 17, 2001, now U.S. Pat. No. 6,512,466; VEHICLE TRACKER COOPERATING WITH A STARTER INTERRUPT AND RELATED METHODS, Ser. No. 09/859,973 filed May 17, 2001; VEHICLE TRACKER WITH USER NOTIFICATIONS AND ASSOCIATED METHODS, Ser. No. 09/859,733 filed May 17, 2001, now U.S. Pat. No. 6,509,868; VEHICLE TRACKER WITH USER REGISTRATION REMINDER AND RELATED METHODS, Ser. No. 09/859,971 filed May 17, 2001, now U.S. Pat. No. 6,507,786; VEHICLE TRACKER INCLUDING INPUT/OUTPUT FEATURES AND RELATED METHODS, Ser. No. 09/859,972 filed May 17, 2001, now U.S. Pat. No. 6,606,561; and VEHICLE TRACKER WITH TEST FEATURES AND RELATED METHODS, Ser. No. 09/859,729 filed May 17, 2001, now U.S. Pat. No. 6,809,659, the entire disclosures of which are incorporated herein by reference.

Many modifications and other embodiments of the invention will come to the mind of one skilled in the art having the benefit of the teachings presented in the foregoing descriptions and the associated drawings. Accordingly, it is understood that the invention is not to be limited to the embodiments disclosed, and that other modifications and embodiments are intended to be included within the spirit and scope of the appended claims.

That which is claimed is:

1. A multi-vehicle compatible tracking unit for a vehicle comprising a vehicle data bus extending throughout the vehicle, the multi-vehicle compatible tracking unit comprising:

a vehicle position determining device;

a wireless communications device;

a multi-vehicle compatible controller for cooperating with said vehicle position determining device and said wireless communications device to send vehicle position information;

said multi-vehicle compatible controller to be coupled to the vehicle data bus for communication thereover with at least one vehicle device using at least one corresponding vehicle device code from among a plurality thereof for different vehicles; and

a downloading interface for permitting downloading of enabling data related to the at least one corresponding vehicle device code for use by said multi-vehicle compatible controller.

2. The multi-vehicle compatible tracking unit according to claim **1** wherein said downloading interface comprises a wired signal downloading interface.

3. The multi-vehicle compatible tracking unit according to claim **2** wherein said wired signal downloading interface comprises a connector for temporary connection to a downloading device.

4. The multi-vehicle compatible tracking unit according to claim **1** wherein said downloading interface comprises a wireless signal downloading interface.

5. The multi-vehicle compatible tracking unit according to claim **4** wherein said wireless signal downloading interface comprises a wireless receiver for temporary connection to a downloading device.

6. The multi-vehicle compatible tracking unit according to claim **1** wherein the corresponding at least one vehicle code is for reading from the at least one vehicle device.

7. The multi-vehicle compatible tracking unit according to claim **1** wherein the corresponding at least one vehicle code is for writing to the at least one vehicle device.

8. The multi-vehicle compatible tracking unit according to claim **1** wherein said downloading interface is also for permitting downloading of at least one programming instruction for said multi-vehicle compatible controller.

9. The multi-vehicle compatible tracking unit according to claim **1** further comprising a remote transmitter; and wherein said multi-vehicle compatible controller also performs at least one vehicle remote control function responsive to said remote transmitter.

10. The multi-vehicle compatible tracking unit according to claim **9** wherein the at least one vehicle remote control function comprises at least one of a vehicle security function, a remote keyless entry function, and a remote engine starting function.

11. The multi-vehicle compatible tracking unit according to claim **1** wherein said wireless position determining device comprises a Global Positioning System (GPS) receiver.

12. The multi-vehicle compatible tracking unit according to claim **1** further comprising a housing containing said vehicle position determining device, said wireless communications device, said multi-vehicle compatible controller, and said downloading interface.

13. A multi-vehicle compatible tracking unit for a vehicle comprising a vehicle data bus extending throughout the vehicle, the multi-vehicle compatible vehicle tracking unit comprising:

a vehicle position determining device;

a wireless communications device;

a multi-vehicle compatible controller for cooperating with said vehicle position determining device and said wireless communications device to send vehicle position information;

said multi-vehicle compatible controller to be coupled to the vehicle data bus for communication thereover with at least one vehicle device using at least one corresponding vehicle device code from among a plurality thereof for different vehicles; and

a downloading interface for permitting downloading of enabling data related to the at least one corresponding vehicle device code for use by said multi-vehicle compatible controller;

said downloading interface comprising a connector for temporary connection to a downloading device.

14. The multi-vehicle compatible tracking unit according to claim **13** wherein the corresponding at least one vehicle code is for reading from the at least one vehicle device.

15. The multi-vehicle compatible tracking unit according to claim **13** wherein the corresponding at least one vehicle code is for writing to the at least one vehicle device.

16. The multi-vehicle compatible tracking unit according to claim **13** wherein said downloading interface is also for permitting downloading of at least one programming instruction for said multi-vehicle compatible controller.

17. The multi-vehicle compatible tracking unit according to claim **13** further comprising a remote transmitter; and wherein said multi-vehicle compatible controller also performs at least one vehicle remote control function responsive to said remote transmitter.

18. A multi-vehicle compatible tracking unit for a vehicle comprising a vehicle data bus extending throughout the vehicle, the multi-vehicle compatible vehicle tracking unit comprising:

a vehicle position determining device;

a wireless communications device;

a multi-vehicle compatible controller for cooperating with said vehicle position determining device and said wireless communications device to send vehicle position information;

said multi-vehicle compatible controller to be coupled to the vehicle data bus for communication thereover with at least one vehicle device using at least one corresponding vehicle device code from among a plurality thereof for different vehicles; and

a downloading interface for permitting downloading of enabling data related to the at least one corresponding vehicle device code for use by said multi-vehicle compatible controller;

said downloading interface comprising a wireless receiver for temporary connection to a downloading device.

19. The multi-vehicle compatible tracking unit according to claim **18** wherein the corresponding at least one vehicle code is for reading from the at least one vehicle device.

20. The multi-vehicle compatible tracking unit according to claim **18** wherein the corresponding at least one vehicle code is for writing to the at least one vehicle device.

21. The multi-vehicle compatible tracking unit according to claim **18** wherein said downloading interface is also for permitting downloading of at least one programming instruction for said multi-vehicle compatible controller.

22. The multi-vehicle compatible tracking unit according to claim **18** further comprising a remote transmitter; and wherein said multi-vehicle compatible controller also performs at least one vehicle remote control function responsive to said remote transmitter.

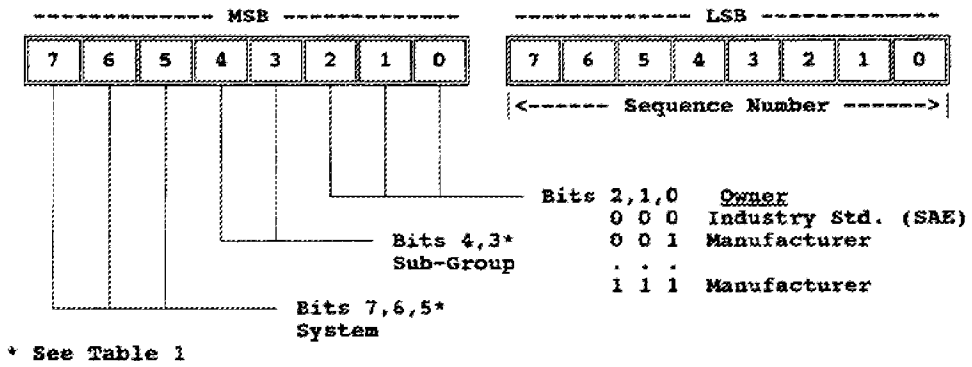
* * * * *

Exhibit C

Flick '278 Claims	PRIOR ART – U.S. Pat. No. 6,028,537 to Suman et al.
1. A multi-vehicle compatible tracking unit for a vehicle comprising a vehicle data bus extending throughout the vehicle, the multi-vehicle compatible tracking unit comprising:	The Suman '537 patent discloses a multi-vehicle compatible tracking unit for a vehicle comprising a data bus, such as a multiplex bus. See, e.g., col. 8, line 58-col. 9, line 16; Figs. 3, 5, 44, 45; see also col. 36, line 53-col. 37, line 17. The Suman '537 patent notes that the multiplexing scheme for such a bus is set forth in SAE J1850. In addition to the teachings of the Suman '537 patent, it would have been obvious to one skilled in the art that a tracking unit compatible with an SAE standard bus would be compatible with multiple vehicles.
a vehicle position determining device;	The Suman '537 patent discloses a GPS or DGPS as a vehicle position determining device. See, e.g., Figs. 3, 5.
a wireless communications device;	The Suman '537 patent discloses a transmitter (see e.g., Figs. 1a, 1b, 2; col. 3, lines 1-3; col. 7, lines 26-30) and a receiver (see e.g., Figs. 1b, 3, 44; col. 3, lines 1-3; col. 7, lines 31-34) for wirelessly receiving signals from the transmitter. In one embodiment disclosed in the Suman '537 patent, the receiver is a cell phone (and thus also includes a transmitter) coupled to the vehicle bus. See, e.g., Figs. 5, 45; col. 36, line 53 – col. 37, line 17.
a multi-vehicle compatible controller for cooperating with said vehicle position determining device and said wireless communications device to send vehicle position information;	The Suman '537 patent discloses a controller that cooperates with the GPS device and the wireless communication device to send vehicle position information. See, e.g., col. 2 lines 3-10; see also col. 6, lines 19-49; col. 11, lines 8-13; col. 12, lines 7-13; col. 14, lines 11-21.
said multi-vehicle compatible controller to be coupled to the vehicle data bus for communication thereover with at least one vehicle device using at least one corresponding vehicle device code from among a plurality thereof for different vehicles; and	The Suman '537 patent discloses that the controller is coupled to the vehicle data bus for communication thereover with at least one vehicle device, using a corresponding vehicle device code, from among a plurality of codes for different vehicles. See, e.g., Figs. 3, 5, 44, 45, 47; see also col. 43, lines 27-47 (including sensors and controls for doors, windows, ignition, speedometer, RPMs, fuel level, turn signals, lights, gears, temperature, oil pressure, defroster, headlights, etc.). The Suman '537 patent, col. 37, lines 15 – 17: "The multiplexing scheme is set forth in SAE standard J1850 and is universally used in the automotive industry." It is inherently disclosed that the J1850 bus described in the Suman '537 patent is included in a variety of different makes and models of vehicles per the federally mandated standard. Furthermore, as described in detail below, a J1850 bus implemented according to the SAE standards provides for communicating with at least one vehicle device using at least one corresponding vehicle device code from

Flick '278 Claims	PRIOR ART – U.S. Pat. No. 6,028,537 to Suman et al.
	among a plurality thereof for different vehicles, including at least one "SAE" defined device codes and up to seven "Reserved Manufacturer" defined device codes for a particular vehicle device, as described in detail below. In particular, the Society of Automotive Engineers (SAE) is a U.S. based standards organization that publishes the standards for implementing the SAE "J1850 bus" used by the Suman '537 patent to communicate with vehicle devices. Furthermore, the SAE standards provide the implementation details for communicating with vehicle devices using the vehicle bus via an OBD II diagnostic connector mandated in every new vehicle sold since 1996. In particular, the SAE standard for implementation of the J1850 vehicle bus is documented in, among many other available publications, the Society of Automotive Engineers (SAE) HS-3000 Manual (1994 edition), entitled "SAE On-Board Diagnostics for Light and Medium Duty Vehicles Standards Manual" (SAE HS-3000 Manual). The SAE HS-3000 Manual sets forth the various standards for communicating with vehicle devices on the vehicle bus, each standard under a particular SAE heading number (e.g., J1850, J2178, among various other standards) related to various aspects of vehicle control systems, including vehicle busses (e.g. SAE J1850, starting on page 91) and communicating, using device codes, with vehicle devices using the vehicle bus via an OBD II diagnostic connector mandated in every new vehicle sold since 1996 (e.g. SAE J1978 starting on page 33 , SAE J1979 starting on page 46 and SAE J2178/1-2178/2 starting on page 200). The SAE HS-3000 Manual discloses using at least one corresponding vehicle device code from among a plurality thereof for different vehicles, and provides details for hundreds of different device codes for different vehicle devices, which include SAE defined device codes and manufacturer defined device codes. In particular, SAE J2178 which starts on page 211 of the SAE HS-3000 Manual and consists of four parts, 1 through 4, defines sets of vehicle device codes, or "messages", for hundreds of different types of vehicle devices. The specific vehicle device code will depend upon whether a particular manufacturer implements the SAE J2178 defined vehicle code or whether a vehicle supports a manufacturer specific vehicle code. Page 156, SAE J1850, Section 4.1 elaborates on the definition of the vehicle codes as follows: "Normal Vehicle

Flick '278 Claims	PRIOR ART – U.S. Pat. No. 6,028,537 to Suman et al.
	Operation (Down the Road) Messages: The messages sent during non-diagnostic operations are called normal vehicle operation messages. These normal vehicle operation messages are used for communication from a transmitter to one or more receivers across this network. The normal operation messages have been developed by the SAE for this communication network and are defined in SAE-J2178. SAE defined messages and the 'Reserved' messages of SAE J2178 shall remain specific to those definitions. In SAE J2178, there is also a set-of 'Reserved-Manufacturer' messages which, if used, will have meanings specific to a vehicle manufacturer but are likely to be different between manufacturers." J2178/1, starting on page 200 of the SAE HS-3000 Manual, includes 10 tables defining vehicle device codes for a large variety of different categories of vehicle devices (the specific device codes are specified in J2178/2). Section 4 of SAE J2178/2 on page 213 specifies the Parameter Reference Number (PRN) Structure utilized within the SAE J2178 messages to use a particular device code from among a plurality thereof for different vehicles, which is illustrated below. Section 4 notes that "Some of the PRN numbers are assigned or reserved for SAE definitions but the majority are reserved for individual motor vehicle manufacturers to coordinate and assign."

Flick '278 Claims	PRIOR ART – U.S. Pat. No. 6,028,537 to Suman et al.
	Figure 3 shows the basic structure of PRNs and Tables 1 and 2 show bit assignments and address ranges based on these assignments.  FIGURE 3—PRN STRUCTURE The first three bits define the system and the next two bits define the sub-group. For each sub-group, three additional bits specify which of eight possible device codes are being used for a particular vehicle device, representing the Industry Std. device code (000) or one of seven manufacturer specific device codes (001-111). Accordingly, the standard specifies at least eight vehicle device codes for each PRN (which include 1 Industry Standard, and 7 manufacturer specific device codes), and thus teaches "using at least one corresponding vehicle device code from among a plurality thereof for different vehicles". Furthermore, SAE J2178/2, which starts on page 211 of the SAE HS-3000 Manual, provides the "Standardized Parameter Definitions" for standardized messages on SAE J1850 Class B networks. SAE J2178/2 sets out respective sets of device codes for a host of vehicle devices that may be present on a given vehicle. For example, Table 2 on page 215, partially reproduced below, provides the address map of the SAE standard and reserved manufacturer specific (Reserved MFG) subgroups of messages for different classes of vehicle devices.

Flick '278 Claims	PRIOR ART – U.S. Pat. No. 6,028,537 to Suman et al.

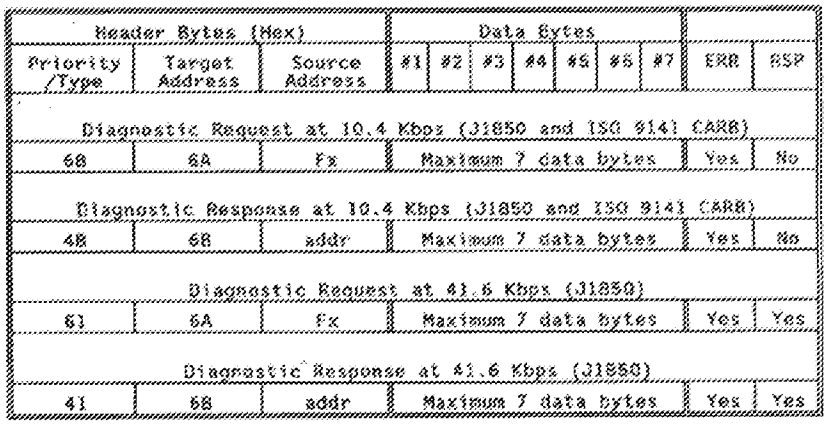
TABLE 2—SAE/MFG PRN RANGES

System	Subgroup	Address Map	Size
Powertrain	J1979 Compatible - SAE	0000 - 00FF	0.25K
	Reserved - MFG	0100 - 07FF	1.75K
	Reserved - SAE	0800 - 08FF	0.25K
	Reserved - MFG	0900 - 0FFF	1.75K
	Engine - SAE	1000 - 10FF	0.25K
	Engine - MFG	1100 - 17FF	1.75K
	Transmission - SAE	1800 - 18FF	0.25K
	Transmission - MFG	1900 - 1FFF	1.75K
Chassis	Reserved - SAE	2000 - 20FF	0.25K
	Reserved - MFG	2100 - 27FF	1.75K
	Brakes/Tires/Wheels - SAE	2800 - 28FF	0.25K
	Brakes/Tires/Wheels - MFG	2900 - 2FFF	1.75K
	Steering - SAE	3000 - 30FF	0.25K
	Steering - MFG	3100 - 37FF	1.75K
	Suspension - SAE	3800 - 38FF	0.25K
	Suspension - MFG	3900 - 3FFF	1.75K

SAE J2178/2 provides the details of device codes for hundreds of different vehicle devices within the address map ranges indicated in the above table. Section 4 of SAE J2178/2 on page 213 specifies that three bits are used to define eight different device codes for a given vehicle device including a SAE standard device code for the specific type of vehicle device and seven manufacturer specific device codes for that specific type of vehicle device.

Furthermore, in order to allow a controller to be compatible with various busses that are used on a plurality of different vehicles, including the two types of J1850 buses that may be utilized, the controller uses a bus discovery procedure that is described on page 37, section 6.5.2 INITIALIZATION DETAILS of SAE J1978, reproduced below as scanned from the SAE HS-3000 manual, that involves sending different device codes or "messages", in the form of signals referred to as a "mode 1 PID 0 request message" in a manner appropriate for each of the SAE J1850 41.6 Kbps PWM bus, SAE J1850 10.4 Kbps VPW, and ISO 9141-2. In particular, as many as three device codes may initially be sent, at least two of which will be non-working for the particular vehicle and one of which is a working device code for the vehicle. See page 37, SAE J1978 at 6.5.1. (" While there are three types of communication interfaces that could be used to

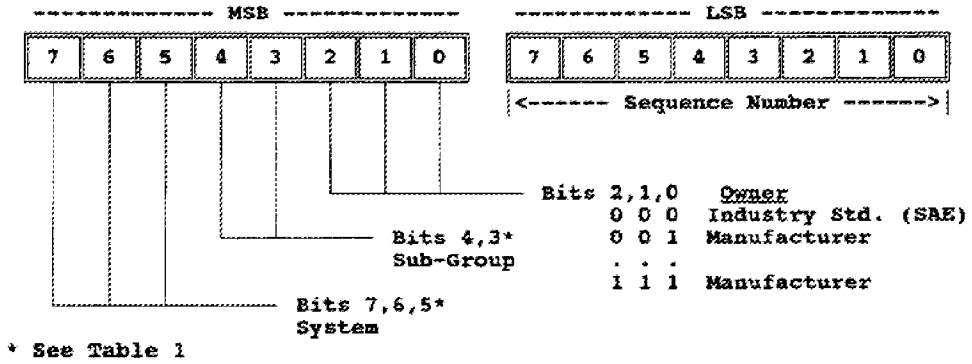
Flick '278 Claims	PRIOR ART – U.S. Pat. No. 6,028,537 to Suman et al.
	access the OBD II functions in a given vehicle (i.e., SAE J1850 41.6 Kbps PWM, SAE J1850 10.4 Kbps VPW and ISO 9141-2), only one is allowed to be used in any one vehicle to access all supported OBD II functions.") a. Test for SAE J1850 41.6 Kbps PWM (1) Step 1—Enable the SAE J1850 41.6 Kbps PWM interface (2) Step 2—Send a mode 1 PID 0 request message (3) Step 3—If a mode 1 PID 0 response message is received then SAE J1850 41.6 Kbps PWM is the type of interface used in a vehicle for OBD II support. b. Test for SAE J1850 10.4 Kbps VPW (1) Step 1—Enable the SAE J1850 10.4 Kbps VPW interface (2) Step 2—Send a mode 1 PID 0 request message (3) Step 3—If a mode 1 PID 0 response message is received then SAE J1850 10.4 Kbps VPW is the type of interface used in a vehicle for OBD II support. c. Test for ISO 9141 CARB (1) Step 1—Enable the ISO 9141-2 interface (2) Step 2—If the initialization sequence defined in ISO 9141-2 is completed successfully, then ISO 9141-2 is the type of interface used in a vehicle for OBD II support. The previous tests may be performed in any order and where possible may be performed in parallel. The mode 1 PID 0 request and response messages are defined in SAE J1979. SAE J1978 indicates that the "mode 1 PID 0" request and response messages are defined in SAE J1979, which starts on page 46 of the SAE HS-3000 Manual. See page 37, SAE J1978, Section 6.5.2., "Initialization Details". Requester further notes that transmission of the mode 1 PID 0 device code has previously been asserted as satisfying this requirement of the claim. See Exhibit F, Plaintiff's Disclosure of Initial Infringement Contentions, starting on page A-45. SAE J1979, starting on page 46, elaborates on the device codes that are used by the controller during bus detection, including the different device codes utilized by vehicles that employ a 10.4 Kbps interface (i.e., a first device code that includes 686A (hex) in the header of the request message) and vehicles that employ a 41.6 Kbps interface (i.e. a second device code that includes

Flick '278 Claims	PRIOR ART – U.S. Pat. No. 6,028,537 to Suman et al.
	616A (hex) in the header of the request message). See e.g., FIGURE 1 on page 51, reproduced below, of SAE J1979.  FIGURE 1—DIAGNOSTIC MESSAGE FORMAT
a downloading interface for permitting downloading of enabling data related to the at least one corresponding vehicle device code for use by said multi-vehicle compatible controller.	The Suman '537 patent, col. 36, lines 31-52: "To achieve these aspects and other advantages, the vehicle accessory control system of the present invention includes a plurality of electrically-operated vehicle accessories, a receiver to be mounted in a vehicle for receiving RF signals from a land-based transmitter, and a control circuit coupled to the receiver and to the vehicle accessories for controlling the operation of the vehicle accessories in accordance with a control program. The RF signals include an address uniquely identifying the vehicle and a reprogramming signal for reprogramming the operation of at least one of the vehicle accessories. The control circuit includes an input interface for receiving information regarding a plurality of sensed conditions, control means for controlling the operation of the vehicle accessories in accordance with the control program and in response to sensed conditions received from the input interface. The control circuit further includes reprogramming means for selectively reprogramming the control program in response to the detection of an RF signal including an address identifying the vehicle and the reprogramming signal, to selectively change the manner in which the control means controls the operation of at least one of the vehicle accessories."

Flick '278 Claims	PRIOR ART – U.S. Pat. No. 6,028,537 to Suman et al.
13. A multi-vehicle compatible tracking unit for a vehicle comprising a vehicle data bus extending throughout the vehicle, the multi-vehicle compatible vehicle tracking unit comprising:	The Suman '537 patent discloses a multi-vehicle compatible tracking unit for a vehicle comprising a data bus, such as a multiplex bus. See, e.g., col. 8, line 58-col. 9, line 16; Figs. 3, 5, 44, 45; see also col. 36, line 53-col. 37, line 17. The Suman '537 patent notes that the multiplexing scheme for such a bus is set forth in SAE J1850. In addition to the teachings of the Suman '537 patent, it would have been obvious to one skilled in the art that a tracking unit compatible with an SAE standard bus would be compatible with multiple vehicles.
a vehicle position determining device;	The Suman '537 patent discloses a GPS or DGPS as a vehicle position determining device. See, e.g., Figs. 3, 5.
a wireless communications device;	The Suman '537 patent discloses a transmitter (see e.g., Figs. 1a, 1b, 2; col. 3, lines 1-3; col. 7, lines 26-30) and a receiver (see e.g., Figs. 1b, 3, 44; col. 3, lines 1-3; col. 7, lines 31-34) for wirelessly receiving signals from the transmitter. In one embodiment disclosed in the Suman '537 patent, the receiver is a cell phone (and thus also includes a transmitter) coupled to the vehicle bus. See, e.g., Figs. 5, 45; col. 36, line 53 – col. 37, line 17.
a multi-vehicle compatible controller for cooperating with said vehicle position determining device and said wireless communications device to send vehicle position information;	The Suman '537 patent discloses a controller that cooperates with the GPS device and the wireless communication device to send vehicle position information. See, e.g., col. 2 lines 3-10; see also col. 6, lines 19-49; col. 11, lines 8-13; col. 12, lines 7-13; col. 14, lines 11-21.
said multi-vehicle compatible controller to be coupled to the vehicle data bus for communication thereover with at least one vehicle device using at least one corresponding vehicle device code from among a plurality thereof for different vehicles;	The Suman '537 patent discloses that the controller is coupled to the vehicle data bus for communication thereover with at least one vehicle device, using a corresponding vehicle device code, from among a plurality of codes for different vehicles. See, e.g., Figs. 3, 5, 44, 45, 47; see also col. 43, lines 27-47 (including sensors and controls for doors, windows, ignition, speedometer, RPMs, fuel level, turn signals, lights, gears, temperature, oil pressure, defroster, headlights, etc.). The Suman '537 patent, col. 37, lines 15 – 17: "The multiplexing scheme is set forth in SAE standard J1850 and is universally used in the automotive industry." It is inherently disclosed that the J1850 bus described in the Suman '537 patent is included in a variety of different makes and models of vehicles per the federally mandated standard. Furthermore, as described in detail below, a J1850 bus implemented according to the SAE standards provides for communicating with at least one vehicle device using at least one corresponding vehicle device code from among a plurality thereof for different vehicles, including at least one "SAE" defined device

Flick '278 Claims	PRIOR ART – U.S. Pat. No. 6,028,537 to Suman et al.
	codes and up to seven "Reserved Manufacturer" defined device codes for a particular vehicle device, as described in detail below. In particular, the Society of Automotive Engineers (SAE) is a U.S. based standards organization that publishes the standards for implementing the SAE "J1850 bus" used by the Suman '537 patent to communicate with vehicle devices. Furthermore, the SAE standards provide the implementation details for communicating with vehicle devices using the vehicle bus via an OBD II diagnostic connector mandated in every new vehicle sold since 1996. In particular, the SAE standard for implementation of the J1850 vehicle bus is documented in, among many other available publications, the Society of Automotive Engineers (SAE) HS-3000 Manual (1994 edition), entitled "SAE On-Board Diagnostics for Light and Medium Duty Vehicles Standards Manual" (SAE HS-3000 Manual). The SAE HS-3000 Manual sets forth the various standards for communicating with vehicle devices on the vehicle bus, each standard under a particular SAE heading number (e.g., J1850, J2178, among various other standards) related to various aspects of vehicle control systems, including vehicle busses (e.g. SAE J1850, starting on page 91) and communicating, using device codes, with vehicle devices using the vehicle bus via an OBD II diagnostic connector mandated in every new vehicle sold since 1996 (e.g. SAE J1978 starting on page 33 , SAE J1979 starting on page 46 and SAE J2178/1-2178/2 starting on page 200). The SAE HS-3000 Manual discloses using at least one corresponding vehicle device code from among a plurality thereof for different vehicles, and provides details for hundreds of different device codes for different vehicle devices, which include SAE defined device codes and manufacturer defined device codes. In particular, SAE J2178 which starts on page 211 of the SAE HS-3000 Manual and consists of four parts, 1 through 4, defines sets of vehicle device codes, or "messages", for hundreds of different types of vehicle devices. The specific vehicle device code will depend upon whether a particular manufacturer implements the SAE J2178 defined vehicle code or whether a vehicle supports a manufacturer specific vehicle code. Page 156, SAE J1850, Section 4.1 elaborates on the definition of the vehicle codes as follows: "Normal Vehicle Operation (Down the Road) Messages: The messages sent during non-diagnostic operations are

Flick '278 Claims	PRIOR ART – U.S. Pat. No. 6,028,537 to Suman et al.
	called normal vehicle operation messages. These normal vehicle operation messages are used for communication from a transmitter to one or more receivers across this network. The normal operation messages have been developed by the SAE for this communication network and are defined in SAE-J2178. SAE defined messages and the 'Reserved' messages of SAE J2178 shall remain specific to those definitions. In SAE J2178, there is also a set-of 'Reserved-Manufacturer' messages which, if used, will have meanings specific to a vehicle manufacturer but are likely to be different between manufacturers." J2178/1, starting on page 200 of the SAE HS-3000 Manual, includes 10 tables defining vehicle device codes for a large variety of different categories of vehicle devices (the specific device codes are specified in J2178/2). Section 4 of SAE J2178/2 on page 213 specifies the Parameter Reference Number (PRN) Structure utilized within the SAE J2178 messages to use a particular device code from among a plurality thereof for different vehicles, which is illustrated below. Section 4 notes that "Some of the PRN numbers are assigned or reserved for SAE definitions but the majority are reserved for individual motor vehicle manufacturers to coordinate and assign."

Flick '278 Claims	PRIOR ART – U.S. Pat. No. 6,028,537 to Suman et al.
	Figure 3 shows the basic structure of PRNs and Tables 1 and 2 show bit assignments and address ranges based on these assignments.  FIGURE 3—PRN STRUCTURE The first three bits define the system and the next two bits define the sub-group. For each sub-group, three additional bits specify which of eight possible device codes are being used for a particular vehicle device, representing the Industry Std. device code (000) or one of seven manufacturer specific device codes (001-111). Accordingly, the standard specifies at least eight vehicle device codes for each PRN (which include 1 Industry Standard, and 7 manufacturer specific device codes), and thus teaches "using at least one corresponding vehicle device code from among a plurality thereof for different vehicles". Furthermore, SAE J2178/2, which starts on page 211 of the SAE HS-3000 Manual, provides the "Standardized Parameter Definitions" for standardized messages on SAE J1850 Class B networks. SAE J2178/2 sets out respective sets of device codes for a host of vehicle devices that may be present on a given vehicle. For example, Table 2 on page 215, partially reproduced below, provides the address map of the SAE standard and reserved manufacturer specific (Reserved MFG) subgroups of messages for different classes of vehicle devices.

Flick '278 Claims	PRIOR ART – U.S. Pat. No. 6,028,537 to Suman et al.

TABLE 2—SAE/MFG PRN RANGES

System	Subgroup	Address Map	Size
Powertrain	J1979 Compatible - SAE	0000 - 00FF	0.25K
	Reserved - MFG	0100 - 07FF	1.75K
	Reserved - SAE	0800 - 08FF	0.25K
	Reserved - MFG	0900 - 0FFF	1.75K
	Engine - SAE	1000 - 10FF	0.25K
	Engine - MFG	1100 - 17FF	1.75K
	Transmission - SAE	1800 - 18FF	0.25K
	Transmission - MFG	1900 - 1FFF	1.75K
Chassis	Reserved - SAE	2000 - 20FF	0.25K
	Reserved - MFG	2100 - 27FF	1.75K
	Brakes/Tires/Wheels - SAE	2800 - 28FF	0.25K
	Brakes/Tires/Wheels - MFG	2900 - 2FFF	1.75K
	Steering - SAE	3000 - 30FF	0.25K
	Steering - MFG	3100 - 37FF	1.75K
	Suspension - SAE	3800 - 38FF	0.25K
	Suspension - MFG	3900 - 3FFF	1.75K

SAE J2178/2 provides the details of device codes for hundreds of different vehicle devices within the address map ranges indicated in the above table. Section 4 of SAE J2178/2 on page 213 specifies that three bits are used to define eight different device codes for a given vehicle device including a SAE standard device code for the specific type of vehicle device and seven manufacturer specific device codes for that specific type of vehicle device.

Furthermore, in order to allow a controller to be compatible with various busses that are used on a plurality of different vehicles, including the two types of J1850 buses that may be utilized, the controller uses a bus discovery procedure that is described on page 37, section 6.5.2 INITIALIZATION DETAILS of SAE J1978, reproduced below as scanned from the SAE HS-3000 manual, that involves sending different device codes or "messages", in the form of signals referred to as a "mode 1 PID 0 request message" in a manner appropriate for each of the SAE J1850 41.6 Kbps PWM bus, SAE J1850 10.4 Kbps VPW, and ISO 9141-2. In particular, as many as three device codes may initially be sent, at least two of which will be non-working for the particular vehicle and one of which is a working device code for the vehicle. See page 37, SAE J1978 at 6.5.1. (" While there are three types of communication interfaces that could be used to

Flick '278 Claims	PRIOR ART – U.S. Pat. No. 6,028,537 to Suman et al.
	access the OBD II functions in a given vehicle (i.e., SAE J1850 41.6 Kbps PWM, SAE J1850 10.4 Kbps VPW and ISO 9141-2), only one is allowed to be used in any one vehicle to access all supported OBD II functions.") a. Test for SAE J1850 41.6 Kbps PWM (1) Step 1—Enable the SAE J1850 41.6 Kbps PWM interface (2) Step 2—Send a mode 1 PID 0 request message (3) Step 3—If a mode 1 PID 0 response message is received then SAE J1850 41.6 Kbps PWM is the type of interface used in a vehicle for OBD II support. b. Test for SAE J1850 10.4 Kbps VPW (1) Step 1—Enable the SAE J1850 10.4 Kbps VPW interface (2) Step 2—Send a mode 1 PID 0 request message (3) Step 3—If a mode 1 PID 0 response message is received then SAE J1850 10.4 Kbps VPW is the type of interface used in a vehicle for OBD II support. c. Test for ISO 9141 CARB (1) Step 1—Enable the ISO 9141-2 interface (2) Step 2—If the initialization sequence defined in ISO 9141-2 is completed successfully, then ISO 9141-2 is the type of interface used in a vehicle for OBD II support. The previous tests may be performed in any order and where possible may be performed in parallel. The mode 1 PID 0 request and response messages are defined in SAE J1979. SAE J1978 indicates that the "mode 1 PID 0" request and response messages are defined in SAE J1979, which starts on page 46 of the SAE HS-3000 Manual. See page 37, SAE J1978, Section 6.5.2., "Initialization Details". Requester further notes that transmission of the mode 1 PID 0 device code has previously been asserted as satisfying this requirement of the claim. See Exhibit F, Plaintiff's Disclosure of Initial Infringement Contentions, starting on page A-45. SAE J1979, starting on page 46, elaborates on the device codes that are used by the controller during bus detection, including the different device codes utilized by vehicles that employ a 10.4 Kbps interface (i.e., a first device code that includes 686A (hex) in the header of the request message) and vehicles that employ a 41.6 Kbps interface (i.e. a second device code that includes

Flick '278 Claims	PRIOR ART – U.S. Pat. No. 6,028,537 to Suman et al.
	616A (hex) in the header of the request message). See e.g., FIGURE 1 on page 51, reproduced below, of SAE J1979.

Header Bytes (Hex)			Data Bytes								
Priority /Type	Target Address	Source Address	#1	#2	#3	#4	#5	#6	#7	ERR	RSP
Diagnostic Request at 10.4 Kbps (J1850 and ISO 9141 CARB)											
68	6A	Fx	Maximum 7 data bytes							Yes	No
Diagnostic Response at 10.4 Kbps (J1850 and ISO 9141 CARB)											
48	6B	addr	Maximum 7 data bytes							Yes	No
Diagnostic Request at 41.6 Kbps (J1850)											
61	6A	Fx	Maximum 7 data bytes							Yes	Yes
Diagnostic Response at 41.6 Kbps (J1850)											
41	6B	addr	Maximum 7 data bytes							Yes	Yes

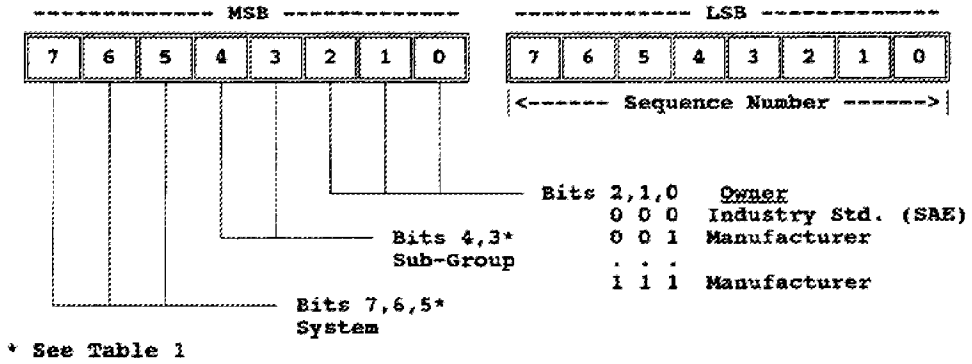
FIGURE 1—DIAGNOSTIC MESSAGE FORMAT

and a downloading interface for permitting downloading of enabling data related to the at least one corresponding vehicle device code for use by said multi-vehicle compatible controller;	the Suman '537 patent, col. 36, lines 31-52: "To achieve these aspects and other advantages, the vehicle accessory control system of the present invention includes a plurality of electrically-operated vehicle accessories, a receiver to be mounted in a vehicle for receiving RF signals from a land-based transmitter, and a control circuit coupled to the receiver and to the vehicle accessories for controlling the operation of the vehicle accessories in accordance with a control program. The RF signals include an address uniquely identifying the vehicle and a reprogramming signal for reprogramming the operation of at least one of the vehicle accessories. The control circuit includes an input interface for receiving information regarding a plurality of sensed conditions, control means for controlling the operation of the vehicle accessories in accordance with the control program and in response to sensed conditions received from the input interface. The control circuit further includes reprogramming means for selectively reprogramming the control program in response to the detection of an RF signal

Flick '278 Claims	PRIOR ART – U.S. Pat. No. 6,028,537 to Suman et al.
	including an address identifying the vehicle and the reprogramming signal, to selectively change the manner in which the control means controls the operation of at least one of the vehicle accessories."
said downloading interface comprising a connector for temporary connection to a downloading device.	It is inherently disclosed that a cellular telephone connected to a RS-232 serial port can be connected and disconnected.
18. A multi-vehicle compatible tracking unit for a vehicle comprising a vehicle data bus extending throughout the vehicle, the multi-vehicle compatible vehicle tracking unit comprising:	The Suman '537 patent discloses a multi-vehicle compatible tracking unit for a vehicle comprising a data bus, such as a multiplex bus. See, e.g., col. 8, line 58-col. 9, line 16; Figs. 3, 5, 44, 45; see also col. 36, line 53-col. 37, line 17. The Suman '537 patent notes that the multiplexing scheme for such a bus is set forth in SAE J1850. In addition to the teachings of the Suman '537 patent, it would have been obvious to one skilled in the art that a tracking unit compatible with an SAE standard bus would be compatible with multiple vehicles.
a vehicle position determining device;	The Suman '537 patent discloses a GPS or DGPS as a vehicle position determining device. See, e.g., Figs. 3, 5.
a wireless communications device;	The Suman '537 patent discloses a transmitter (see e.g., Figs. 1a, 1b, 2; col. 3, lines 1-3; col. 7, lines 26-30) and a receiver (see e.g., Figs. 1b, 3, 44; col. 3, lines 1-3; col. 7, lines 31-34) for wirelessly receiving signals from the transmitter. In one embodiment disclosed in the Suman '537 patent, the receiver is a cell phone (and thus also includes a transmitter) coupled to the vehicle bus. See, e.g., Figs. 5, 45; col. 36, line 53 – col. 37, line 17.
a multi-vehicle compatible controller for cooperating with said vehicle position determining device and said wireless communications device to send vehicle position information;	The Suman '537 patent discloses a controller that cooperates with the GPS device and the wireless communication device to send vehicle position information. See, e.g., col. 2 lines 3-10; see also col. 6, lines 19-49; col. 11, lines 8-13; col. 12, lines 7-13; col. 14, lines 11-21.
said multi-vehicle compatible controller to be coupled to the vehicle data bus for communication thereover with at least one vehicle device using at least one corresponding vehicle device code from among a plurality thereof for different	The Suman '537 patent discloses that the controller is coupled to the vehicle data bus for communication thereover with at least one vehicle device, using a corresponding vehicle device code, from among a plurality of codes for different vehicles. See, e.g., Figs. 3, 5, 44, 45, 47; see also col. 43, lines 27-47 (including sensors and controls for doors, windows, ignition, speedometer, RPMs, fuel level, turn signals, lights, gears, temperature, oil pressure, defroster, headlights, etc.).

Flick '278 Claims	PRIOR ART – U.S. Pat. No. 6,028,537 to Suman et al.
vehicles; and	The Suman '537 patent, col. 37, lines 15 – 17: "The multiplexing scheme is set forth in SAE standard J1850 and is universally used in the automotive industry." It is inherently disclosed that the J1850 bus described in the Suman '537 patent is included in a variety of different makes and models of vehicles per the federally mandated standard. Furthermore, as described in detail below, a J1850 bus implemented according to the SAE standards provides for communicating with at least one vehicle device using at least one corresponding vehicle device code from among a plurality thereof for different vehicles, including at least one "SAE" defined device codes and up to seven "Reserved Manufacturer" defined device codes for a particular vehicle device, as described in detail below. In particular, the Society of Automotive Engineers (SAE) is a U.S. based standards organization that publishes the standards for implementing the SAE "J1850 bus" used by the Suman '537 patent to communicate with vehicle devices. Furthermore, the SAE standards provide the implementation details for communicating with vehicle devices using the vehicle bus via an OBD II diagnostic connector mandated in every new vehicle sold since 1996. In particular, the SAE standard for implementation of the J1850 vehicle bus is documented in, among many other available publications, the Society of Automotive Engineers (SAE) HS-3000 Manual (1994 edition), entitled "SAE On-Board Diagnostics for Light and Medium Duty Vehicles Standards Manual" (SAE HS-3000 Manual). The SAE HS-3000 Manual sets forth the various standards for communicating with vehicle devices on the vehicle bus, each standard under a particular SAE heading number (e.g., J1850, J2178, among various other standards) related to various aspects of vehicle control systems, including vehicle busses (e.g. SAE J1850, starting on page 91) and communicating, using device codes, with vehicle devices using the vehicle bus via an OBD II diagnostic connector mandated in every new vehicle sold since 1996 (e.g. SAE J1978 starting on page 33 , SAE J1979 starting on page 46 and SAE J2178/1-2178/2 starting on page 200). The SAE HS-3000 Manual discloses using at least one corresponding vehicle device code from among a plurality thereof for different vehicles, and provides details for hundreds of different

Flick '278 Claims	PRIOR ART – U.S. Pat. No. 6,028,537 to Suman et al.
	device codes for different vehicle devices, which include SAE defined device codes and manufacturer defined device codes. In particular, SAE J2178 which starts on page 211 of the SAE HS-3000 Manual and consists of four parts, 1 through 4, defines sets of vehicle device codes, or "messages", for hundreds of different types of vehicle devices. The specific vehicle device code will depend upon whether a particular manufacturer implements the SAE J2178 defined vehicle code or whether a vehicle supports a manufacturer specific vehicle code. Page 156, SAE J1850, Section 4.1 elaborates on the definition of the vehicle codes as follows: "Normal Vehicle Operation (Down the Road) Messages: The messages sent during non-diagnostic operations are called normal vehicle operation messages. These normal vehicle operation messages are used for communication from a transmitter to one or more receivers across this network. The normal operation messages have been developed by the SAE for this communication network and are defined in SAE-J2178. SAE defined messages and the 'Reserved' messages of SAE J2178 shall remain specific to those definitions. In SAE J2178, there is also a set-of 'Reserved-Manufacturer' messages which, if used, will have meanings specific to a vehicle manufacturer but are likely to be different between manufacturers." J2178/1, starting on page 200 of the SAE HS-3000 Manual, includes 10 tables defining vehicle device codes for a large variety of different categories of vehicle devices (the specific device codes are specified in J2178/2). Section 4 of SAE J2178/2 on page 213 specifies the Parameter Reference Number (PRN) Structure utilized within the SAE J2178 messages to use a particular device code from among a plurality thereof for different vehicles, which is illustrated below. Section 4 notes that "Some of the PRN numbers are assigned or reserved for SAE definitions but the majority are reserved for individual motor vehicle manufacturers to coordinate and assign."

Flick '278 Claims	PRIOR ART – U.S. Pat. No. 6,028,537 to Suman et al.
	Figure 3 shows the basic structure of PRNs and Tables 1 and 2 show bit assignments and address ranges based on these assignments.  FIGURE 3—PRN STRUCTURE The first three bits define the system and the next two bits define the sub-group. For each sub-group, three additional bits specify which of eight possible device codes are being used for a particular vehicle device, representing the Industry Std. device code (000) or one of seven manufacturer specific device codes (001-111). Accordingly, the standard specifies at least eight vehicle device codes for each PRN (which include 1 Industry Standard, and 7 manufacturer specific device codes), and thus teaches "using at least one corresponding vehicle device code from among a plurality thereof for different vehicles". Furthermore, SAE J2178/2, which starts on page 211 of the SAE HS-3000 Manual, provides the "Standardized Parameter Definitions" for standardized messages on SAE J1850 Class B networks. SAE J2178/2 sets out respective sets of device codes for a host of vehicle devices that may be present on a given vehicle. For example, Table 2 on page 215, partially reproduced below, provides the address map of the SAE standard and reserved manufacturer specific (Reserved MFG) subgroups of messages for different classes of vehicle devices.

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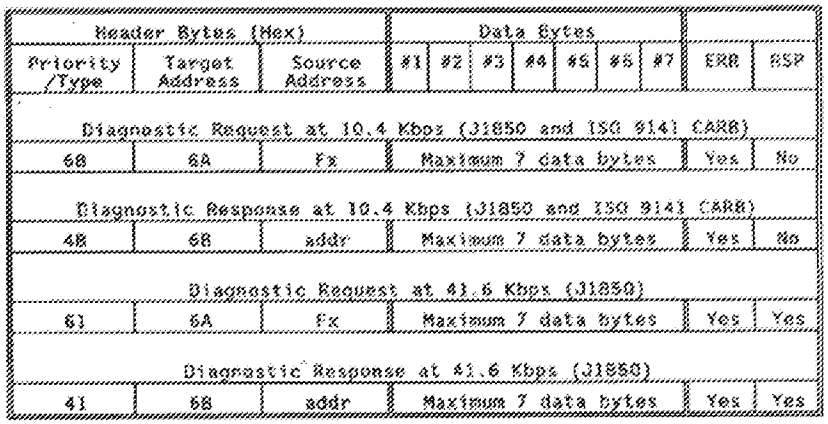
TABLE 2—SAE/MFG PRN RANGES

System	Subgroup	Address Map	Size
Powertrain	J1979 Compatible - SAE	0000 - 00FF	0.25K
	Reserved - MFG	0100 - 07FF	1.75K
	Reserved - SAE	0800 - 08FF	0.25K
	Reserved - MFG	0900 - 0FFF	1.75K
	Engine - SAE	1000 - 10FF	0.25K
	Engine - MFG	1100 - 17FF	1.75K
	Transmission - SAE	1800 - 18FF	0.25K
	Transmission - MFG	1900 - 1FFF	1.75K
Chassis	Reserved - SAE	2000 - 20FF	0.25K
	Reserved - MFG	2100 - 27FF	1.75K
	Brakes/Tires/Wheels - SAE	2800 - 28FF	0.25K
	Brakes/Tires/Wheels - MFG	2900 - 2FFF	1.75K
	Steering - SAE	3000 - 30FF	0.25K
	Steering - MFG	3100 - 37FF	1.75K
	Suspension - SAE	3800 - 38FF	0.25K
	Suspension - MFG	3900 - 3FFF	1.75K

SAE J2178/2 provides the details of device codes for hundreds of different vehicle devices within the address map ranges indicated in the above table. Section 4 of SAE J2178/2 on page 213 specifies that three bits are used to define eight different device codes for a given vehicle device including a SAE standard device code for the specific type of vehicle device and seven manufacturer specific device codes for that specific type of vehicle device.

Furthermore, in order to allow a controller to be compatible with various busses that are used on a plurality of different vehicles, including the two types of J1850 buses that may be utilized, the controller uses a bus discovery procedure that is described on page 37, section 6.5.2 INITIALIZATION DETAILS of SAE J1978, reproduced below as scanned from the SAE HS-3000 manual, that involves sending different device codes or "messages", in the form of signals referred to as a "mode 1 PID 0 request message" in a manner appropriate for each of the SAE J1850 41.6 Kbps PWM bus, SAE J1850 10.4 Kbps VPW, and ISO 9141-2. In particular, as many as three device codes may initially be sent, at least two of which will be non-working for the particular vehicle and one of which is a working device code for the vehicle. See page 37, SAE J1978 at 6.5.1. (" While there are three types of communication interfaces that could be used to

Flick '278 Claims	PRIOR ART – U.S. Pat. No. 6,028,537 to Suman et al.
	access the OBD II functions in a given vehicle (i.e., SAE J1850 41.6 Kbps PWM, SAE J1850 10.4 Kbps VPW and ISO 9141-2), only one is allowed to be used in any one vehicle to access all supported OBD II functions.") a. Test for SAE J1850 41.6 Kbps PWM (1) Step 1—Enable the SAE J1850 41.6 Kbps PWM interface (2) Step 2—Send a mode 1 PID 0 request message (3) Step 3—If a mode 1 PID 0 response message is received then SAE J1850 41.6 Kbps PWM is the type of interface used in a vehicle for OBD II support. b. Test for SAE J1850 10.4 Kbps VPW (1) Step 1—Enable the SAE J1850 10.4 Kbps VPW interface (2) Step 2—Send a mode 1 PID 0 request message (3) Step 3—If a mode 1 PID 0 response message is received then SAE J1850 10.4 Kbps VPW is the type of interface used in a vehicle for OBD II support. c. Test for ISO 9141 CARB (1) Step 1—Enable the ISO 9141-2 interface (2) Step 2—If the initialization sequence defined in ISO 9141-2 is completed successfully, then ISO 9141-2 is the type of interface used in a vehicle for OBD II support. The previous tests may be performed in any order and where possible may be performed in parallel. The mode 1 PID 0 request and response messages are defined in SAE J1979. SAE J1978 indicates that the "mode 1 PID 0" request and response messages are defined in SAE J1979, which starts on page 46 of the SAE HS-3000 Manual. See page 37, SAE J1978, Section 6.5.2., "Initialization Details". Requester further notes that transmission of the mode 1 PID 0 device code has previously been asserted as satisfying this requirement of the claim. See Exhibit F, Plaintiff's Disclosure of Initial Infringement Contentions, starting on page A-45. SAE J1979, starting on page 46, elaborates on the device codes that are used by the controller during bus detection, including the different device codes utilized by vehicles that employ a 10.4 Kbps interface (i.e., a first device code that includes 686A (hex) in the header of the request message) and vehicles that employ a 41.6 Kbps interface (i.e. a second device code that includes

Flick '278 Claims	PRIOR ART – U.S. Pat. No. 6,028,537 to Suman et al.
	616A (hex) in the header of the request message). See e.g., FIGURE 1 on page 51, reproduced below, of SAE J1979.  FIGURE 1—DIAGNOSTIC MESSAGE FORMAT
a downloading interface for permitting downloading of enabling data related to the at least one corresponding vehicle device code for use by said multi-vehicle compatible controller;	the Suman '537 patent, col. 36, lines 31-52: "To achieve these aspects and other advantages, the vehicle accessory control system of the present invention includes a plurality of electrically-operated vehicle accessories, a receiver to be mounted in a vehicle for receiving RF signals from a land-based transmitter, and a control circuit coupled to the receiver and to the vehicle accessories for controlling the operation of the vehicle accessories in accordance with a control program. The RF signals include an address uniquely identifying the vehicle and a reprogramming signal for reprogramming the operation of at least one of the vehicle accessories. The control circuit includes an input interface for receiving information regarding a plurality of sensed conditions, control means for controlling the operation of the vehicle accessories in accordance with the control program and in response to sensed conditions received from the input interface. The control circuit further includes reprogramming means for selectively reprogramming the control program in response to the detection of an RF signal including an address identifying the vehicle and the reprogramming signal, to selectively change the manner in which the control means controls the operation of at least one of the vehicle accessories."

Flick '278 Claims	PRIOR ART – U.S. Pat. No. 6,028,537 to Suman et al.
said downloading interface comprising a wireless receiver for temporary connection to a downloading device.	See above. The receiver receiving RF signals is a wireless receiver. It is inherently disclosed that wireless communications include a temporary connection.

Exhibit D

The '278 Patent	PRIOR ART - US Patent 5,732,074 to Spaur et al.
1. A multi-vehicle compatible tracking unit for a vehicle comprising a vehicle data bus extending throughout the vehicle, the multi-vehicle compatible tracking unit comprising, lines	The Spaur '074 patent teaches "The controller 30 is responsible for a number of functions related to understanding and acting on information received from one or more remote stations 10, obtaining and responding to 35 requested information and operatively functioning with information including data available from other elements in the vehicle. In that regard, the controller 30 communicates with a controller interface 34 that electrically links the controller 30 with a vehicle standardized network 40. The vehicle standardized network 40 includes a controller unit 44 that provides appropriate message and data handling functions associated with sending and receiving information including data from each of a plurality of physical vehicle devices 50 that are operatively connected to a bus 46 of the vehicle standardized network 40. Like the remote standardized network 14, the vehicle standardized network 40 is an established and previously developed network that interfaces with components in a vehicle, such as engine related components in order to provide desired or requested data concerning the operations or status of these components. (Spaur '074 patent, col. 6, lines 31-50) The Spaur '074 patent states: "In order to provide the necessary communications protocol between the controller 30 and the vehicle devices 50a-50n, another standardized network communications link is provided." "This further standardized communications network is responsible for handling the communication exchange functions associated with sending and receiving information relative to the vehicle devices 50." (Spaur '074 patent, col. 10, lines 10 – 18). The Spaur '074 patent further states: "In a preferred embodiment, this further standardized network is a network that has been previously devised and is commonly used in a number of makes and models of vehicles. This communications network is defined as the controller area network (CAN) 124. Although the CAN 124 has previously commonly been used in operative association with automotive electronics including engine control elements, sensors, lamps, electric windows etc., the present invention also enables the CAN 124 to be used with a variety of other devices contained in the vehicle, such as the previously described devices." (Spaur '074 patent, col. 10, lines 18-39) See also FIG. 1 and FIG. 2 of the Spaur '074 patent.
a vehicle position determining device;	The Spaur '074 patent discloses a GPS receiver (vehicle position determining device) at column 14, lines 4 – 9: "At block 300, vehicle positioning data is available from one of the vehicle devices 50, which might

	be a GPS. On a requested or regular input scheme, such vehicle device data is sent to the CAN bus 126 at block 304. The CAN controller 122 is responsible for controlling the receipt and transmitting of such data to the controller 30 at block 308." Additionally, the Spaur '074 patent discloses several wireless communication devices. For example, the wireless device 18 and remote air link transfer protocol modem 20 in Fig. 1, or the cellular phone 80 and vehicle CDPD network modem 82 in Fig. 2. It was notoriously well-known as of the earliest claimed priority date of the Spaur '074 patent that cellular telephones are capable of determining position information, both by the inclusion of GPS receivers in the cellular phone (see, e.g., Darnell in 1991) and by calculating position using cellular tower triangulation techniques (see e.g. Song in 1993).
a wireless communications device;	The Spaur '074 patent states: "In one embodiment, the cellular digitized packet data (CDPD) network provides the desired link including arrangement of information being communicated and where the destination site, namely the particular vehicle, is found in the network. If a channel is available to the particular vehicle, the CDPD link can proceed to transmit the Internet packets to the vehicle of interest. Instead of the CDPD network as the link, a communications interface could be employed that involves data only, such as a two way paging interface with the vehicle. (Spaur '074 patent, col. 2, lines 41-50) "In one embodiment, the communication information is formatted in accordance with a CDPD (cellular digitized packet data) configuration. At the vehicle, this information is received by a wireless device 18 that is able to transmit and receive information via the airlink. The wireless device 18 is operatively associated with a vehicle airlink transfer protocol modem 20 for the proper handling of the airlink formatted transmission. In one embodiment, the wireless device 18 includes a cellular phone that is selected from a plurality of conventional or commercially available cellular phones. The wireless device 18 bi-directionally communicates with a controller 30 contained in the vehicle through a network protocol converter 26 using a wireless device interface 22. The wireless device interface 22 establishes the necessary signal compatibilities and connections from the wireless device 18." (Spaur '074 patent, col. 6, lines 1-16) "The Internet 68 operatively communicates with a standardized network transmission protocol that permits information to be bi-directionally communicated over the airlink and, in one embodiment, includes a remote CDPD network modem 76 which prepares the information in a conventionally acceptable manner for transmission and communication with a cellular phone 80 which is contained in

	the vehicle. The cellular phone 80 can be any selected one of a number of conventional cellular phones that have the capability of properly communicating with the desired formatted or arranged information. In the illustrated embodiment of FIG. 2, the cellular phone 80 is operatively associated with a vehicle CDPD network modem 82 that demodulates the received information so that it is acceptable for further handling or processing. (Spaur '074 patent, col. 7, lines 40-54)
a multi-vehicle compatible controller for cooperating with said vehicle position determining device and said wireless communications device to send vehicle position information;	The Spaur '074 patent states: "At block 300, vehicle positioning data is available from one of the vehicle devices 50, which might be a GPS. On a requested or regular input scheme, such vehicle device data is sent to the CAN bus 126 at block 304. The CAN controller 122 is responsible for controlling the receipt and transmitting of such data to the controller 30 at block 308. The vehicle data that is to be transmitted over the wire link, in accordance with the predetermined or determinable procedure, is appropriately processed, analyzed or otherwise acted on using the controller 30 at block 312. In one embodiment, vehicle device data, such as GPS data, do not rely on the web server 102 but may utilize a different communications pathway, such as E-mail. In any event, the controller 30 gates the vehicle location data to the cellular phone having the vehicle airlink transfer protocol modem 20, such as a CDPD network modem 82, at block 316. The vehicle location data is properly formatted and transmitted through the cellular phone over the airlink at block 320." (Spaur '074 patent, col. 14, lines 4-21)
said multi-vehicle compatible controller to be coupled to the vehicle data bus for communication thereover with at least one vehicle device using at least one corresponding vehicle device code from among a plurality thereof for different vehicles; and	The Spaur '074 patent states: "The controller 30 is responsible for a number of functions related to understanding and acting on information received from one or more remote stations 10, obtaining and responding to 35 requested information and operatively functioning with information including data available from other elements in the vehicle. In that regard, the controller 30 communicates with a controller interface 34 that electrically links the controller 30 with a vehicle standardized network 40. The vehicle standardized network 40 includes a controller unit 44 that provides appropriate message and data handling functions associated with sending and receiving information including data from each of a plurality of physical vehicle devices 50 that are operatively connected to a bus 46 of the vehicle standardized network 40. Like the remote standardized network 14, **the vehicle standardized network 40 is an established and previously developed network that interfaces with components in a vehicle**, such as engine related components in order to provide desired or requested data concerning the operations or status of these components." (Spaur '074 patent, col. 6, lines 31-50) "In interfacing with the CAN 124, the controller 30 also has device drivers 128 that are useful in

	achieving desired communications in both directions between the CAN 124 and the controller 30. For example, the processor 90 is able to obtain data or other information from the vehicle devices 50a-50n using the device drivers 128 and which information can be used by the processor 90 including, for example, storing data in the data memory 106 for subsequent access and transmission to a remote station 10." (Spaur '074 patent, col. 10, lines 55-64) The Society of Automotive Engineers (SAE) is a U.S. based standards organization that has published various standards related to vehicle standardized networks. Furthermore, the various SAE standards provide the implementation details for communicating with vehicle devices using the vehicle bus via an OBD II diagnostic connector mandated in every new vehicle sold since 1996. In particular, the SAE standards are documented in, among many other available publications, the Society of Automotive Engineers (SAE) HS-3000 Manual (1994 edition), entitled "SAE On-Board Diagnostics for Light and Medium Duty Vehicles Standards Manual" (SAE HS-3000 Manual). The SAE HS-3000 includes various standards for communicating with vehicle devices on the vehicle bus, each standard under a particular SAE heading number (e.g., J1850, J2178, among various other standards) related to various aspects of vehicle control systems, including vehicle busses (e.g. SAE J1850, starting on page 91) and communicating, using device codes, with vehicle devices using the vehicle bus via an OBD II diagnostic connector mandated in every new vehicle sold since 1996 (e.g. SAE J1978 starting on page 33 , SAE J1979 starting on page 46 and SAE J2178/1-2178/2 starting on page 200). The HS-3000 Manual provides details for hundreds of different device codes for different vehicle devices, which include SAE defined device codes and manufacturer defined device codes. In particular, SAE J2178 which starts on page 211 of the SAE HS-3000 Manual and consists of four parts, 1 through 4, defines sets of vehicle device codes, or "messages", for hundreds of different types of vehicle devices. The specific vehicle device code will depend upon whether a particular manufacturer implements the SAE J2178 defined vehicle code or whether a vehicle supports a manufacturer specific vehicle code. Page 156, SAE J1850, Section 4.1 elaborates on the definition of the vehicle codes as follows: "Normal Vehicle Operation (Down the Road) Messages: The messages sent during non-diagnostic operations are called normal vehicle operation messages. These normal vehicle operation messages are used for communication from a transmitter to one or more receivers across this network. The normal operation messages have been developed by the SAE for this communication network and are defined in SAE-

J2178. SAE defined messages and the 'Reserved' messages of SAE J2178 shall remain specific to those definitions. In SAE J2178, there is also a set-of 'Reserved-Manufacturer' messages which, if used, will have meanings specific to a vehicle manufacturer but are likely to be different between manufacturers."

J2178/1, starting on page 200 of the SAE HS-3000 Manual, includes 10 tables defining vehicle device codes for a large variety of different categories of vehicle devices (the specific device codes are specified in J2178/2).

Section 4 of SAE J2178/2 on page 213 specifies the Parameter Reference Number (PRN) Structure utilized within the SAE J2178 messages to use a particular device code from among a plurality thereof for different vehicles, which is illustrated below. Section 4 notes that "Some of the PRN numbers are assigned or reserved for SAE definitions but the majority are reserved for individual motor vehicle manufacturers to coordinate and assign."

Figure 3 shows the basic structure of PRNs and Tables 1 and 2 show bit assignments and address ranges based on these assignments.

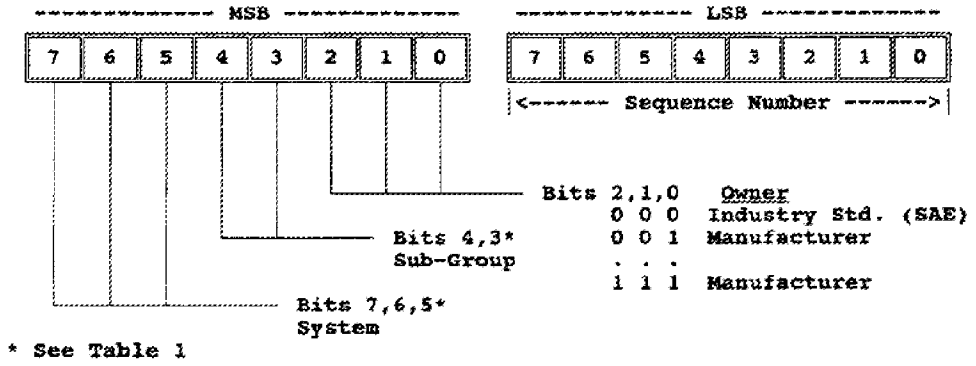


FIGURE 3--PRN STRUCTURE

The first three bits define the system and the next two bits define the sub-group. For each sub-group, three additional bits specify which of eight possible device codes are being used for a particular vehicle device, representing the Industry Std. device code (000) or one of seven manufacturer specific device

codes (001-111). Accordingly, the standard specifies at least eight vehicle device codes for each PRN (which include 1 Industry Standard, and 7 manufacturer specific device codes).

SAE J2178/2, which starts on page 211 of the SAE HS-3000 Manual, provides the "Standardized Parameter Definitions" for standardized messages on SAE J1850 Class B networks. SAE J2178/2 sets out respective sets of device codes for a host of vehicle devices that may be present on a given vehicle. For example, Table 2 on page 215, partially reproduced below, provides the address map of the SAE standard and reserved manufacturer specific (Reserved MFG) subgroups of messages for different classes of vehicle devices.

TABLE 2—SAE/MFG PRN RANGES

System	Subgroup	Address Map	Size
Powertrain	J1979 Compatible - SAE	0000 - 00FF	0.25K
	Reserved - MFG	0100 - 07FF	1.75K
	Reserved - SAE	0800 - 08FF	0.25K
	Reserved - MFG	0900 - 0FFF	1.75K
	Engine - SAE	1000 - 10FF	0.25K
	Engine - MFG	1100 - 17FF	1.75K
	Transmission - SAE	1800 - 18FF	0.25K
	Transmission - MFG	1900 - 1FFF	1.75K
Chassis	Reserved - SAE	2000 - 20FF	0.25K
	Reserved - MFG	2100 - 27FF	1.75K
	Brakes/Tires/Wheels - SAE	2800 - 28FF	0.25K
	Brakes/Tires/Wheels - MFG	2900 - 2FFF	1.75K
	Steering - SAE	3000 - 30FF	0.25K
	Steering - MFG	3100 - 37FF	1.75K
	Suspension - SAE	3800 - 38FF	0.25K
	Suspension - MFG	3900 - 3FFF	1.75K

SAE J2178/2 provides the details of device codes for hundreds of different vehicle devices within the address map ranges indicated in the above table. Section 4 of SAE J2178/2 on page 213 specifies that three bits are used to define eight different device codes for a given vehicle device including a SAE standard device code for the specific type of vehicle device and seven manufacturer specific device codes for that specific type of vehicle device.

The SAE HS-3000 Manual discloses using at least one corresponding vehicle device code from among a plurality thereof for different vehicles. In particular, in order to allow a controller to be compatible with various busses that are used on a plurality of different vehicles, the controller uses a bus discovery procedure that is described on page 37, section 6.5.2 INITIALIZATION DETAILS of SAE J1978, reproduced below as scanned from the SAE HS-3000 manual, that involves sending different device codes or "messages", in the form of signals referred to as a "mode 1 PID 0 request message" in a manner appropriate for each of the SAE J1850 41.6 Kbps PWM bus, SAE J1850 10.4 Kbps VPW, and ISO 9141-2. In particular, as many as three device codes may initially be sent, at least two of which will be non-working for the particular vehicle and one of which is a working device code for the vehicle. See page 37, SAE J1978 at 6.5.1.(" While there are three types of communication interfaces that could be used to access the OBD II functions in a given vehicle (i.e., SAE J1850 41.6 Kbps PWM, SAE J1850 10.4 Kbps VPW and ISO 9141-2), only one is allowed to be used in any one vehicle to access all supported OBD II functions.")

a. Test for SAE J1850 41.6 Kbps PWM
   (1) Step 1—Enable the SAE J1850 41.6 Kbps PWM interface
   (2) Step 2—Send a mode 1 PID 0 request message
   (3) Step 3—If a mode 1 PID 0 response message is received then SAE J1850 41.6 Kbps PWM is the type of interface used in a vehicle for OBD II support.

b. Test for SAE J1850 10.4 Kbps VPW
   (1) Step 1—Enable the SAE J1850 10.4 Kbps VPW interface
   (2) Step 2—Send a mode 1 PID 0 request message
   (3) Step 3—If a mode 1 PID 0 response message is received then SAE J1850 10.4 Kbps VPW is the type of interface used in a vehicle for OBD II support.

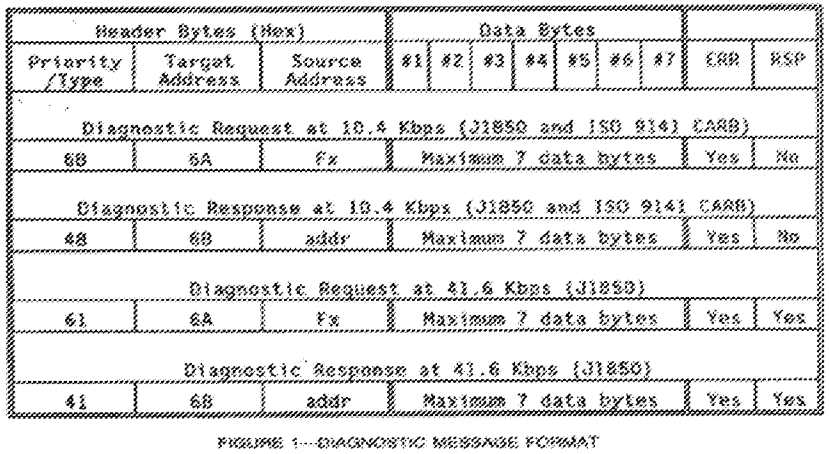
c. Test for ISO 9141 CARB
   (1) Step 1—Enable the ISO 9141-2 interface
   (2) Step 2—If the initialization sequence defined in ISO 9141-2 is completed successfully, then ISO 9141-2 is the type of interface used in a vehicle for OBD II support.

The previous tests may be performed in any order and where possible may be performed in parallel.

The mode 1 PID 0 request and response messages are defined in SAE J1979.

SAE J1978 indicates that the "mode 1 PID 0" request and response messages are defined in SAE J1979, which starts on page 46 of the SAE HS-3000 Manual. See page 37, SAE J1978, Section 6.5.2., "Initialization Details". Requester further notes that transmission of the mode 1 PID 0 device code has previously been asserted as satisfying this requirement of the claim. See Exhibit F, Plaintiff's Disclosure of Initial Infringement Contentions, starting on page A-45.

SAE J1979, starting on page 46, elaborates on the device codes that are used by the controller during bus detection, including the different device codes utilized by vehicles that employ a 10.4 Kbps interface (i.e., a first device code that includes 686A (hex) in the header of the request message) and vehicles that employ a 41.6 Kbps interface (i.e. a second device code that includes 616A (hex) in the header of the request message). See e.g., FIGURE 1 on page 51, reproduced below, of SAE J1979.



Header Bytes (Hex)			Data Bytes								
Priority /Type	Target Address	Source Address	#1	#2	#3	#4	#5	#6	#7	CRC	RSP
Diagnostic Request at 10.4 Kbps (J1850 and ISO 9141 CARB)											
68	6A	Fx	Maximum 7 data bytes							Yes	No
Diagnostic Response at 10.4 Kbps (J1850 and ISO 9141 CARB)											
48	6B	addr	Maximum 7 data bytes							Yes	No
Diagnostic Request at 41.6 Kbps (J1850)											
61	6A	Fx	Maximum 7 data bytes							Yes	Yes
Diagnostic Response at 41.6 Kbps (J1850)											
41	6B	addr	Maximum 7 data bytes							Yes	Yes

FIGURE 1—DIAGNOSTIC MESSAGE FORMAT

The Spaur '074 patent teaches communicating with vehicle devices via a "standardized network…commonly used in a number of makes and models of vehicles" (Spaur '074 patent, col. 10, lines 18-21). The SAE standards, including the SAE HS-3000 Manual, were published for the specific purpose of teaching people of ordinary skill in the art how to communicate with vehicle devices via the "standardized networks". Accordingly, it would have been obvious to utilize the teachings described in SAE HS-3000 Manual to provide multi-vehicle compatibility because the Spaur '074 patent expressly directs using standards, such as the SAE standards, for the purpose for which the standards were

	created.
a downloading interface for permitting downloading of enabling data related to the at least one corresponding vehicle device code for use by said multi-vehicle compatible controller.	The Spaur '074 patent teaches that the wireless communications device can be utilized to download enabling data: "since bi-directional communications involving a vehicle are conducted wirelessly for at least a portion of the communications link, it is necessary for the Internet to communicate with an appropriate interface or network that wirelessly links with the vehicle. In one embodiment, the cellular digitized packet data (CDPD) network provides the desired link including arrangement of information being communicated and where the destination site, namely the particular vehicle, is found in the network." (Spaur '074 patent, col. 2, lines 37 – 46). "A combination of controller related components are containable in a vehicle for responding to requests from remote sites, obtaining and storing information associated with vehicle devices and running executable software that may be available in the program memory of the controller or downloaded from the remote site, while handling and configuring information including data that is communicative with the remote site over an established network, such as the Internet." (Spaur '074 patent, col. 4, line 64 – col. 5, line 5). Furthermore, "Preferably, the controller in the vehicle is also associated with an interface for communication with one or more available systems, such as an RS232 connection, an Ethernet connection and/or a PCMCIA unit. In a related embodiment, the controller includes a direct communications port for receiving and sending information without requiring the wireless device and the Internet connection to the wireless device." (Spaur '074 patent, col. 4, lines 38 – 45).
13. A multi-vehicle compatible tracking unit for a vehicle comprising a vehicle data bus extending throughout the vehicle, the multi-vehicle compatible vehicle tracking unit comprising, lines	As described in the Spaur '074 patent: "The controller 30 is responsible for a number of functions related to understanding and acting on information received from one or more remote stations 10, obtaining and responding to requested information and operatively functioning with information including data available from other elements in the vehicle. In that regard, the controller 30 communicates with a controller interface 34 that electrically links the controller 30 with a vehicle standardized network 40. The vehicle standardized network 40 includes a controller unit 44 that provides appropriate message and data handling functions associated with sending and receiving

	information including data from each of a plurality of physical vehicle devices 50 that are operatively connected to a bus 46 of the vehicle standardized network 40. Like the remote standardized network 14, the vehicle standardized network 40 is an established and previously developed network that interfaces with components in a vehicle, such as engine related components in order to provide desired or requested data concerning the operations or status of these components." (Spaur '074 patent, col. 6, lines 31-50) The Spaur '074 patent states: "In order to provide the necessary communications protocol between the controller 30 and the vehicle devices 50a-50n, another standardized network communications link is provided." "This further standardized communications network is responsible for handling the communication exchange functions associated with sending and receiving information relative to the vehicle devices 50." (Spaur '074 patent, col. 10, lines 10 – 18). "In a preferred embodiment, this further standardized network is a network that has been previously devised and is commonly used in a number of makes and models of vehicles. This communications network is defined as the controller area network (CAN) 124. Although the CAN 124 has previously commonly been used in operative association with automotive electronics including engine control elements, sensors, lamps, electric windows etc., the present invention also enables the CAN 124 to be used with a variety of other devices contained in the vehicle, such as the previously described devices." (Spaur '074 patent, col. 10, lines 18-39) See also FIG. 1 and FIG. 2 of the Spaur '074 patent.
a vehicle position determining device;	The Spaur '074 patent discloses a GPS receiver (vehicle position determining device) at column 14, lines 4 – 9: > At block 300, vehicle positioning data is available from one of the vehicle devices 50, which might be a GPS. On a requested or regular input scheme, such vehicle device data is sent to the CAN bus 126 at block 304. The CAN controller 122 is responsible for controlling the receipt and transmitting of such data to the controller 30 at block 308. Additionally, the Spaur '074 patent discloses several wireless communication devices. For example, the wireless device 18 and remote air link transfer protocol modem 20 in Fig. 1, or the cellular phone 80 and vehicle CDPD network modem 82 in Fig. 2. It was notoriously well-known as of the earliest claimed priority date of the Spaur '074 patent that cellular telephones are capable of determining position

	information, both by the inclusion of GPS receivers in the cellular phone (see, e.g., Darnell in 1991) and by calculating position using cellular tower triangulation techniques (see e.g. Song in 1993).
a wireless communications device;	The Spaur '074 patent states: "In one embodiment, the cellular digitized packet data (CDPD) network provides the desired link including arrangement of information being communicated and where the destination site, namely the particular vehicle, is found in the network. If a channel is available to the particular vehicle, the CDPD link can proceed to transmit the Internet packets to the vehicle of interest. Instead of the CDPD network as the link, a communications interface could be employed that involves data only, such as a two way paging interface with the vehicle." (Spaur '074 patent, col. 2, lines 41-50) "In one embodiment, the communication information is formatted in accordance with a CDPD (cellular digitized packet data) configuration. At the vehicle, this information is received by a wireless device 18 that is able to transmit and receive information via the airlink. The wireless device 18 is operatively associated with a vehicle airlink transfer protocol modem 20 for the proper handling of the airlink formatted transmission. In one embodiment, the wireless device 18 includes a cellular phone that is selected from a plurality of conventional or commercially available cellular phones. The wireless device 18 bi-directionally communicates with a controller 30 contained in the vehicle through a network protocol converter 26 using a wireless device interface 22. The wireless device interface 22 establishes the necessary signal compatibilities and connections from the wireless device 18." (Spaur '074 patent, col. 6, lines 1-16) "The Internet 68 operatively communicates with a standardized network transmission protocol that permits information to be bi-directionally communicated over the airlink and, in one embodiment, includes a remote CDPD network modem 76 which prepares the information in a conventionally acceptable manner for transmission and communication with a cellular phone 80 which is contained in the vehicle. The cellular phone 80 can be any selected one of a number of conventional cellular phones that have the capability of properly communicating with the desired formatted or arranged information. In the illustrated embodiment of FIG. 2, the cellular phone 80 is operatively associated with a vehicle CDPD network modem 82 that demodulates the received information so that it is acceptable for further handling or processing." (Spaur '074 patent, col. 7, lines 40-54)
a multi-vehicle compatible controller for cooperating with said vehicle position determining device and said	The Spaur '074 patent states: "At block 300, vehicle positioning data is available from one of the vehicle devices 50, which might be a GPS. On a requested or regular input scheme, such vehicle device data is sent to the CAN bus 126 at block 304. The CAN controller 122 is responsible for controlling the receipt

wireless communications device to send vehicle position information;	and transmitting of such data to the controller 30 at block 308. The vehicle data that is to be transmitted over the wire link, in accordance with the predetermined or determinable procedure, is appropriately processed, analyzed or otherwise acted on using the controller 30 at block 312. In one embodiment, vehicle device data, such as GPS data, do not rely on the web server 102 but may utilize a different communications pathway, such as E-mail. In any event, the controller 30 gates the vehicle location data to the cellular phone having the vehicle airlink transfer protocol modem 20, such as a CDPD network modem 82, at block 316. The vehicle location data is properly formatted and transmitted through the cellular phone over the airlink at block 320." (Spaur '074 patent, col. 14, lines 4-21)
said multi-vehicle compatible controller to be coupled to the vehicle data bus for communication thereover with at least one vehicle device using at least one corresponding vehicle device code from among a plurality thereof for different vehicles;	The Spaur '074 patent states: "The controller 30 is responsible for a number of functions related to understanding and acting on information received from one or more remote stations 10, obtaining and responding to 35 requested information and operatively functioning with information including data available from other elements in the vehicle. In that regard, the controller 30 communicates with a controller interface 34 that electrically links the controller 30 with a vehicle standardized network 40. The vehicle standardized network 40 includes a controller unit 44 that provides appropriate message and data handling functions associated with sending and receiving information including data from each of a plurality of physical vehicle devices 50 that are operatively connected to a bus 46 of the vehicle standardized network 40. Like the remote standardized network 14, **the vehicle standardized network 40 is an established and previously developed network that interfaces with components in a vehicle**, such as engine related components in order to provide desired or requested data concerning the operations or status of these components." (Spaur '074 patent, col. 6, lines 31-50) "In interfacing with the CAN 124, the controller 30 also has device drivers 128 that are useful in achieving desired communications in both directions between the CAN 124 and the controller 30. For example, the processor 90 is able to obtain data or other information from the vehicle devices 50a-50n using the device drivers 128 and which information can be used by the processor 90 including, for example, storing data in the data memory 106 for subsequent access and transmission to a remote station 10." (Spaur '074 patent, col. 10, lines 55-64) The Society of Automotive Engineers (SAE) is a U.S. based standards organization that has published various standards related to vehicle standardized networks. Furthermore, the various SAE standards provide the implementation details for communicating with vehicle devices using the vehicle bus via an OBD II diagnostic connector mandated in every new vehicle sold since 1996.

	In particular, the SAE standards are documented in, among many other available publications, the Society of Automotive Engineers (SAE) HS-3000 Manual (1994 edition), entitled "SAE On-Board Diagnostics for Light and Medium Duty Vehicles Standards Manual" (SAE HS-3000 Manual). The SAE HS-3000 includes various standards for communicating with vehicle devices on the vehicle bus, each standard under a particular SAE heading number (e.g., J1850, J2178, among various other standards) related to various aspects of vehicle control systems, including vehicle busses (e.g. SAE J1850, starting on page 91) and communicating, using device codes, with vehicle devices using the vehicle bus via an OBD II diagnostic connector mandated in every new vehicle sold since 1996 (e.g. SAE J1978 starting on page 33 , SAE J1979 starting on page 46 and SAE J2178/1-2178/2 starting on page 200). The HS-3000 Manual provides details for hundreds of different device codes for different vehicle devices, which include SAE defined device codes and manufacturer defined device codes. In particular, SAE J2178 which starts on page 211 of the SAE HS-3000 Manual and consists of four parts, 1 through 4, defines sets of vehicle device codes, or "messages", for hundreds of different types of vehicle devices. The specific vehicle device code will depend upon whether a particular manufacturer implements the SAE J2178 defined vehicle code or whether a vehicle supports a manufacturer specific vehicle code. Page 156, SAE J1850, Section 4.1 elaborates on the definition of the vehicle codes as follows: "Normal Vehicle Operation (Down the Road) Messages: The messages sent during non-diagnostic operations are called normal vehicle operation messages. These normal vehicle operation messages are used for communication from a transmitter to one or more receivers across this network. The normal operation messages have been developed by the SAE for this communication network and are defined in SAE-J2178. SAE defined messages and the 'Reserved' messages of SAE J2178 shall remain specific to those definitions. In SAE J2178, there is also a set-of 'Reserved-Manufacturer' messages which, if used, will have meanings specific to a vehicle manufacturer but are likely to be different between manufacturers." J2178/1, starting on page 200 of the SAE HS-3000 Manual, includes 10 tables defining vehicle device codes for a large variety of different categories of vehicle devices (the specific device codes are specified in J2178/2). Section 4 of SAE J2178/2 on page 213 specifies the Parameter Reference Number (PRN) Structure utilized within the SAE J2178 messages to use a particular device code from among a plurality thereof for different vehicles, which is illustrated below. Section 4 notes that "Some of the PRN numbers are

assigned or reserved for SAE definitions but the majority are reserved for individual motor vehicle manufacturers to coordinate and assign."

Figure 3 shows the basic structure of PRNs and Tables 1 and 2 show bit assignments and address ranges based on these assignments.

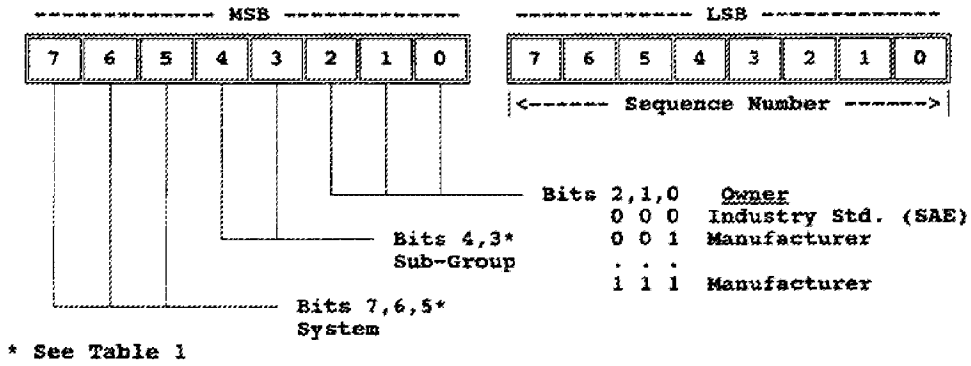


FIGURE 3--PRN STRUCTURE

The first three bits define the system and the next two bits define the sub-group. For each sub-group, three additional bits specify which of eight possible device codes are being used for a particular vehicle device, representing the Industry Std. device code (000) or one of seven manufacturer specific device codes (001-111). Accordingly, the standard specifies at least eight vehicle device codes for each PRN (which include 1 Industry Standard, and 7 manufacturer specific device codes).

SAE J2178/2, which starts on page 211 of the SAE HS-3000 Manual, provides the "Standardized Parameter Definitions" for standardized messages on SAE J1850 Class B networks. SAE J2178/2 sets out respective sets of device codes for a host of vehicle devices that may be present on a given vehicle. For example, Table 2 on page 215, partially reproduced below, provides the address map of the SAE standard and reserved manufacturer specific (Reserved MFG) subgroups of messages for different classes of vehicle devices.

TABLE 2—SAE/MFG PRN RANGES

System	Subgroup	Address Map	Size
Powertrain	J1979 Compatible - SAE	0000 - 00FF	0.25K
	Reserved - MFG	0100 - 07FF	1.75K
	Reserved - SAE	0800 - 08FF	0.25K
	Reserved - MFG	0900 - 0FFF	1.75K
	Engine - SAE	1000 - 10FF	0.25K
	Engine - MFG	1100 - 17FF	1.75K
	Transmission - SAE	1800 - 18FF	0.25K
	Transmission - MFG	1900 - 1FFF	1.75K
Chassis	Reserved - SAE	2000 - 20FF	0.25K
	Reserved - MFG	2100 - 27FF	1.75K
	Brakes/Tires/Wheels - SAE	2800 - 28FF	0.25K
	Brakes/Tires/Wheels - MFG	2900 - 2FFF	1.75K
	Steering - SAE	3000 - 30FF	0.25K
	Steering - MFG	3100 - 37FF	1.75K
	Suspension - SAE	3800 - 38FF	0.25K
	Suspension - MFG	3900 - 3FFF	1.75K

SAE J2178/2 provides the details of device codes for hundreds of different vehicle devices within the address map ranges indicated in the above table. Section 4 of SAE J2178/2 on page 213 specifies that three bits are used to define eight different device codes for a given vehicle device including a SAE standard device code for the specific type of vehicle device and seven manufacturer specific device codes for that specific type of vehicle device.

The SAE HS-3000 Manual discloses using at least one corresponding vehicle device code from among a plurality thereof for different vehicles. In particular, in order to allow a controller to be compatible with various busses that are used on a plurality of different vehicles, the controller uses a bus discovery procedure that is described on page 37, section 6.5.2 INITIALIZATION DETAILS of SAE J1978, reproduced below as scanned from the SAE HS-3000 manual, that involves sending different device codes or "messages", in the form of signals referred to as a "mode 1 PID 0 request message" in a manner appropriate for each of the SAE J1850 41.6 Kbps PWM bus, SAE J1850 10.4 Kbps VPW, and ISO 9141-2. In particular, as many as three device codes may initially be sent, at least two of which will be non-working

for the particular vehicle and one of which is a working device code for the vehicle. See page 37, SAE J1978 at 6.5.1.(" While there are three types of communication interfaces that could be used to access the OBD II functions in a given vehicle (i.e., SAE J1850 41.6 Kbps PWM, SAE J1850 10.4 Kbps VPW and ISO 9141-2), only one is allowed to be used in any one vehicle to access all supported OBD II functions.")

a. Test for SAE J1850 41.6 Kbps PWM
   (1) Step 1—Enable the SAE J1850 41.6 Kbps PWM interface
   (2) Step 2—Send a mode 1 PID 0 request message
   (3) Step 3—If a mode 1 PID 0 response message is received then SAE J1850 41.6 Kbps PWM is the type of interface used in a vehicle for OBD II support.

b. Test for SAE J1850 10.4 Kbps VPW
   (1) Step 1—Enable the SAE J1850 10.4 Kbps VPW interface
   (2) Step 2—Send a mode 1 PID 0 request message
   (3) Step 3—If a mode 1 PID 0 response message is received then SAE J1850 10.4 Kbps VPW is the type of interface used in a vehicle for OBD II support.

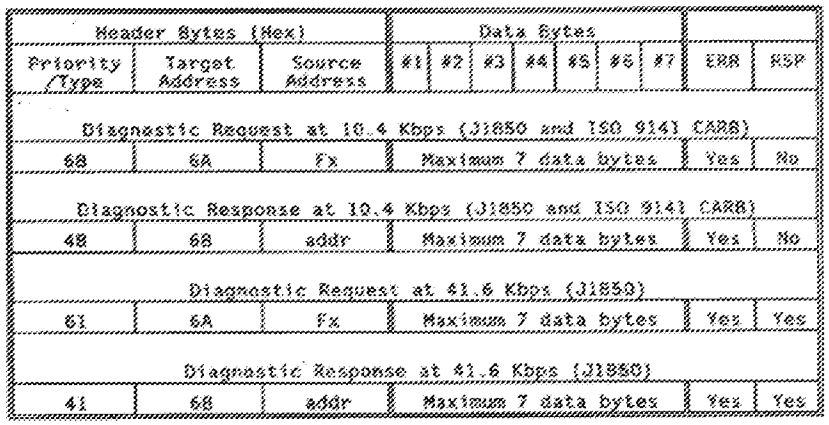
c. Test for ISO 9141 CARB
   (1) Step 1—Enable the ISO 9141-2 interface
   (2) Step 2—If the initialization sequence defined in ISO 9141-2 is completed successfully, then ISO 9141-2 is the type of interface used in a vehicle for OBD II support.

The previous tests may be performed in any order and where possible may be performed in parallel.

The mode 1 PID 0 request and response messages are defined in SAE J1979.

SAE J1978 indicates that the "mode 1 PID 0" request and response messages are defined in SAE J1979, which starts on page 46 of the SAE HS-3000 Manual. See page 37, SAE J1978, Section 6.5.2., "Initialization Details". Requester further notes that transmission of the mode 1 PID 0 device code has previously been asserted as satisfying this requirement of the claim. See Exhibit F, Plaintiff's Disclosure of Initial Infringement Contentions, starting on page A-45.

SAE J1979, starting on page 46, elaborates on the device codes that are used by the controller during bus detection, including the different device codes utilized by vehicles that employ a 10.4 Kbps interface (i.e., a first device code that includes 686A (hex) in the header of the request message) and vehicles that employ a 41.6 Kbps interface (i.e. a second device code that includes 616A (hex) in the header of the

	request message). See e.g., FIGURE 1 on page 51, reproduced below, of SAE J1979.  FIGURE 1—DIAGNOSTIC MESSAGE FORMAT The Spaur '074 patent teaches communicating with vehicle devices via a "standardized network…commonly used in a number of makes and models of vehicles" (Spaur '074 patent, col. 10, lines 18-21). The SAE standards, including the SAE HS-3000 Manual, were published for the specific purpose of teaching people of ordinary skill in the art how to communicate with vehicle devices via the "standardized networks". Accordingly, it would have been obvious to utilize the teachings described in SAE HS-3000 Manual to provide multi-vehicle compatibility because the Spaur '074 patent expressly directs using standards, such as the SAE standards, for the purpose for which the standards were created.
and a downloading interface for permitting downloading of enabling data related to the at least one corresponding vehicle device code for use by said multi-vehicle compatible controller;	The Spaur '074 patent teaches that the wireless communications device can be utilized to download enabling data: "since bi-directional communications involving a vehicle are conducted wirelessly for at least a portion of the communications link, it is necessary for the Internet to communicate with an appropriate interface or network that wirelessly links with the vehicle. In one embodiment, the cellular digitized packet data (CDPD) network provides the desired link including arrangement of information being communicated and where the destination site, namely the particular vehicle, is found in the network." (Spaur '074 patent, col. 2, lines 37 – 46). "A combination of controller related components are containable in a vehicle for responding to requests from remote sites, obtaining and storing information

	associated with vehicle devices and running executable software that may be available in the program memory of the controller or downloaded from the remote site, while handling and configuring information including data that is communicative with the remote site over an established network, such as the Internet." (Spaur '074 patent, col. 4, line 64 – col. 5, line 5). Furthermore, "Preferably, the controller in the vehicle is also associated with an interface for communication with one or more available systems, such as an RS232 connection, an Ethernet connection and/or a PCMCIA unit. In a related embodiment, the controller includes a direct communications port for receiving and sending information without requiring the wireless device and the Internet connection to the wireless device." (Spaur '074 patent, col. 4, lines 38 – 45).
said downloading interface comprising a connector for temporary connection to a downloading device.	One skilled in the art would understand that the Spaur '074 patent discloses a wireless downloading interface comprising of a wireless receiver for temporary connection to a downloading device. Therefore, it is inherently disclosed that the wireless connections can be temporary connections.
18. A multi-vehicle compatible tracking unit for a vehicle comprising a vehicle data bus extending throughout the vehicle, the multi-vehicle compatible vehicle tracking unit comprising, lines	The Spaur '074 patent states: "The controller 30 is responsible for a number of functions related to understanding and acting on information received from one or more remote stations 10, obtaining and responding to 35 requested information and operatively functioning with information including data available from other elements in the vehicle. In that regard, the controller 30 communicates with a controller interface 34 that electrically links the controller 30 with a vehicle standardized network 40. The vehicle standardized network 40 includes a controller unit 44 that provides appropriate message and data handling functions associated with sending and receiving information including data from each of a plurality of physical vehicle devices 50 that are operatively connected to a bus 46 of the vehicle standardized network 40. Like the remote standardized network 14, the vehicle standardized network 40 is an established and previously developed network that interfaces with components in a vehicle, such as engine related components in order to provide desired or requested data concerning the operations or status of these components." (Spaur '074 patent, col. 6, lines 31-50) The Spaur '074 patent states: "In order to provide the necessary communications protocol between the controller 30 and the vehicle devices 50a-50n, another standardized network communications link is provided." "This further standardized communications network is responsible for handling the communication exchange functions associated with sending and receiving information relative to the vehicle devices 50." (Spaur '074 patent, col. 10, lines 10 – 18).

	"In a preferred embodiment, this further standardized network is a network that has been previously devised and is commonly used in a number of makes and models of vehicles. This communications network is defined as the controller area network (CAN) 124. Although the CAN 124 has previously commonly been used in operative association with automotive electronics including engine control elements, sensors, lamps, electric windows etc., the present invention also enables the CAN 124 to be used with a variety of other devices contained in the vehicle, such as the previously described devices." (Spaur '074 patent, col. 10, lines 18-39) See also FIG. 1 and FIG. 2 of the Spaur '074 patent.
a vehicle position determining device;	The Spaur '074 patent states: "At block 300, vehicle positioning data is available from one of the vehicle devices 50, which might be a GPS. On a requested or regular input scheme, such vehicle device data is sent to the CAN bus 126 at block 304. The CAN controller 122 is responsible for controlling the receipt and transmitting of such data to the controller 30 at block 308." (Spaur '074 patent, col. 14, lines 4 – 9). Additionally, the Spaur '074 patent discloses several wireless communication devices. For example, the wireless device 18 and remote air link transfer protocol modem 20 in Fig. 1, or the cellular phone 80 and vehicle CDPD network modem 82 in Fig. 2. It was notoriously well-known as of the earliest claimed priority date of the Spaur '074 patent that cellular telephones are capable of determining position information, both by the inclusion of GPS receivers in the cellular phone (see, e.g., Darnell in 1991) and by calculating position using cellular tower triangulation techniques (see e.g. Song in 1993).
a wireless communications device;	The Spaur '074 patent states: "In one embodiment, the cellular digitized packet data (CDPD) network provides the desired link including arrangement of information being communicated and where the destination site, namely the particular vehicle, is found in the network. If a channel is available to the particular vehicle, the CDPD link can proceed to transmit the Internet packets to the vehicle of interest. Instead of the CDPD network as the link, a communications interface could be employed that involves data only, such as a two way paging interface with the vehicle." (Spaur '074 patent, col. 2, lines 41-50) "In one embodiment, the communication information is formatted in accordance with a CDPD (cellular digitized packet data) configuration. At the vehicle, this information is received by a wireless device 18 that is able to transmit and receive information via the airlink. The wireless device 18 is operatively associated with a vehicle airlink transfer protocol modem 20 for the proper handling of the airlink

	formatted transmission. In one embodiment, the wireless device 18 includes a cellular phone that is selected from a plurality of conventional or commercially available cellular phones. The wireless device 18 bi-directionally communicates with a controller 30 contained in the vehicle through a network protocol converter 26 using a wireless device interface 22. The wireless device interface 22 establishes the necessary signal compatibilities and connections from the wireless device 18." (Spaur '074 patent, col. 6, lines 1-16) "The Internet 68 operatively communicates with a standardized network transmission protocol that permits information to be bi-directionally communicated over the airlink and, in one embodiment, includes a remote CDPD network modem 76 which prepares the information in a conventionally acceptable manner for transmission and communication with a cellular phone 80 which is contained in the vehicle. The cellular phone 80 can be any selected one of a number of conventional cellular phones that have the capability of properly communicating with the desired formatted or arranged information. In the illustrated embodiment of FIG. 2, the cellular phone 80 is operatively associated with a vehicle CDPD network modem 82 that demodulates the received information so that it is acceptable for further handling or processing." (Spaur '074 patent, col. 7, lines 40-54)
a multi-vehicle compatible controller for cooperating with said vehicle position determining device and said wireless communications device to send vehicle position information;	The Spaur '074 patent states: "At block 300, vehicle positioning data is available from one of the vehicle devices 50, which might be a GPS. On a requested or regular input scheme, such vehicle device data is sent to the CAN bus 126 at block 304. The CAN controller 122 is responsible for controlling the receipt and transmitting of such data to the controller 30 at block 308. The vehicle data that is to be transmitted over the wire link, in accordance with the predetermined or determinable procedure, is appropriately processed, analyzed or otherwise acted on using the controller 30 at block 312. In one embodiment, vehicle device data, such as GPS data, do not rely on the web server 102 but may utilize a different communications pathway, such as E-mail. In any event, the controller 30 gates the vehicle location data to the cellular phone having the vehicle airlink transfer protocol modem 20, such as a CDPD network modem 82, at block 316. The vehicle location data is properly formatted and transmitted through the cellular phone over the airlink at block 320." (Spaur '074 patent, col. 14, lines 4-21)
said multi-vehicle compatible controller to be coupled to the vehicle data bus for communication thereover with at least one vehicle device using at least one	The Spaur '074 patent states: "The controller 30 is responsible for a number of functions related to understanding and acting on information received from one or more remote stations 10, obtaining and responding to 35 requested information and operatively functioning with information including data available from other elements in the vehicle. In that regard, the controller 30 communicates with a controller interface 34 that electrically links the controller 30 with a vehicle standardized network 40.

corresponding vehicle device code from among a plurality thereof for different vehicles;	The vehicle standardized network 40 includes a controller unit 44 that provides appropriate message and data handling functions associated with sending and receiving information including data from each of a plurality of physical vehicle devices 50 that are operatively connected to a bus 46 of the vehicle standardized network 40. Like the remote standardized network 14, **the vehicle standardized network 40 is an established and previously developed network that interfaces with components in a vehicle**, such as engine related components in order to provide desired or requested data concerning the operations or status of these components." (Spaur '074 patent, col. 6, lines 31-50) "In interfacing with the CAN 124, the controller 30 also has device drivers 128 that are useful in achieving desired communications in both directions between the CAN 124 and the controller 30. For example, the processor 90 is able to obtain data or other information from the vehicle devices 50a-50n using the device drivers 128 and which information can be used by the processor 90 including, for example, storing data in the data memory 106 for subsequent access and transmission to a remote station 10." (Spaur '074 patent, col. 10, lines 55-64) The Society of Automotive Engineers (SAE) is a U.S. based standards organization that has published various standards related to vehicle standardized networks. Furthermore, the various SAE standards provide the implementation details for communicating with vehicle devices using the vehicle bus via an OBD II diagnostic connector mandated in every new vehicle sold since 1996. In particular, the SAE standards are documented in, among many other available publications, the Society of Automotive Engineers (SAE) HS-3000 Manual (1994 edition), entitled "SAE On-Board Diagnostics for Light and Medium Duty Vehicles Standards Manual" (SAE HS-3000 Manual). The SAE HS-3000 includes various standards for communicating with vehicle devices on the vehicle bus, each standard under a particular SAE heading number (e.g., J1850, J2178, among various other standards) related to various aspects of vehicle control systems, including vehicle busses (e.g. SAE J1850, starting on page 91) and communicating, using device codes, with vehicle devices using the vehicle bus via an OBD II diagnostic connector mandated in every new vehicle sold since 1996 (e.g. SAE J1978 starting on page 33 , SAE J1979 starting on page 46 and SAE J2178/1-2178/2 starting on page 200). The HS-3000 Manual provides details for hundreds of different device codes for different vehicle devices, which include SAE defined device codes and manufacturer defined device codes. In particular,

	SAE J2178 which starts on page 211 of the SAE HS-3000 Manual and consists of four parts, 1 through 4, defines sets of vehicle device codes, or "messages", for hundreds of different types of vehicle devices. The specific vehicle device code will depend upon whether a particular manufacturer implements the SAE J2178 defined vehicle code or whether a vehicle supports a manufacturer specific vehicle code. Page 156, SAE J1850, Section 4.1 elaborates on the definition of the vehicle codes as follows: "Normal Vehicle Operation (Down the Road) Messages: The messages sent during non-diagnostic operations are called normal vehicle operation messages. These normal vehicle operation messages are used for communication from a transmitter to one or more receivers across this network. The normal operation messages have been developed by the SAE for this communication network and are defined in SAE-J2178. SAE defined messages and the 'Reserved' messages of SAE J2178 shall remain specific to those definitions. In SAE J2178, there is also a set-of 'Reserved-Manufacturer' messages which, if used, will have meanings specific to a vehicle manufacturer but are likely to be different between manufacturers." J2178/1, starting on page 200 of the SAE HS-3000 Manual, includes 10 tables defining vehicle device codes for a large variety of different categories of vehicle devices (the specific device codes are specified in J2178/2). Section 4 of SAE J2178/2 on page 213 specifies the Parameter Reference Number (PRN) Structure utilized within the SAE J2178 messages to use a particular device code from among a plurality thereof for different vehicles, which is illustrated below. Section 4 notes that "Some of the PRN numbers are assigned or reserved for SAE definitions but the majority are reserved for individual motor vehicle manufacturers to coordinate and assign."

Figure 3 shows the basic structure of PRNs and Tables 1 and 2 show bit assignments and address ranges based on these assignments.

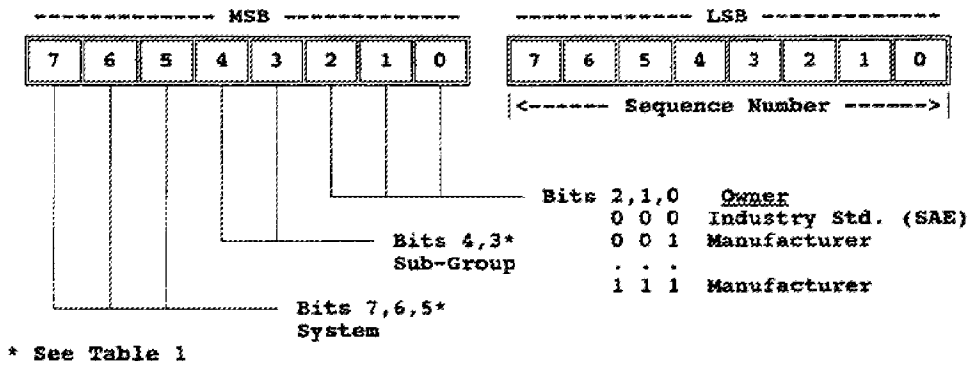


FIGURE 3--PRN STRUCTURE

The first three bits define the system and the next two bits define the sub-group. For each sub-group, three additional bits specify which of eight possible device codes are being used for a particular vehicle device, representing the Industry Std. device code (000) or one of seven manufacturer specific device codes (001-111). Accordingly, the standard specifies at least eight vehicle device codes for each PRN (which include 1 Industry Standard, and 7 manufacturer specific device codes).

SAE J2178/2, which starts on page 211 of the SAE HS-3000 Manual, provides the "Standardized Parameter Definitions" for standardized messages on SAE J1850 Class B networks. SAE J2178/2 sets out respective sets of device codes for a host of vehicle devices that may be present on a given vehicle. For example, Table 2 on page 215, partially reproduced below, provides the address map of the SAE standard and reserved manufacturer specific (Reserved MFG) subgroups of messages for different classes of vehicle devices.

TABLE 2—SAE/MFG PRN RANGES

System	Subgroup	Address Map	Size
Powertrain	J1979 Compatible - SAE	0000 - 00FF	0.25K
	Reserved - MFG	0100 - 07FF	1.75K
	Reserved - SAE	0800 - 08FF	0.25K
	Reserved - MFG	0900 - 0FFF	1.75K
	Engine - SAE	1000 - 10FF	0.25K
	Engine - MFG	1100 - 17FF	1.75K
	Transmission - SAE	1800 - 18FF	0.25K
	Transmission - MFG	1900 - 1FFF	1.75K
Chassis	Reserved - SAE	2000 - 20FF	0.25K
	Reserved - MFG	2100 - 27FF	1.75K
	Brakes/Tires/Wheels - SAE	2800 - 28FF	0.25K
	Brakes/Tires/Wheels - MFG	2900 - 2FFF	1.75K
	Steering - SAE	3000 - 30FF	0.25K
	Steering - MFG	3100 - 37FF	1.75K
	Suspension - SAE	3800 - 38FF	0.25K
	Suspension - MFG	3900 - 3FFF	1.75K

SAE J2178/2 provides the details of device codes for hundreds of different vehicle devices within the address map ranges indicated in the above table. Section 4 of SAE J2178/2 on page 213 specifies that three bits are used to define eight different device codes for a given vehicle device including a SAE standard device code for the specific type of vehicle device and seven manufacturer specific device codes for that specific type of vehicle device.

The SAE HS-3000 Manual discloses using at least one corresponding vehicle device code from among a plurality thereof for different vehicles. In particular, in order to allow a controller to be compatible with various busses that are used on a plurality of different vehicles, the controller uses a bus discovery procedure that is described on page 37, section 6.5.2 INITIALIZATION DETAILS of SAE J1978, reproduced below as scanned from the SAE HS-3000 manual, that involves sending different device codes or "messages", in the form of signals referred to as a "mode 1 PID 0 request message" in a manner appropriate for each of the SAE J1850 41.6 Kbps PWM bus, SAE J1850 10.4 Kbps VPW, and ISO 9141-2. In particular, as many as three device codes may initially be sent, at least two of which will be non-working

for the particular vehicle and one of which is a working device code for the vehicle. See page 37, SAE J1978 at 6.5.1.(" While there are three types of communication interfaces that could be used to access the OBD II functions in a given vehicle (i.e., SAE J1850 41.6 Kbps PWM, SAE J1850 10.4 Kbps VPW and ISO 9141-2), only one is allowed to be used in any one vehicle to access all supported OBD II functions.")

a. Test for SAE J1850 41.6 Kbps PWM
   (1) Step 1—Enable the SAE J1850 41.6 Kbps PWM interface
   (2) Step 2—Send a mode 1 PID 0 request message
   (3) Step 3—If a mode 1 PID 0 response message is received then SAE J1850 41.6 Kbps PWM is the type of interface used in a vehicle for OBD II support.

b. Test for SAE J1850 10.4 Kbps VPW
   (1) Step 1—Enable the SAE J1850 10.4 Kbps VPW interface
   (2) Step 2—Send a mode 1 PID 0 request message
   (3) Step 3—If a mode 1 PID 0 response message is received then SAE J1850 10.4 Kbps VPW is the type of interface used in a vehicle for OBD II support.

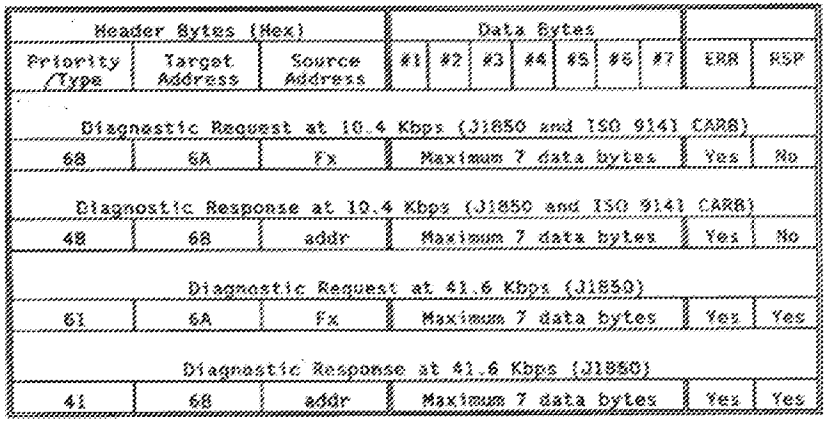
c. Test for ISO 9141 CARB
   (1) Step 1—Enable the ISO 9141-2 interface
   (2) Step 2—If the initialization sequence defined in ISO 9141-2 is completed successfully, then ISO 9141-2 is the type of interface used in a vehicle for OBD II support.

The previous tests may be performed in any order and where possible may be performed in parallel.

The mode 1 PID 0 request and response messages are defined in SAE J1979.

SAE J1978 indicates that the "mode 1 PID 0" request and response messages are defined in SAE J1979, which starts on page 46 of the SAE HS-3000 Manual. See page 37, SAE J1978, Section 6.5.2., "Initialization Details". Requester further notes that transmission of the mode 1 PID 0 device code has previously been asserted as satisfying this requirement of the claim. See Exhibit F, Plaintiff's Disclosure of Initial Infringement Contentions, starting on page A-45.

SAE J1979, starting on page 46, elaborates on the device codes that are used by the controller during bus detection, including the different device codes utilized by vehicles that employ a 10.4 Kbps interface (i.e., a first device code that includes 686A (hex) in the header of the request message) and vehicles that employ a 41.6 Kbps interface (i.e. a second device code that includes 616A (hex) in the header of the

	request message). See e.g., FIGURE 1 on page 51, reproduced below, of SAE J1979.  FIGURE 1—DIAGNOSTIC MESSAGE FORMAT The Spaur '074 patent teaches communicating with vehicle devices via a "standardized network…commonly used in a number of makes and models of vehicles" (Spaur '074 patent, col. 10, lines 18-21). The SAE standards, including the SAE HS-3000 Manual, were published for the specific purpose of teaching people of ordinary skill in the art how to communicate with vehicle devices via the "standardized networks". Accordingly, it would have been obvious to utilize the teachings described in SAE HS-3000 Manual to provide multi-vehicle compatibility because the Spaur '074 patent expressly directs using standards, such as the SAE standards, for the purpose for which the standards were created.
and a downloading interface for permitting downloading of enabling data related to the at least one corresponding vehicle device code for use by said multi-vehicle compatible controller;	The Spaur '074 patent teaches that the wireless communications device can be utilized to download enabling data: "since bi-directional communications involving a vehicle are conducted wirelessly for at least a portion of the communications link, it is necessary for the Internet to communicate with an appropriate interface or network that wirelessly links with the vehicle. In one embodiment, the cellular digitized packet data (CDPD) network provides the desired link including arrangement of information being communicated and where the destination site, namely the particular vehicle, is found in the network." (Spaur '074 patent, col. 2, lines 37 – 46). "A combination of controller related components are containable in a vehicle for responding to requests from remote sites, obtaining and storing information

	associated with vehicle devices and running executable software that may be available in the program memory of the controller or downloaded from the remote site, while handling and configuring information including data that is communicative with the remote site over an established network, such as the Internet." (Spaur '074 patent, col. 4, line 64 – col. 5, line 5). Furthermore, "Preferably, the controller in the vehicle is also associated with an interface for communication with one or more available systems, such as an RS232 connection, an Ethernet connection and/or a PCMCIA unit. In a related embodiment, the controller includes a direct communications port for receiving and sending information without requiring the wireless device and the Internet connection to the wireless device." (Spaur '074 patent, col. 4, lines 38 – 45).
said downloading interface comprising a wireless receiver for temporary connection to a downloading device.	"In one embodiment, the cellular digitized packet data (CDPD) network provides the desired link including arrangement of information being communicated and where the destination site, namely the particular vehicle, is found in the network. If a channel is available to the particular vehicle, the CDPD link can proceed to transmit the Internet packets to the vehicle of interest. Instead of the CDPD network as the link, a communications interface could be employed that involves data only, such as a two way paging interface with the vehicle." (Spaur '074 patent, col. 2, lines 41-50) "In accordance with the present invention, a system is provided in which communication of information, including requests, commands and data, is achieved between vehicle having physical vehicle devices and one or more sites that are remote from the vehicle." (Spaur '074 patent, col. 2, lines 11-15)

Exhibit F

IN THE UNITED STATES DISTRICT COURT
FOR THE MIDDLE DISTRICT OF FLORIDA
ORLANDO DIVISION

OMEGA PATENTS, LLC,
a Georgia limited liability company,

Plaintiff,

vs. **Case No. 6:13-cv-1950-Orl-31DAB**

CALAMP CORP.,
a Delaware corporation,

Defendant.
_____/

PLAINTIFF'S DISCLOSURE OF INITIAL INFRINGEMENT CONTENTIONS

Pursuant to the Case Management and Scheduling Order (Doc. 29), Plaintiff Omega Patents, LLC ("Omega") hereby serves it initial infringement contentions regarding U.S. Patent Nos. 6,346,876 B1 ("the '876 Patent"); 6,737,989 B2 ("the '989 Patent"); 6,756,885 B1 ("the '885 Patent"); 7,671,727 B2 ("the '727 Patent"); and 8,032,278 B2 ("the '278 Patent"), (collectively "patents-in-suit") on Defendant Calamp Corp. ("Calamp").

Because discovery has just begun, Omega makes these infringement contentions based on information presently known. Omega reserves the right to supplement and/or amend these contentions as a result of any ruling from the Court, including but not limited to the issuance of a *Markman* ruling.

Subject to these objections, Omega states as follows:

I. INFRINGEMENT

Omega contends that the following claims of the asserted patents are infringed by Calamp's LMU-3000 and LMU-3030 products: 1, 3-5, 12, 14, 16, 28, 34-36, and 41 of the '876

Patent; 23, 31, 32, 34 and 35 of the '989 Patent; 1-3, 12, 14 and 24 of the '885 Patent; 1, 10, 11, 19 and 25 of the '727 Patent; and 1-6, 8, 11-14, 16, 18, 19 and 21 of the '278 Patent.

Claim charts illustrating Omega's contentions are attached hereto and correspond to the following Exhibits:

Exhibit A-1	Infringement of the '876 Patent
Exhibit A-2	Infringement of the '989 Patent
Exhibit A-3	Infringement of the '885 Patent
Exhibit A-4	Infringement of the '727 Patent
Exhibit A-5	Infringement of the '278 Patent

Dated: May 30, 2014

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CERTIFICATE OF SERVICE

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/s/Ryan T. Santurri
Ryan T. Santurri

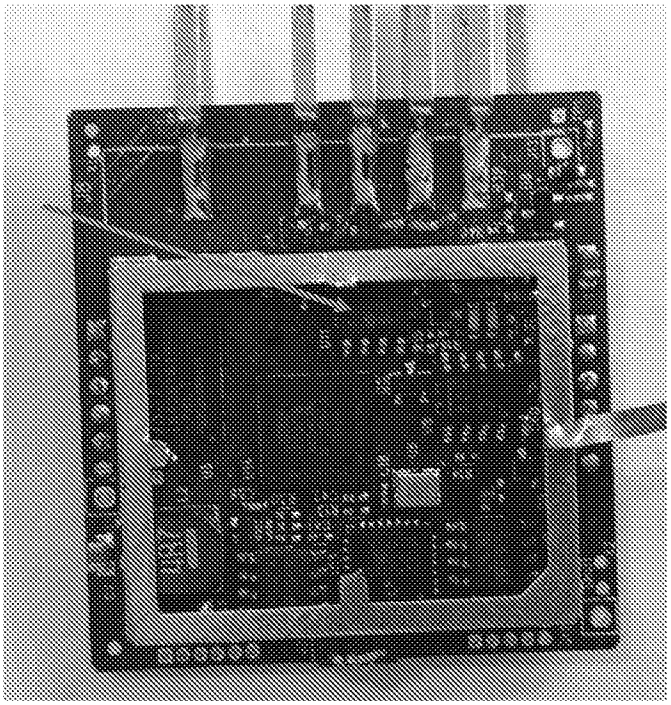
EXHIBIT A-1

U.S. PATENT 6,346,876	
OMEGA PATENT CLAIMS	LMU-3000/LMU-3030[1]
1. A control system for a vehicle comprising a data communications bus and at least one vehicle device connected to the data communications bus, the control system comprising:	The LMU-3000 is part of a control system for a vehicle comprising a data communications bus and at least one vehicle device connected to the data communications bus.
a transmitter and a receiver for receiving signals from said transmitter; and	The LMU-3000 uses a transmitter and a receiver for receiving signals from said transmitter. The LMU-3000 includes a cellular module that allows transmission to and reception from a central station:

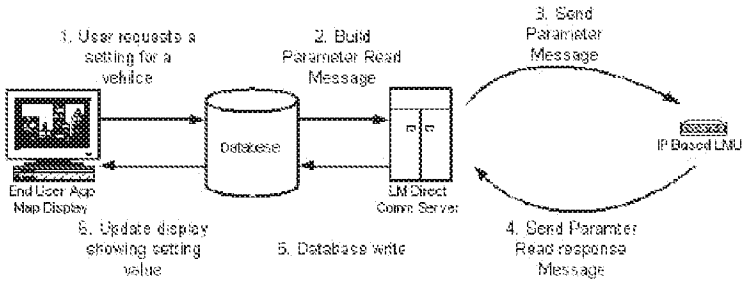
[1] The LMU-3000 and LMU-3030 are advertised as having the same functionality and features described herein. Thus, references throughout these claim charts to the LMU-3000 are intended to apply equally to the LMU-3030.

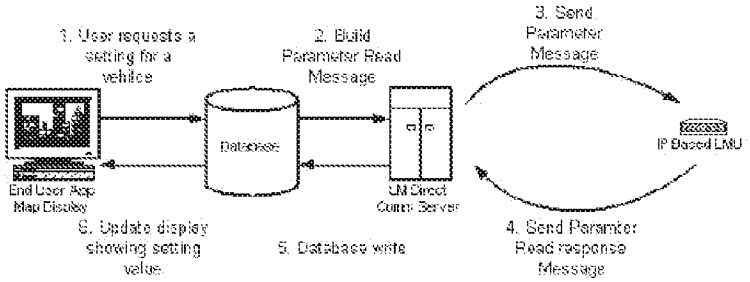
U.S. PATENT 6,346,876	
OMEGA PATENT CLAIMS	LMU-3000/LMU-3030[1]
	
a multi-vehicle compatible controller at the vehicle and cooperating with said transmitter and receiver, said multi-vehicle compatible controller generating at least one set of command signals on the data	The LMU-3000 includes a multi-vehicle compatible controller at the vehicle and cooperating with said transmitter and receiver, said multi-vehicle compatible controller generating at least one set of command signals on the data communications bus for the at least one vehicle device, the at least one set of

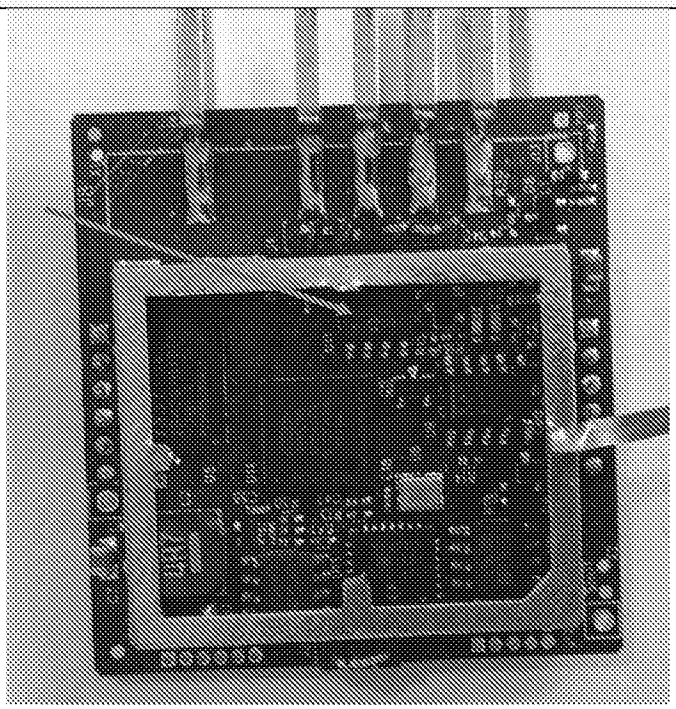
U.S. PATENT 6,346,876	
OMEGA PATENT CLAIMS	LMU-3000/LMU-3030[1]
communications bus for the at least one vehicle device, the at least one set of command signals comprising at least one working command signal and at least one non-working command signal for a given vehicle to thereby provide command compatibility with a plurality of different vehicles.	command signals comprising at least one working command signal and at least one non-working command signal for a given vehicle to thereby provide command compatibility with a plurality of different vehicles. The vehicle device is the vehicle's engine control module (ECM). The LMU-3000 includes a multivehicle compatible controller that cooperates with the cellular module. 

U.S. PATENT 6,346,876	
OMEGA PATENT CLAIMS	LMU-3000/LMU-3030[1]
	The LMU-3000 includes a CAN bus transceiver, product MCP2551I:  On initial installation, the multi-vehicle compatible controller generates a

U.S. PATENT 6,346,876	
OMEGA PATENT CLAIMS	LMU-3000/LMU-3030[1]
	sequence of working and non-working command signals to determine command compatibility of different vehicles, including CAN 11 Bit 7DF message, CAN 29 Bit 18DB33F1 message, J1850 VPW 68 6A F1 message, J1850 PWM message, K-Line messages and J1850 VPW 6C 10 F1 message.
3. A control system according to claim 1 wherein said multi-vehicle compatible controller generates command signals sequentially.	The LMU-3000 includes a multi-vehicle compatible controller generates command signals sequentially, using the following sequence: CAN 11 Bit 7DF message, CAN 29 Bit 18DB33F1 message, J1850 VPW 68 6A F1 message, J1850 PWM message, K-Line messages and J1850 VPW 6C 10 F1 message.
4. A control system according to claim 1 wherein said multi-vehicle compatible controller generates command signals each representing digitally coded information.	The LMU-3000 includes a multi-vehicle compatible controller generates command signals each representing digitally coded information, using the following messages: CAN 11 Bit 7DF message, CAN 29 Bit 18DB33F1 message, J1850 VPW 68 6A F1 message, J1850 PWM message, K-Line messages and J1850 VPW 6C 10 F1 message.
5. A control system according to claim 1 wherein said multi-vehicle compatible controller comprises a memory for storing data relating to the at least one set of command signals.	The LMU-3000 includes a multi-vehicle compatible controller comprising a memory for storing data relating to the at least one set of command signals, including the following messages: CAN 11 Bit 7DF message, CAN 29 Bit 18DB33F1 message, J1850 VPW 68 6A F1 message, J1850 PWM message, K-Line messages and J1850 VPW 6C 10 F1 message. After configuration, the memory also stores data relating to the learned vehicle.
12. A control system according to claim 1 wherein said multi-vehicle compatible controller is further for storing a set of device codes for a given vehicle	The LMU-3000 includes a multi-vehicle compatible controller is further for storing a set of device codes for a given vehicle device for a plurality of different vehicles, for reading a device code from the data communications bus,

U.S. PATENT 6,346,876	
OMEGA PATENT CLAIMS	LMU-3000/LMU-3030[1]
device for a plurality of different vehicles, for reading a device code from the data communications bus, and for determining a match between a read device code and the stored device codes to thereby provide reading compatibility with a plurality of different vehicles.	and for determining a match between a read device code and the stored device codes to thereby provide reading compatibility with a plurality of different vehicles. The LMU-3000 stores messages for CAN, J1850 and K Line buses, reads the messages transmitted from a vehicle device on the bus, and matches the read message to the stored message to provide compatibility with different vehicles.
14. A control system according to claim 1 wherein said transmitter comprises at least a central station transmitter; and wherein said receiver is at the vehicle.	The LMU-3000 includes a cellular module that allows communication between the device and a central station.  LM Direct Reference Manual v.8.6.c.2 p. 53.
16. A control system according to claim 1 wherein said receiver comprises at least a central station transmitter; and wherein said transmitter is at the vehicle.	The LMU-3000 includes a cellular module that allows communication between the device and a central station.

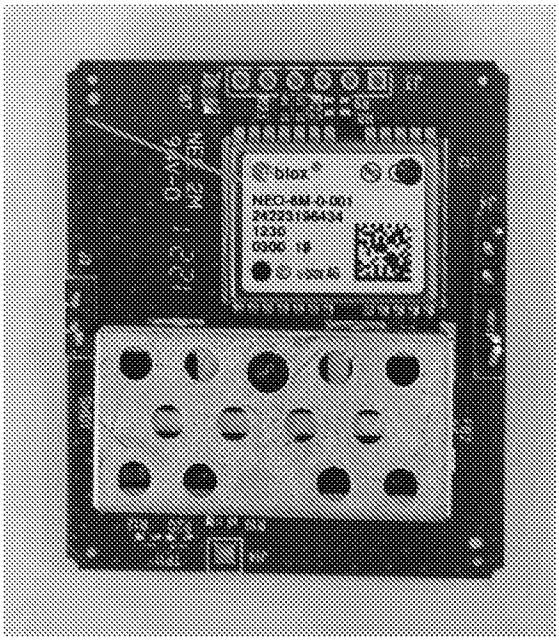
U.S. PATENT 6,346,876	
OMEGA PATENT CLAIMS	LMU-3000/LMU-3030[1]
	 LM Direct Reference Manual v.8.6.c.2 p. 53.
28. A control method for a vehicle comprising a data communications bus and at least one vehicle device connected to the data communications bus, the method comprising:	The LMU-3000 allows one to practice a control method for a vehicle comprising a data communications bus and at least one vehicle device connected to the data communications bus.
generating at least one set of command signals on the data communications bus for the at least one vehicle device, the at least one set of command signals comprising at least one working command signal and at least one non-working command signal for a given vehicle to thereby provide command compatibility with a plurality of different vehicles.	The LMU-3000 generates at least one set of command signals on the data communications bus for the at least one vehicle device, the at least one set of command signals comprising at least one working command signal and at least one non-working command signal for a given vehicle to thereby provide command compatibility with a plurality of different vehicles. The at least one vehicle device is the vehicle's ECM. The LMU-3000 includes a CAN bus transceiver, product MCP2551I:

U.S. PATENT 6,346,876	
OMEGA PATENT CLAIMS	LMU-3000/LMU-3030[1]
	
	On initial installation, the multi-vehicle compatible controller generates a sequence of working and non-working command signals to determine command compatibility of different vehicles, including CAN 11 Bit 7DF message, CAN 29 Bit 18DB33F1 message, J1850 VPW 68 6A F1 message, J1850 PWM

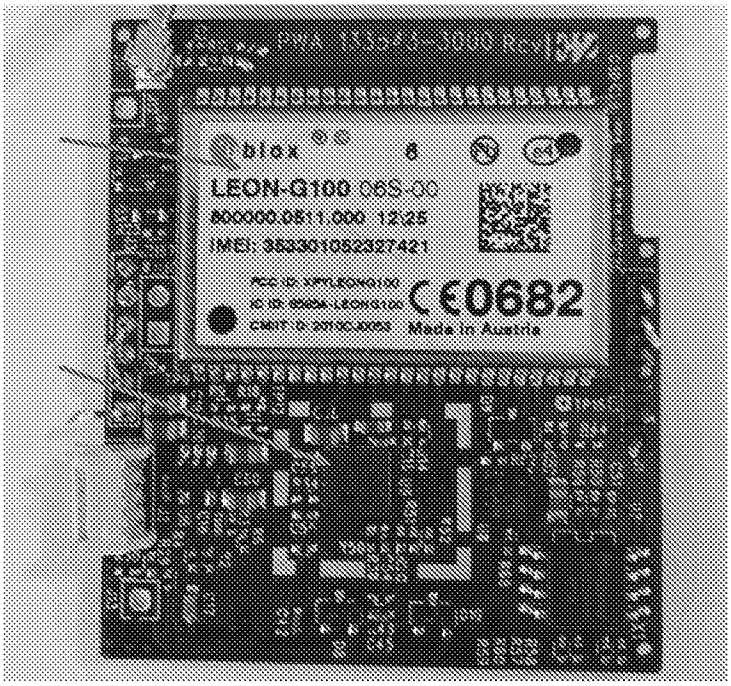
U.S. PATENT 6,346,876	
OMEGA PATENT CLAIMS	LMU-3000/LMU-3030[1]
	message, K-Line messages and J1850 VPW 6C 10 F1 message.
34. A method according to claim 28 wherein the command signals are generated sequentially.	The LMU-3000 includes a multi-vehicle compatible controller generates command signals sequentially, using the following sequence: CAN 11 Bit 7DF message, CAN 29 Bit 18DB33F1 message, J1850 VPW 68 6A F1 message, J1850 PWM message, K-Line messages and J1850 VPW 6C 10 F1 message.
35. A method according to claim 28 the command signals each represent digitally coded information.	The LMU-3000 includes a multi-vehicle compatible controller generates command signals each representing digitally coded information, using the following messages: CAN 11 Bit 7DF message, CAN 29 Bit 18DB33F1 message, J1850 VPW 68 6A F1 message, J1850 PWM message, K-Line messages and J1850 VPW 6C 10 F1 message.
36. A method according to claim 28 further comprising storing in a memory data relating to the at least one set of command signals.	The LMU-3000 includes a multi-vehicle compatible controller comprises a memory for storing data relating to the at least one set of command signals, including the following messages: CAN 11 Bit 7DF message, CAN 29 Bit 18DB33F1 message, J1850 VPW 68 6A F1 message, J1850 PWM message, K-Line messages and J1850 VPW 6C 10 F1 message. After configuration, the memory also stores data relating to the learned vehicle.
41. A method according to claim 28 further comprising:	
storing a set of device codes for a given vehicle device for a plurality of different vehicles;	The LMU-3000 stores a set of device codes for a given vehicle device for a plurality of different vehicles.

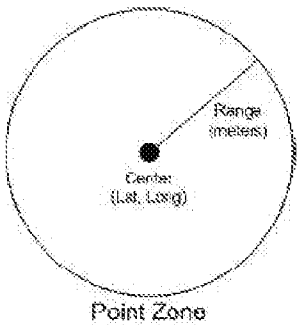
U.S. PATENT 6,346,876	
OMEGA PATENT CLAIMS	LMU-3000/LMU-3030[1]
reading a device code from the data communications bus; and	The LMU-3000 reads a device code from the data communications bus.
determining a match between a read device code and the stored device codes to thereby provide reading compatibility with a plurality of different vehicles.	The LMU-3000 determines a match between a read device code and the stored device codes to thereby provide reading compatibility with a plurality of different vehicles.

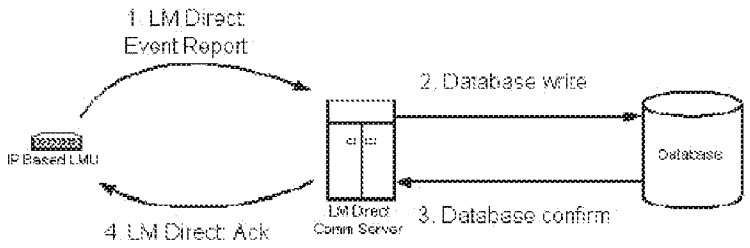
EXHIBIT A-2

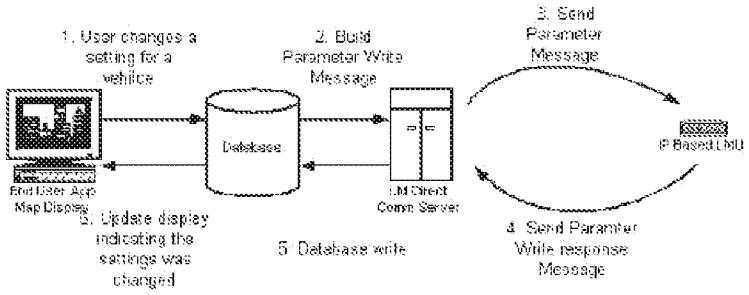
U.S. PATENT 6,737,989	
OMEGA PATENT CLAIMS	LMU-3000/LMU-3030[2]
23. A tracking unit for a vehicle comprising:	The LMU-3000 is a tracking unit for a vehicle.
a vehicle position determining device, a wireless communication device, and a controller cooperating with said wireless communications device and said vehicle position determining device to determine and send vehicle position information to a monitoring station;	The LMU-3000 is a vehicle position determining device: 

[2] The LMU-3000 and LMU-3030 are advertised as having the same functionality and features described herein. Thus, references throughout these claim charts to the LMU-3000 are intended to apply equally to the LMU-3030.

U.S. PATENT 6,737,989	
OMEGA PATENT CLAIMS	LMU-3000/LMU-3030[2]
	a wireless communication device, and a controller cooperating with said wireless communications device and said vehicle position determining device to determine and send vehicle position information to a monitoring station. Depicted below is the wireless communication device and controller. 

U.S. PATENT 6,737,989	
OMEGA PATENT CLAIMS	LMU-3000/LMU-3030[2]
said controller storing a user selected reference location;	The LMU-3000 includes a controller storing a user selected reference location.
said controller also sending the vehicle position information based upon the vehicle moving beyond a radial threshold distance from the user selected reference location.	The LMU-3000 includes a controller also sending the vehicle position information based upon the vehicle moving beyond a radial threshold distance from the user selected reference location. PEG Programming Guide (v1.0.0), p. 26(section 3.8.2.1) sets forth the Parameter IDs and how geofences are set:  3-4 Point Zone Definition Calamp's LMU Manager guides customers through setting up geofencing by allowing customers to set a geofence zone using the "Zones" tab in LMU Manager, then setting up an input trigger for zone entry/zone exit, and programming the LMU-3000 to send report.

U.S. PATENT 6,737,989	
OMEGA PATENT CLAIMS	LMU-3000/LMU-3030[2]
	 LM Direct Reference Guide v.8.6.c.2 p. 45.
31. The vehicle tracking unit according to claim 23 wherein said controller comprises at least one memory for storing the user selected reference location and vehicle position information therein.	The LMU-3000 includes at least one memory for storing the user selected reference location and vehicle position information therein.
32. The vehicle tracking unit according to claim 23 wherein said controller sets the user selected reference location based upon at least one signal provided by the monitoring station.	The LMU-3000 includes a controller that sets the user selected reference location based upon at least one signal provided by the monitoring station. The user can use LMU Manager to set the user selected reference location and send it to the LMU-3000 via a monitoring station.

U.S. PATENT 6,737,989	
OMEGA PATENT CLAIMS	LMU-3000/LMU-3030[2]
	 LM Direct Reference Guide v.8.6.c.2 p. 55.
34. The vehicle tracking unit according to claim 32 wherein the at least one signal includes the user selected reference location.	The LMU-3000 according to claim 32 that includes at least the user selected reference location.
35. The vehicle tracking unit according to claim 23 wherein said vehicle position determining device comprises a Global Positioning System (GPS) device.	The LMU-3000 includes a Global Positioning System (GPS) device.

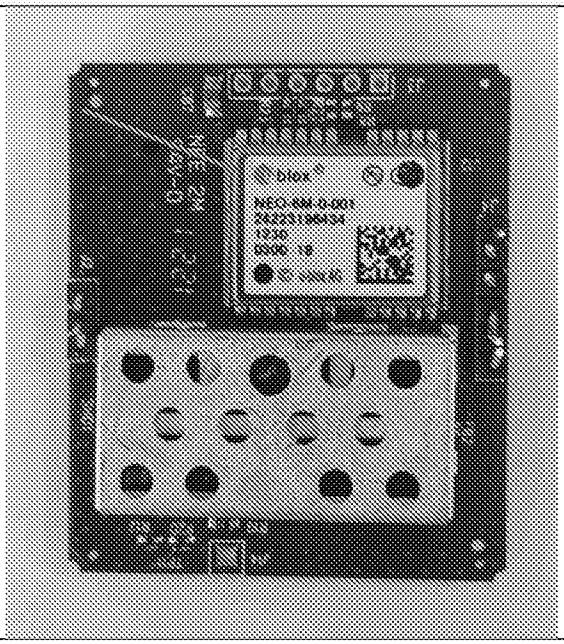
U.S. PATENT 6,737,989	
OMEGA PATENT CLAIMS	LMU-3000/LMU-3030[2]
	

EXHIBIT A-3

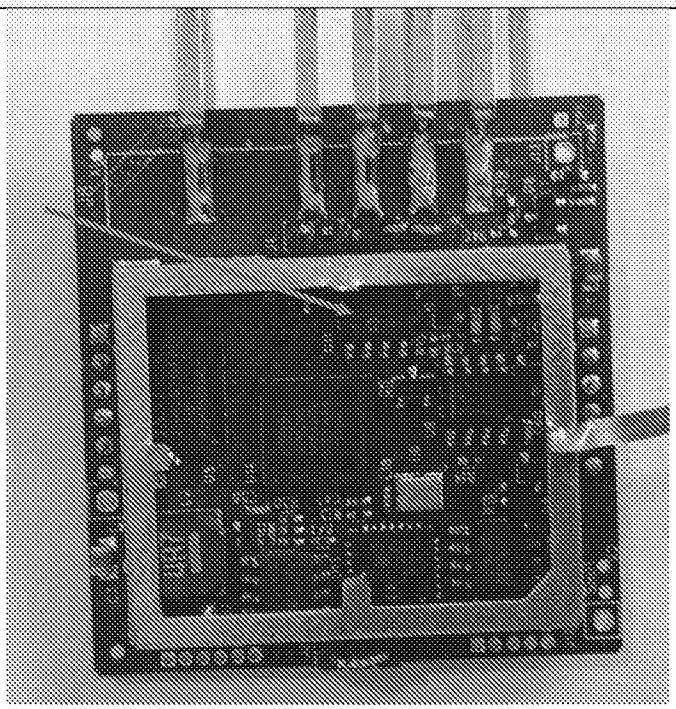
U.S. PATENT 6,756,885	
OMEGA PATENT CLAIMS	LMU-3000/LMU-3030[3]
1. A control system for a vehicle comprising a data communications bus and at least one vehicle device connected thereto, the control system comprising:	The LMU-3000 is a control system for a vehicle comprising a data communications bus and at least one vehicle device connected thereto.
a transmitter and a receiver for receiving signals from said transmitter; and	The LMU-3000 has a transmitter and a receiver for receiving signals from said transmitter. The LMU-3000 includes a cellular module that allows transmission to and reception from a central station. Below is the cellular module that comprises a transmitter and receiver.

[3] The LMU-3000 and LMU-3030 are advertised as having the same functionality and features described herein. Thus, references throughout these claim charts to the LMU-3000 are intended to apply equally to the LMU-3030.

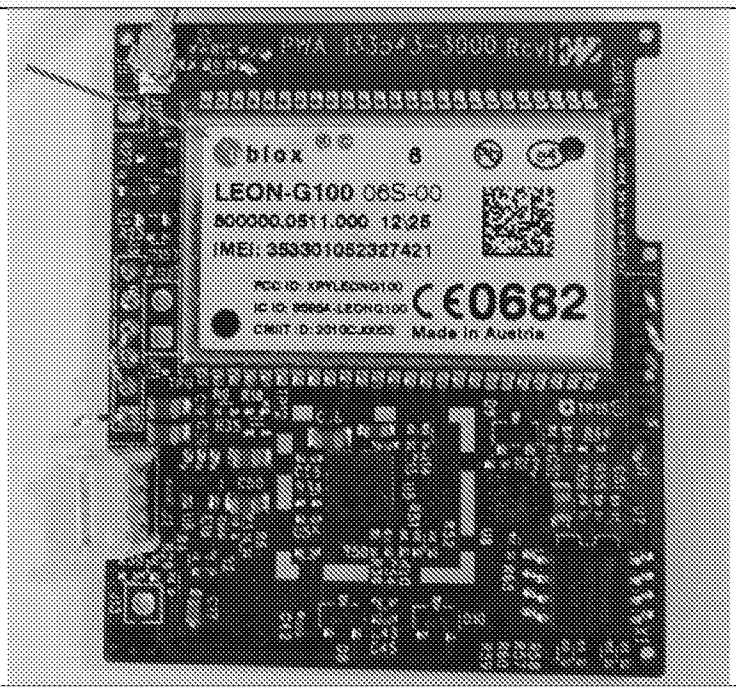
U.S. PATENT 6,756,885	
OMEGA PATENT CLAIMS	LMU-3000/LMU-3030[3]
	
a multi-vehicle compatible controller cooperating with said transmitter and said receiver and for storing a set of device codes for a given vehicle device for a plurality of different vehicles, for reading a device code from the data communications	The LMU-3000 includes a multi-vehicle compatible controller cooperating with said transmitter and said receiver and for storing a set of device codes for a given vehicle device for a plurality of different vehicles, for reading a device code from the data communications bus, and for determining a match between a read device code and the stored device codes to thereby provide compatibility

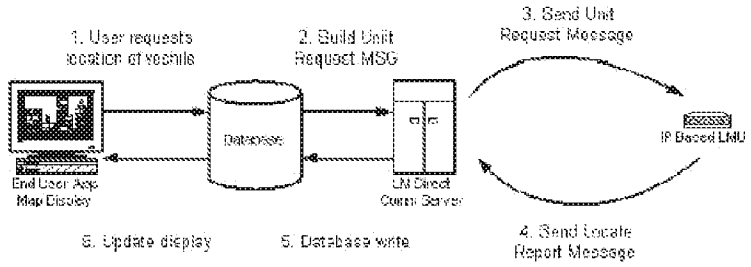
U.S. PATENT 6,756,885	
OMEGA PATENT CLAIMS	LMU-3000/LMU-3030[3]
bus, and for determining a match between a read device code and the stored device codes to thereby provide compatibility with a plurality of different vehicles.	with a plurality of different vehicles. The given vehicle device is the ECM.  The LMU-3000 stores messages for CAN, J1850 and K Line buses, reads the messages transmitted from a vehicle device on the bus, and matches the read

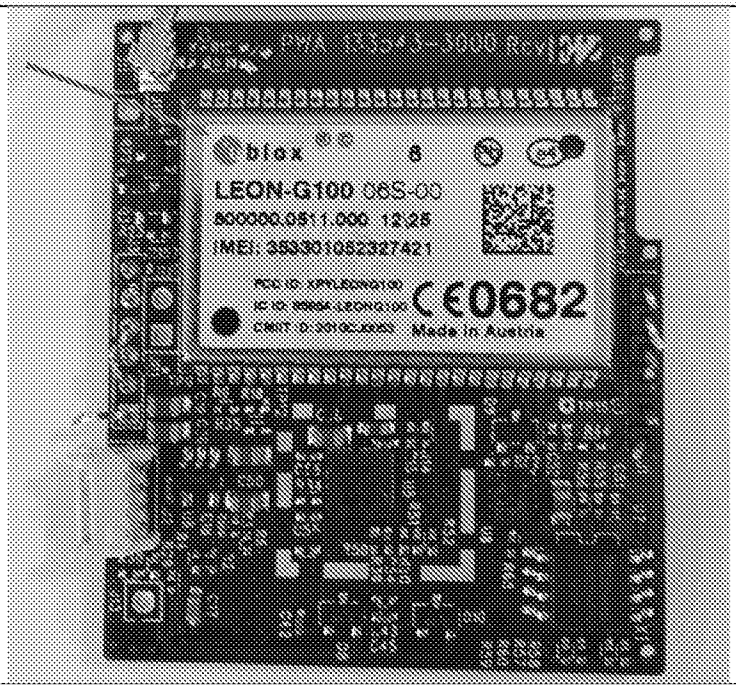
U.S. PATENT 6,756,885	
OMEGA PATENT CLAIMS	LMU-3000/LMU-3030[3]
	message to the stored message to provide compatibility with a plurality of different vehicles. The LMU-3000 includes a CAN bus transceiver, product MCP25511:

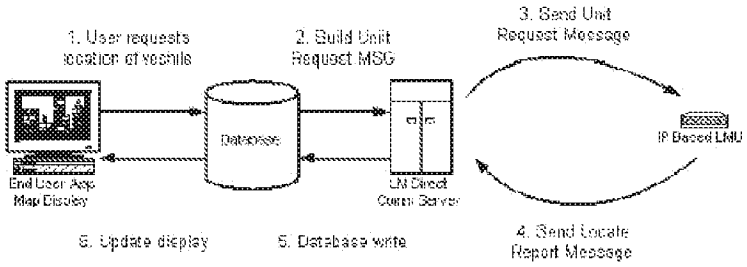
U.S. PATENT 6,756,885	
OMEGA PATENT CLAIMS	LMU-3000/LMU-3030[3]
	
2. A control system according to claim 1 wherein said multi-vehicle compatible controller comprises a memory for the stored device codes.	The LMU-3000 includes a multi-vehicle compatible controller comprises a memory for the stored device codes. The LMU-3000 includes a memory for storing device codes, including the following messages: CAN 11 Bit 7DF

U.S. PATENT 6,756,885	
OMEGA PATENT CLAIMS	LMU-3000/LMU-3030[3]
	message, CAN 29 Bit 18DB33F1 message, J1850 VPW 68 6A F1 message, J1850 PWM message, K-Line messages and J1850 VPW 6C 10 F1 message. After configuration, the memory also stores data relating to the learned vehicle.
3. A control system according to claim 2 wherein said multi-vehicle compatible controller comprises a processor cooperating with said memory for determining the match between the read device code and the stored device codes.	The LMU-3000 includes a multi-vehicle compatible controller comprises a processor cooperating with said memory for determining the match between the read device code and the stored device codes.
12. A control system according to claim 1 wherein said transmitter comprises at least a central station transmitter; and wherein said receiver is at the vehicle.	The LMU-3000 includes a cellular module that allows communication between the device and a central station.

U.S. PATENT 6,756,885	
OMEGA PATENT CLAIMS	LMU-3000/LMU-3030[3]
	

U.S. PATENT 6,756,885	
OMEGA PATENT CLAIMS	LMU-3000/LMU-3030[3]
	 LM Direct Reference Guide v.8.6.c.2 p. 47.
14. A control system according to claim 1 wherein said receiver comprises at least a central station transmitter; and wherein said transmitter is at the vehicle.	The LMU-3000 includes a cellular module that allows communication between the device and a central station.

U.S. PATENT 6,756,885	
OMEGA PATENT CLAIMS	LMU-3000/LMU-3030[3]
	

U.S. PATENT 6,756,885	
OMEGA PATENT CLAIMS	LMU-3000/LMU-3030[3]
	 LM Direct Reference Guide v.8.6.c.2 p. 47.
24. A control method for a vehicle comprising a data communications bus and at least one vehicle device connected thereto, the method comprising:	The LMU-3000 allows one to practice a control method for a vehicle comprising a data communications bus and at least one vehicle device connected thereto.
storing a set of device codes for a given vehicle device for a plurality of different vehicles;	The LMU-3000 stores a set of device codes for a given vehicle device for a plurality of different vehicles. The LMU-3000 stores messages for CAN, J1850 and K Line buses for a plurality of different vehicles.
reading a device code from the data communications bus; and	The LMU-3000 reads a device code from the data communications bus. The LMU-3000 reads the messages transmitted from a vehicle device on the bus.
determining a match between a read device code and the stored device codes and performing a function based thereon to thereby provide compatibility with a plurality of different vehicles.	The LMU-3000 determines a match between a read device code and the stored device codes and performing a function based thereon to thereby provide compatibility with a plurality of different vehicles. The LMU-3000 matches the read message to the stored message to provide compatibility with a plurality of different vehicles.

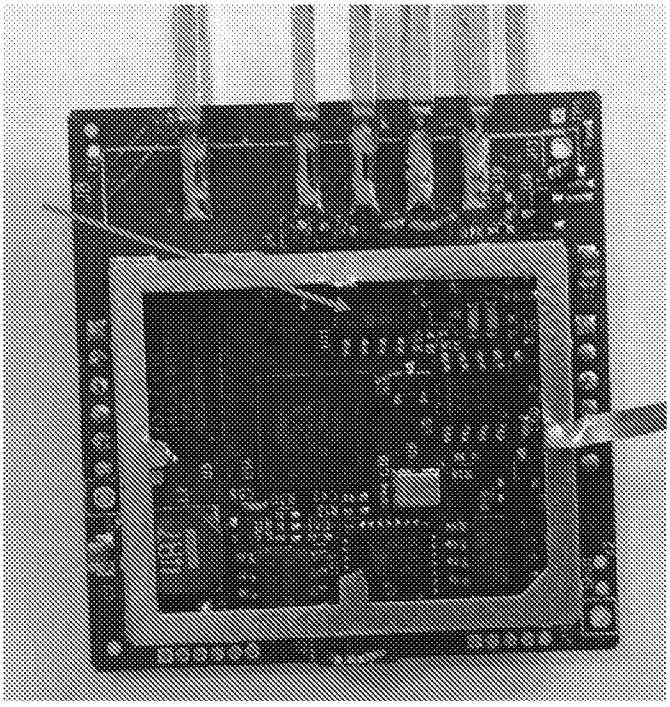
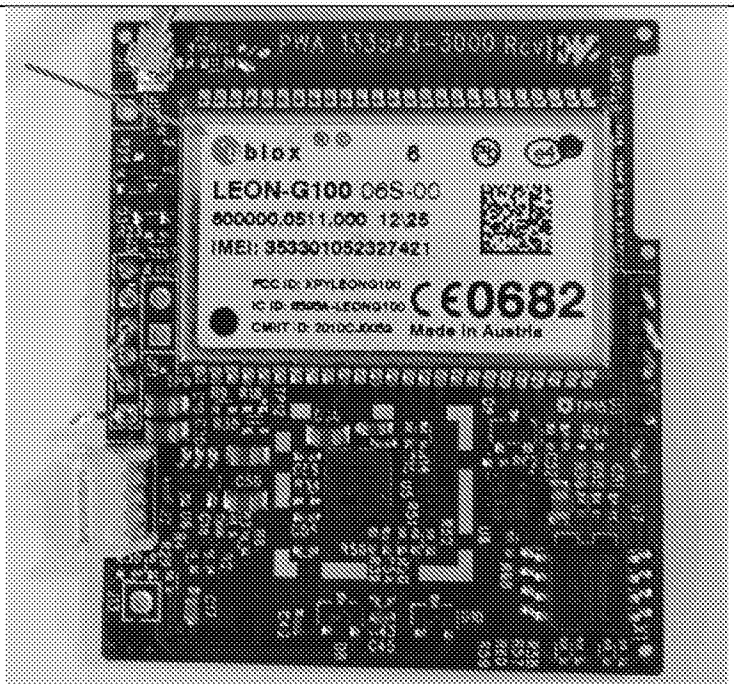
U.S. PATENT 6,756,885	
OMEGA PATENT CLAIMS	LMU-3000/LMU-3030[3]
	The LMU-3000 includes a CAN bus transceiver, product MCP2551I: 

EXHIBIT A-3 TO OMEGA'S INITIAL INFRINGEMENT CONTENTIONS
A-31

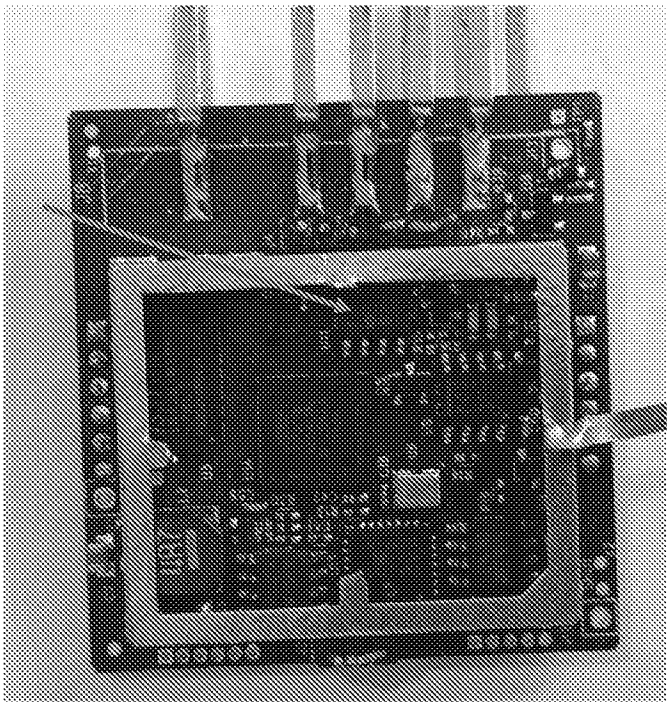
EXHIBIT A-4

U.S. PATENT 7,671,727	
OMEGA PATENT CLAIMS	LMU-3000/LMU-3030[4]
1. A speed exceeded notification device for a vehicle of a type comprising a vehicle data communications bus extending throughout the vehicle, and at least one vehicle device generating data related to vehicle speed on the vehicle data communications bus, the speed exceeded notification device comprising:	The LMU-3000 is a speed exceeded notification device for a vehicle of a type comprising a vehicle data communications bus extending throughout the vehicle, and at least one vehicle device generating data related to vehicle speed on the vehicle data communications bus.
a wireless communications device; and	The LMU-3000 includes a wireless communications device. The LMU-3000 includes a cellular module.

[4] The LMU-3000 and LMU-3030 are advertised as having the same functionality and features described herein. Thus, references throughout these claim charts to the LMU-3000 are intended to apply equally to the LMU-3030.

U.S. PATENT 7,671,727	
OMEGA PATENT CLAIMS	LMU-3000/LMU-3030[4]
	
a controller to be coupled to the vehicle data communications bus for reading the data related to vehicle speed from the vehicle data communications bus, and determining when a vehicle speed exceeds a speed threshold for a	The LMU-3000 includes a controller to be coupled to the vehicle data communications bus for reading the data related to vehicle speed from the vehicle data communications bus, and determining when a vehicle speed exceeds a speed threshold for a first time period and based thereon cooperating with said wireless communications device to send a remote vehicle speed exceeded notification.

U.S. PATENT 7,671,727	
OMEGA PATENT CLAIMS	LMU-3000/LMU-3030[4]
first time period and based thereon cooperating with said wireless communications device to send a remote vehicle speed exceeded notification.	The controller is depicted below: 

U.S. PATENT 7,671,727	
OMEGA PATENT CLAIMS	LMU-3000/LMU-3030[4]
	The LMU-3000 includes a CAN bus transceiver, product MCP2551I:  Using the PEG Programming Guide (v1.0.0), p. 17 (section 3.5), the user sets the

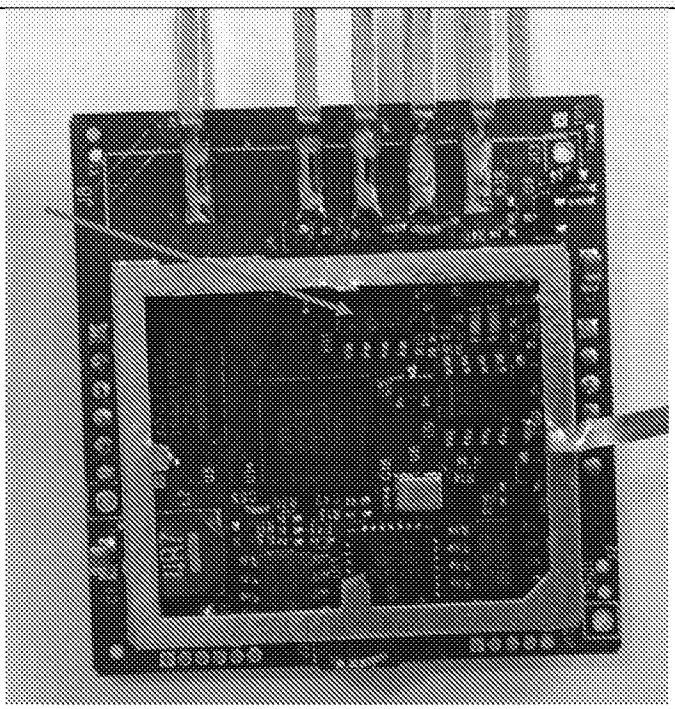
U.S. PATENT 7,671,727	
OMEGA PATENT CLAIMS	LMU-3000/LMU-3030[4]
	correct Parameter IDs for how the features work and sets the Speed above delay (time it has to be over speed before report) 3.5 **Speed Thresholds and Movement** The LMU has five Speed Thresholds to use within PEG, four of which are tied to generic Speed Thresholds (Parameter 257, indexes 0-3) and the last to the Moving Speed Threshold (Parameter 1035). Each Threshold is measured in cm/s, though many of the tools used with the LMU (eg PULS and LMU Manager) convert this into MPH or km/h. The Calamp LMU Manager Users Guide explains how to configure features for speed notification. The Speed Threshold is set in LMU Manager, and an input trigger defines the speed above, no conditions, and to send report. Calamp includes canned event message sent (LM Direct Reference Guide v. 8.6.c.2 (p. 4)) that include position and speed.

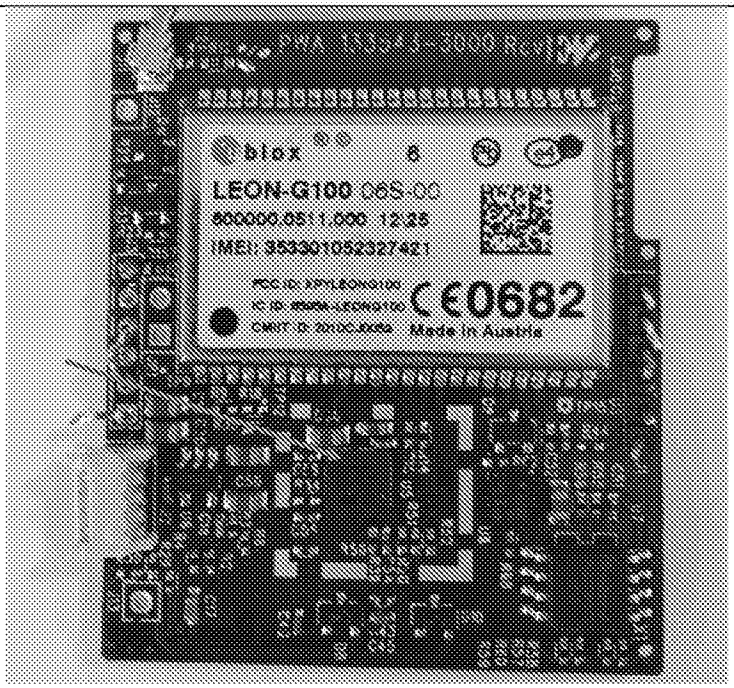
U.S. PATENT 7,671,727	
OMEGA PATENT CLAIMS	LMU-3000/LMU-3030[4]
	Event Report Message (Message Type 2): Event Report messages are initiated by the LMU and are generated by the LMU's Programmable Event Generator (PEG). They can be either Acknowledged or Unacknowledged Requests. The Server should respond to an Acknowledged Event Report Request with an Acknowledge message. Event reports have the following structure:

15	0
Options Header (optional)	..
..	..
Message Header	..
..	..
Update Time (msByte)	Update Time
Update Time	Update Time (lsByte)
Time of Fix (msByte)	Time of Fix
Time of Fix	Time of Fix (lsByte)
Latitude (msByte)	Latitude
Latitude	Latitude(lsByte)
Longitude (msByte)	Longitude
Longitude	Longitude (lsByte)
Altitude (msByte)	Altitude
Altitude	Altitude(lsByte)
Speed (msByte)	Speed
Speed	Speed (lsByte)
Heading (msByte)	Heading (lsByte)
Satellites	Fix Status
Carrier (msByte)	Carrier (lsByte)
RSSI (msByte)	RSSI (lsByte)
Comm State	HDOP
Inputs	Unit Status
Event Index	Event Code
Accums	spare
AccumList(msByte)	AccumList
AccumList	AccumList (lsByte)
..	..

Event Report Message Format

U.S. PATENT 7,671,727	
OMEGA PATENT CLAIMS	LMU-3000/LMU-3030[4]
10. The speed exceeded notification device according to claim 1 wherein the remote vehicle speed exceeded notification further comprises a speed of the vehicle.	The LMU-3000 is a speed exceeded notification device according to claim 1 wherein the remote vehicle speed exceeded notification further comprises a speed of the vehicle. Calamp includes canned event message (LM Direct Reference Guide v. 8.6.c.2 (p. 4)) that include position and speed.
11. The speed exceeded notification device according to claim 1 wherein the remote vehicle speed exceeded notification further comprises a vehicle position.	The LMU-3000 is a speed exceeded notification device according to claim 1 wherein the remote vehicle speed exceeded notification further comprises a vehicle position. Calamp includes canned event message (LM Direct Reference Guide v. 8.6.c.2 (p. 4)) that include position and speed.
19. A method for speed exceeded notification in a vehicle of a type comprising a vehicle data communications bus extending throughout the vehicle, and at least one vehicle device generating data related to vehicle speed on the vehicle data communications bus, the method comprising:	The LMU-3000 provides a method for speed exceeded notification in a vehicle of a type comprising a vehicle data communications bus extending throughout the vehicle, and at least one vehicle device generating data related to vehicle speed on the vehicle data communications bus.
using a controller coupled to the vehicle data communications bus for reading the data related to vehicle speed from the vehicle data communications bus, and	The LMU-3000 provides using a controller coupled to the vehicle data communications bus for reading the data related to vehicle speed from the vehicle data communications bus. The LMU-3000 includes a CAN bus transceiver, product MCP2551I:

U.S. PATENT 7,671,727	
OMEGA PATENT CLAIMS	LMU-3000/LMU-3030[4]
	 The controller is depicted below:

U.S. PATENT 7,671,727	
OMEGA PATENT CLAIMS	LMU-3000/LMU-3030[4]
	 Using the PEG Programming Guide (v1.0.0), p. 17 (section 3.5), the user sets the correct Parameter IDs for how the features work and sets the Speed above delay (time it has to be over speed before report).

U.S. PATENT 7,671,727	
OMEGA PATENT CLAIMS	LMU-3000/LMU-3030[4]
	3.5 **Speed Thresholds and Movement** The LMU has five Speed Thresholds to use within PEG, four of which are tied to generic Speed Thresholds (Parameter 257, indexes 0-3) and the last to the Moving Speed Threshold (Parameter 1035). Each Threshold is measured in cm/s, though many of the tools used with the LMU (eg PULS and LMU Manager) convert this into MPH or km/h. The Calamp LMU Manager Users Guide explains how to configure features for speed notification. The Speed Threshold is set in LMU Manager, and an input trigger defines the speed above, no conditions, and to send report. Calamp includes canned event message sent (LM Direct Reference Guide v. 8.6.c.2 (p. 4)) that include position and speed.

U.S. PATENT 7,671,727	
OMEGA PATENT CLAIMS	LMU-3000/LMU-3030[4]
	Event Report Message (Message Type 2): Event Report messages are initiated by the LMU and are generated by the LMU's Programmable Event Generator (PEG). They can be either Acknowledged or Unacknowledged Requests. The Server should respond to an Acknowledged Event Report Request with an Acknowledge message. Event reports have the following structure:

15	0
Options Header (optional)	..
..	..
Message Header	..
..	..
Update Time (msByte)	Update Time
Update Time	Update Time (lsByte)
Time of Fix (msByte)	Time of Fix
Time of Fix	Time of Fix (lsByte)
Latitude (msByte)	Latitude
Latitude	Latitude(lsByte)
Longitude (msByte)	Longitude
Longitude	Longitude (lsByte)
Altitude (msByte)	Altitude
Altitude	Altitude(lsByte)
Speed (msByte)	Speed
Speed	Speed (lsByte)
Heading (msByte)	Heading (lsByte)
Satellites	Fix Status
Carrier (msByte)	Carrier (lsByte)
RSSI (msByte)	RSSI (lsByte)
Comm State	HDOP
Inputs	Unit Status
Event Index	Event Code
Accums	spare
AccumList(msByte)	AccumList
AccumList	AccumList (lsByte)
..	..

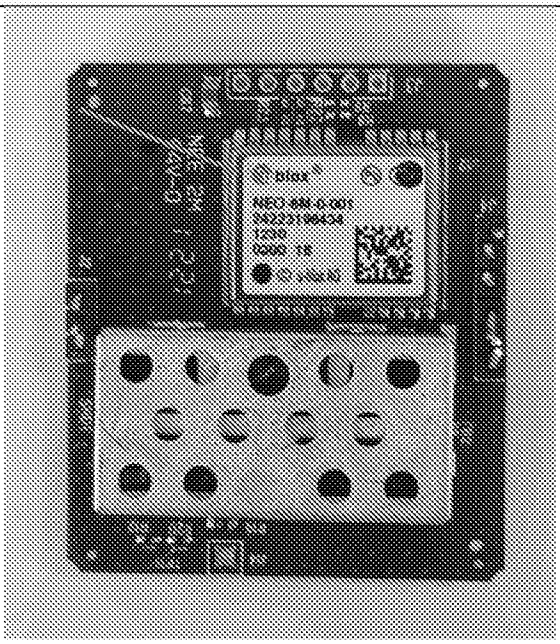
Event Report Message Format

U.S. PATENT 7,671,727	
OMEGA PATENT CLAIMS	LMU-3000/LMU-3030[4]
determining when a vehicle speed exceeds a speed threshold for a first time period and based thereon cooperating with a wireless communications device to send a remote vehicle speed exceeded notification.	The LMU-3000 provides for determining when a vehicle speed exceeds a speed threshold for a first time period and based thereon cooperating with a wireless communications device to send a remote vehicle speed exceeded notification, as shown above.
25. The method according to claim 19 wherein the remote vehicle speed exceeded notification further comprises at least one of an identity of the vehicle, a speed of the vehicle, a vehicle position, and a time the vehicle exceeded the speed threshold.	The LMU-3000 provides the remote vehicle speed exceeded notification further comprises at least one of an identity of the vehicle, a speed of the vehicle, a vehicle position, and a time the vehicle exceeded the speed threshold. Calamp includes canned event message (LM Direct Reference Guide v. 8.6.c.2 (p. 4)) that include position and speed.

EXHIBIT A-5

U.S. PATENT 8,032,278	
OMEGA PATENT CLAIMS	LMU-3000/LMU-3030[5]
1. A multi-vehicle compatible tracking unit for a vehicle comprising a vehicle data bus extending throughout the vehicle, the multi-vehicle compatible tracking unit comprising:	The LMU-3000 is a multi-vehicle compatible tracking unit for a vehicle comprising a vehicle data bus extending throughout the vehicle.
a vehicle position determining device;	The LMU-3000 includes a vehicle position determining device. The LMU-3000 includes a GPS module.

[5] The LMU-3000 and LMU-3030 are advertised as having the same functionality and features described herein. Thus, references throughout these claim charts to the LMU-3000 are intended to apply equally to the LMU-3030.

U.S. PATENT 8,032,278	
OMEGA PATENT CLAIMS	LMU-3000/LMU-3030[5]
	
a wireless communications device;	The LMU-3000 includes a wireless communications device. The LMU-3000 includes a cellular module that allows transmission to and reception from a central station.

U.S. PATENT 8,032,278	
OMEGA PATENT CLAIMS	LMU-3000/LMU-3030[5]
	
a multi-vehicle compatible controller for cooperating with said vehicle position determining device and said wireless communications device to send vehicle position information;	The LMU-3000 includes a multi-vehicle compatible controller for cooperating with said vehicle position determining device and said wireless communications device to send vehicle position information.

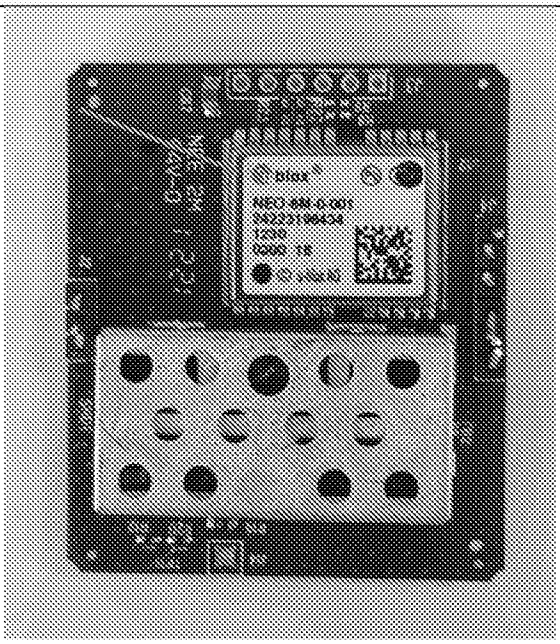
U.S. PATENT 8,032,278	
OMEGA PATENT CLAIMS	LMU-3000/LMU-3030[5]
	
said multi-vehicle compatible controller to be coupled to the vehicle data bus for communication thereover with at least one vehicle device using at least one corresponding vehicle device code from among a plurality thereof for	The LMU-3000 includes a said multi-vehicle compatible controller to be coupled to the vehicle data bus for communication thereover with at least one vehicle device using at least one corresponding vehicle device code from among a plurality thereof for different vehicles.

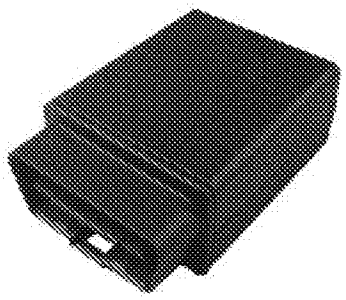
U.S. PATENT 8,032,278	
OMEGA PATENT CLAIMS	LMU-3000/LMU-3030[5]
different vehicles; and	The at least one vehicle device is the vehicle's ECM. On initial installation, the multi-vehicle compatible controller generates a sequence of device codes to determine compatibility with different vehicles, including CAN 11 Bit 7DF message, CAN 29 Bit 18DB33F1 message, J1850 VPW 68 6A F1 message, J1850 PWM message, K-Line messages and J1850 VPW 6C 10 F1 message.

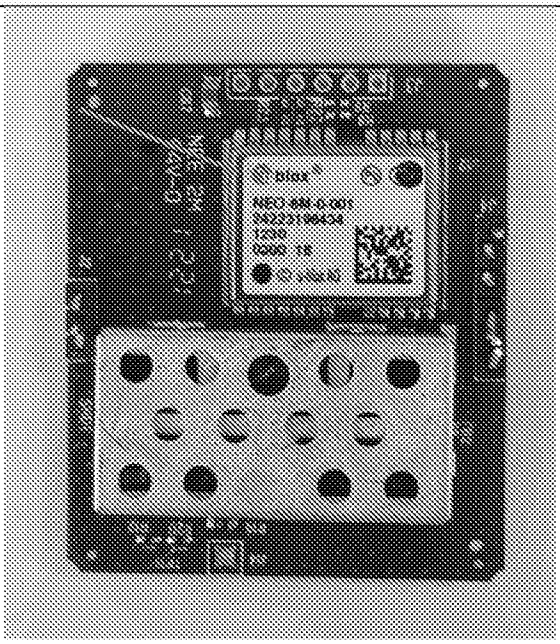
U.S. PATENT 8,032,278	
OMEGA PATENT CLAIMS	LMU-3000/LMU-3030[5]
	
a downloading interface for permitting downloading of enabling data related to the at least one corresponding vehicle device code for use by said multi-vehicle compatible controller.	The LMU-3000 includes a downloading interface for permitting downloading of enabling data related to the at least one corresponding vehicle device code for use by said multi-vehicle compatible controller.

U.S. PATENT 8,032,278	
OMEGA PATENT CLAIMS	LMU-3000/LMU-3030[5]
	The LMU-3000 includes a serial interface that can be used for downloading of enabling data. The LMU-3000 is also advertised as having automatic, over the air unit configuration on power up, as well as over the air firmware download. Calamp provides its users the ability to update the VBUS VehicleDB Type I File and/or the firmware and Vehicle DB Type II Ext File.
2. The multi-vehicle compatible tracking unit according to claim 1 wherein said downloading interface comprises a wired signal downloading interface.	The LMU-3000 includes a wired signal downloading interface. The LMU-3000 includes a serial interface that can be used for downloading enabling data.
3. The multi-vehicle compatible tracking unit according to claim 2 wherein said wired signal downloading interface comprises a connector for temporary connection to a downloading device.	The LMU-3000 includes a wired signal downloading interface comprises a connector for temporary connection to a downloading device. The LMU-3000 includes a serial interface that can be used for downloading enabling data.
4. The multi-vehicle compatible tracking unit according to claim 1 wherein said downloading interface comprises a wireless signal downloading interface.	The LMU-3000 includes a downloading interface comprising a wireless signal downloading interface. The LMU-3000 is also advertised as having automatic, over the air unit configuration on power up, as well as over the air firmware download.
5. The multi-vehicle compatible tracking unit according to claim 4 wherein said wireless signal downloading interface	The LMU-3000 includes a wireless signal downloading interface that comprises a wireless receiver for temporary connection to a downloading

U.S. PATENT 8,032,278	
OMEGA PATENT CLAIMS	LMU-3000/LMU-3030[5]
comprises a wireless receiver for temporary connection to a downloading device.	device. The LMU-3000 is also advertised as having automatic, over the air unit configuration on power up, as well as over the air firmware download.
6. The multi-vehicle compatible tracking unit according to claim 1 wherein the corresponding at least one vehicle code is for reading from the at least one vehicle device.	The LMU-3000 is a multi-vehicle compatible tracking unit wherein the corresponding at least one vehicle code is for reading from the at least one vehicle device. On initial installation, the multi-vehicle compatible controller generates a sequence of device codes to determine compatibility with different vehicles, including CAN 11 Bit 7DF message, CAN 29 Bit 18DB33F1 message, J1850 VPW 68 6A F1 message, J1850 PWM message, K-Line messages and J1850 VPW 6C 10 F1 message, which control and direct the at least one vehicle device to send a vehicle code that is read by the LMU-3000.
8. The multi-vehicle compatible tracking unit according to claim 1 wherein said downloading interface is also for permitting downloading of at least one programming instruction for said multi-vehicle compatible controller.	The LMU-3000 includes a downloading interface for permitting downloading of at least one programming instruction for said multi-vehicle compatible controller. The LMU-3000 includes a serial interface that can be used for downloading of enabling data. The LMU-3000 is also advertised as having automatic, over the air unit configuration on power up, as well as over the air firmware download.
11. The multi-vehicle compatible tracking unit according to claim 1 wherein said wireless position determining device comprises a Global Positioning System (GPS) receiver.	The LMU-3000 includes a GPS module.

U.S. PATENT 8,032,278	
OMEGA PATENT CLAIMS	LMU-3000/LMU-3030[5]
	
12. The multi-vehicle compatible tracking unit according to claim 1 further comprising a housing containing said vehicle position determining device, said wireless communications device, said multi-vehicle compatible controller, and said downloading interface.	The LMU-3000 includes a housing containing said vehicle position determining device, said wireless communications device, said multi-vehicle compatible controller, and said downloading interface.

U.S. PATENT 8,032,278	
OMEGA PATENT CLAIMS	LMU-3000/LMU-3030[5]
	
13. A multi-vehicle compatible tracking unit for a vehicle comprising a vehicle data bus extending throughout the vehicle, the multi-vehicle compatible vehicle tracking unit comprising:	The LMU-3000 is a multi-vehicle compatible tracking unit for a vehicle comprising a vehicle data bus extending throughout the vehicle.
a vehicle position determining device;	The LMU-3000 includes a vehicle position determining device. The LMU-3000 includes a GPS module.

U.S. PATENT 8,032,278	
OMEGA PATENT CLAIMS	LMU-3000/LMU-3030[5]
	
a wireless communications device;	The LMU-3000 includes a wireless communications device. The LMU-3000 includes a cellular module that allows transmission to and reception from a central station.

U.S. PATENT 8,032,278	
OMEGA PATENT CLAIMS	LMU-3000/LMU-3030[5]
	
a multi-vehicle compatible controller for cooperating with said vehicle position determining device and said wireless communications device to send vehicle position information;	The LMU-3000 includes a multi-vehicle compatible controller for cooperating with said vehicle position determining device and said wireless communications device to send vehicle position information.

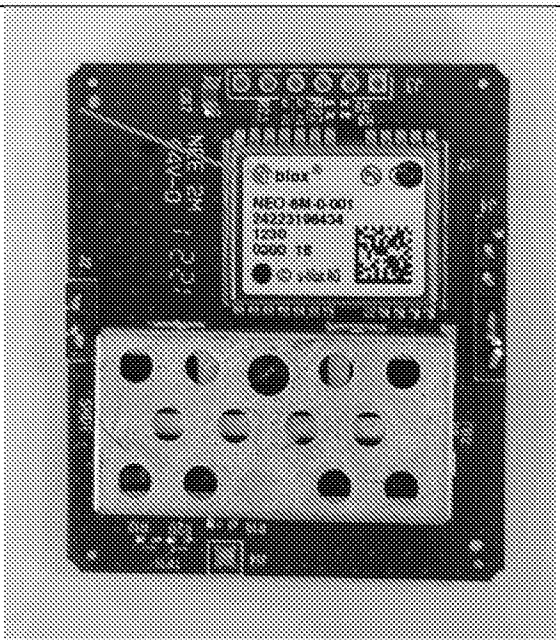
U.S. PATENT 8,032,278	
OMEGA PATENT CLAIMS	LMU-3000/LMU-3030[5]
	
said multi-vehicle compatible controller to be coupled to the vehicle data bus for communication thereover with at least one vehicle device using at least one corresponding vehicle device code from among a plurality thereof for	The LMU-3000 includes a said multi-vehicle compatible controller to be coupled to the vehicle data bus for communication thereover with at least one vehicle device using at least one corresponding vehicle device code from among a plurality thereof for different vehicles.

U.S. PATENT 8,032,278	
OMEGA PATENT CLAIMS	LMU-3000/LMU-3030[5]
different vehicles; and	The at least one vehicle device is the vehicle's ECM. On initial installation, the multi-vehicle compatible controller generates a sequence of device codes to determine compatibility with different vehicles, including CAN 11 Bit 7DF message, CAN 29 Bit 18DB33F1 message, J1850 VPW 68 6A F1 message, J1850 PWM message, K-Line messages and J1850 VPW 6C 10 F1 message.

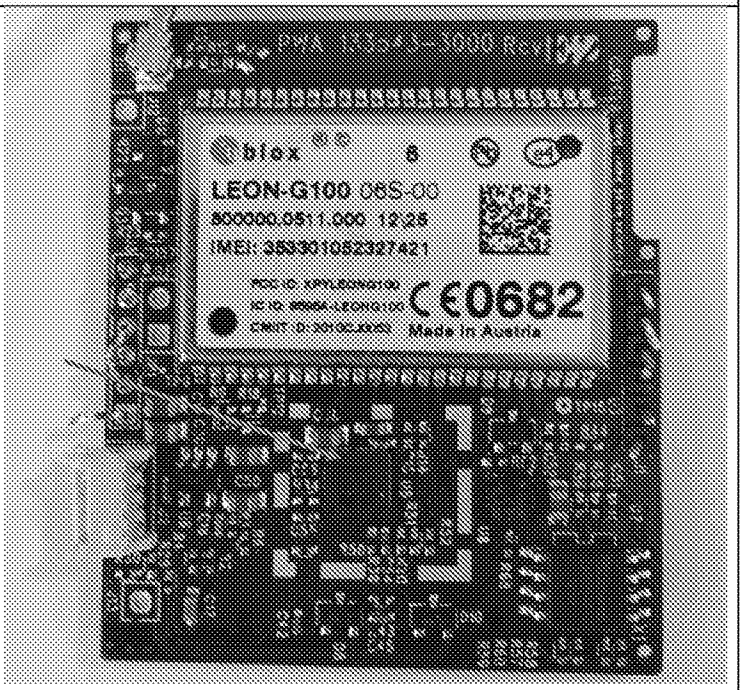
U.S. PATENT 8,032,278	
OMEGA PATENT CLAIMS	LMU-3000/LMU-3030[5]
	
a downloading interface for permitting downloading of enabling data related to the at least one corresponding vehicle device code for use by said multi-vehicle compatible controller;	The LMU-3000 includes a downloading interface for permitting downloading of enabling data related to the at least one corresponding vehicle device code for use by said multi-vehicle compatible controller.

U.S. PATENT 8,032,278	
OMEGA PATENT CLAIMS	LMU-3000/LMU-3030[5]
	The LMU-3000 includes a serial interface that can be used for downloading of enabling data. The LMU-3000 is also advertised as having automatic, over the air unit configuration on power up, as well as over the air firmware download. Calamp provides its users the ability to update the VBUS VehicleDB Type I File and/or the firmware and Vehicle DB Type II Ext File.
said downloading interface comprising a connector for temporary connection to a downloading device.	The LMU-3000 includes a downloading interface comprising a connector for temporary connection to a downloading device. The LMU-3000 includes a serial interface that can be used for downloading enabling data. The LMU-3000 is also advertised as having automatic, over the air unit configuration on power up, as well as over the air firmware download.
14. The multi-vehicle compatible tracking unit according to claim 13 wherein the corresponding at least one vehicle code is for reading from the at least one vehicle device.	The LMU-3000 is a multi-vehicle compatible tracking unit wherein the corresponding at least one vehicle code is for reading from the at least one vehicle device. On initial installation, the multi-vehicle compatible controller generates a sequence of device codes to determine compatibility with different vehicles, including CAN 11 Bit 7DF message, CAN 29 Bit 18DB33F1 message, J1850 VPW 68 6A F1 message, J1850 PWM message, K-Line messages and J1850 VPW 6C 10 F1 message, which control and direct the at least one vehicle device to send a vehicle code that is read by the LMU-3000.
16. The multi-vehicle compatible tracking unit according to claim 13 wherein said downloading interface is also for permitting downloading of at least one programming instruction for said multi-vehicle compatible controller.	The LMU-3000 includes a downloading interface for permitting downloading of at least one programming instruction for said multi-vehicle compatible controller. The LMU-3000 includes a serial interface that can be used for downloading of enabling data. The LMU-3000 is also advertised as having automatic, over the air unit configuration on

U.S. PATENT 8,032,278	
OMEGA PATENT CLAIMS	LMU-3000/LMU-3030[5]
	power up, as well as over the air firmware download.
18. A multi-vehicle compatible tracking unit for a vehicle comprising a vehicle data bus extending throughout the vehicle, the multi-vehicle compatible vehicle tracking unit comprising:	The LMU-3000 is a multi-vehicle compatible tracking unit for a vehicle comprising a vehicle data bus extending throughout the vehicle.
a vehicle position determining device;	The LMU-3000 includes a vehicle position determining device. The LMU-3000 includes a GPS module.

U.S. PATENT 8,032,278	
OMEGA PATENT CLAIMS	LMU-3000/LMU-3030[5]
	
a wireless communications device;	The LMU-3000 includes a wireless communications device. The LMU-3000 includes a cellular module that allows transmission to and reception from a central station.

U.S. PATENT 8,032,278	
OMEGA PATENT CLAIMS	LMU-3000/LMU-3030[5]
	
a multi-vehicle compatible controller for cooperating with said vehicle position determining device and said wireless communications device to send vehicle position information;	The LMU-3000 includes a multi-vehicle compatible controller for cooperating with said vehicle position determining device and said wireless communications device to send vehicle position information.

U.S. PATENT 8,032,278	
OMEGA PATENT CLAIMS	LMU-3000/LMU-3030[5]
	
said multi-vehicle compatible controller to be coupled to the vehicle data bus for communication thereover with at least one vehicle device using at least one corresponding vehicle device code from among a plurality thereof for	The LMU-3000 includes a said multi-vehicle compatible controller to be coupled to the vehicle data bus for communication thereover with at least one vehicle device using at least one corresponding vehicle device code from among a plurality thereof for different vehicles.

U.S. PATENT 8,032,278	
OMEGA PATENT CLAIMS	LMU-3000/LMU-3030[5]
different vehicles; and	The at least one vehicle device is the vehicle's ECM. On initial installation, the multi-vehicle compatible controller generates a sequence of device codes to determine compatibility with different vehicles, including CAN 11 Bit 7DF message, CAN 29 Bit 18DB33F1 message, J1850 VPW 68 6A F1 message, J1850 PWM message, K-Line messages and J1850 VPW 6C 10 F1 message.

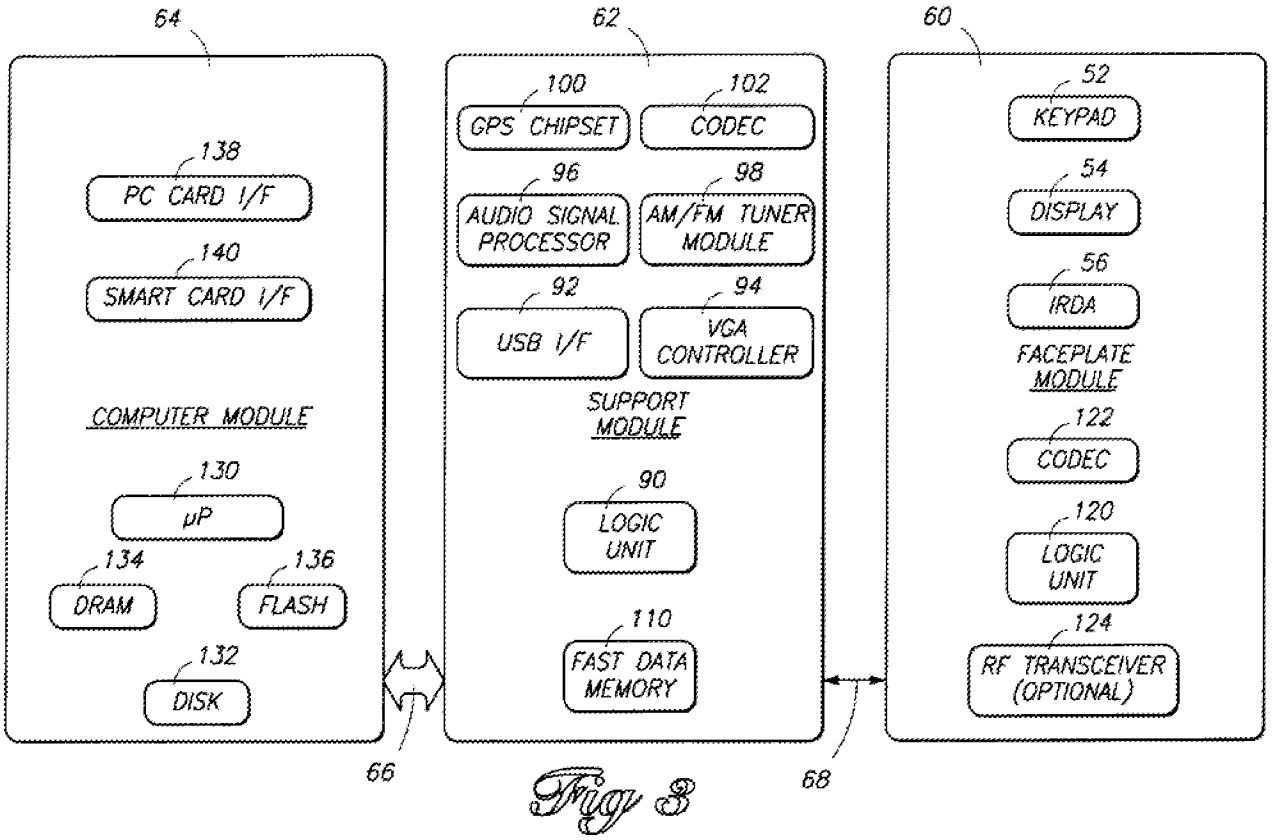
U.S. PATENT 8,032,278	
OMEGA PATENT CLAIMS	LMU-3000/LMU-3030[5]
	
a downloading interface for permitting downloading of enabling data related to the at least one corresponding vehicle device code for use by said multi-vehicle compatible controller;	The LMU-3000 includes a downloading interface for permitting downloading of enabling data related to the at least one corresponding vehicle device code for use by said multi-vehicle compatible controller.

U.S. PATENT 8,032,278	
OMEGA PATENT CLAIMS	LMU-3000/LMU-3030[5]
	The LMU-3000 includes a serial interface that can be used for downloading of enabling data. The LMU-3000 is also advertised as having automatic, over the air unit configuration on power up, as well as over the air firmware download. Calamp provides its users the ability to update the VBUS VehicleDB Type I File and/or the firmware and Vehicle DB Type II Ext File.
said downloading interface comprising a wireless receiver for temporary connection to a downloading device.	The LMU-3000 includes a downloading interface that comprises a wireless receiver for temporary connection to a downloading device. The LMU-3000 is also advertised as having automatic, over the air unit configuration on power up, as well as over the air firmware download.
19. The multi-vehicle compatible tracking unit according to claim 18 wherein the corresponding at least one vehicle code is for reading from the at least one vehicle device.	The LMU-3000 is a multi-vehicle compatible tracking unit wherein the corresponding at least one vehicle code is for reading from the at least one vehicle device. On initial installation, the multi-vehicle compatible controller generates a sequence of device codes to determine compatibility with different vehicles, including CAN 11 Bit 7DF message, CAN 29 Bit 18DB33F1 message, J1850 VPW 68 6A F1 message, J1850 PWM message, K-Line messages and J1850 VPW 6C 10 F1 message, which control and direct the at least one vehicle device to send a vehicle code that is read by the LMU-3000.
21. The multi-vehicle compatible tracking unit according to claim 18 wherein said downloading interface is also for permitting downloading of at least one programming instruction for said multi-vehicle compatible controller.	The LMU-3000 includes a downloading interface for permitting downloading of at least one programming instruction for said multi-vehicle compatible controller. The LMU-3000 includes a serial interface that can be used for downloading of enabling data. The LMU-3000 is also advertised as having automatic, over the air unit configuration on power up, as well as over the air firmware download.

EXHIBIT A-5 TO OMEGA'S INITIAL INFRINGEMENT CONTENTIONS
A-69

Exhibit B

The '278 Patent	PRIOR ART – U.S. Patent 6,009,363 to Beckert et al. (incorporates disclosure of U.S. Patent 5,794,164 to Beckert et al. by reference) and inherently the SAE HS-3000 Manual
1. A multi-vehicle compatible tracking unit for a vehicle comprising a vehicle data bus extending throughout the vehicle, the multi-vehicle compatible tracking unit comprising:	**The Beckert et al. '363 patent discloses a multi-vehicle compatible tracking unit in the form of a vehicle computer system** ("The vehicle computer system has a housing sized to be mounted in a vehicle dashboard or other convenient location. This system provides an open hardware architecture and supports an open platform operating system. The open platform operating system supports multiple different applications that can be supplied by a software vendor. For instance, the operating system can support applications pertaining to entertainment, navigation, communications, security, diagnostics, and others." Beckert et al. '363 patent, col. 2, lines 10-17) **for a vehicle comprising a vehicle data bus extending throughout the vehicle** ("Most late model (1996 or later for OBD II, 1993 or later for OBD I) vehicles are also constructed with a diagnostic system that analyzes performance of the vehicle's engine transmission and fuel system, and other components. The diagnostic system can be coupled to an external computer download or monitor diagnostic information that is useful to a vehicle mechanic during servicing of the vehicle." Beckert et al. '363 patent, col. 1, lines 32 – 38) **the multi-vehicle compatible tracking unit comprising:**
a vehicle position determining device;	**The Beckert et al. '363 patent discloses a vehicle position determining device** in the form of a GPS chipset ("a GPS (global positioning system) chipset 100 to provide for satellite navigation such that the longitude, latitude, and altitude of the vehicle may be readily determined" Beckert et al. '363 patent, col. 6, lines 50–53). A block diagram of the vehicle computer system showing the GPS chipset 110 is included in the Beckert et al. '363 patent as FIG. 3 (reproduced below).

	 Figg 3
a wireless communications device;	**The Beckert et al. '363 patent discloses a wireless communications device** in the form of a wireless Internet link 76 ("Another technique to load data or applications or transfer data with other computing devices is through … the wireless Internet link 76." Beckert et al. '363 patent, col. 5, lines 9 – 12, and FIGS. 1 and 3).

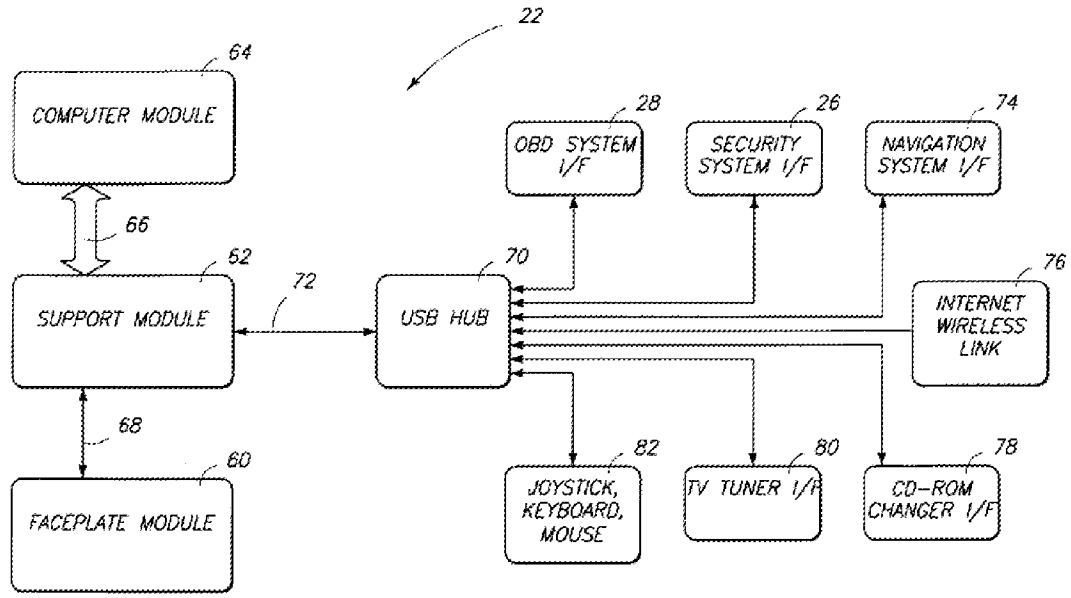
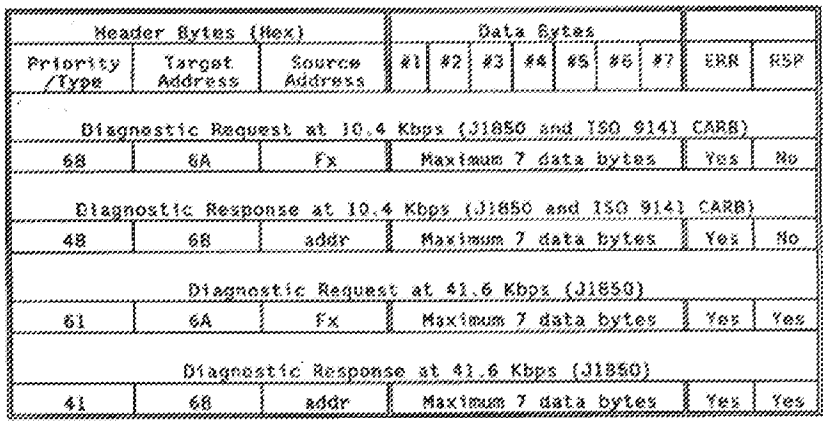
<table>
<tr><td></td><td> 

Fig 2</td></tr>
<tr><td>a multi-vehicle compatible controller for cooperating with said vehicle position determining device and said wireless communications device to send vehicle position information;</td><td>The Beckert et al. ‘363 patent discloses a multi-vehicle compatible controller in the form of the computer module 64 for cooperating with said vehicle position determining device (“The address/data bus structure 140 will also be driven for transfers between the host processor and peripheral registers such as the computer module reading the GPS receive registers.” Beckert et al. ‘363 patent, col. 9, lines 6 – 9) and said wireless communications device to send vehicle position information (“Another technique to… transfer data with other computing devices is through… the wireless Internet link 76” Beckert et al. ‘363 patent, col. 5, lines 9 - 12; U.S. Patent No. 5,794,164 (Beckert et al. ‘164 patent) is incorporated by reference in the Beckert et al. ‘363 patent at col. 7, lines 44-51; The Beckert et al. ‘164 patent further discloses that vehicle computer system implements several application program interfaces (APIs) that can be accessed by remote computers. “Example APIs include a position and navigation API…” Beckert et al. ‘164 patent, col. 12, lines 25 - 30).</td></tr>
</table>

said multi-vehicle compatible controller to be coupled to the vehicle data bus for communication thereover with at least one vehicle device using at least one corresponding vehicle device code from among a plurality thereof for different vehicles; and	**The Beckert et al. '363 patent discloses that said multi-vehicle compatible controller is coupled to the vehicle data bus for communication thereover** ("In FIG. 2, the support module 62 is also connected to a universal serial bus (USB) hub 70 via a multi-bit connector 72 (e.g., 8 bits). The USB hub 70 provides connections to… the OBD (On Board Diagnostic) system 28…" Beckert et al. '363 patent, col. 6, line 63 – col. 7, line 1); U.S. Patent No. 5,794,164 (Beckert et al. '164 patent) is incorporated by reference in the Beckert et al. '363 patent at col. 7, lines 44-51; The Beckert et al. '164 patent further discloses that the computer module includes an OBD interpreter; "An OBD (On Board Diagnostic) interpreter 116 is provided in the computer module to communicate with the OBD system built into the vehicle by the manufacturer." Beckert et al. '164 patent, col. 9, lines 29 - 31) **with at least one vehicle device using at least one corresponding vehicle device code from among a plurality thereof for different vehicles** ("Most late model vehicles are also constructed with a diagnostic system that analyzes performance of the vehicle's engine, transmission and fuel system, and other components (1996 or later for OBD II, 1993 or later for OBD I)" Beckert et al. '363 patent, col. 1, lines 32 – 35; At the time of the filing of the Beckert et al. '363 patent three signaling protocols were permitted with the OBD II interface; "The OBD interpreter 116 interprets the status data received and provides performance related information from the vehicle's OBD system to the microprocessor 100. Also, commands can be provided to the interpreter which allows non-critical car systems to be controlled." Beckert et al. '164 patent, col. 9, lines 31 – 35; The status data interpreted by the OBD interpreter is transmitted using one of the three signaling protocols permitted by the OBD II interface). The Society of Automotive Engineers (SAE) has published various standards related to vehicle standardized networks mandated in every new vehicle sold in the United States since 1996. In particular, the SAE standards relate a for communicating with vehicle devices using the vehicle bus via an OBD II diagnostic connector. In particular, the SAE standard is documented in, among many other available publications, the Society of Automotive Engineers (SAE) HS-3000 Manual (1994 edition), entitled "SAE On-Board Diagnostics for Light and Medium Duty Vehicles Standards Manual" (SAE HS-3000 Manual). The SAE HS-3000 includes various standards for communicating with vehicle devices on the vehicle

	bus, each standard under a particular SAE heading number (e.g., J1850, J2178, among various other standards) related to various aspects of vehicle control systems, including vehicle busses (e.g. SAE J1850, starting on page 91) and communicating, using device codes, with vehicle devices using the vehicle bus via an OBD II diagnostic connector mandated in every new vehicle sold since 1996 (e.g. SAE J1978 starting on page 33 , SAE J1979 starting on page 46 and SAE J2178/1-2178/2 starting on page 200). The SAE HS-3000 Manual discloses using at least one corresponding vehicle device code from among a plurality thereof for different vehicles. In particular, in order to allow a controller to be compatible with various busses that are used on a plurality of different vehicles, the controller uses a bus discovery procedure that is described on page 37, section 6.5.2 INITIALIZATION DETAILS of SAE J1978, reproduced below as scanned from the SAE HS-3000 manual, that involves sending different device codes or "messages", in the form of signals referred to as a "mode 1 PID 0 request message" in a manner appropriate for each of the SAE J1850 41.6 Kbps PWM bus, SAE J1850 10.4 Kbps VPW, and ISO 9141-2. In particular, as many as three device codes may initially be sent, at least two of which will be non-working for the particular vehicle and one of which is a working device code for the vehicle. See page 37, SAE J1978 at 6.5.1.(" While there are three types of communication interfaces that could be used to access the OBD II functions in a given vehicle (i.e., SAE J1850 41.6 Kbps PWM, SAE J1850 10.4 Kbps VPW and ISO 9141-2), only one is allowed to be used in any one vehicle to access all supported OBD II functions.")

	a. Test for SAE J1850 41.6 Kbps PWM (1) Step 1—Enable the SAE J1850 41.6 Kbps PWM interface (2) Step 2—Send a mode 1 PID 0 request message (3) Step 3—If a mode 1 PID 0 response message is received then SAE J1850 41.6 Kbps PWM is the type of interface used in a vehicle for OBD II support. b. Test for SAE J1850 10.4 Kbps VPW (1) Step 1—Enable the SAE J1850 10.4 Kbps VPW interface (2) Step 2—Send a mode 1 PID 0 request message (3) Step 3—If a mode 1 PID 0 response message is received then SAE J1850 10.4 Kbps VPW is the type of interface used in a vehicle for OBD II support. c. Test for ISO 9141 CARB (1) Step 1—Enable the ISO 9141-2 interface (2) Step 2—If the initialization sequence defined in ISO 9141-2 is completed successfully, then ISO 9141-2 is the type of interface used in a vehicle for OBD II support. The previous tests may be performed in any order and where possible may be performed in parallel. The mode 1 PID 0 request and response messages are defined in SAE J1979. SAE J1978 indicates that the "mode 1 PID 0" request and response messages are defined in SAE J1979, which starts on page 46 of the SAE HS-3000 Manual. See page 37, SAE J1978, Section 6.5.2., "Initialization Details". Requester further notes that transmission of the mode 1 PID 0 device code has previously been asserted as satisfying this requirement of the claim. See Exhibit F, Plaintiff's Disclosure of Initial Infringement Contentions, starting on page A-45. SAE J1979, starting on page 46, elaborates on the device codes that are used by the controller during bus detection, including the different device codes utilized by vehicles that employ a 10.4 Kbps interface (i.e., a first device code that includes 686A (hex) in the header of the request message) and vehicles that employ a 41.6 Kbps interface (i.e. a second device code that includes 616A (hex) in the header of the request message). See e.g., FIGURE 1 on page 51, reproduced below, of SAE J1979.



Header Bytes (Hex)			Data Bytes								
Priority /Type	Target Address	Source Address	#1	#2	#3	#4	#5	#6	#7	ERR	RSP
Diagnostic Request at 10.4 Kbps (J1850 and ISO 9141 CARB)											
68	6A	Fx	Maximum 7 data bytes							Yes	No
Diagnostic Response at 10.4 Kbps (J1850 and ISO 9141 CARB)											
48	6B	addr	Maximum 7 data bytes							Yes	No
Diagnostic Request at 41.6 Kbps (J1850)											
61	6A	Fx	Maximum 7 data bytes							Yes	Yes
Diagnostic Response at 41.6 Kbps (J1850)											
41	6B	addr	Maximum 7 data bytes							Yes	Yes

FIGURE 1—DIAGNOSTIC MESSAGE FORMAT

The HS-3000 Manual further provides details for hundreds of different device codes for different vehicle devices, which include SAE defined device codes and manufacturer defined device codes. In particular,, SAE J2178 which starts on page 211 of the SAE HS-3000 Manual and consists of four parts, 1 through 4, defines sets of vehicle device codes, or "messages", for hundreds of different types of vehicle devices. The specific vehicle device code will depend upon whether a particular manufacturer implements the SAE J2178 defined vehicle code or whether a vehicle supports a manufacturer specific vehicle code. Page 156, SAE J1850, Section 4.1 elaborates on the definition of the vehicle codes as follows: "Normal Vehicle Operation (Down the Road) Messages: The messages sent during non-diagnostic operations are called normal vehicle operation messages. These normal vehicle operation messages are used for communication from a transmitter to one or more receivers across this network. The normal operation messages have been developed by the SAE for this communication network and are defined in SAE-J2178. SAE defined messages and the 'Reserved' messages of SAE J2178 shall remain specific to those definitions. In SAE J2178, there is also a set-of 'Reserved-Manufacturer' messages which, if used, will have meanings specific to a vehicle manufacturer but are likely to be different between manufacturers."

J2178/1, starting on page 200 of the SAE HS-3000 Manual, includes 10 tables defining vehicle device codes for a large variety of different categories of vehicle devices (the specific device codes are

specified in J2178/2).

Section 4 of SAE J2178/2 on page 213 specifies the Parameter Reference Number (PRN) Structure utilized within the SAE J2178 messages to use a particular device code from among a plurality thereof for different vehicles, which is illustrated below. Section 4 notes that "Some of the PRN numbers are assigned or reserved for SAE definitions but the majority are reserved for individual motor vehicle manufacturers to coordinate and assign."

Figure 3 shows the basic structure of PRNs and Tables 1 and 2 show bit assignments and address ranges based on these assignments.

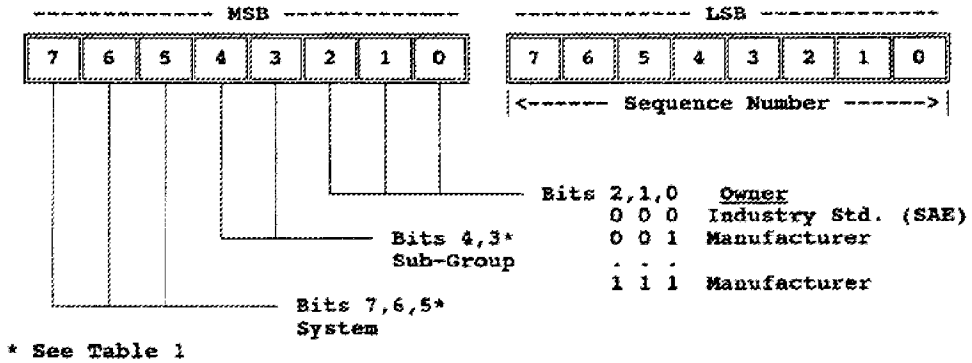


FIGURE 3—PRN STRUCTURE

The first three bits define the system and the next two bits define the sub-group. For each sub-group, three additional bits specify which of eight possible device codes are being used for a particular vehicle device, representing the Industry Std. device code (000) or one of seven manufacturer specific device codes (001-111). Accordingly, the standard specifies at least eight vehicle device codes for each PRN (which include 1 Industry Standard, and 7 manufacturer specific device codes).

SAE J2178/2, which starts on page 211 of the SAE HS-3000 Manual, provides the "Standardized

Parameter Definitions" for standardized messages on SAE J1850 Class B networks. SAE J2178/2 sets out respective sets of device codes for a host of vehicle devices that may be present on a given vehicle. For example, Table 2 on page 215, partially reproduced below, provides the address map of the SAE standard and reserved manufacturer specific (Reserved MFG) subgroups of messages for different classes of vehicle devices.

TABLE 2—SAE/MFG PRN RANGES

System	Subgroup	Address Map	Size
Powertrain	J1979 Compatible - SAE	0000 - 00FF	0.25K
	Reserved - MFG	0100 - 07FF	1.75K
	Reserved - SAE	0800 - 08FF	0.25K
	Reserved - MFG	0900 - 0FFF	1.75K
	Engine - SAE	1000 - 10FF	0.25K
	Engine - MFG	1100 - 17FF	1.75K
	Transmission - SAE	1800 - 18FF	0.25K
	Transmission - MFG	1900 - 1FFF	1.75K
Chassis	Reserved - SAE	2000 - 20FF	0.25K
	Reserved - MFG	2100 - 27FF	1.75K
	Brakes/Tires/Wheels - SAE	2800 - 28FF	0.25K
	Brakes/Tires/Wheels - MFG	2900 - 2FFF	1.75K
	Steering - SAE	3000 - 30FF	0.25K
	Steering - MFG	3100 - 37FF	1.75K
	Suspension - SAE	3800 - 38FF	0.25K
	Suspension - MFG	3900 - 3FFF	1.75K

SAE J2178/2 provides the details of device codes for hundreds of different vehicle devices within the address map ranges indicated in the above table. Section 4 of SAE J2178/2 on page 213 specifies that three bits are used to define eight different device codes for a given vehicle device including a SAE standard device code for the specific type of vehicle device and seven manufacturer specific device codes for that specific type of vehicle device.

The Beckert et al. '363 patent states that "Most late model vehicles are also constructed with a diagnostic system that analyzes performance of the vehicle's engine, transmission and fuel system,

	and other components (1006 or later for OBD II, 1993 or later for OBD I)." (Beckert '363 patent, col. 1, lines 35-26). The SAE standards, including the SAE HS-3000 Manual, were published for the specific purpose of teaching people of ordinary skill in the art how to communicate with vehicle devices using the vehicle bus via an OBD II diagnostic connector. Accordingly, it would have been both inherent and obvious to utilize the teachings described in SAE HS-3000 Manual because the Beckert et al. '363 patent expressly directs using the OBD II diagnostic system.
a downloading interface for permitting downloading of enabling data related to the at least one corresponding vehicle device code for use by said multi-vehicle compatible controller.	**The Beckert et al. '363 patent discloses multiple downloading interfaces** ("To load an application or data onto the computer 22, the vehicle user inserts a CD or other media (if the application is not already contained on the hard disk) into the appropriate drive and the operating system downloads the application or data therefrom. The installation process can be automatically handled by the operating system, or with the assistance of commands input from the user in the form of keyed sequences on the keypad 52 or verbal instructions using the voice recognition device. Another technique to load data or applications or transfer data with other computing devices is through the use of the IrDA transceiver port 56, or the wireless Internet link 76." Beckert et al. '363 patent, col. 5, lines 1 – 12; U.S. Patent No. 5,794,164 (Beckert et al. '164 patent) is incorporated by reference in the Beckert et al. '363 patent at col. 7, lines 44-51; "It is further noted that the complete vehicle system can be removed from the base unit for security reasons, or to plug the computer into a docking station at the user's residence or office. With a docking station, the user can install or configure various programs for vehicle usage…" Beckert et al. '164 patent, col. 12, lines 5 - 11) **for permitting downloading of enabling data related to the at least one corresponding vehicle device code for use by said multi-vehicle compatible controller in the form of vehicle diagnostics applications downloaded via a wireless Internet connection** ("The microprocessor runs an open platform operating system, such as Windows 95® or Windows NT™, or Windows® derivative operating systems from Microsoft Corporation… The computer module 64 supports any variety of applications that the vehicle user might desire. These applications can… downloaded from an optional wireless Internet connection." Beckert et al. '363 patent, col. 7, lines 20-33; "… the operating system can support applications pertaining to… diagnostics" Beckert et al. '363 patent, col. 2, lines 15-17; "For instance, the vehicle computer system 20 can serve as… a diagnostic system" Beckert et al. '363 patent, col. 5, lines 36-41; U.S. Patent No. 5,794,164 (Beckert et al. '164 patent) is incorporated by reference in the Beckert et al. '363 patent at col. 7, lines 44-51; The

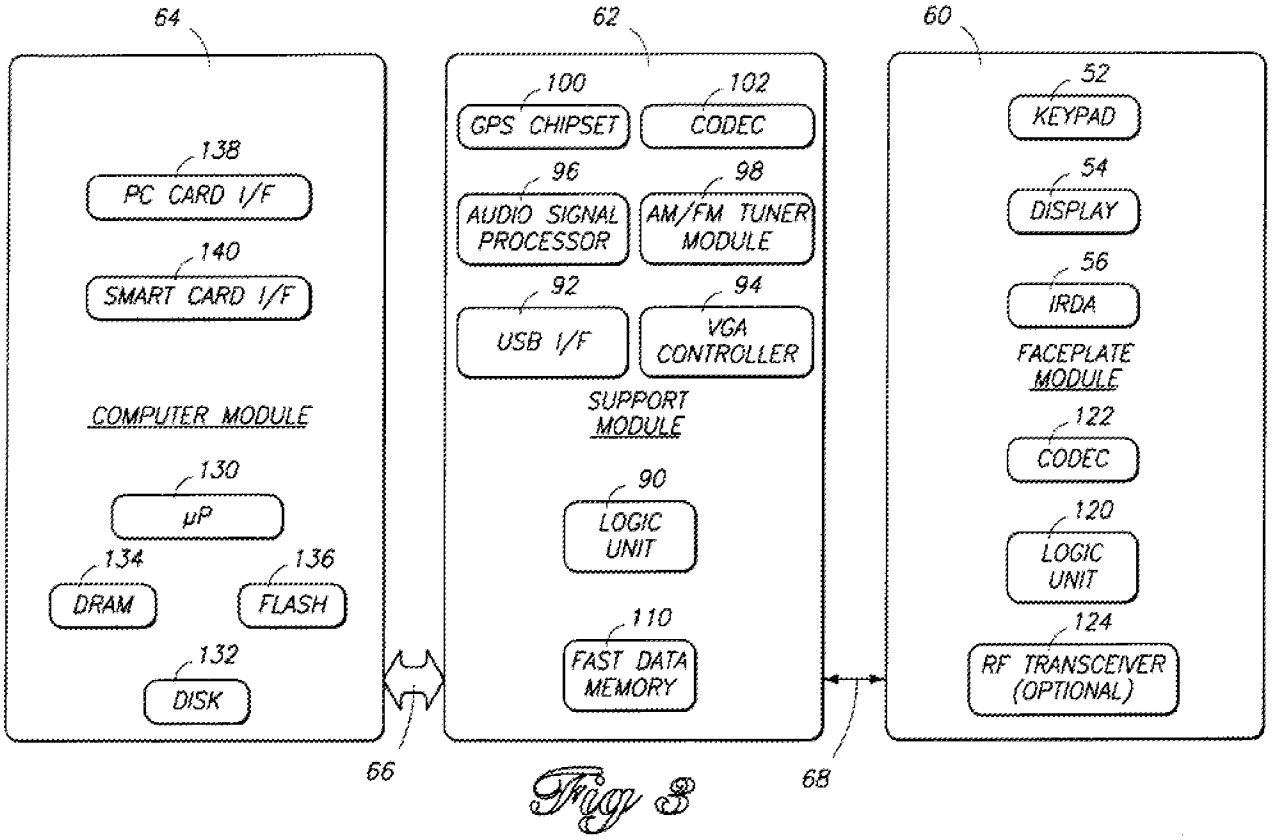
	Beckert et al. '164 patent further discloses that "[T]here are several applications that are supported by the operating system… The vehicle computer system also implements several application program interfaces (APIs) that offer specific functionality to support the various applications. Example APIs include… a diagnostics API… These applications and APIs are vehicle related… Essentially, the vehicle computer system can support any applications that run on the open platform operating system, which are many and varied" Beckert et al. '164 patent, col. 12, lines 12 – 40).
2. The multi-vehicle compatible tracking unit according to claim 1 wherein said downloading interface comprises a wired signal downloading interface.	**The Beckert et al. '363 patent discloses multiple downloading interfaces including wired signal downloading interfaces** ("To load an application or data onto the computer 22, the vehicle user inserts a CD or other media (if the application is not already contained on the hard disk) into the appropriate drive and the operating system downloads the application or data therefrom. The installation process can be automatically handled by the operating system, or with the assistance of commands input from the user in the form of keyed sequences on the keypad 52 or verbal instructions using the voice recognition device. Another technique to load data or applications or transfer data with other computing devices is through the use of the IrDA transceiver port 56, or the wireless Internet link 76." Beckert et al. '363 patent, col. 5, lines 1 – 12; U.S. Patent No. 5,794,164 (Beckert et al. '164 patent) is incorporated by reference in the Beckert et al. '363 patent at col. 7, lines 44-51; "It is further noted that the complete vehicle system can be removed from the base unit for security reasons, or to plug the computer into a docking station at the user's residence or office. With a docking station, the user can install or configure various programs for vehicle usage…" Beckert et al. '164 patent, col. 12, lines 5 - 11).
3. The multi-vehicle compatible tracking unit according to claim 2 wherein said wired signal downloading interface comprises a connector for temporary connection to a downloading device.	**The Beckert et al. '363 patent discloses that the wired signal downloading interface comprises a connector for temporary connection to a downloading device** ("It is further noted that the complete vehicle system can be removed from the base unit for security reasons, or to plug the computer into a docking station at the user's residence or office. With a docking station, the user can install or configure various programs for vehicle usage…" Beckert et al. '164 patent, col. 12, lines 5 - 11).

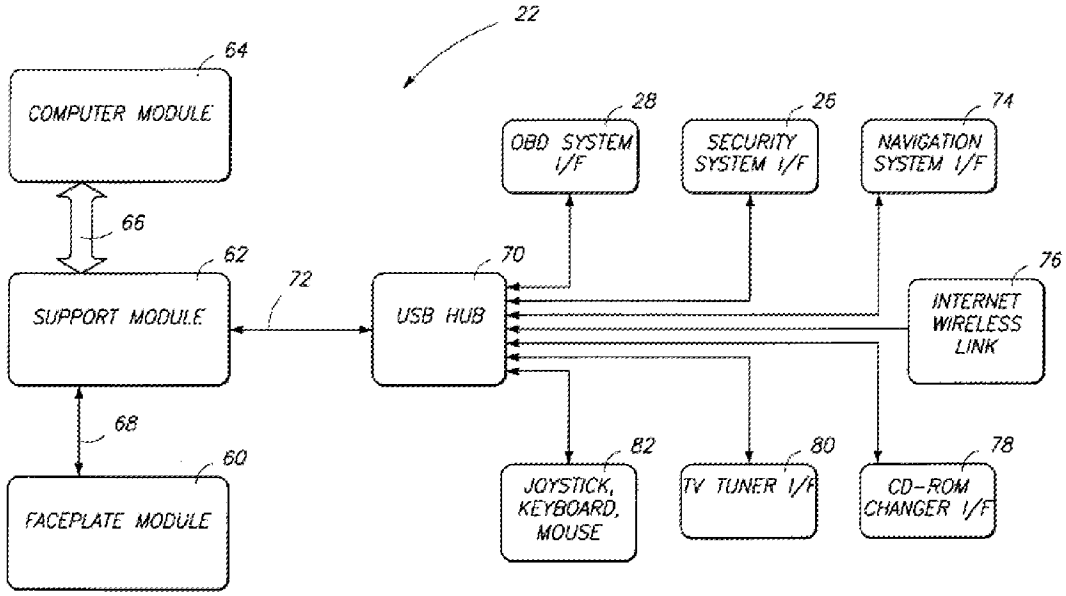
4. The multi-vehicle compatible tracking unit according to claim 1 wherein said downloading interface comprises a wireless signal downloading interface.	**The Beckert et al. '363 patent discloses that said downloading interface comprises a wireless signal downloading interface in the form of a wireless Internet link** ("To load an application or data onto the computer 22, the vehicle user inserts a CD or other media (if the application is not already contained on the hard disk) into the appropriate drive and the operating system downloads the application or data therefrom. The installation process can be automatically handled by the operating system, or with the assistance of commands input from the user in the form of keyed sequences on the keypad 52 or verbal instructions using the voice recognition device. Another technique to load data or applications or transfer data with other computing devices is through the use of the IrDA transceiver port 56, or the wireless Internet link 76." Beckert et al. '363 patent, col. 5, lines 1 – 12).
5. The multi-vehicle compatible tracking unit according to claim 4 wherein said wireless signal downloading interface comprises a wireless receiver for temporary connection to a downloading device.	**The Beckert et al. '363 patent discloses that said wireless signal downloading interface comprises a wireless receiver for temporary connection to a downloading device** ("Additionally, the faceplate module contains a slot for an optional plug-in RF transceiver 124 such as a cellphone, two-way pager, or point-to-point spread spectrum transceiver", Beckert et al. '363 patent, col. 7, lines 10-13).
6. The multi-vehicle compatible tracking unit according to claim 1 wherein the corresponding at least one vehicle code is for reading from the at least one vehicle device.	**The Beckert et al. '363 patent discloses that wherein the corresponding at least one vehicle code is for reading from the at least one vehicle device by describing reading status data from the vehicle's OBD system** ("Most late model (1996 or later for OBD II, 1993 or later for OBD I) vehicles are also constructed with a diagnostic system that analyzes performance of the vehicle's engine transmission and fuel system, and other components. The diagnostic system can be coupled to an external computer download or monitor diagnostic information that is useful to a vehicle mechanic during servicing of the vehicle." Beckert et al. '363 patent, col. 1, lines 32 – 38; U.S. Patent No. 5,794,164 (Beckert et al. '164 patent) is incorporated by reference in the Beckert et al. '363 patent at col. 7, lines 44-51; "The OBD interpreter 116 interprets the status data received and provides performance related information from the vehicle's OBD system to the microprocessor 100. Also, commands can be provided to the interpreter which allows non-critical car systems to be

	controlled." Beckert et al. '164 patent, col. 9, lines 31 – 35)
7. The multi-vehicle compatible tracking unit according to claim 1 wherein the corresponding at least one vehicle code is for writing to the at least one vehicle device.	**The Beckert et al. '363 patent discloses writing to the at least one vehicle device via an OBD-II port by disclosing providing commands that allow non-critical car systems to be controlled** ("Most late model (1996 or later for OBD II, 1993 or later for OBD I) vehicles are also constructed with a diagnostic system that analyzes performance of the vehicle's engine transmission and fuel system, and other components. The diagnostic system can be coupled to an external computer download or monitor diagnostic information that is useful to a vehicle mechanic during servicing of the vehicle." Beckert et al. '363 patent, col. 1, lines 32 – 38; U.S. Patent No. 5,794,164 (Beckert et al. '164 patent) is incorporated by reference in the Beckert et al. '363 patent at col. 7, lines 44-51; "The OBD interpreter 116 interprets the status data received and provides performance related information from the vehicle's OBD system to the microprocessor 100. Also, commands can be provided to the interpreter which allows non-critical car systems to be controlled." Beckert et al. '164 patent, col. 9, lines 31 – 35)
8. The multi-vehicle compatible tracking unit according to claim 1 wherein said downloading interface is also for permitting downloading of at least one programming instruction for said multi-vehicle compatible controller.	**The Beckert et al. '363 patent discloses that said downloading interface is also for permitting downloading of at least one programming instruction for said multi-vehicle compatible controller** ("The microprocessor runs an open platform operating system, such as Windows 95® or Windows NT™, or Windows® derivative operating systems from Microsoft Corporation… The computer module 64 supports any variety of applications that the vehicle user might desire. These applications can… downloaded from an optional wireless Internet connection." Beckert et al. '363 patent, col. 7, lines 20-33; "… the operating system can support applications pertaining to… diagnostics" Beckert et al. '363 patent, col. 2, lines 15-17; "For instance, the vehicle computer system 20 can serve as… a diagnostic system" Beckert et al. '363 patent, col. 5, lines 36-41; U.S. Patent No. 5,794,164 (Beckert et al. '164 patent) is incorporated by reference in the Beckert et al. '363 patent at col. 7, lines 44-51; The Beckert et al. '164 patent further discloses that "[T]here are several applications that are supported by the operating system… The vehicle computer system also implements several application program interfaces (APIs) that offer specific functionality to support the various applications. Example APIs include… a diagnostics API… These applications and APIs are vehicle related… Essentially, the vehicle computer system can support any applications that run on

	the open platform operating system, which are many and varied" Beckert et al. '164 patent, col. 12, lines 12 – 40)
9. The multi-vehicle compatible tracking unit according to claim 1 further comprising a remote transmitter;	**The Beckert et al. '363 patent discloses a remote transmitter in the form of other computing devices that communicate with the vehicle computer system via the wireless Internet link** ("Another technique to… transfer data with other computing devices is through… the wireless Internet link 76" Beckert et al. '363 patent, col. 5, lines 9 – 12).
and wherein said multi-vehicle compatible controller also performs at least one vehicle remote control function responsive to said remote transmitter.	**The Beckert et al. '363 patent discloses performing at least one vehicle remote control function responsive to the remote transmitter by incorporating U.S. Patent No. 5,794,164 (Beckert et al. '164 patent) by reference to disclose the full capabilities of the vehicle computer system that include a number of APIs that can be accessed by the remote computing devices including a diagnostic API that can be used to control the functions of the vehicle** ("Example APIs include… a diagnostics API" Beckert et al. '164 patent, col. 12, lines 25 – 30; "The OBD interpreter 116 interprets the status data received and provides performance related information from the vehicle's OBD system to the microprocessor 100. Also, commands can be provided to the interpreter which allows non-critical car systems to be controlled." Beckert et al. '164 patent, col. 9, lines 31 – 35).
10. The multi-vehicle compatible tracking unit according to claim 9 wherein the at least one vehicle remote control function comprises at least one of a vehicle security function, a remote keyless entry function, and a remote engine starting function.	**The Beckert et al. '363 patent discloses that security systems control actuators to lock/unlock doors or windows, and an alarm or siren and the controlling of the security system via the wireless Internet link** ("Security System also controls actuators to lock/unlock doors or windows, and an alarm or siren" Beckert et al. '363 patent, col. 1, lines 35 – 31; "The open platform operating system supports multiple different applications that can be supplied by a software vendor. For instance, the operating system can support applications pertaining to entertainment, navigation, communications, security, diagnostics, and others." Beckert et al. '363 patent, col. 2, lines 13–18; "It is desirable that the computer system remain operative to maintain security and communication features even though the system can no longer draw power from the vehicle battery." Beckert et al. '363 patent, col. 14, lines 6-9)
11. The multi-vehicle compatible tracking unit	**The Beckert et al. '363 patent discloses that said wireless position determining device comprises a Global Positioning System (GPS) receiver** ("a GPS (global positioning system) chipset 100 to provide

according to claim 1 wherein said wireless position determining device comprises a Global Positioning System (GPS) receiver.	for satellite navigation such that the longitude, latitude, and altitude of the vehicle may be readily determined" Beckert et al. '363 patent, col. 6, lines 50–53).
12. The multi-vehicle compatible tracking unit according to claim 1 further comprising a housing containing said vehicle position determining device, said wireless communications device, said multi-vehicle compatible controller, and said downloading interface.	**The Beckert et al. '363 patent discloses a housing containing said vehicle position determining device, said wireless communications device, said multi-vehicle compatible controller, and said downloading interface** ("The vehicle computer system has a housing sized to be mounted in a vehicle dashboard or other convenient location." Beckert et al. 363 patent, col. 2, lines 9 – 11; "The computer 22 is assembled in a housing 36 that is sized to be mounted in a vehicle dashboard, similar to a conventional automobile stereo. Preferably, the housing 36 has a form factor of a single DIN (Deutsche Industry Normen). But, it possibly could be housed in a 2 DIN unit or other special form factor for an OEM." Beckert et al. patent, col. 4, lines 4-9).
13. A multi-vehicle compatible tracking unit for a vehicle comprising a vehicle data bus extending throughout the vehicle, the multi-vehicle compatible vehicle tracking unit comprising:	**The Beckert et al. '363 patent discloses a multi-vehicle compatible tracking unit in the form of a vehicle computer system** ("The vehicle computer system has a housing sized to be mounted in a vehicle dashboard or other convenient location. This system provides an open hardware architecture and supports an open platform operating system. The open platform operating system supports multiple different applications that can be supplied by a software vendor. For instance, the operating system can support applications pertaining to entertainment, navigation, communications, security, diagnostics, and others." Beckert et al. '363 patent, col. 2, lines 10-17) **for a vehicle comprising a vehicle data bus extending throughout the vehicle** ("Most late model (1996 or later for OBD II, 1993 or later for OBD I) vehicles are also constructed with a diagnostic system that analyzes performance of the vehicle's engine transmission and fuel system, and other components. The diagnostic system can be coupled to an external computer download or monitor diagnostic information that is useful to a vehicle mechanic during servicing of the vehicle." Beckert et al. '363 patent, col. 1, lines 32 – 38) **the multi-vehicle compatible tracking unit comprising:**
a vehicle position	**The Beckert et al. '363 patent discloses a vehicle position determining device** in the form of a GPS

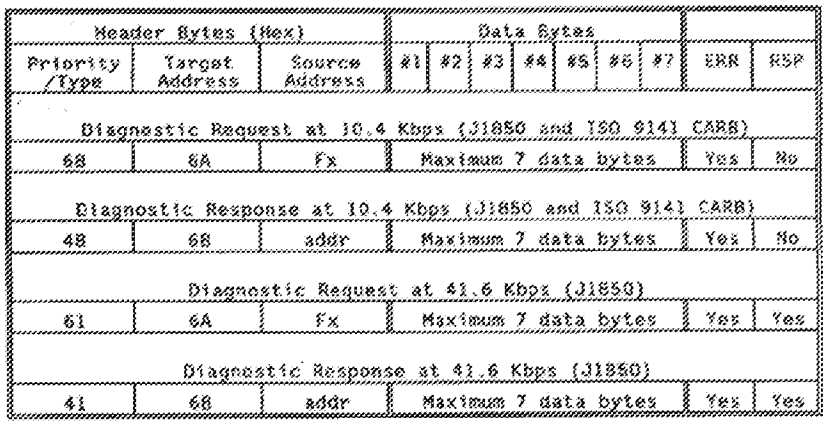
determining device;	chipset ("a GPS (global positioning system) chipset 100 to provide for satellite navigation such that the longitude, latitude, and altitude of the vehicle may be readily determined" Beckert et al. '363 patent, col. 6, lines 50–53). A block diagram of the vehicle computer system showing the GPS chipset 110 is included in the Beckert et al. '363 patent as FIG. 3 (reproduced below).  Fig. 3
a wireless communications device;	**The Beckert et al. '363 patent discloses a wireless communications device** in the form of a wireless Internet link 76 ("Another technique to load data or applications or transfer data with other computing devices is through … the wireless Internet link 76." Beckert et al. '363 patent, col. 5, lines

	9 – 12, and FIGS. 1 and 3).  Fig. 2
a multi-vehicle compatible controller for cooperating with said vehicle position determining device and said wireless communications device to send vehicle position information;	**The Beckert et al. '363 patent discloses a multi-vehicle compatible controller** in the form of the computer module 64 **for cooperating with said vehicle position determining device** ("The address/data bus structure 140 will also be driven for transfers between the host processor and peripheral registers such as the computer module reading the GPS receive registers." Beckert et al. '363 patent, col. 9, lines 6 – 9) **and said wireless communications device to send vehicle position information** ("Another technique to… transfer data with other computing devices is through… the wireless Internet link 76" Beckert et al. '363 patent, col. 5, lines 9 - 12; U.S. Patent No. 5,794,164 (Beckert et al. '164 patent) is incorporated by reference in the Beckert et al. '363 patent at col. 7, lines 44-51; The Beckert et al. '164 patent further discloses that vehicle computer system implements several application program interfaces (APIs) that can be accessed by remote computers. "Example APIs include a position and navigation API…" Beckert et al. '164 patent, col.

	12, lines 25 - 30).
said multi-vehicle compatible controller to be coupled to the vehicle data bus for communication thereover with at least one vehicle device using at least one corresponding vehicle device code from among a plurality thereof for different vehicles; and	**The Beckert et al. '363 patent discloses that said multi-vehicle compatible controller is coupled to the vehicle data bus for communication thereover** ("In FIG. 2, the support module 62 is also connected to a universal serial bus (USB) hub 70 via a multi-bit connector 72 (e.g., 8 bits). The USB hub 70 provides connections to… the OBD (On Board Diagnostic) system 28…" Beckert et al. '363 patent, col. 6, line 63 – col. 7, line 1); U.S. Patent No. 5,794,164 (Beckert et al. '164 patent) is incorporated by reference in the Beckert et al. '363 patent at col. 7, lines 44-51; The Beckert et al. '164 patent further discloses that the computer module includes an OBD interpreter; "An OBD (On Board Diagnostic) interpreter 116 is provided in the computer module to communicate with the OBD system built into the vehicle by the manufacturer." Beckert et al. '164 patent, col. 9, lines 29 - 31) **with at least one vehicle device using at least one corresponding vehicle device code from among a plurality thereof for different vehicles** ("Most late model vehicles are also constructed with a diagnostic system that analyzes performance of the vehicle's engine, transmission and fuel system, and other components (1996 or later for OBD II, 1993 or later for OBD I)" Beckert et al. '363 patent, col. 1, lines 32 – 35; At the time of the filing of the Beckert et al. '363 patent three signaling protocols were permitted with the OBD II interface; "The OBD interpreter 116 interprets the status data received and provides performance related information from the vehicle's OBD system to the microprocessor 100. Also, commands can be provided to the interpreter which allows non-critical car systems to be controlled." Beckert et al. '164 patent, col. 9, lines 31 – 35; The status data interpreted by the OBD interpreter is transmitted using one of the three signaling protocols permitted by the OBD II interface). The Society of Automotive Engineers (SAE) has published various standards related to vehicle standardized networks mandated in every new vehicle sold in the United States since 1996. In particular, the SAE standards relate a for communicating with vehicle devices using the vehicle bus via an OBD II diagnostic connector. In particular, the SAE standard is documented in, among many other available publications, the Society of Automotive Engineers (SAE) HS-3000 Manual (1994 edition), entitled "SAE On-Board Diagnostics for Light and Medium Duty Vehicles Standards Manual" (SAE HS-3000 Manual).

	The SAE HS-3000 includes various standards for communicating with vehicle devices on the vehicle bus, each standard under a particular SAE heading number (e.g., J1850, J2178, among various other standards) related to various aspects of vehicle control systems, including vehicle busses (e.g. SAE J1850, starting on page 91) and communicating, using device codes, with vehicle devices using the vehicle bus via an OBD II diagnostic connector mandated in every new vehicle sold since 1996 (e.g. SAE J1978 starting on page 33 , SAE J1979 starting on page 46 and SAE J2178/1-2178/2 starting on page 200). The SAE HS-3000 Manual discloses using at least one corresponding vehicle device code from among a plurality thereof for different vehicles. In particular, in order to allow a controller to be compatible with various busses that are used on a plurality of different vehicles, the controller uses a bus discovery procedure that is described on page 37, section 6.5.2 INITIALIZATION DETAILS of SAE J1978, reproduced below as scanned from the SAE HS-3000 manual, that involves sending different device codes or "messages", in the form of signals referred to as a "mode 1 PID 0 request message" in a manner appropriate for each of the SAE J1850 41.6 Kbps PWM bus, SAE J1850 10.4 Kbps VPW, and ISO 9141-2. In particular, as many as three device codes may initially be sent, at least two of which will be non-working for the particular vehicle and one of which is a working device code for the vehicle. See page 37, SAE J1978 at 6.5.1.(" While there are three types of communication interfaces that could be used to access the OBD II functions in a given vehicle (i.e., SAE J1850 41.6 Kbps PWM, SAE J1850 10.4 Kbps VPW and ISO 9141-2), only one is allowed to be used in any one vehicle to access all supported OBD II functions.")

	a. Test for SAE J1850 41.6 Kbps PWM (1) Step 1—Enable the SAE J1850 41.6 Kbps PWM interface (2) Step 2—Send a mode 1 PID 0 request message (3) Step 3—If a mode 1 PID 0 response message is received then SAE J1850 41.6 Kbps PWM is the type of interface used in a vehicle for OBD II support. b. Test for SAE J1850 10.4 Kbps VPW (1) Step 1—Enable the SAE J1850 10.4 Kbps VPW interface (2) Step 2—Send a mode 1 PID 0 request message (3) Step 3—If a mode 1 PID 0 response message is received then SAE J1850 10.4 Kbps VPW is the type of interface used in a vehicle for OBD II support. c. Test for ISO 9141 CARB (1) Step 1—Enable the ISO 9141-2 interface (2) Step 2—If the initialization sequence defined in ISO 9141-2 is completed successfully, then ISO 9141-2 is the type of interface used in a vehicle for OBD II support. The previous tests may be performed in any order and where possible may be performed in parallel. The mode 1 PID 0 request and response messages are defined in SAE J1979. SAE J1978 indicates that the "mode 1 PID 0" request and response messages are defined in SAE J1979, which starts on page 46 of the SAE HS-3000 Manual. See page 37, SAE J1978, Section 6.5.2., "Initialization Details". Requester further notes that transmission of the mode 1 PID 0 device code has previously been asserted as satisfying this requirement of the claim. See Exhibit F, Plaintiff's Disclosure of Initial Infringement Contentions, starting on page A-45. SAE J1979, starting on page 46, elaborates on the device codes that are used by the controller during bus detection, including the different device codes utilized by vehicles that employ a 10.4 Kbps interface (i.e., a first device code that includes 686A (hex) in the header of the request message) and vehicles that employ a 41.6 Kbps interface (i.e. a second device code that includes 616A (hex) in the header of the request message). See e.g., FIGURE 1 on page 51, reproduced below, of SAE J1979.



Header Bytes (Hex)			Data Bytes								
Priority /Type	Target Address	Source Address	#1	#2	#3	#4	#5	#6	#7	ERR	RSP
Diagnostic Request at 10.4 Kbps (J1850 and ISO 9141 CARB)											
68	6A	Fx	Maximum 7 data bytes							Yes	No
Diagnostic Response at 10.4 Kbps (J1850 and ISO 9141 CARB)											
48	6B	addr	Maximum 7 data bytes							Yes	No
Diagnostic Request at 41.6 Kbps (J1850)											
61	6A	Fx	Maximum 7 data bytes							Yes	Yes
Diagnostic Response at 41.6 Kbps (J1850)											
41	6B	addr	Maximum 7 data bytes							Yes	Yes

FIGURE 1—DIAGNOSTIC MESSAGE FORMAT

The HS-3000 Manual further provides details for hundreds of different device codes for different vehicle devices, which include SAE defined device codes and manufacturer defined device codes. In particular,, SAE J2178 which starts on page 211 of the SAE HS-3000 Manual and consists of four parts, 1 through 4, defines sets of vehicle device codes, or "messages", for hundreds of different types of vehicle devices. The specific vehicle device code will depend upon whether a particular manufacturer implements the SAE J2178 defined vehicle code or whether a vehicle supports a manufacturer specific vehicle code. Page 156, SAE J1850, Section 4.1 elaborates on the definition of the vehicle codes as follows: "Normal Vehicle Operation (Down the Road) Messages: The messages sent during non-diagnostic operations are called normal vehicle operation messages. These normal vehicle operation messages are used for communication from a transmitter to one or more receivers across this network. The normal operation messages have been developed by the SAE for this communication network and are defined in SAE-J2178. SAE defined messages and the 'Reserved' messages of SAE J2178 shall remain specific to those definitions. In SAE J2178, there is also a set-of 'Reserved-Manufacturer' messages which, if used, will have meanings specific to a vehicle manufacturer but are likely to be different between manufacturers."

J2178/1, starting on page 200 of the SAE HS-3000 Manual, includes 10 tables defining vehicle device codes for a large variety of different categories of vehicle devices (the specific device codes are

specified in J2178/2).

Section 4 of SAE J2178/2 on page 213 specifies the Parameter Reference Number (PRN) Structure utilized within the SAE J2178 messages to use a particular device code from among a plurality thereof for different vehicles, which is illustrated below. Section 4 notes that "Some of the PRN numbers are assigned or reserved for SAE definitions but the majority are reserved for individual motor vehicle manufacturers to coordinate and assign."

Figure 3 shows the basic structure of PRNs and Tables 1 and 2 show bit assignments and address ranges based on these assignments.

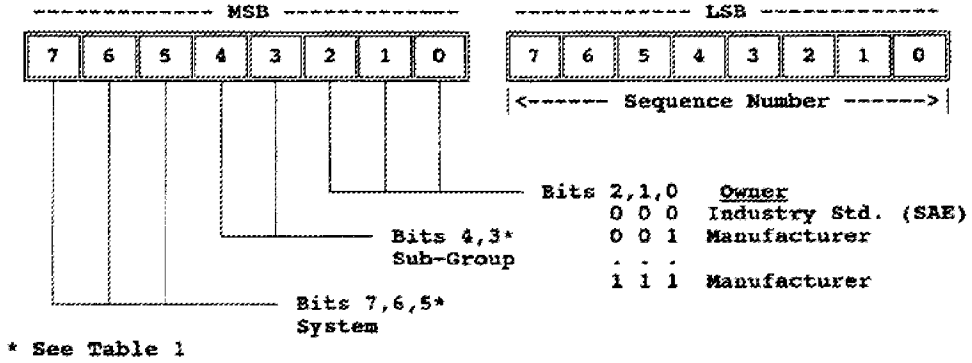


FIGURE 3—PRN STRUCTURE

The first three bits define the system and the next two bits define the sub-group. For each sub-group, three additional bits specify which of eight possible device codes are being used for a particular vehicle device, representing the Industry Std. device code (000) or one of seven manufacturer specific device codes (001-111). Accordingly, the standard specifies at least eight vehicle device codes for each PRN (which include 1 Industry Standard, and 7 manufacturer specific device codes).

SAE J2178/2, which starts on page 211 of the SAE HS-3000 Manual, provides the "Standardized

Parameter Definitions" for standardized messages on SAE J1850 Class B networks. SAE J2178/2 sets out respective sets of device codes for a host of vehicle devices that may be present on a given vehicle. For example, Table 2 on page 215, partially reproduced below, provides the address map of the SAE standard and reserved manufacturer specific (Reserved MFG) subgroups of messages for different classes of vehicle devices.

TABLE 2—SAE/MFG PRN RANGES

System	Subgroup	Address Map	Size
Powertrain	J1979 Compatible - SAE	0000 - 00FF	0.25K
	Reserved - MFG	0100 - 07FF	1.75K
	Reserved - SAE	0800 - 08FF	0.25K
	Reserved - MFG	0900 - 0FFF	1.75K
	Engine - SAE	1000 - 10FF	0.25K
	Engine - MFG	1100 - 17FF	1.75K
	Transmission - SAE	1800 - 18FF	0.25K
	Transmission - MFG	1900 - 1FFF	1.75K
Chassis	Reserved - SAE	2000 - 20FF	0.25K
	Reserved - MFG	2100 - 27FF	1.75K
	Brakes/Tires/Wheels - SAE	2800 - 28FF	0.25K
	Brakes/Tires/Wheels - MFG	2900 - 2FFF	1.75K
	Steering - SAE	3000 - 30FF	0.25K
	Steering - MFG	3100 - 37FF	1.75K
	Suspension - SAE	3800 - 38FF	0.25K
	Suspension - MFG	3900 - 3FFF	1.75K

SAE J2178/2 provides the details of device codes for hundreds of different vehicle devices within the address map ranges indicated in the above table. Section 4 of SAE J2178/2 on page 213 specifies that three bits are used to define eight different device codes for a given vehicle device including a SAE standard device code for the specific type of vehicle device and seven manufacturer specific device codes for that specific type of vehicle device.

The Beckert et al. '363 patent states that "Most late model vehicles are also constructed with a diagnostic system that analyzes performance of the vehicle's engine, transmission and fuel system,

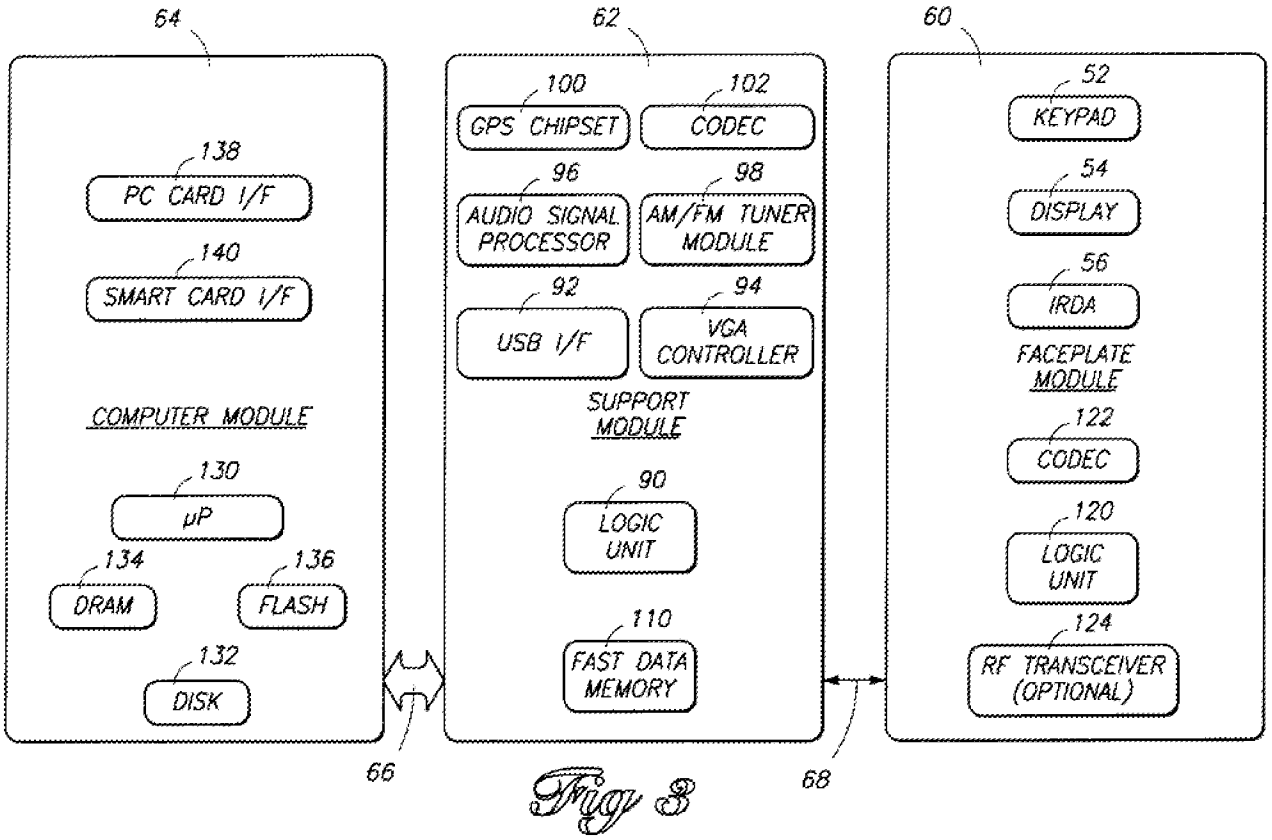
	and other components (1006 or later for OBD II, 1993 or later for OBD I)." (Beckert '363 patent, col. 1, lines 35-26). The SAE standards, including the SAE HS-3000 Manual, were published for the specific purpose of teaching people of ordinary skill in the art how to communicate with vehicle devices using the vehicle bus via an OBD II diagnostic connector. Accordingly, it would have been obvious to utilize the teachings described in SAE HS-3000 Manual because the Beckert et al. '363 patent expressly directs using the OBD II diagnostic system.
a downloading interface for permitting downloading of enabling data related to the at least one corresponding vehicle device code for use by said multi-vehicle compatible controller;	**The Beckert et al. '363 patent discloses multiple downloading interfaces** ("To load an application or data onto the computer 22, the vehicle user inserts a CD or other media (if the application is not already contained on the hard disk) into the appropriate drive and the operating system downloads the application or data therefrom. The installation process can be automatically handled by the operating system, or with the assistance of commands input from the user in the form of keyed sequences on the keypad 52 or verbal instructions using the voice recognition device. Another technique to load data or applications or transfer data with other computing devices is through the use of the IrDA transceiver port 56, or the wireless Internet link 76." Beckert et al. '363 patent, col. 5, lines 1 – 12; U.S. Patent No. 5,794,164 (Beckert et al. '164 patent) is incorporated by reference in the Beckert et al. '363 patent at col. 7, lines 44-51; "It is further noted that the complete vehicle system can be removed from the base unit for security reasons, or to plug the computer into a docking station at the user's residence or office. With a docking station, the user can install or configure various programs for vehicle usage…" Beckert et al. '164 patent, col. 12, lines 5 - 11) **for permitting downloading of enabling data related to the at least one corresponding vehicle device code for use by said multi-vehicle compatible controller in the form of vehicle diagnostics applications downloaded via a wireless Internet connection** ("The microprocessor runs an open platform operating system, such as Windows 95® or Windows NT™, or Windows® derivative operating systems from Microsoft Corporation… The computer module 64 supports any variety of applications that the vehicle user might desire. These applications can… downloaded from an optional wireless Internet connection." Beckert et al. '363 patent, col. 7, lines 20-33; "… the operating system can support applications pertaining to… diagnostics" Beckert et al. '363 patent, col. 2, lines 15-17; "For instance, the vehicle computer system 20 can serve as… a diagnostic system" Beckert et al. '363 patent, col. 5, lines 36-41; U.S. Patent No. 5,794,164 (Beckert et al. '164 patent) is incorporated by reference in the Beckert et al. '363 patent at col. 7, lines 44-51; The

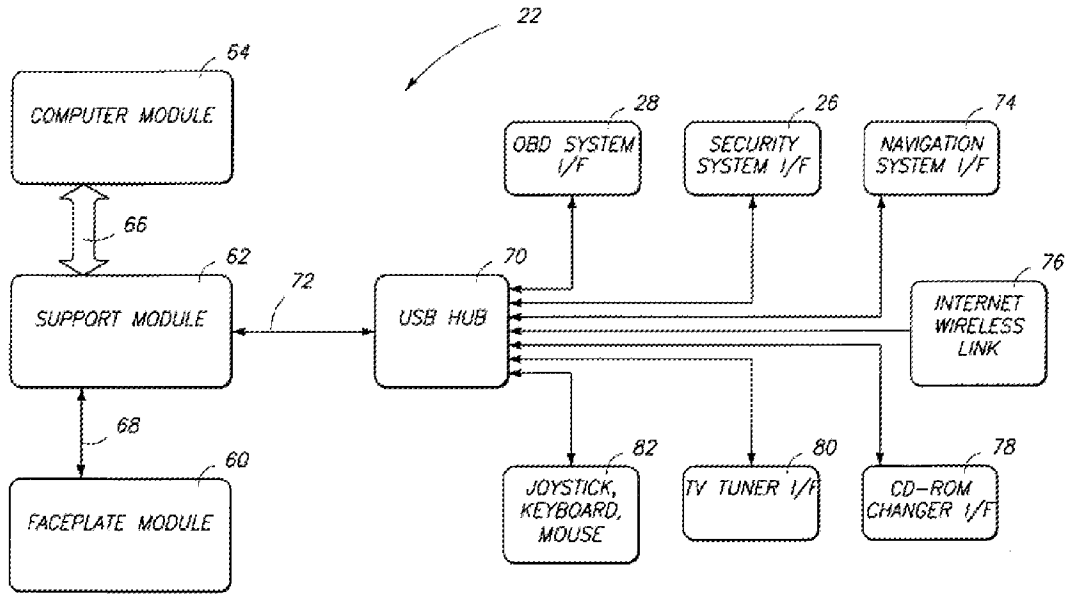
	Beckert et al. '164 patent further discloses that "[T]here are several applications that are supported by the operating system… The vehicle computer system also implements several application program interfaces (APIs) that offer specific functionality to support the various applications. Example APIs include… a diagnostics API… These applications and APIs are vehicle related… Essentially, the vehicle computer system can support any applications that run on the open platform operating system, which are many and varied" Beckert et al. '164 patent, col. 12, lines 12 – 40)
said downloading interface comprising a connector for temporary connection to a downloading device.	**The Beckert et al. '363 patent discloses that the wired signal downloading interface comprises a connector for temporary connection to a downloading device** ("It is further noted that the complete vehicle system can be removed from the base unit for security reasons, or to plug the computer into a docking station at the user's residence or office. With a docking station, the user can install or configure various programs for vehicle usage…" Beckert et al. '164 patent, col. 12, lines 5 - 11) **The Beckert et al. '363 patent also discloses a wireless signal downloading interface for temporary connection to a downloading device** ("Additionally, the faceplate module contains a slot for an optional plug-in RF transceiver 124 such as a cellphone, two-way pager, or point-to-point spread spectrum transceiver", Beckert et al. '363 patent, col. 7, lines 10-13).
14. The multi-vehicle compatible tracking unit according to claim 13 wherein the corresponding at least one vehicle code is for reading from the at least one vehicle device.	**The Beckert et al. '363 patent discloses that wherein the corresponding at least one vehicle code is for reading from the at least one vehicle device by describing reading status data from the vehicle's OBD system** ("Most late model (1996 or later for OBD II, 1993 or later for OBD I) vehicles are also constructed with a diagnostic system that analyzes performance of the vehicle's engine transmission and fuel system, and other components. The diagnostic system can be coupled to an external computer download or monitor diagnostic information that is useful to a vehicle mechanic during servicing of the vehicle." Beckert et al. '363 patent, col. 1, lines 32 – 38; U.S. Patent No. 5,794,164 (Beckert et al. '164 patent) is incorporated by reference in the Beckert et al. '363 patent at col. 7, lines 44-51; "The OBD interpreter 116 interprets the status data received and provides performance related information from the vehicle's OBD system to the microprocessor 100. Also, commands can be provided to the interpreter which allows non-critical car systems to be

	controlled." Beckert et al. '164 patent, col. 9, lines 31 – 35)
15. The multi-vehicle compatible tracking unit according to claim 13 wherein the corresponding at least one vehicle code is for writing to the at least one vehicle device.	**The Beckert et al. '363 patent discloses writing to the at least one vehicle device via an OBD-II port by disclosing providing commands that allow non-critical car systems to be controlled** ("Most late model (1996 or later for OBD II, 1993 or later for OBD I) vehicles are also constructed with a diagnostic system that analyzes performance of the vehicle's engine transmission and fuel system, and other components. The diagnostic system can be coupled to an external computer download or monitor diagnostic information that is useful to a vehicle mechanic during servicing of the vehicle." Beckert et al. '363 patent, col. 1, lines 32 – 38; U.S. Patent No. 5,794,164 (Beckert et al. '164 patent) is incorporated by reference in the Beckert et al. '363 patent at col. 7, lines 44-51; "The OBD interpreter 116 interprets the status data received and provides performance related information from the vehicle's OBD system to the microprocessor 100. Also, commands can be provided to the interpreter which allows non-critical car systems to be controlled." Beckert et al. '164 patent, col. 9, lines 31 – 35)
16. The multi-vehicle compatible tracking unit according to claim 13 wherein said downloading interface is also for permitting downloading of at least one programming instruction for said multi-vehicle compatible controller.	**The Beckert et al. '363 patent discloses that said downloading interface is also for permitting downloading of at least one programming instruction for said multi-vehicle compatible controller** ("The microprocessor runs an open platform operating system, such as Windows 95® or Windows NT™, or Windows® derivative operating systems from Microsoft Corporation… The computer module 64 supports any variety of applications that the vehicle user might desire. These applications can… downloaded from an optional wireless Internet connection." Beckert et al. '363 patent, col. 7, lines 20-33; "… the operating system can support applications pertaining to… diagnostics" Beckert et al. '363 patent, col. 2, lines 15-17; "For instance, the vehicle computer system 20 can serve as… a diagnostic system" Beckert et al. '363 patent, col. 5, lines 36-41; U.S. Patent No. 5,794,164 (Beckert et al. '164 patent) is incorporated by reference in the Beckert et al. '363 patent at col. 7, lines 44-51; The Beckert et al. '164 patent further discloses that "[T]here are several applications that are supported by the operating system… The vehicle computer system also implements several application program interfaces (APIs) that offer specific functionality to support the various applications. Example APIs include… a diagnostics API… These applications and APIs are vehicle related… Essentially, the vehicle computer system can support any applications that run on

	the open platform operating system, which are many and varied" Beckert et al. '164 patent, col. 12, lines 12 – 40)
17. The multi-vehicle compatible tracking unit according to claim 13 further comprising a remote transmitter;	**The Beckert et al. '363 patent discloses a remote transmitter in the form of other computing devices that communicate with the vehicle computer system via the wireless Internet link** ("Another technique to… transfer data with other computing devices is through… the wireless Internet link 76" Beckert et al. '363 patent, col. 5, lines 9 – 12).
and wherein said multi-vehicle compatible controller also performs at least one vehicle remote control function responsive to said remote transmitter.	**The Beckert et al. '363 patent discloses performing at least one vehicle remote control function responsive to the remote transmitter by incorporating U.S. Patent No. 5,794,164 (Beckert et al. '164 patent) by reference to disclose the full capabilities of the vehicle computer system that include a number of APIs that can be accessed by the remote computing devices including a diagnostic API that can be used to control the functions of the vehicle** ("Example APIs include… a diagnostics API" Beckert et al. '164 patent, col. 12, lines 25 – 30; "The OBD interpreter 116 interprets the status data received and provides performance related information from the vehicle's OBD system to the microprocessor 100. Also, commands can be provided to the interpreter which allows non-critical car systems to be controlled." Beckert et al. '164 patent, col. 9, lines 31 – 35).
18. A multi-vehicle compatible tracking unit for a vehicle comprising a vehicle data bus extending throughout the vehicle, the multi-vehicle compatible vehicle tracking unit comprising:	**The Beckert et al. '363 patent discloses a multi-vehicle compatible tracking unit in the form of a vehicle computer system** ("The vehicle computer system has a housing sized to be mounted in a vehicle dashboard or other convenient location. This system provides an open hardware architecture and supports an open platform operating system. The open platform operating system supports multiple different applications that can be supplied by a software vendor. For instance, the operating system can support applications pertaining to entertainment, navigation, communications, security, diagnostics, and others." Beckert et al. '363 patent, col. 2, lines 10-17) **for a vehicle comprising a vehicle data bus extending throughout the vehicle** ("Most late model (1996 or later for OBD II, 1993 or later for OBD I) vehicles are also constructed with a diagnostic system that analyzes performance of the vehicle's engine transmission and fuel system, and other components. The diagnostic system can be coupled to an external computer download or monitor

	diagnostic information that is useful to a vehicle mechanic during servicing of the vehicle." Beckert et al. '363 patent, col. 1, lines 32 – 38) **the multi-vehicle compatible tracking unit comprising:**
a vehicle position determining device;	**The Beckert et al. '363 patent discloses a vehicle position determining device** in the form of a GPS chipset ("a GPS (global positioning system) chipset 100 to provide for satellite navigation such that the longitude, latitude, and altitude of the vehicle may be readily determined" Beckert et al. '363 patent, col. 6, lines 50–53). A block diagram of the vehicle computer system showing the GPS chipset 110 is included in the Beckert et al. '363 patent as FIG. 3 (reproduced below).

	 Figg 3
a wireless communications device;	**The Beckert et al. '363 patent discloses a wireless communications device** in the form of a wireless Internet link 76 ("Another technique to load data or applications or transfer data with other computing devices is through … the wireless Internet link 76." Beckert et al. '363 patent, col. 5, lines 9 – 12, and FIGS. 1 and 3).

	 Fig 2
a multi-vehicle compatible controller for cooperating with said vehicle position determining device and said wireless communications device to send vehicle position information;	**The Beckert et al. '363 patent discloses a multi-vehicle compatible controller** in the form of the computer module 64 **for cooperating with said vehicle position determining device** ("The address/data bus structure 140 will also be driven for transfers between the host processor and peripheral registers such as the computer module reading the GPS receive registers." Beckert et al. '363 patent, col. 9, lines 6 – 9) **and said wireless communications device to send vehicle position information** ("Another technique to… transfer data with other computing devices is through… the wireless Internet link 76" Beckert et al. '363 patent, col. 5, lines 9 - 12; U.S. Patent No. 5,794,164 (Beckert et al. '164 patent) is incorporated by reference in the Beckert et al. '363 patent at col. 7, lines 44-51; The Beckert et al. '164 patent further discloses that vehicle computer system implements several application program interfaces (APIs) that can be accessed by remote computers. "Example APIs include a position and navigation API…" Beckert et al. '164 patent, col. 12, lines 25 - 30).

said multi-vehicle compatible controller to be coupled to the vehicle data bus for communication thereover with at least one vehicle device using at least one corresponding vehicle device code from among a plurality thereof for different vehicles; and	**The Beckert et al. '363 patent discloses that said multi-vehicle compatible controller is coupled to the vehicle data bus for communication thereover** ("In FIG. 2, the support module 62 is also connected to a universal serial bus (USB) hub 70 via a multi-bit connector 72 (e.g., 8 bits). The USB hub 70 provides connections to… the OBD (On Board Diagnostic) system 28…" Beckert et al. '363 patent, col. 6, line 63 – col. 7, line 1); U.S. Patent No. 5,794,164 (Beckert et al. '164 patent) is incorporated by reference in the Beckert et al. '363 patent at col. 7, lines 44-51; The Beckert et al. '164 patent further discloses that the computer module includes an OBD interpreter; "An OBD (On Board Diagnostic) interpreter 116 is provided in the computer module to communicate with the OBD system built into the vehicle by the manufacturer." Beckert et al. '164 patent, col. 9, lines 29 - 31) **with at least one vehicle device using at least one corresponding vehicle device code from among a plurality thereof for different vehicles** ("Most late model vehicles are also constructed with a diagnostic system that analyzes performance of the vehicle's engine, transmission and fuel system, and other components (1996 or later for OBD II, 1993 or later for OBD I)" Beckert et al. '363 patent, col. 1, lines 32 – 35; At the time of the filing of the Beckert et al. '363 patent three signaling protocols were permitted with the OBD II interface; "The OBD interpreter 116 interprets the status data received and provides performance related information from the vehicle's OBD system to the microprocessor 100. Also, commands can be provided to the interpreter which allows non-critical car systems to be controlled." Beckert et al. '164 patent, col. 9, lines 31 – 35; The status data interpreted by the OBD interpreter is transmitted using one of the three signaling protocols permitted by the OBD II interface). The Society of Automotive Engineers (SAE) has published various standards related to vehicle standardized networks mandated in every new vehicle sold in the United States since 1996. In particular, the SAE standards relate a for communicating with vehicle devices using the vehicle bus via an OBD II diagnostic connector. In particular, the SAE standard is documented in, among many other available publications, the Society of Automotive Engineers (SAE) HS-3000 Manual (1994 edition), entitled "SAE On-Board Diagnostics for Light and Medium Duty Vehicles Standards Manual" (SAE HS-3000 Manual). The SAE HS-3000 includes various standards for communicating with vehicle devices on the vehicle

	bus, each standard under a particular SAE heading number (e.g., J1850, J2178, among various other standards) related to various aspects of vehicle control systems, including vehicle busses (e.g. SAE J1850, starting on page 91) and communicating, using device codes, with vehicle devices using the vehicle bus via an OBD II diagnostic connector mandated in every new vehicle sold since 1996 (e.g. SAE J1978 starting on page 33 , SAE J1979 starting on page 46 and SAE J2178/1-2178/2 starting on page 200). The SAE HS-3000 Manual discloses using at least one corresponding vehicle device code from among a plurality thereof for different vehicles. In particular, in order to allow a controller to be compatible with various busses that are used on a plurality of different vehicles, the controller uses a bus discovery procedure that is described on page 37, section 6.5.2 INITIALIZATION DETAILS of SAE J1978, reproduced below as scanned from the SAE HS-3000 manual, that involves sending different device codes or "messages", in the form of signals referred to as a "mode 1 PID 0 request message" in a manner appropriate for each of the SAE J1850 41.6 Kbps PWM bus, SAE J1850 10.4 Kbps VPW, and ISO 9141-2. In particular, as many as three device codes may initially be sent, at least two of which will be non-working for the particular vehicle and one of which is a working device code for the vehicle. See page 37, SAE J1978 at 6.5.1.(" While there are three types of communication interfaces that could be used to access the OBD II functions in a given vehicle (i.e., SAE J1850 41.6 Kbps PWM, SAE J1850 10.4 Kbps VPW and ISO 9141-2), only one is allowed to be used in any one vehicle to access all supported OBD II functions.")

a. Test for SAE J1850 41.6 Kbps PWM
(1) Step 1—Enable the SAE J1850 41.6 Kbps PWM interface
(2) Step 2—Send a mode 1 PID 0 request message
(3) Step 3—If a mode 1 PID 0 response message is received then SAE J1850 41.6 Kbps PWM is the type of interface used in a vehicle for OBD II support.

b. Test for SAE J1850 10.4 Kbps VPW
(1) Step 1—Enable the SAE J1850 10.4 Kbps VPW interface
(2) Step 2—Send a mode 1 PID 0 request message
(3) Step 3—If a mode 1 PID 0 response message is received then SAE J1850 10.4 Kbps VPW is the type of interface used in a vehicle for OBD II support.

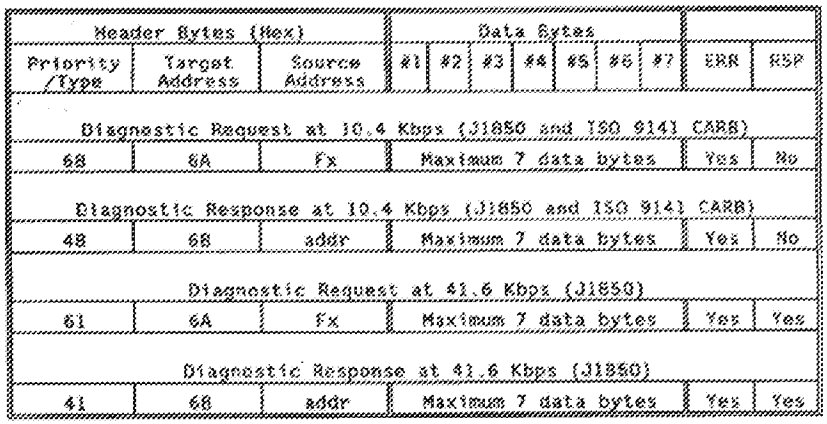
c. Test for ISO 9141 CARB
(1) Step 1—Enable the ISO 9141-2 interface
(2) Step 2—If the initialization sequence defined in ISO 9141-2 is completed successfully, then ISO 9141-2 is the type of interface used in a vehicle for OBD II support.

The previous tests may be performed in any order and where possible may be performed in parallel.

The mode 1 PID 0 request and response messages are defined in SAE J1979.

SAE J1978 indicates that the "mode 1 PID 0" request and response messages are defined in SAE J1979, which starts on page 46 of the SAE HS-3000 Manual. See page 37, SAE J1978, Section 6.5.2., "Initialization Details". Requester further notes that transmission of the mode 1 PID 0 device code has previously been asserted as satisfying this requirement of the claim. See Exhibit F, Plaintiff's Disclosure of Initial Infringement Contentions, starting on page A-45.

SAE J1979, starting on page 46, elaborates on the device codes that are used by the controller during bus detection, including the different device codes utilized by vehicles that employ a 10.4 Kbps interface (i.e., a first device code that includes 686A (hex) in the header of the request message) and vehicles that employ a 41.6 Kbps interface (i.e. a second device code that includes 616A (hex) in the header of the request message). See e.g., FIGURE 1 on page 51, reproduced below, of SAE J1979.



Header Bytes (Hex)			Data Bytes								
Priority /Type	Target Address	Source Address	#1	#2	#3	#4	#5	#6	#7	ERR	RSP
Diagnostic Request at 10.4 Kbps (J1850 and ISO 9141 CARB)											
68	6A	Fx	Maximum 7 data bytes							Yes	No
Diagnostic Response at 10.4 Kbps (J1850 and ISO 9141 CARB)											
48	6B	addr	Maximum 7 data bytes							Yes	No
Diagnostic Request at 41.6 Kbps (J1850)											
61	6A	Fx	Maximum 7 data bytes							Yes	Yes
Diagnostic Response at 41.6 Kbps (J1850)											
41	6B	addr	Maximum 7 data bytes							Yes	Yes

FIGURE 1—DIAGNOSTIC MESSAGE FORMAT

The HS-3000 Manual further provides details for hundreds of different device codes for different vehicle devices, which include SAE defined device codes and manufacturer defined device codes. In particular,, SAE J2178 which starts on page 211 of the SAE HS-3000 Manual and consists of four parts, 1 through 4, defines sets of vehicle device codes, or "messages", for hundreds of different types of vehicle devices. The specific vehicle device code will depend upon whether a particular manufacturer implements the SAE J2178 defined vehicle code or whether a vehicle supports a manufacturer specific vehicle code. Page 156, SAE J1850, Section 4.1 elaborates on the definition of the vehicle codes as follows: "Normal Vehicle Operation (Down the Road) Messages: The messages sent during non-diagnostic operations are called normal vehicle operation messages. These normal vehicle operation messages are used for communication from a transmitter to one or more receivers across this network. The normal operation messages have been developed by the SAE for this communication network and are defined in SAE-J2178. SAE defined messages and the 'Reserved' messages of SAE J2178 shall remain specific to those definitions. In SAE J2178, there is also a set-of 'Reserved-Manufacturer' messages which, if used, will have meanings specific to a vehicle manufacturer but are likely to be different between manufacturers."

J2178/1, starting on page 200 of the SAE HS-3000 Manual, includes 10 tables defining vehicle device codes for a large variety of different categories of vehicle devices (the specific device codes are

specified in J2178/2).

Section 4 of SAE J2178/2 on page 213 specifies the Parameter Reference Number (PRN) Structure utilized within the SAE J2178 messages to use a particular device code from among a plurality thereof for different vehicles, which is illustrated below. Section 4 notes that "Some of the PRN numbers are assigned or reserved for SAE definitions but the majority are reserved for individual motor vehicle manufacturers to coordinate and assign."

Figure 3 shows the basic structure of PRNs and Tables 1 and 2 show bit assignments and address ranges based on these assignments.

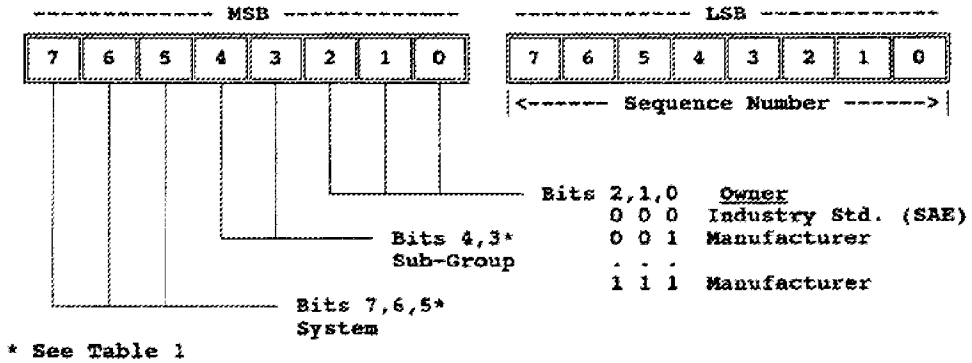


FIGURE 3—PRN STRUCTURE

The first three bits define the system and the next two bits define the sub-group. For each sub-group, three additional bits specify which of eight possible device codes are being used for a particular vehicle device, representing the Industry Std. device code (000) or one of seven manufacturer specific device codes (001-111). Accordingly, the standard specifies at least eight vehicle device codes for each PRN (which include 1 Industry Standard, and 7 manufacturer specific device codes).

SAE J2178/2, which starts on page 211 of the SAE HS-3000 Manual, provides the "Standardized

Parameter Definitions" for standardized messages on SAE J1850 Class B networks. SAE J2178/2 sets out respective sets of device codes for a host of vehicle devices that may be present on a given vehicle. For example, Table 2 on page 215, partially reproduced below, provides the address map of the SAE standard and reserved manufacturer specific (Reserved MFG) subgroups of messages for different classes of vehicle devices.

TABLE 2—SAE/MFG PRN RANGES

System	Subgroup	Address Map	Size
Powertrain	J1979 Compatible - SAE	0000 - 00FF	0.25K
	Reserved - MFG	0100 - 07FF	1.75K
	Reserved - SAE	0800 - 08FF	0.25K
	Reserved - MFG	0900 - 0FFF	1.75K
	Engine - SAE	1000 - 10FF	0.25K
	Engine - MFG	1100 - 17FF	1.75K
	Transmission - SAE	1800 - 18FF	0.25K
	Transmission - MFG	1900 - 1FFF	1.75K
Chassis	Reserved - SAE	2000 - 20FF	0.25K
	Reserved - MFG	2100 - 27FF	1.75K
	Brakes/Tires/Wheels - SAE	2800 - 28FF	0.25K
	Brakes/Tires/Wheels - MFG	2900 - 2FFF	1.75K
	Steering - SAE	3000 - 30FF	0.25K
	Steering - MFG	3100 - 37FF	1.75K
	Suspension - SAE	3800 - 38FF	0.25K
	Suspension - MFG	3900 - 3FFF	1.75K

SAE J2178/2 provides the details of device codes for hundreds of different vehicle devices within the address map ranges indicated in the above table. Section 4 of SAE J2178/2 on page 213 specifies that three bits are used to define eight different device codes for a given vehicle device including a SAE standard device code for the specific type of vehicle device and seven manufacturer specific device codes for that specific type of vehicle device.

The Beckert et al. '363 patent states that "Most late model vehicles are also constructed with a diagnostic system that analyzes performance of the vehicle's engine, transmission and fuel system,

	and other components (1006 or later for OBD II, 1993 or later for OBD I)." (Beckert '363 patent, col. 1, lines 35-26). The SAE standards, including the SAE HS-3000 Manual, were published for the specific purpose of teaching people of ordinary skill in the art how to communicate with vehicle devices using the vehicle bus via an OBD II diagnostic connector. Accordingly, it would have been obvious to utilize the teachings described in SAE HS-3000 Manual because the Beckert et al. '363 patent expressly directs using the OBD II diagnostic system.
a downloading interface for permitting downloading of enabling data related to the at least one corresponding vehicle device code for use by said multi-vehicle compatible controller;	**The Beckert et al. '363 patent discloses multiple downloading interfaces** ("To load an application or data onto the computer 22, the vehicle user inserts a CD or other media (if the application is not already contained on the hard disk) into the appropriate drive and the operating system downloads the application or data therefrom. The installation process can be automatically handled by the operating system, or with the assistance of commands input from the user in the form of keyed sequences on the keypad 52 or verbal instructions using the voice recognition device. Another technique to load data or applications or transfer data with other computing devices is through the use of the IrDA transceiver port 56, or the wireless Internet link 76." Beckert et al. '363 patent, col. 5, lines 1 – 12; U.S. Patent No. 5,794,164 (Beckert et al. '164 patent) is incorporated by reference in the Beckert et al. '363 patent at col. 7, lines 44-51; "It is further noted that the complete vehicle system can be removed from the base unit for security reasons, or to plug the computer into a docking station at the user's residence or office. With a docking station, the user can install or configure various programs for vehicle usage…" Beckert et al. '164 patent, col. 12, lines 5 - 11) **for permitting downloading of enabling data related to the at least one corresponding vehicle device code for use by said multi-vehicle compatible controller in the form of vehicle diagnostics applications downloaded via a wireless Internet connection** ("The microprocessor runs an open platform operating system, such as Windows 95® or Windows NT™, or Windows® derivative operating systems from Microsoft Corporation… The computer module 64 supports any variety of applications that the vehicle user might desire. These applications can… downloaded from an optional wireless Internet connection." Beckert et al. '363 patent, col. 7, lines 20-33; "… the operating system can support applications pertaining to… diagnostics" Beckert et al. '363 patent, col. 2, lines 15-17; "For instance, the vehicle computer system 20 can serve as… a diagnostic system" Beckert et al. '363 patent, col. 5, lines 36-41; U.S. Patent No. 5,794,164 (Beckert et al. '164 patent) is incorporated by reference in the Beckert et al. '363 patent at col. 7, lines 44-51; The

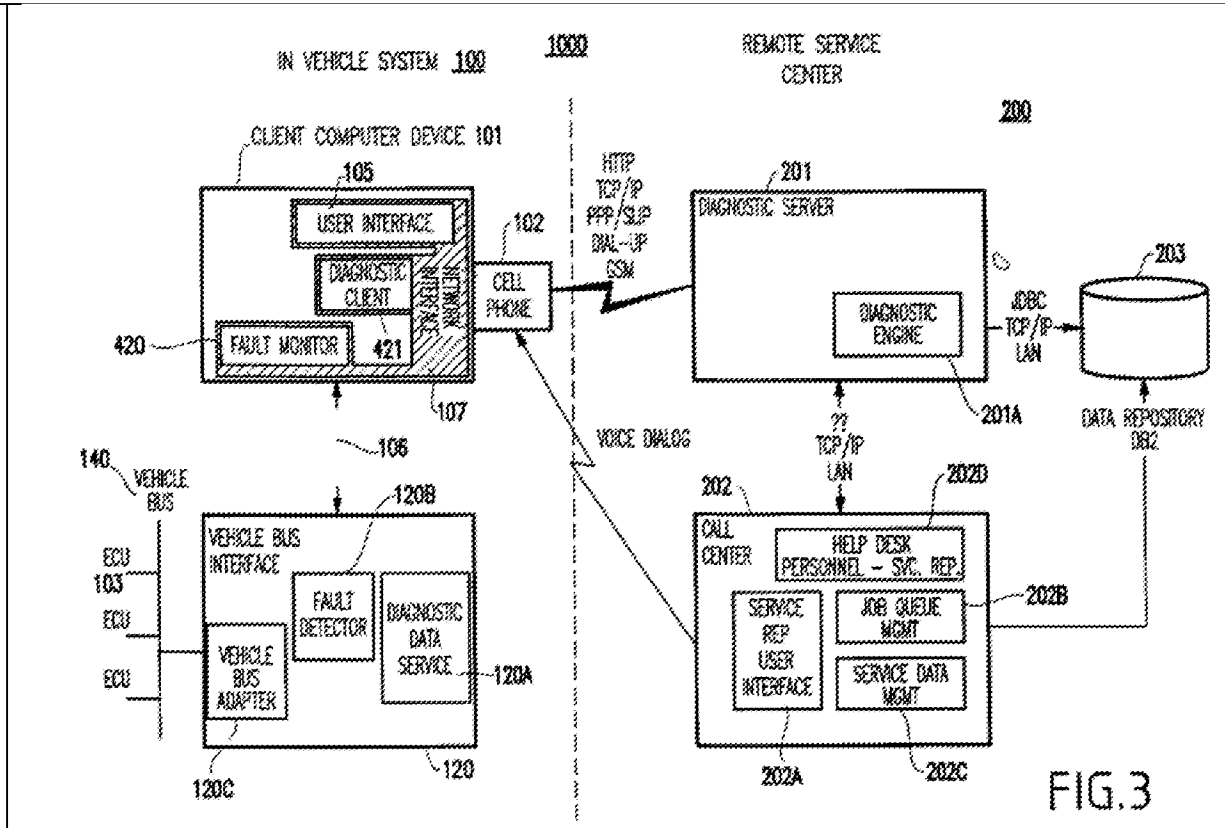
	Beckert et al. '164 patent further discloses that "[T]here are several applications that are supported by the operating system… The vehicle computer system also implements several application program interfaces (APIs) that offer specific functionality to support the various applications. Example APIs include… a diagnostics API… These applications and APIs are vehicle related… Essentially, the vehicle computer system can support any applications that run on the open platform operating system, which are many and varied" Beckert et al. '164 patent, col. 12, lines 12 – 40)
said downloading interface comprising a wireless receiver for temporary connection to a downloading device.	**The Beckert et al. '363 patent discloses that said downloading interface comprises a wireless signal downloading interface in the form of a wireless Internet link** ("To load an application or data onto the computer 22, the vehicle user inserts a CD or other media (if the application is not already contained on the hard disk) into the appropriate drive and the operating system downloads the application or data therefrom. The installation process can be automatically handled by the operating system, or with the assistance of commands input from the user in the form of keyed sequences on the keypad 52 or verbal instructions using the voice recognition device. Another technique to load data or applications or transfer data with other computing devices is through the use of the IrDA transceiver port 56, or the wireless Internet link 76." Beckert et al. '363 patent, col. 5, lines 1 – 12) **The Beckert et al. '363 patent discloses that said wireless signal downloading interface comprises a wireless receiver for temporary connection to a downloading device in the form of a plug-in RF transceiver that can be a cellphone or a two-way pager** ("Additionally, the faceplate module contains a slot for an optional plug-in RF transceiver 124 such as a cellphone, two-way pager, or point-to-point spread spectrum transceiver", Beckert et al. '363 patent, col. 7, lines 10-13).
19. The multi-vehicle compatible tracking unit according to claim 18 wherein the corresponding at least one vehicle code is for reading from the at least one vehicle device.	**The Beckert et al. '363 patent discloses that wherein the corresponding at least one vehicle code is for reading from the at least one vehicle device by describing reading status data from the vehicle's OBD system** ("Most late model (1996 or later for OBD II, 1993 or later for OBD I) vehicles are also constructed with a diagnostic system that analyzes performance of the vehicle's engine transmission and fuel system, and other components. The diagnostic system can be coupled to an external computer download or monitor diagnostic information that is useful to a vehicle mechanic during servicing of the vehicle." Beckert et al. '363 patent, col. 1, lines 32 – 38; U.S. Patent No.

	5,794,164 (Beckert et al. '164 patent) is incorporated by reference in the Beckert et al. '363 patent at col. 7, lines 44-51; "The OBD interpreter 116 interprets the status data received and provides performance related information from the vehicle's OBD system to the microprocessor 100. Also, commands can be provided to the interpreter which allows non-critical car systems to be controlled." Beckert et al. '164 patent, col. 9, lines 31 – 35)
20. The multi-vehicle compatible tracking unit according to claim 18 wherein the corresponding at least one vehicle code is for writing to the at least one vehicle device.	**The Beckert et al. '363 patent discloses writing to the at least one vehicle device via an OBD-II port by disclosing providing commands that allow non-critical car systems to be controlled** ("Most late model (1996 or later for OBD II, 1993 or later for OBD I) vehicles are also constructed with a diagnostic system that analyzes performance of the vehicle's engine transmission and fuel system, and other components. The diagnostic system can be coupled to an external computer download or monitor diagnostic information that is useful to a vehicle mechanic during servicing of the vehicle." Beckert et al. '363 patent, col. 1, lines 32 – 38; U.S. Patent No. 5,794,164 (Beckert et al. '164 patent) is incorporated by reference in the Beckert et al. '363 patent at col. 7, lines 44-51; "The OBD interpreter 116 interprets the status data received and provides performance related information from the vehicle's OBD system to the microprocessor 100. Also, commands can be provided to the interpreter which allows non-critical car systems to be controlled." Beckert et al. '164 patent, col. 9, lines 31 – 35)
21. The multi-vehicle compatible tracking unit according to claim 18 wherein said downloading interface is also for permitting downloading of at least one programming instruction for said multi-vehicle compatible controller.	**The Beckert et al. '363 patent discloses that said downloading interface is also for permitting downloading of at least one programming instruction for said multi-vehicle compatible controller** ("The microprocessor runs an open platform operating system, such as Windows 95® or Windows NT™, or Windows® derivative operating systems from Microsoft Corporation… The computer module 64 supports any variety of applications that the vehicle user might desire. These applications can… downloaded from an optional wireless Internet connection." Beckert et al. '363 patent, col. 7, lines 20-33; "… the operating system can support applications pertaining to… diagnostics" Beckert et al. '363 patent, col. 2, lines 15-17; "For instance, the vehicle computer system 20 can serve as… a diagnostic system" Beckert et al. '363 patent, col. 5, lines 36-41; U.S. Patent No. 5,794,164 (Beckert et al. '164 patent) is incorporated by reference in the Beckert et al. '363 patent at col. 7, lines 44-51; The Beckert et al. '164 patent further discloses that "[T]here are

	several applications that are supported by the operating system… The vehicle computer system also implements several application program interfaces (APIs) that offer specific functionality to support the various applications. Example APIs include… a diagnostics API… These applications and APIs are vehicle related… Essentially, the vehicle computer system can support any applications that run on the open platform operating system, which are many and varied" Beckert et al. '164 patent, col. 12, lines 12 – 40)53 – 55).
22. The multi-vehicle compatible tracking unit according to claim 18 further comprising a remote transmitter;	**The Beckert et al. '363 patent discloses a remote transmitter in the form of other computing devices that communicate with the vehicle computer system via the wireless Internet link** ("Another technique to… transfer data with other computing devices is through… the wireless Internet link 76" Beckert et al. '363 patent, col. 5, lines 9 – 12).
and wherein said multi-vehicle compatible controller also performs at least one vehicle remote control function responsive to said remote transmitter.	**The Beckert et al. '363 patent discloses performing at least one vehicle remote control function responsive to the remote transmitter by incorporating U.S. Patent No. 5,794,164 (Beckert et al. '164 patent) by reference to disclose the full capabilities of the vehicle computer system that include a number of APIs that can be accessed by the remote computing devices including a diagnostic API that can be used to control the functions of the vehicle** ("Example APIs include… a diagnostics API" Beckert et al. '164 patent, col. 12, lines 25 – 30; "The OBD interpreter 116 interprets the status data received and provides performance related information from the vehicle's OBD system to the microprocessor 100. Also, commands can be provided to the interpreter which allows non-critical car systems to be controlled." Beckert et al. '164 patent, col. 9, lines 31 – 35).

Exhibit E

The '278 Patent	**PRIOR ART – U.S. Patent 6,330,499 to Chou et al. (Chou)**
1. A multi-vehicle compatible tracking unit for a vehicle comprising a vehicle data bus extending throughout the vehicle, the multi-vehicle compatible tracking unit comprising:	Chou discloses a multi-vehicle tracking unit for a vehicle comprising a vehicle data bus. See e.g., Fig. 3, reproduced below and col. 3 lines 33-46: "The processor 300 is coupled to a vehicle bus 335 through a vehicle bus interface 330. The coupling between the client computer device and the vehicle bus interface 106 of FIG. 3, may be one of RS-232, USB (Universal Serial Bus), IDB (ITS Data Bus), Ethernet, and the like. The vehicle bus interface may support one of vehicle bus standards such as CAN (Controller Area Network) and the Society of Automotive Engineers' SAE J1850 - Class B Data Communication Network Interface. Alternatively, the processor supports some or all of the functions of the vehicle bus interface and connects directly to the vehicle bus 335. The vehicle bus shown in FIG. 2 is an inherent part of all new automobiles. The dotted line is used as an indication that the vehicle bus is built into the vehicle."

	 FIG.3
a vehicle position determining device;	Chou discloses a vehicle position determining device. See e.g., col. 3, lines 54-56: "Optionally, the processor 300 may be coupled to a location sensing device such as a GPS receiver 317 (FIG. 1) to provide vehicle location information."
a wireless communications device;	Chou discloses a wireless communication device. See e.g. col. 2, lines 30-37:, "As shown in FIG. 1, the system 1000 includes a vehicle 10 with a vehicle driver or user 140, having an in-vehicle computing system 100, a client computer device 101 installed to enable vehicle health checkup and remote diagnostics, a communication link 150 (e.g., via wireless base stations 150B, or the like) for communicating vehicle information (e.g., vehicle identification number, (VIN), diagnostic data, and the like).

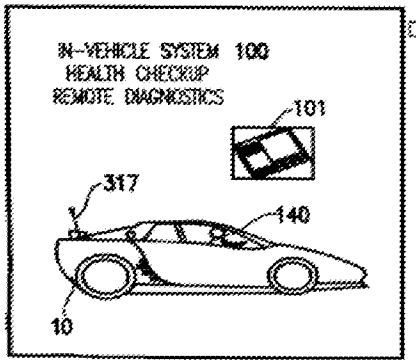
a multi-vehicle compatible controller for cooperating with said vehicle position determining device and said wireless communications device to send vehicle position information;	Chou discloses a multi-vehicle compatible controller for cooperating with said vehicle position determining device and said wireless communications device to send vehicle position information. See .e.g., col. 3, lines 54-56: Optionally, the processor 300 may be coupled to a location sensing device such as a GPS receiver 317 (FIG. 1) to provide vehicle location information. See also, e.g., col. 2, lines 30-37: "As shown in FIG. 1, the system 1000 includes a vehicle 10 with a vehicle driver or user 140, having an in-vehicle computing system 100, a client computer device 101 installed to enable vehicle health checkup and remote diagnostics, a communication link 150 (e.g., via wireless base stations 150B, or the like) for communicating vehicle information (e.g., vehicle identification number, (VIN), diagnostic data, and the like)."
said multi-vehicle compatible controller to be coupled to the vehicle data bus for communication thereover with at least one vehicle device using at least one corresponding vehicle device code from among a plurality thereof for different vehicles; and	Chou discloses communicating with at least one vehicle device using at least one corresponding vehicle device code from among a plurality thereof for different vehicles. See e.g. Fig. 3 reproduced above, item 120c vehicle bus adaptor and col. 4, lines 20-38: "The vehicle bus interface 120 is responsible for replying to requests for parametric data. It is also responsible for continuously monitoring the vehicle bus 104 for any fault reported by the ECUs 103, in terms of diagnostic trouble codes (DTCs). The vehicle bus interface 120 includes the following modules: vehicle bus adapter 120C, fault detector 120B, and diagnostic data service 120A. The fault detector 120B polls the vehicle bus 104 through the vehicle bus adapter 120C checking for fault codes reported by the vehicle ECUs 103. The vehicle bus adapter 120C translates the messages received from the vehicle bus into the language of the fault detector. It also translates messages from the fault detector into the language of the vehicle bus. ***The fault code specifications and protocols of the vehicle may be Original Equipment Manufacturer (OEM) and model dependent***. The term 'vehicle fault codes' is meant to be synonymous with the term 'trouble code' or 'diagnostic trouble code'. A listing of such codes may be found in the publication of the Society of Automotive Engineers, 'SAE On-Board Diagnostics for Light and Medium Duty Vehicles Standards Manual'. The diagnostic data service 120A accepts request for vehicle parametric data and retrieves the data using the vehicle bus adapter." (emphasis added). The "SAE On-Board Diagnostics for Light and Medium Duty Vehicles Standards Manual" is the SAE HS-3000 Manual, a copy of which is attached as Exhibit G. The SAE HS-3000 Manual discloses that translating messages into the language of the vehicle data bus involves selecting between an SAE standard and/or one of seven manufacturer specific version of the device code. See e.g., SAE HS-3000 Manual, page 213, Section

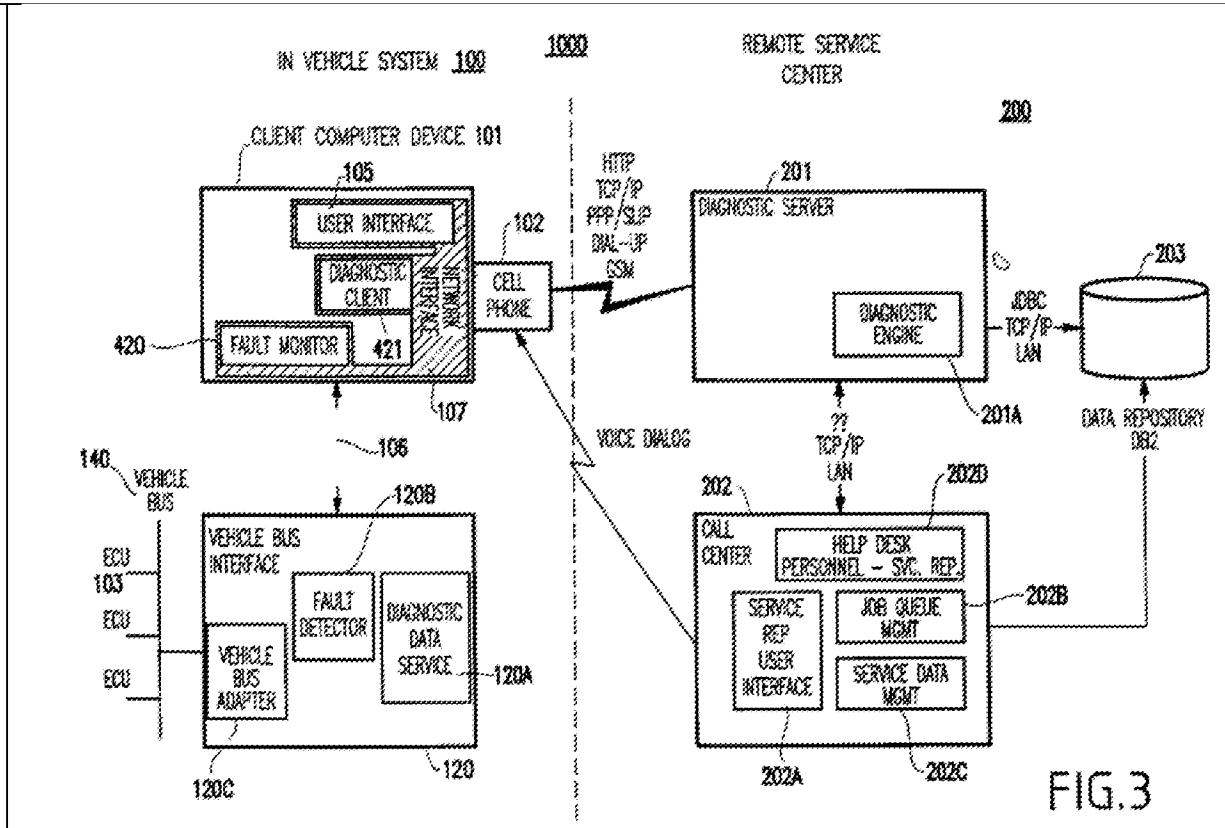
	4 of SAE J2178/2. Furthermore, the SAE HS-3000 Manual discloses a bus discovery process involving sending different verions of the mode 1 PID 0 device code. See e.g,. SAE HS-3000 Manual, page 37, section 6.5.2 INITIALIZATION DETAILS of SAE J1978. Patent Owner has previously asserted that sending different versions of the mode 1 PID 0 message during bus discovery satisfies this claim limitation. See Exhibit F, Plaintiff's Disclosure of Initial Infringement Contentions, starting on page A-45.
a downloading interface for permitting downloading of enabling data related to the at least one corresponding vehicle device code for use by said multi-vehicle compatible controller.	Chou discloses a downloading interface for permitting downloading of enabling data related to the at least one corresponding vehicle device code. See e.g., Fig. 2, item 320 network interface. See e.g., col. 3, lines 15-32: "The processor is integrated with a network interface 320 to provide communication capability with the remote service center 200. Preferably, the network interface comprises a removable wireless telephone such as the Motorola i1000+ and a docking facility for the wireless phone integrated with the client computer device. Both voice and data connections can be supported by interfacing the processor 300 and the wireless phone. The telephone integration provides basic communication functions. It establishes a data (e.g. TCP/IP) connection with a remote service center (e.g., remote service center 200). Wireless technologies such as GSM (Global System for Mobile Communications), CDMA (Code Division Multiple Access), TDMA (Time Division Multiple Access), iDEN™ (a TDMA-based Motorola technology), and AMPS (Advanced Mobile Phone System) can all be supported. The phone may also be used for wireless voice communications." Chou discloses that the remote health monitoring application can be bundled with other applications, such as "vehicle parameter update/change" application. See e.g., col. 10, lines 5-11: "Other applications and services that can be developed or bundled as extensions of the diagnostics services include: … vehicle parameter update/change..."
2. The multi-vehicle compatible tracking unit according to claim 1 wherein said downloading interface comprises a wired signal downloading interface.	Chou discloses a docking facility for the network interface. One skilled in the art would recognize that using a docking facility interface is a wired interface to the controller and would enable downloading to the controller. See e.g., Fig. 3, item 102 cell phone attached to network interface 107 and col. 3, lines 17-21: "The processor is integrated with a network interface 320 to provide communication capability with the remote service center 200. Preferably, the network interface comprises a removable wireless telephone such as the Motorola i1000+ and a docking facility for

	the wireless phone integrated with the client computer device."
3. The multi-vehicle compatible tracking unit according to claim 2 wherein said wired signal downloading interface comprises a connector for temporary connection to a downloading device.	Chou discloses a docking facility for the network interface that includes a removable wireless telephone. One skilled in the art would understand that the docking facility could be used temporarily as the cell phone is removable to thereby provide a connector for temporary connection to a downloading device. See e.g., Fig. 3, item 102 cell phone attached to network interface 107 and col. 3, lines 17-21: "The processor is integrated with a network interface 320 to provide communication capability with the remote service center 200. Preferably, the network interface comprises a removable wireless telephone such as the Motorola i1000+ and a docking facility for the wireless phone integrated with the client computer device."
4. The multi-vehicle compatible tracking unit according to claim 1 wherein said downloading interface comprises a wireless signal downloading interface.	Chou discloses the downloading interface comprises a wireless signal downloading interface. See e.g., Chou Fig. 3, network interface 107 and cell phone 102 together forming the downloading interface. See also e.g., col. 3, lines 15-32: "The processor is integrated with a network interface 320 to provide communication capability with the remote service center 200. Preferably, the network interface comprises a removable wireless telephone such as the Motorola i1000+ and a docking facility for the wireless phone integrated with the client computer device. Both voice and data connections can be supported by interfacing the processor 300 and the wireless phone. The telephone integration provides basic communication functions. It establishes a data (e.g. TCP/IP) connection with a remote service center (e.g., remote service center 200). Wireless technologies such as GSM (Global System for Mobile Communications), CDMA (Code Division Multiple Access), TDMA (Time Division Multiple Access), iDEN™ (a TDMA-based Motorola technology), and AMPS (Advanced Mobile Phone System) can all be supported. The phone may also be used for wireless voice communications."
5. The multi-vehicle compatible tracking unit according to claim 4 wherein said wireless signal downloading interface	Chou discloses the wireless signal downloading interface (e.g., network interface 107 and cell phone 102) comprises a wireless receiver (e.g., removable cell phone 102) for temporary connection to a downloading device. It is inherently disclosed that the wireless connections can be temporary connections.

comprises a wireless receiver for temporary connection to a downloading device.	See e.g., col. 5, lines 1-5: "The in-vehicle system establishes a data connection, using a cellular phone 102, with a diagnostic server 201 at the service center 200, collects diagnostic data using the diagnostic data service 120A, and uploads a snapshot of the vehicle data (e.g. VIN, test data with time-stamp) to the diagnostic server 201".
6. The multi-vehicle compatible tracking unit according to claim 1 wherein the corresponding at least one vehicle code is for reading from the at least one vehicle device.	Chou discloses the at least one vehicle code is for reading from the at least one vehicle device. See e.g., col. 9, lines 35-48: "Then in step 2, the diagnostic client 421 initiates a health checkup session with the diagnostic server 201, and in step 3, the diagnostic server instructs the diagnostic client to gather vehicle data, such as VIN, malfunction codes, and/or a snapshot of the vehicle data. Then in step 4, the diagnostic client 421 requests the data from the diagnostic data service 120A at the vehicle bus interface 120. Then, in step 5, the diagnostic data service interrogates the ECUs 103 via the vehicle bus adapter 120C for the requested data. In step 6, th***e ECUs 103 provide the requested data, and in step 7, the data is returned to the diagnostic client 421***. Then, in step 8, the data is in turn transmitted to the diagnostic server 201." (emphasis added).
7. The multi-vehicle compatible tracking unit according to claim 1 wherein the corresponding at least one vehicle code is for writing to the at least one vehicle device.	Chou discloses the at least one vehicle code is for writing to the at least one vehicle device. See e.g., col. 9, lines 35-48: "Then in step 2, the diagnostic client 421 initiates a health checkup session with the diagnostic server 201, and in step 3, the diagnostic server instructs the diagnostic client to gather vehicle data, such as VIN, malfunction codes, and/or a snapshot of the vehicle data. Then in step 4, the diagnostic client ***421 requests the data from the diagnostic data service 120A at the vehicle bus interface 120***. Then, in step 5, the diagnostic data service interrogates the ECUs 103 via the vehicle bus adapter 120C for the requested data. In step 6, the ECUs 103 provide the requested data, and in step 7, the data is returned to the diagnostic client 421. Then, in step 8, the data is in turn transmitted to the diagnostic server 201." (emphasis added).
8. The multi-vehicle compatible tracking unit according to claim 1 wherein said downloading interface is also for permitting downloading of at least one	Chou discloses downloading of at least one programming instruction (e.g. vehicle parameter update/change). See e.g., col. 10 lines 5-11: "Other applications and services that can be developed or bundled as extensions of the diagnostics services include: … vehicle parameter update/change.."

programming instruction for said multi-vehicle compatible controller.	
9. The multi-vehicle compatible tracking unit according to claim 1 further comprising a remote transmitter;	Chou discloses a remote transmitter (e.g., cel phone 102). See e.g., col. 4, lines 39-42: "The client computer device 101 performs several functions including communicating to the remote service center 200 by means of the network interface 107 using the cell phone 102."
and wherein said multi-vehicle compatible controller also performs at least one vehicle remote control function responsive to said remote transmitter.	Chou discloses remote vehicle access. See e.g., col. 10, lines 5-10: "Other applications and services that can be developed or bundled as extensions of the diagnostics services include: … remote vehicle access." One of ordinary skill in the art would readily appreciate that the remote vehicle access involves performing the function of unlocking the car doors based on a response from the cell phone 102 communicating with the remote service center 200.
10. The multi-vehicle compatible tracking unit according to claim 9 wherein the at least one vehicle remote control function comprises at least one of a vehicle security function, a remote keyless entry function, and a remote engine starting function.	Chou discloses the at least one remote control function includes a vehicle security function, a remote keyless entry function, and a remote engine starting function. See e.g., col. 10, lines 5-11: "Other applications and services that can be developed or bundled as extensions of the diagnostics services include: …theft prevention, … remote vehicle access, etc."
11. The multi-vehicle compatible tracking unit according to claim 1 wherein said wireless position	Chou discloses a GPS receiver. See e.g., col. 3, lines 54-56: "Optionally, the processor 300 may be coupled to a location sensing device such as a GPS receiver 317 (FIG. 1) to provide vehicle location information,"

determining device comprises a Global Positioning System (GPS) receiver.	
12. The multi-vehicle compatible tracking unit according to claim 1 further comprising a housing containing said vehicle position determining device, said wireless communications device, said multi-vehicle compatible controller, and said downloading interface.	Chou discloses the client computer device 101 is stored in a housing. See e.g., Fig. 1, partially reproduced below, and Fig. 3, client computer device 101 illustrated within a housing. 
13. A multi-vehicle compatible tracking unit for a vehicle comprising a vehicle data bus extending throughout the vehicle, the multi-vehicle compatible vehicle tracking unit comprising:	Chou discloses a multi-vehicle tracking unit for a vehicle comprising a vehicle data bus. See e.g., Fig. 3, reproduced below and col. 3 lines 33-46: "The processor 300 is coupled to a vehicle bus 335 through a vehicle bus interface 330. The coupling between the client computer device and the vehicle bus interface 106 of FIG. 3, may be one of RS-232, USB (Universal Serial Bus), IDB (ITS Data Bus), Ethernet, and the like. The vehicle bus interface may support one of vehicle bus standards such as CAN (Controller Area Network) and the Society of Automotive Engineers' SAE J1850 - Class B Data Communication Network Interface. Alternatively, the processor supports some or all of the functions of the vehicle bus interface and connects directly to the vehicle bus 335. The vehicle bus shown in FIG. 2 is an inherent part of all new automobiles. The dotted line is used as an indication that the vehicle bus is built into the vehicle."

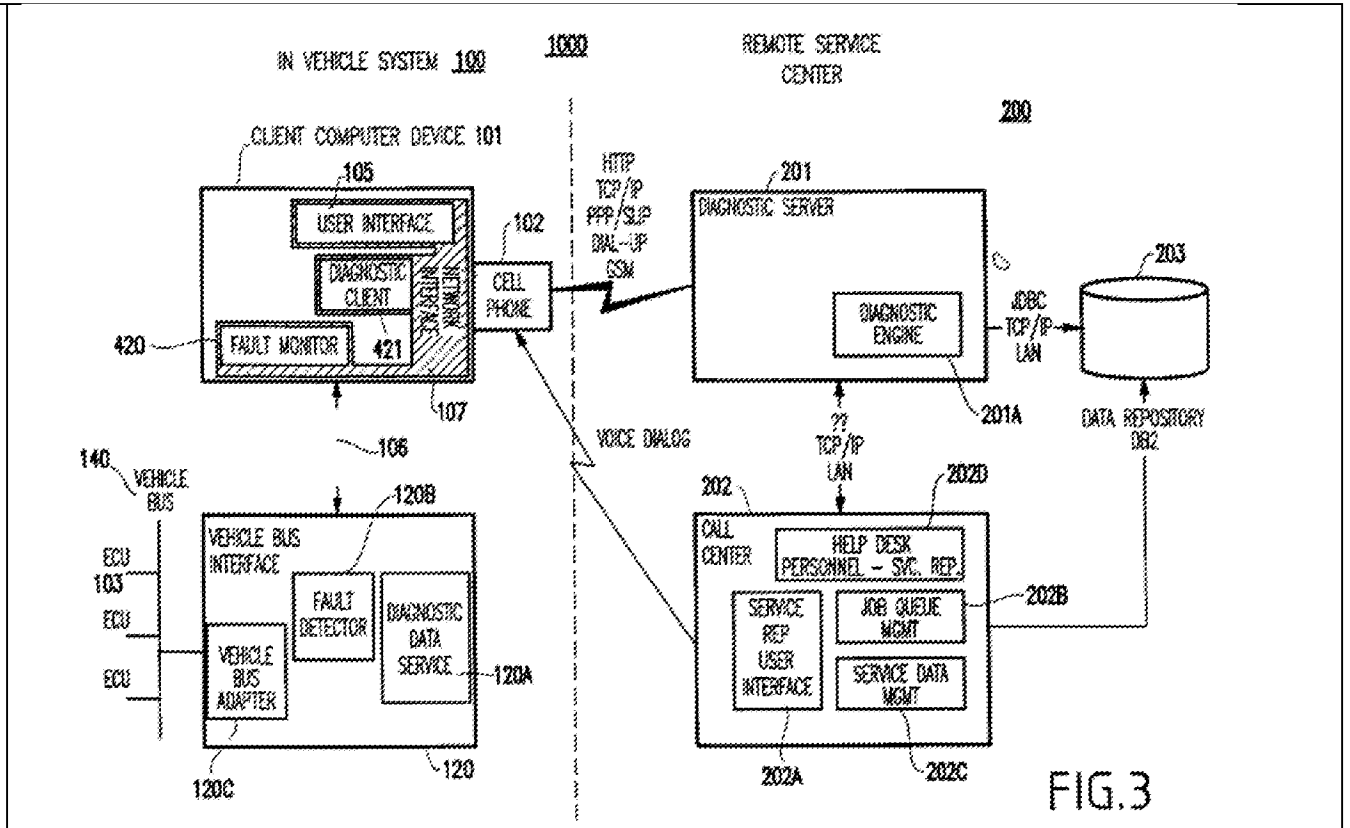
	 FIG.3
a vehicle position determining device;	Chou discloses a vehicle position determining device. See e.g., col. 3, lines 54-56: "Optionally, the processor 300 may be coupled to a location sensing device such as a GPS receiver 317 (FIG. 1) to provide vehicle location information."
a wireless communications device;	Chou discloses a wireless communication device. See e.g. col. 2, lines 30-37:, "As shown in FIG. 1, the system 1000 includes a vehicle 10 with a vehicle driver or user 140, having an in-vehicle computing system 100, a client computer device 101 installed to enable vehicle health checkup and remote diagnostics, a communication link 150 (e.g., via wireless base stations 150B, or the like) for communicating vehicle information (e.g., vehicle identification number, (VIN), diagnostic data, and the like).

a multi-vehicle compatible controller for cooperating with said vehicle position determining device and said wireless communications device to send vehicle position information;	Chou discloses a multi-vehicle compatible controller for cooperating with said vehicle position determining device and said wireless communications device to send vehicle position information. See .e.g., col. 3, lines 54-56: Optionally, the processor 300 may be coupled to a location sensing device such as a GPS receiver 317 (FIG. 1) to provide vehicle location information. See also, e.g., col. 2, lines 30-37: "As shown in FIG. 1, the system 1000 includes a vehicle 10 with a vehicle driver or user 140, having an in-vehicle computing system 100, a client computer device 101 installed to enable vehicle health checkup and remote diagnostics, a communication link 150 (e.g., via wireless base stations 150B, or the like) for communicating vehicle information (e.g., vehicle identification number, (VIN), diagnostic data, and the like)."
said multi-vehicle compatible controller to be coupled to the vehicle data bus for communication thereover with at least one vehicle device using at least one corresponding vehicle device code from among a plurality thereof for different vehicles; and	hou discloses communicating with at least one vehicle device using at least one corresponding vehicle device code from among a plurality thereof for different vehicles. See e.g. Fig. 3 reproduced above, item 120c vehicle bus adaptor and col. 4, lines 20-38: "The vehicle bus interface 120 is responsible for replying to requests for parametric data. It is also responsible for continuously monitoring the vehicle bus 104 for any fault reported by the ECUs 103, in terms of diagnostic trouble codes (DTCs). The vehicle bus interface 120 includes the following modules: vehicle bus adapter 120C, fault detector 120B, and diagnostic data service 120A. The fault detector 120B polls the vehicle bus 104 through the vehicle bus adapter 120C checking for fault codes reported by the vehicle ECUs 103. The vehicle bus adapter 120C translates the messages received from the vehicle bus into the language of the fault detector. It also translates messages from the fault detector into the language of the vehicle bus. ***The fault code specifications and protocols of the vehicle may be Original Equipment Manufacturer (OEM) and model dependent***. The term 'vehicle fault codes' is meant to be synonymous with the term 'trouble code' or 'diagnostic trouble code'. A listing of such codes may be found in the publication of the Society of Automotive Engineers, 'SAE On-Board Diagnostics for Light and Medium Duty Vehicles Standards Manual'. The diagnostic data service 120A accepts request for vehicle parametric data and retrieves the data using the vehicle bus adapter." (emphasis added). The "SAE On-Board Diagnostics for Light and Medium Duty Vehicles Standards Manual" is the SAE HS-3000 Manual, a copy of which is attached as Exhibit G. The SAE HS-3000 Manual discloses that translating messages into the language of the vehicle data bus involves selecting between an SAE standard and/or one of seven manufacturer specific version of the device code. See e.g., SAE HS-3000 Manual, page 213, Section

	4 of SAE J2178/2. Furthermore, the SAE HS-3000 Manual discloses a bus discovery process involving sending different verions of the mode 1 PID 0 device code. See e.g,. SAE HS-3000 Manual, page 37, section 6.5.2 INITIALIZATION DETAILS of SAE J1978. Patent Owner has previously asserted that sending different versions of the mode 1 PID 0 message during bus discovery satisfies this claim limitation. See Exhibit F, Plaintiff's Disclosure of Initial Infringement Contentions, starting on page A-45.
a downloading interface for permitting downloading of enabling data related to the at least one corresponding vehicle device code for use by said multi-vehicle compatible controller;	Chou discloses a downloading interface for permitting downloading of enabling data related to the at least one corresponding vehicle device code. See e.g., Fig. 2, item 320 network interface. See e.g., col. 3, lines 15-32: "The processor is integrated with a network interface 320 to provide communication capability with the remote service center 200. Preferably, the network interface comprises a removable wireless telephone such as the Motorola i1000+ and a docking facility for the wireless phone integrated with the client computer device. Both voice and data connections can be supported by interfacing the processor 300 and the wireless phone. The telephone integration provides basic communication functions. It establishes a data (e.g. TCP/IP) connection with a remote service center (e.g., remote service center 200). Wireless technologies such as GSM (Global System for Mobile Communications), CDMA (Code Division Multiple Access), TDMA (Time Division Multiple Access), iDEN™ (a TDMA-based Motorola technology), and AMPS (Advanced Mobile Phone System) can all be supported. The phone may also be used for wireless voice communications." Chou discloses that the remote health monitoring application can be bundled with other applications, such as "vehicle parameter update/change" application. See e.g., col. 10, lines 5-11: "Other applications and services that can be developed or bundled as extensions of the diagnostics services include: … vehicle parameter update/change..."
said downloading interface comprising a connector for temporary connection to a downloading device.	See e.g., col. 3, lines 15-32: "The processor is integrated with a network interface 320 to provide communication capability with the remote service center 200. Preferably, the network interface comprises a removable wireless telephone such as the Motorola i1000+ and a docking facility for the wireless phone integrated with the client computer device. Both voice and data connections can be supported by interfacing the processor 300 and the wireless phone. The telephone integration provides basic communication functions. It establishes a data (e.g. TCP/IP) connection with a remote service center (e.g., remote service center 200). Wireless technologies such as GSM (Global

	System for Mobile Communications), CDMA (Code Division Multiple Access), TDMA (Time Division Multiple Access), iDEN™ (a TDMA-based Motorola technology), and AMPS (Advanced Mobile Phone System) can all be supported. The phone may also be used for wireless voice communications."
14. The multi-vehicle compatible tracking unit according to claim 13 wherein the corresponding at least one vehicle code is for reading from the at least one vehicle device.	Chou discloses the at least one vehicle code is for reading from the at least one vehicle device. See e.g., col. 9, lines 35-48: "Then in step 2, the diagnostic client 421 initiates a health checkup session with the diagnostic server 201, and in step 3, the diagnostic server instructs the diagnostic client to gather vehicle data, such as VIN, malfunction codes, and/or a snapshot of the vehicle data. Then in step 4, the diagnostic client 421 requests the data from the diagnostic data service 120A at the vehicle bus interface 120. Then, in step 5, the diagnostic data service interrogates the ECUs 103 via the vehicle bus adapter 120C for the requested data. In step 6, th***e ECUs 103 provide the requested data, and in step 7, the data is returned to the diagnostic client 421***. Then, in step 8, the data is in turn transmitted to the diagnostic server 201." (emphasis added).
15. The multi-vehicle compatible tracking unit according to claim 13 wherein the corresponding at least one vehicle code is for writing to the at least one vehicle device.	Chou discloses the at least one vehicle code is for writing to the at least one vehicle device. See e.g., col. 9, lines 35-48: "Then in step 2, the diagnostic client 421 initiates a health checkup session with the diagnostic server 201, and in step 3, the diagnostic server instructs the diagnostic client to gather vehicle data, such as VIN, malfunction codes, and/or a snapshot of the vehicle data. Then in step 4, the diagnostic client ***421 requests the data from the diagnostic data service 120A at the vehicle bus interface 120***. Then, in step 5, the diagnostic data service interrogates the ECUs 103 via the vehicle bus adapter 120C for the requested data. In step 6, the ECUs 103 provide the requested data, and in step 7, the data is returned to the diagnostic client 421. Then, in step 8, the data is in turn transmitted to the diagnostic server 201." (emphasis added).
16. The multi-vehicle compatible tracking unit according to claim 13 wherein said downloading interface is also for permitting downloading of at	Chou discloses downloading of at least one programming instruction (e.g. vehicle parameter update/change). See e.g., col. 10 lines 5-11: "Other applications and services that can be developed or bundled as extensions of the diagnostics services include: … vehicle parameter update/change.."

least one programming instruction for said multi-vehicle compatible controller.	
17. The multi-vehicle compatible tracking unit according to claim 13 further comprising a remote transmitter;	Chou discloses a remote transmitter (e.g., cel phone 102). See e.g., col. 4, lines 39-42: "The client computer device 101 performs several functions including communicating to the remote service center 200 by means of the network interface 107 using the cell phone 102."
and wherein said multi-vehicle compatible controller also performs at least one vehicle remote control function responsive to said remote transmitter.	Chou discloses remote vehicle access. See e.g., 10, lines 5-10: "Other applications and services that can be developed or bundled as extensions of the diagnostics services include: … remote vehicle access." One of ordinary skill in the art would readily appreciate that the remote vehicle access involves performing the function of unlocking the car doors based on a response from the cell phone 102 communicating with the remote service center 200.
18. A multi-vehicle compatible tracking unit for a vehicle comprising a vehicle data bus extending throughout the vehicle, the multi-vehicle compatible vehicle tracking unit comprising:	Chou discloses a multi-vehicle tracking unit for a vehicle comprising a vehicle data bus. See e.g., Fig. 3, reproduced below and col. 3 lines 33-46: "The processor 300 is coupled to a vehicle bus 335 through a vehicle bus interface 330. The coupling between the client computer device and the vehicle bus interface 106 of FIG. 3, may be one of RS-232, USB (Universal Serial Bus), IDB (ITS Data Bus), Ethernet, and the like. The vehicle bus interface may support one of vehicle bus standards such as CAN (Controller Area Network) and the Society of Automotive Engineers' SAE J1850 - Class B Data Communication Network Interface. Alternatively, the processor supports some or all of the functions of the vehicle bus interface and connects directly to the vehicle bus 335. The vehicle bus shown in FIG. 2 is an inherent part of all new automobiles. The dotted line is used as an indication that the vehicle bus is built into the vehicle."

	 FIG.3
a vehicle position determining device;	Chou discloses a vehicle position determining device. See e.g., col. 3, lines 54-56: "Optionally, the processor 300 may be coupled to a location sensing device such as a GPS receiver 317 (FIG. 1) to provide vehicle location information."
a wireless communications device;	Chou discloses a wireless communication device. See e.g. col. 2, lines 30-37:, "As shown in FIG. 1, the system 1000 includes a vehicle 10 with a vehicle driver or user 140, having an in-vehicle computing system 100, a client computer device 101 installed to enable vehicle health checkup and remote diagnostics, a communication link 150 (e.g., via wireless base stations 150B, or the like) for communicating vehicle information (e.g., vehicle identification number, (VIN), diagnostic data, and the like).

a multi-vehicle compatible controller for cooperating with said vehicle position determining device and said wireless communications device to send vehicle position information;	Chou discloses a multi-vehicle compatible controller for cooperating with said vehicle position determining device and said wireless communications device to send vehicle position information. See .e.g., col. 3, lines 54-56: Optionally, the processor 300 may be coupled to a location sensing device such as a GPS receiver 317 (FIG. 1) to provide vehicle location information. See also, e.g., col. 2, lines 30-37: "As shown in FIG. 1, the system 1000 includes a vehicle 10 with a vehicle driver or user 140, having an in-vehicle computing system 100, a client computer device 101 installed to enable vehicle health checkup and remote diagnostics, a communication link 150 (e.g., via wireless base stations 150B, or the like) for communicating vehicle information (e.g., vehicle identification number, (VIN), diagnostic data, and the like)."
said multi-vehicle compatible controller to be coupled to the vehicle data bus for communication thereover with at least one vehicle device using at least one corresponding vehicle device code from among a plurality thereof for different vehicles; and	Chou discloses communicating with at least one vehicle device using at least one corresponding vehicle device code from among a plurality thereof for different vehicles. See e.g. Fig. 3 reproduced above, item 120c vehicle bus adaptor and col. 4, lines 20-38: "The vehicle bus interface 120 is responsible for replying to requests for parametric data. It is also responsible for continuously monitoring the vehicle bus 104 for any fault reported by the ECUs 103, in terms of diagnostic trouble codes (DTCs). The vehicle bus interface 120 includes the following modules: vehicle bus adapter 120C, fault detector 120B, and diagnostic data service 120A. The fault detector 120B polls the vehicle bus 104 through the vehicle bus adapter 120C checking for fault codes reported by the vehicle ECUs 103. The vehicle bus adapter 120C translates the messages received from the vehicle bus into the language of the fault detector. It also translates messages from the fault detector into the language of the vehicle bus. ***The fault code specifications and protocols of the vehicle may be Original Equipment Manufacturer (OEM) and model dependent***. The term 'vehicle fault codes' is meant to be synonymous with the term 'trouble code' or 'diagnostic trouble code'. A listing of such codes may be found in the publication of the Society of Automotive Engineers, 'SAE On-Board Diagnostics for Light and Medium Duty Vehicles Standards Manual'. The diagnostic data service 120A accepts request for vehicle parametric data and retrieves the data using the vehicle bus adapter." (emphasis added). The "SAE On-Board Diagnostics for Light and Medium Duty Vehicles Standards Manual" is the SAE HS-3000 Manual, a copy of which is attached as Exhibit G. The SAE HS-3000 Manual discloses that translating messages into the language of the vehicle data bus involves selecting between an SAE standard and/or one of seven manufacturer specific version of the device code. See e.g., SAE HS-3000 Manual, page 213, Section

	4 of SAE J2178/2. Furthermore, the SAE HS-3000 Manual discloses a bus discovery process involving sending different verions of the mode 1 PID 0 device code. See e.g,. SAE HS-3000 Manual, page 37, section 6.5.2 INITIALIZATION DETAILS of SAE J1978. Patent Owner has previously asserted that sending different versions of the mode 1 PID 0 message during bus discovery satisfies this claim limitation. See Exhibit F, Plaintiff's Disclosure of Initial Infringement Contentions, starting on page A-45.
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said downloading interface comprising a wireless receiver for temporary connection to a downloading device.	See e.g., col. 3, lines 15-32: "The processor is integrated with a network interface 320 to provide communication capability with the remote service center 200. Preferably, the network interface comprises a removable wireless telephone such as the Motorola i1000+ and a docking facility for the wireless phone integrated with the client computer device. Both voice and data connections can be supported by interfacing the processor 300 and the wireless phone. The telephone integration provides basic communication functions. It establishes a data (e.g. TCP/IP) connection with a remote service center (e.g., remote service center 200). Wireless technologies such as GSM (Global

	System for Mobile Communications), CDMA (Code Division Multiple Access), TDMA (Time Division Multiple Access), iDEN™ (a TDMA-based Motorola technology), and AMPS (Advanced Mobile Phone System) can all be supported. The phone may also be used for wireless voice communications."
19. The multi-vehicle compatible tracking unit according to claim 18 wherein the corresponding at least one vehicle code is for reading from the at least one vehicle device.	Chou discloses the at least one vehicle code is for reading from the at least one vehicle device. See e.g., col. 9, lines 35-48: "Then in step 2, the diagnostic client 421 initiates a health checkup session with the diagnostic server 201, and in step 3, the diagnostic server instructs the diagnostic client to gather vehicle data, such as VIN, malfunction codes, and/or a snapshot of the vehicle data. Then in step 4, the diagnostic client 421 requests the data from the diagnostic data service 120A at the vehicle bus interface 120. Then, in step 5, the diagnostic data service interrogates the ECUs 103 via the vehicle bus adapter 120C for the requested data. In step 6, th***e ECUs 103 provide the requested data, and in step 7, the data is returned to the diagnostic client 421***. Then, in step 8, the data is in turn transmitted to the diagnostic server 201." (emphasis added).
20. The multi-vehicle compatible tracking unit according to claim 18 wherein the corresponding at least one vehicle code is for writing to the at least one vehicle device.	Chou discloses the at least one vehicle code is for writing to the at least one vehicle device. See e.g., col. 9, lines 35-48: "Then in step 2, the diagnostic client 421 initiates a health checkup session with the diagnostic server 201, and in step 3, the diagnostic server instructs the diagnostic client to gather vehicle data, such as VIN, malfunction codes, and/or a snapshot of the vehicle data. Then in step 4, the diagnostic client ***421 requests the data from the diagnostic data service 120A at the vehicle bus interface 120***. Then, in step 5, the diagnostic data service interrogates the ECUs 103 via the vehicle bus adapter 120C for the requested data. In step 6, the ECUs 103 provide the requested data, and in step 7, the data is returned to the diagnostic client 421. Then, in step 8, the data is in turn transmitted to the diagnostic server 201." (emphasis added).
21. The multi-vehicle compatible tracking unit according to claim 18 wherein said downloading interface is also for permitting downloading of at	Chou discloses downloading of at least one programming instruction (e.g. vehicle parameter update/change). See e.g., col. 10 lines 5-11: "Other applications and services that can be developed or bundled as extensions of the diagnostics services include: … vehicle parameter update/change…"

least one programming instruction for said multi-vehicle compatible controller.	
22. The multi-vehicle compatible tracking unit according to claim 18 further comprising a remote transmitter;	Chou discloses a remote transmitter (e.g., cel phone 102). See e.g., col. 4, lines 39-42: "The client computer device 101 performs several functions including communicating to the remote service center 200 by means of the network interface 107 using the cell phone 102."
and wherein said multi-vehicle compatible controller also performs at least one vehicle remote control function responsive to said remote transmitter.	Chou discloses remote vehicle access. See e.g., 10, lines 5-10: "Other applications and services that can be developed or bundled as extensions of the diagnostics services include: … remote vehicle access." One of ordinary skill in the art would readily appreciate that the remote vehicle access involves performing the function of unlocking the car doors based on a response from the cell phone 102 communicating with the remote service center 200.

IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

In re U.S. Patent No. 8,032,278

Issued:	October 4, 2011	Reexamination Control No.:	Not Yet Assigned
Filed:	July 3, 2007	Examiner:	Not Yet Assigned
Applicant:	Kenneth FLICK	Art Unit:	Not Yet Assigned
Title:	Vehicle Tracking Unit with Downloadable Codes and Associated Methods		

Mail Stop "Ex Parte Re Examination"
Office of Patent Legal Affairs
ATTN: Central Reexamination Unit
Commissioner for Patents
P.O. Box 1450
Alexandria, VA 22313-1450

Request for *Ex Parte* Reexamination of U.S. Patent 8,032,278

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I. INTRODUCTION

CalAmp Corp., ("Requester") requests reexamination under 35 U.S.C. §§ 301-307 and 37 C.F.R. § 1.510 *et seq.* of claims 1 – 22 of U.S. Patent No. 8,032,278 ("Flick '278 patent"), a copy of which is attached as Exhibit A. The Flick '278 patent issued on October 4, 2011, lists Kenneth E. Flick as the sole inventor. The Flick '278 patent is believed to be currently assigned to Omega Patents, LLC ("Applicant"). This is a second reexamination request being submitted by Requester with respect to the Flick '278 patent. The Flick '278 patent is currently undergoing ex parte reexamination in Ex Parte Reexamination Control No. 90/013,587 (the Flick '587 Reexam).

For the reasons explained in detail below, there is significant prior art which Patent Owner is aware of but which was not provided to the Patent Office in response to a direct request for information from the Examiner in the currently pending Flick '587 Reexam (in particular, evidence related to the use of device codes). Accordingly, Requester is submitting this second Request for ex parte reexamination of the Flick '278 patent in part to bring this material prior art evidence to the attention of the Patent Office. The prior art that Patent Owner failed to submit has not previously been considered by the Patent Office and raises substantial new questions of patentability with respect to the claims of the Flick '278 patent by presenting prior art that was the basis for granting the initial ex parte reexamination of the Flick '278 patent (i.e., the Flick '587 Reexam) in a new light.

Requester has also identified additional prior art references that independently raise substantial new questions of patentability with respect to the claims of the Flick '278 patent.

II. REEXAMINATION REQUEST SATISFIES REQUIREMENTS OF 37 C.F.R. § 1.510(B)

37 C.F.R. § 1.510(b)(1): A statement of each substantial new question of patentability with respect to the relevant prior patents and printed publications is provided in Section VI of this Request.

37 C.F.R. § 1.510(b)(2): Reexamination of claims 1 – 22 of the Flick '278 patent is requested as discussed in Section VI. A detailed explanation of the proper application of the prior art to each claim element, and a set of proposed rejections based on such application, is provided in Section IX by reference to the claim charts attached as Exhibits B – E.

37 C.F.R. § 1.510(b)(3): This reexamination Request is based on the prior art references listed below and attached as Exhibits listed in Section IX of this Request. A copy of every patent or printed publication relied upon is attached as an Exhibit and are listed in a PTO/SB/42 form submitted herewith, with the exception of U.S. Patents which are listed in the PTO/SB/42 form only per "Best Practices and FAQs for filing requests for reexamination complaint with 37 C.F.R. 1.510 and 1.915" dated May 2010.

37 C.F.R. § 1.510(b)(4): A copy of the Flick '278 patent is attached as Exhibit A.

37 C.F.R. § 1.510(b)(5): A certificate of service confirming service of this reexamination Request in its entirety on the attorney of record is provided on the last page of this reexamination Request.

The fee for this Request for Ex Parte Reexamination has been paid by credit card as part of the EFS-WEB submission.

III. RELATED LITIGATION:

To the best of Requester's knowledge, Applicant has asserted the Flick '278 patent in the following related prior or co-pending litigation:

- Omega Patents, LLC v. Enfora, Inc., Northern District of Georgia, Case No. 1:13-cv-00646-TWT; and
- Omega Patents, LLC v. CalAmp Corp., Middle District of Florida, Orlando Division, Case No. 6:13-cv-1950-PGB-DAB (the CalAmp litigation).

IV. NOTIFICATION OF EXISTENCE OF CONCURRENT REEXAMINATION PROCEEDINGS AND REQUEST TO MERGE PROCEEDINGS

The Flick '278 patent is currently in ex parte reexamination. See Ex Parte Reexamination with Control No. 90/013,587 (the Flick '587 Reexam). This Flick '587 Reexam had been requested by Requester. To the best of Requester's knowledge, there are no other reexaminations of this patent. Requester has addressed in detail below in Section VII certain issues raised by the Patent Owner's failure to submit relevant prior art of which it was aware in the pending Flick '587 Reexam. In view of the fact that the Flick '587 Reexam is still pending and many of the prior art references relied upon in the rejection of all of the claims of the Flick '278 patent also form the basis of this ex parte reexamination request, Requester requests that the Flick '587 Reexam and this Request be merged.

V. CITATION OF PERTINENT AND APPLICABLE PRIOR ART BELIEVED TO HAVE BEARING ON PATENTABILITY

As explained in detail below in this Request, the following prior art references, as they would have been understood by one of ordinary skill in the art at the time of the invention of the Flick '278 patent, raise substantial new questions of patentability with respect to claims 1 – 22. Reexamination of Claims 1 – 22 is therefore respectfully requested. The prior art references relied upon in this Request that raise new questions of patentability are as follows:

Title	Hereinafter
U.S. Patent No. 6,009,363 to Beckert et al. (issued December 28, 1999),	"Beckert '363 patent"
U.S. Patent No. 5,732,074 to Spaur et al. (issued March 24, 1998)	"Spaur '074 patent"
U.S. Patent No. 6,028,537 to Suman et al. (issued February 22, 2000)	"Suman '537 patent"
U.S. Patent No. 6,330,499 to Chou et al. (issued Dec. 11, 2001)	"Chou '499 patent"
SAE HS-3000, "SAE On-Board Diagnostics for Light and Medium Duty Vehicles Standards Manual" (1994 Edition)	(SAE HS-3000 Manual) –Exhibit G

Requester notes that these references were not previously considered during the original prosecution of the Flick '278 patent, but that the Beckert '363 patent, the Spaur '074 patent and the Suman '537 patent are being considered in the pending Flick '587 Reexam. However, these references are being presented in a new light in this Request. In particular, the Examiner in the Flick '587 Reexam had requested "evidence relating to the use of device codes" as related to their inherent use in the Spaur '074 patent and the Suman '537 patent. However, Patent Owner, in responding to this Request, failed to provide highly material prior art specifically related to the use of device codes, including any of a number of various SAE publications that were known to the Patent Owner and that relate specifically to device codes. Accordingly, Requester is submitting this material prior art evidence in the form of the SAE HS-3000 Manual published in 1994.

The SAE HS-3000 Manual is one of numerous publications published by the Society of Automotive Engineers ("SAE") that set forth the standards for communicating with vehicle

devices via a vehicle data bus using various device codes, as was used in the Spaur '074 patent, the Suman '537 patent, and the Beckert '363 patent in order to communicate with the vehicle devices. Requester also notes that these communications standards have been federally mandated for all new vehicles sold in the United States since 1996.

As detailed in the accompanying claim charts, the SAE HS-3000 Manual provides details regarding hundreds of device codes, or "PRN" device codes, for communicating with vehicle devices, including standard codes and up to seven manufacturer specified vehicle device codes. For example, SAE J2178/2, which starts on page 211 of the SAE HS-3000 Manual, provides the "Standardized Parameter Definitions" for standardized messages on SAE J1850 Class B networks. SAE J2178/2 sets out respective sets of device codes for a host of vehicle devices that may be present on a given vehicle. For example, Table 2 on page 215, partially reproduced below, provides the address map of the SAE standard and reserved manufacturer specific (Reserved MFG) subgroups of messages for different classes of vehicle devices.

TABLE 2--SAE/MFG PRN RANGES

System	Subgroup	Address Map	Size
Powertrain	J1979 Compatible - SAE	0000 - 00FF	0.25K
	Reserved - MFG	0100 - 07FF	1.75K
	Reserved - SAE	0800 - 08FF	0.25K
	Reserved - MFG	0900 - 0FFF	1.75K
	Engine - SAE	1000 - 10FF	0.25K
	Engine - MFG	1100 - 17FF	1.75K
	Transmission - SAE	1800 - 18FF	0.25K
	Transmission - MFG	1900 - 1FFF	1.75K
Chassis	Reserved - SAE	2000 - 20FF	0.25K
	Reserved - MFG	2100 - 27FF	1.75K
	Brakes/Tires/Wheels - SAE	2800 - 28FF	0.25K
	Brakes/Tires/Wheels - MFG	2900 - 2FFF	1.75K
	Steering - SAE	3000 - 30FF	0.25K
	Steering - MFG	3100 - 37FF	1.75K
	Suspension - SAE	3800 - 38FF	0.25K
	Suspension - MFG	3900 - 3FFF	1.75K

SAE J2178/2 provides the details of device codes for hundreds of different vehicle devices within the address map ranges indicated in the above table. Section 4 of SAE J2178/2 on page 213 specifies that three bits are used to define eight different device codes for a given vehicle device including a SAE standard device code for the specific type of vehicle device and seven manufacturer reserved device codes for that particular vehicle device.

Furthermore, the SAE HS-3000 Manual teaches a bus discovery procedure that can be used by systems interfacing with a vehicle bus, which involves communicating with vehicle devices using at least one vehicle device code from among a plurality thereof for different vehicles. In particular, the bus discovery procedure sends a plurality of device codes, referred to as "mode 1 PID 0 response message" in a manner appropriate for each of the SAE J1850 41.6 Kbps PWM bus, SAE J1850 10.4 Kbps VPW, and ISO 9141-2 in order to determine a type of bus used in a vehicle. (See SAE HS-3000 Manual section 6.5.1 on page 37).

Accordingly, the Beckert '363 patent, Spaur '074 patent, and the Suman '537 patent are each being presented in a new light in view of the SAE HS-3000 Manual and continue to raise substantial new questions of patentability with respect to the Flick '278 patent. Requester also notes that the Chou '499 patent was not previously considered in either the original prosecution of the Flick '278 patent or the currently pending Fick '587 Reexam and that this prior art reference presents a substantial new question of patentability with respect to the Flick '278 patent.

VI. STATEMENTS POINTING OUT EACH SUBSTANTIAL NEW QUESTION OF PATENTABILITY

Requester notes that the earliest effective filing date to which the Flick '278 patent is entitled to is July 3, 2007. The currently pending Flick '587 ex parte reexamination of the Flick '278 patent issued a Non-Final Action on May 6, 2016 whereby the Examiner affirmed that the earliest effective filing date to which the Flick '278 patent is entitled is July 3, 2007. Accordingly, as explained in greater detail below, A) the Beckert '363 patent; B) the Spaur '074 patent; C) the Suman '537 patent; and D) the Chou '499 patent either alone or in combination with the SAE HS-3000 Manual, all of which were published more than a year prior to the earliest priority date to which the Flick '278 patent is entitled to, raise substantial new questions of patentability with respect to the Flick '278 patent.

A. U.S. Patent No. 6,009,363 to Beckert (inherently disclosing the SAE HS-3000 Manual)

The Beckert '363 patent issued Dec. 28, 1999 and the SAE HS-3000 Manual published in 1994 and therefore are prior art to the Flick '278 patent under 35 U.S.C. §§ 102(a), 102(b),

and 102(e). These references were not considered during the original prosecution of the Flick '278 patent. However, the Beckert '363 patent was considered during the Flick '587 Reexam, but was inexplicably withdrawn from the Flick '587 Reexam with no reasons being made on the record as to why this rejection was being withdrawn. Accordingly, Requester is again resubmitting this reference for at least the following reasons:

1. No Reasons Provided Why Beckert '363 Patent Withdrawn From Rejection in the Flick '587 Reexam --- Examiner Interview Summary filed 6-21-2016 in the Flick '587 Reexam

The Examiner Interview Summary Record (PTOL – 413) filed on 6-21-2016 in the Fick '587 Reexam states: "Examiner agreed to drop the 102 rejection based upon Beckert." (Reproduced below).

Description of the general nature of what was agreed to if an agreement was reached, or any other comments:
Spaur and Suman references were discussed. Examiner agreed to drop the 102 rejection based upon Beckert. Examiner suggested that the Patent Owner provide evidence relating to the use of device codes in vehicles at the time of the invention in relation to their inherent use in Suman and Spaur. The scope of the claims was also discussed. Patent Owner's representative provided the attached agenda and various documents pertaining to related court proceedings.

MPEP 713.04 requires that "[t]he complete and proper recordation of the substance of any interview should include at least the following applicable items:... E) the general thrust of the principal arguments of the applicant and the examiner should also be identified, even where the interview is initiated by the examiner. The identification of arguments need not be lengthy or elaborate. A verbatim or highly detailed description of the arguments is not required. ***The identification of the arguments is sufficient if the general nature or thrust of the principal arguments can be understood in the context of the application file***. Of course, the applicant may desire to emphasize and fully describe those arguments which he or she feels were or might be persuasive to the examiner...". (emphasis added).

However, no reasons were provided on the record to indicate why the Beckert '363 patent was withdrawn. Likewise, Patent Owner's Applicant Summary of Interview with Examiner filed on July 7, 2016 is void of any discussion regarding the reasons why the Beckert '363 patent was withdrawn. The Patent Owner's interview agenda (filed within the same document) did include the following summary of the Beckert '363 patent:

VII. Anticipation Rejection over Beckert et al. :

Cited Beckert et al. provides:

In FIG. 2, the support module 62 is also connected to a universal serial bus (USB) hub 70 via a multi-bit connector 72 (e.g., 8 bits). The USB hub 70 provides connections to many peripheral devices (e.g., 128 devices). Example peripheral devices include the OBD (On Board Diagnostic) system 28, the security system 26, navigation system 74, a wireless link 76 to the Internet, a CD-ROM changer 78, a TV tuner 80, and user I/O devices such as a joystick, keyboard or a mouse 82. This USB hub could be separate as shown in FIG. 2 or it could be integrated into one or more of the USB peripherals.

Incorporated by reference Beckert et al. '164 provides:

An OBD (On Board Diagnostic) interpreter 116 is provided in the computer module to communicate with the OBD system built into the vehicle by the manufacturer. The OBD interpreter 116 interprets the status data received and provides performance related information from the vehicle's OBD system to the microprocessor 100. Also, commands can be provided to the interpreter which allows non-critical car systems to be controlled.

No multi-vehicle compatible controller and no downloading interface.

However, no reasons are provided as to why this reference was withdrawn. To the extent that the Patent Owner may have argued that the Beckert '363 patent involves only "reading" diagnostic data, and thus does not "control" vehicle devices as could be stated under a broadest reasonable interpretation standard with respect to a "multi-vehicle compatible **controller**" as recited in the claims, Requester notes that solely "reading" diagnostic data in accordance with the bus discovery procedure specified within the SAE standards for connecting to a vehicle via its OBD II connection has been previously asserted as sufficient by

Patent Owners to satisfy the claim limitation of the "multi-vehicle compatible controller" (See Patent Owner's Infringement Contentions provided below in Section VIII). Thus, if Patent Owner seeks to take an interpretation that is different from this interpretation, Requester respectfully requests such interpretation be made of record in the file wrapper.

Patent Owner's Applicant Summary of Interview, reproduced above, also asserts that the Beckert' 363 patent does not disclose a downloading interface. Requester respectfully disagrees. On the contrary, as detailed in the attached Exhibit B, the Beckert '363 patent explicitly discloses a downloading interface, and states: "[a]nother technique to load data or applications or transfer data with other computing devices is through the use of the IrDA transceiver port 56, or the wireless Internet link 76." Beckert et al. '363 patent, col. 5, lines 1 – 12. Furthermore, Requester has provided Patent Owner's Infringement Contentions below in Section VIII, which illustrate that a standard firmware update has been asserted by Patent Owner as sufficient for satisfying this claim limitation.

Accordingly, Requester is re-submitting the Beckert '363 patent, including the SAE HS-3000 Manual which is inherently disclosed by the OBD II interface being used in the Beckert '363 patent (see e.g., Beckert '363 col. 1, lines 32 – 35 stating: "Most late model vehicles are also constructed with a diagnostic system that analyzes performance of the vehicle's engine, transmission and fuel system, and other components (1996 or later for OBD II, 1993 or later for OBD I)…". While Requester believes it unlikely that any of the rejections proposed herein will be withdrawn, Requester respectfully requests that any future reasons for withdrawing any proposed rejections be made of record so that the public has notice both as to the meaning and scope of the claims and regarding the basis under which prior art fails to render the claims

anticipated and/or obvious. These references provide new technological teachings that raise a substantial new question of patentability with respect to the Flick '278 patent.

2. Technological Teaching: Transmitting Location Data, Communicating Via an OBD II Vehicle Data Bus, and Downloading Means Downloading Enabling Data

The Beckert '363 patent teaches a vehicle computer system including a wireless communications device, a vehicle location determination device, a downloading interface, and a controller capable of communicating with a variety of vehicle devices via the OBD II standardized vehicle data bus mandated for inclusion in 1996 or later model vehicles. An illustration of the components of the Beckert '363 patent is conceptually shown n FIG. 3:

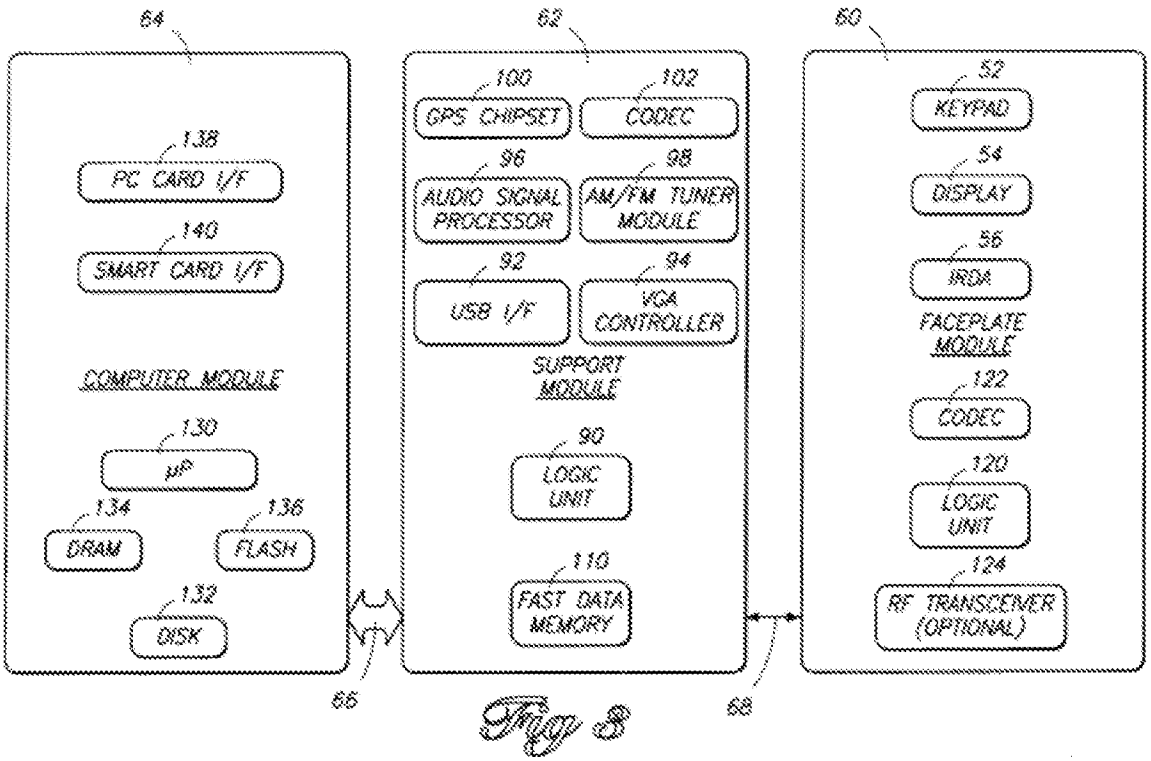


Fig. 3

The Beckert '363 patent also incorporated by reference the disclosure of U.S. Patent 5,794,164 to Beckert et al. (the Beckert '164 patent) in its entirety at col. 7, lines 44-51. The

Beckert '164 patent provides additional detail concerning the modules of the vehicle computer system disclosed in the Beckert '363 patent and specific detail concerning the OBD interpreter and APIs that are exposed to remote devices by the vehicle computer system, including a diagnostic API (amongst others). The SAE standards, and in particular the SAE HS-3000 Manual, were published for the specific purpose of teaching people of ordinary skill in the art how to communicate with vehicle devices via the OBD II interface. In particular, the SAE HS-3000 Manual teaches a bus discovery procedure that can be used by systems interfacing with a vehicle bus via an OBD II diagnostic connector, which involves communicating with vehicle devices using at least one vehicle device code from among a plurality thereof for different vehicles. In particular, the bus discovery procedure sends a plurality of device codes, each a different form of the "mode 1 PID 0 response message", in a manner appropriate for each of the SAE J1850 41.6 Kbps PWM bus, SAE J185 10.4 Kbps VPW, and ISO 9141-2 in order to determine a type of bus used in a vehicle. (See SAE HS-3000 Manual section 6.5.1 on page 37). Indeed, it was Requester's implementation of the most current version of this standard that was pointed to by Patent Owner as satisfying the requirements of the Flick '278 patent (See Patent Owner's Infringement Contentions, page A-50, provided in Section VIII below, where the series of device codes are as follows: "On initial installation, the multi-vehicle compatible controller generates a sequence of device codes to determine compatibility with different vehicles, including CAN 11 Bit 7DF message, CAN 29 Bit 18DB33F1 message, J1850 VPW 68 6A F1 message, J1850 PWM message, K-Line messages and J1850 VPW 6C 10 F1 message."

Accordingly, the Beckert '363 patent teaches that the modules inherently disclose the use of the bus discovery protocols that involve sending a plurality of device codes for different

vehicles required by the SAE standards as that specify the implementation details for the OBD II interface. Furthermore, it would have been obvious to utilize the teachings described in the SAE HS-3000 Manual because the Beckert '363 patent expressly directs communicating with the OBD system built into the vehicle using the OBD interface. Thus, the Beckert '363 patent is being presented in a new light in view of the SAE HS-3000 Manual that raises a substantial new question of patentability.

3. The Beckert '363 Patent and the SAE HS-3000 Manual are Analogous to the Flick '278 patent

The Beckert '363 patent and the SAE HS-3000 Manual are analogous art because they are in the same field of endeavor as the Flick '278 patent, namely vehicle monitoring and tracking units, and more specifically location tracking devices that can be installed in vehicles and communicate with vehicle devices using a vehicle data bus. *See In re Klein, 647 F.3d 1343, 1349 (Fed. Cir. 2011)* (Noting that a reference is analogous when "the art is from the same field of endeavor, regardless of the problem addressed...").

4. Substantial New Question of Patentability as to Claims 1 – 22 because the Beckert '363 Patent in view of the SAE HS-3000 Manual Teaches all Claim Elements

Each of claims 1 – 22 require a multi-vehicle compatible controller coupled to a vehicle data bus for communication thereover with at least one vehicle device. As shown above, and in more detail in the claim charts attached as Exhibit B, the Beckert '363 patent in view of the SAE HS-3000 Manual disclose this and all other required limitations, explicitly disclosing communicating via a "vehicle data bus" and a "downloading interface". Accordingly, all

aspects of claims 1-22 are disclosed by the Beckert '363 patent and the SAE HS-3000 Manual. A reasonable examiner would consider the teachings important in deciding whether or not claims 1-22 of the Flick '278 patent are patentable. For these reasons, the Beckert '363 patent, including the SAE HS-3000 Manual, raises a substantial new question of patentability as to claims 1-22.

B. U.S. Patent No. 5,732,074 to Spaur in view of the SAE HS-3000 Manual

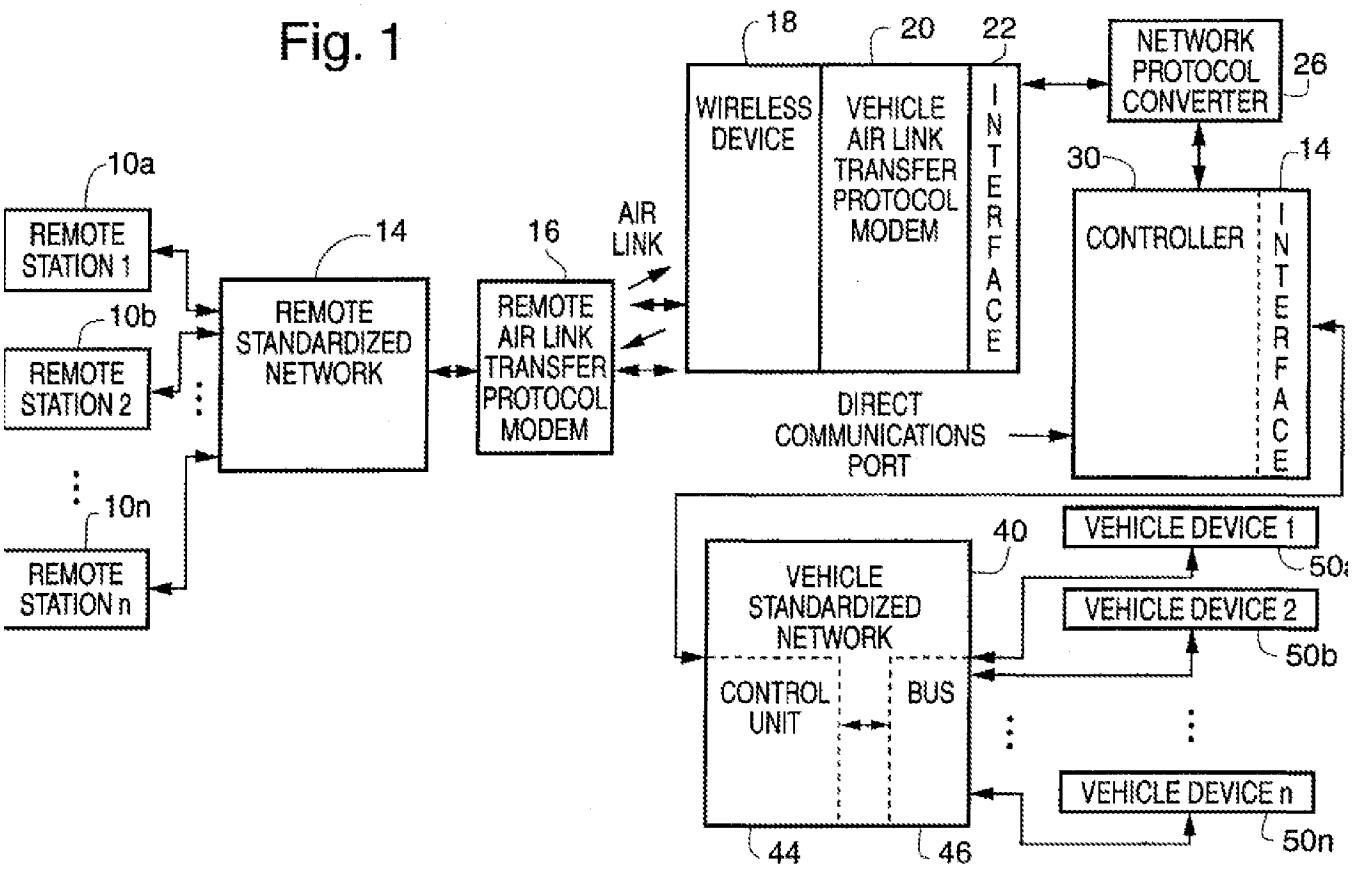
The Spaur '074 patent issued March 24, 1998 and the SAE HS-3000 Manual published in 1994 and therefore are prior art to the Flick '278 patent under 35 U.S.C. §§ 102(a), 102(b), and 102(e). These references were not considered during the original prosecution of the Flick '278 patent, but the Spaur '074 patent is currently being considered in the Flick '587 Reexam. Furthermore, as noted above and described in detail below in Section VII, the Examiner in the Flick '587 Reexam had requested evidence related to the use of device codes as related to the Spaur' 074 patent, and Patent Owner failed to provide any of the various SAE publications of which it was aware and that relate specifically to device codes. Accordingly, Requester is submitting the SAE HS-3000 Manual which provides material evidence related to the use of device codes as related to the Spaur '074 patent. Accordingly, the Spaur '074 patent is being presented in a new light in view of the SAE HS-3000 Manual and continues to raise a substantial new question of patentability.

1. Technological Teaching: Obtaining and Transmitting Location Data using a Standard Vehicle Bus and Vehicle Device Codes for Different Vehicles

The Spaur '074 patent teaches a controller having a wireless device, a direct communications port, and a connection to a vehicle standardized network that can be utilized

to read data from vehicle devices and transmit that data via the wireless device. An illustration of the system taught by the Spaur '074 patent is illustrated in FIG. 1:

Fig. 1



The Spaur '074 patent teaches communicating with vehicle devices via a "standardized network ... commonly used in a number of makes and models of vehicles" (Spaur '074 patent, col. 10, lines 18-21). The SAE standards, and in particular the SAE HS-3000 Manual, were published for the specific purpose of teaching people of ordinary skill in the art how to communicate with vehicle devices via one of the "standardized networks" present within a vehicle.

In particular, the SAE HS-3000 manual provides details of communicating with a plurality of vehicle devices using the SAE messaging protocols defined in SAE J2178 (Class B

Data Communication Network Messages), which provides details of the various device codes that may be utilized to communicate with hundreds of vehicle devices, and the device codes for a particular vehicle device include at least one SAE standard device code and up to seven manufacturer specific or "reserved" device codes. See Fig. 3, reproduced below, whereby MSB bits 2,1,0 that correspond to binary "000" are set as the "Industry Std. (SAE)", and binary "001" to "111" as reserved "Manufacturer".

Figure 3 shows the basic structure of PRNs and Tables 1 and 2 show bit assignments and address ranges based on these assignments.

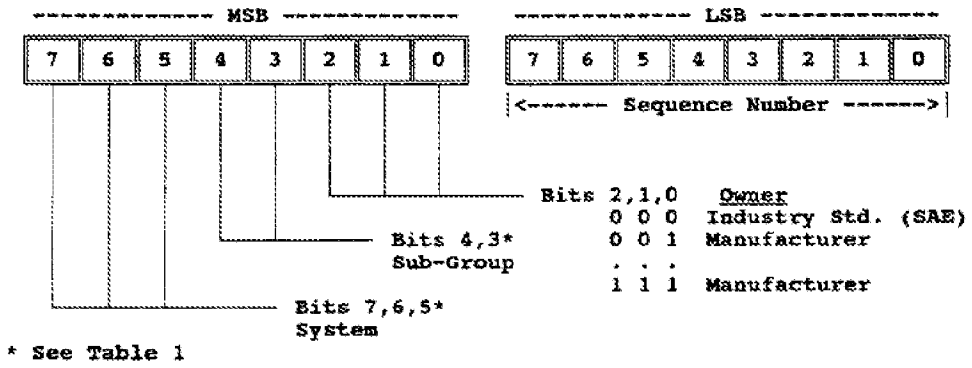


FIGURE 3—PRN STRUCTURE

Furthermore, SAE J2178/2, on page 213 of the SAE HS-3000 Manual, states that "Some of the PRN numbers are assigned or reserved for SAE definitions but the majority are reserved for individual motor vehicle manufacturers to coordinate and assign" thereby teaching multi-vehicle compatibility, with manufacturer specific device codes and SAE standard codes.

Furthermore, the SAE HS-3000 Manual teaches a bus discovery procedure that can be used by systems interfacing with a vehicle bus via an OBD II diagnostic connector, which involves communicating with vehicle devices using at least one vehicle device code from among a plurality thereof for different vehicles. In particular, the bus discovery procedure sends a plurality of device codes, referred to as "mode 1 PID 0 response message" in a

manner appropriate for each of the SAE J1850 41.6 Kbps PWM bus, SAE J1850 10.4 Kbps VPW, and ISO 9141-2 in order to determine a type of bus used in a vehicle. (See SAE HS-3000 Manual section 6.5.1 on page 37). Accordingly, it would have been obvious to utilize the teachings described in the SAE HS-3000 Manual because the Spaur '074 patent expressly directs using standards, such as the SAE standards as described by the SAE HS-3000 Manual, for the purpose for which the standards were created. Thus, the Spaur '074 patent in view of the SAE HS-3000 Manual disclose technological teachings that the Examiner previously found to be missing from the prior art of record disclosed in the Flick '278 patent.

2. The Spaur '074 Patent and the SAE HS-3000 Manual are Analogous to the Flick '278 patent

The Spaur '074 patent is analogous art because it is in the same field of endeavor as the Flick '278 patent, namely location tracking units, and more specifically location tracking devices that can be installed in vehicles and communicate with vehicle devices using a vehicle bus. The SAE HS-3000 Manual is analogous art because the publications relate to the same field of endeavor as the Flick '278 patent, namely vehicle communications systems and methods for communicating with vehicle devices, and more specifically, communicating with vehicle devices using at least one corresponding vehicle device code from among a plurality thereof for different vehicles using a vehicle bus. *See In re Klein, 647 F.3d 1343, 1349 (Fed. Cir. 2011)* (Noting that a reference is analogous when "the art is from the same field of endeavor, regardless of the problem addressed...").

3. Substantial New Question of Patentability as to Claims 1 – 22 Because Spaur '074 in view of the SAE HS-3000 Manual Teaches all Claim Elements

Each of claims 1 – 22 require a multi-vehicle compatible controller coupled to a vehicle data bus for communication thereover with at least one vehicle device. As shown above, and in more detail in the claim charts attached as Exhibit D, the Spaur '074 patent in view of the SAE HS-3000 Manual discloses this and all other required limitations, explicitly disclosing communicating via a "vehicle data bus", "using at least one corresponding device code from among a plurality thereof for different vehicles", and "downloading interface". In particular, the limitation "using at least one corresponding vehicle device code from among a plurality thereof for different vehicles" is discussed in greater detail in the SAE HS-3000 Manual, which provides the implementation details for communicating via the standardized vehicle network described in the Spaur '074 patent.

Accordingly, it would have been obvious to one skilled in the art that all aspect of claims 1 – 22 are disclosed by the Spaur '074 patent in view of the SAE HS-3000 Manual. A reasonable examiner would consider the teachings important in deciding whether or not claims 1 – 22 of the Flick '278 patent are patentable. For these reasons, the Spaur '074 patent in view of the SAE HS-3000 Manual raises a substantial new question of patentability as to claims 1 – 22.

C. U.S. Patent No. 6,028,537 to Suman (inherently disclosing the SAE HS-3000 Manual)

The Suman '537 patent issued February 22, 2000 and the SAE HS-3000 Manual published in 1994 and therefore are prior art to the Flick '278 patent under 35 U.S.C. §§

102(a), 102(b) and 102(e). These references were not considered during the original prosecution of the Flick '278 patent, but the Suman '537 patent is currently being considered in the Flick '587 Reexam. Furthermore, as noted above and described in detail below in Section VII, the Examiner in the Flick '587 Reexam had requested evidence related to the use of device codes as related to the Suman '537 patent, however, Patent Owner failed to provide the Patent Office with significant prior art to which Patent Owner is aware and that relates specifically to the use of device codes as used in the Suman '537 patent. Accordingly, Requester is submitting material prior art, in particular, the SAE HS-3000 Manual which provides material evidence related to the use of device codes as related to the Suman '537 patent. Accordingly, the Suman '537 patent is being presented in a new light in view of the SAE HS-3000 Manual and continues to raise a substantial new question of patentability.

1. Technological Teaching: Obtaining and Transmitting Location Data using a Standard Vehicle Bus and Multi-Vehicle Compatibility

The Suman '537 patent teaches a vehicle communication and control system including a wireless communications device, a vehicle location determination device, and a controller capable of communicating with a variety of vehicle devices via a standardized vehicle data bus. An illustration of the components of the Suman '537 patent is conceptually shown in FIG. 44:

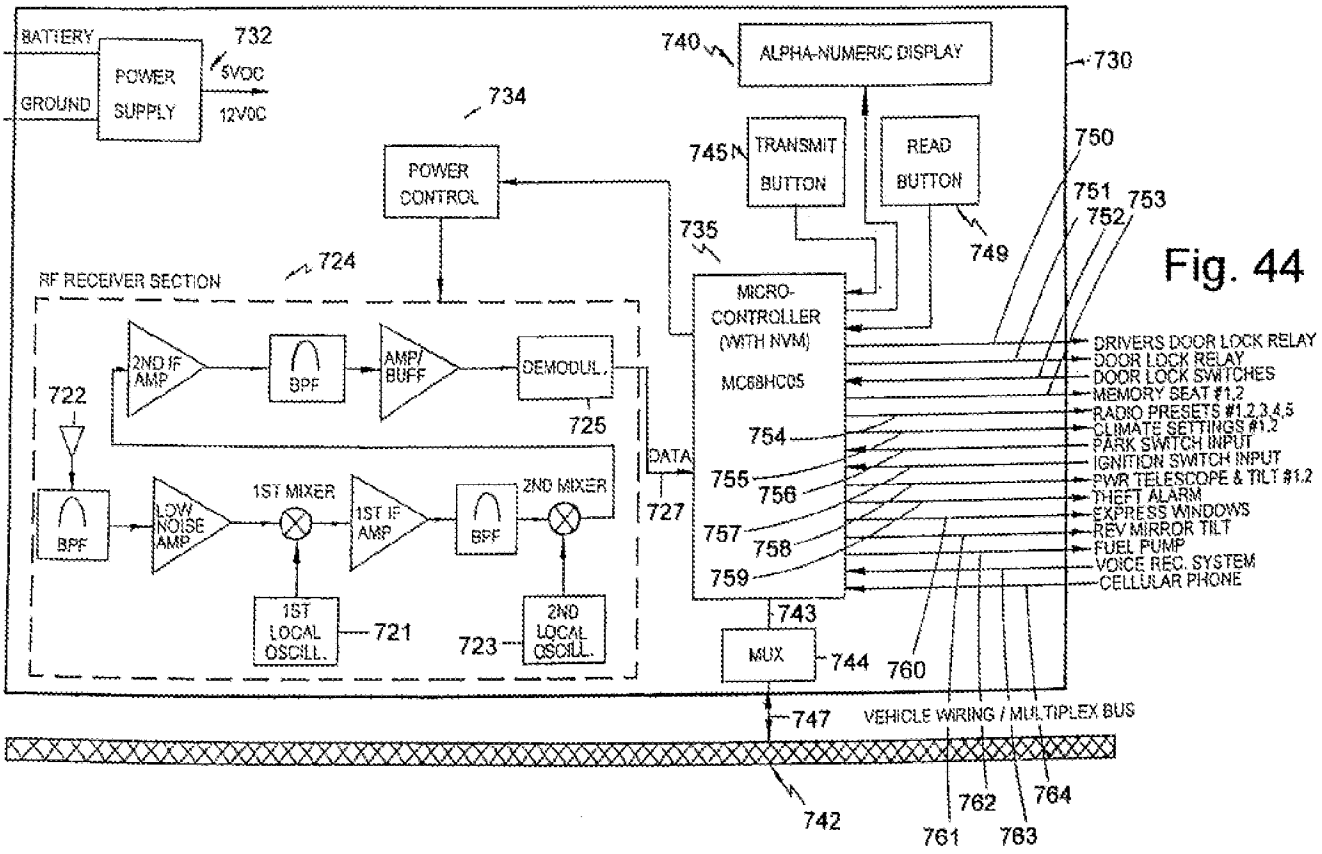


Fig. 44

The Suman '537 patent notes that the multiplexing scheme (e.g., item 744 illustrated in Fig. 44 above) is set forth in SAE standard J1850 and "is universally used in the automotive industry." The SAE HS-3000 Manual is a publication that provides details regarding the SAE J1850 standard, and provides implementation details for communicating with vehicle devices on a plurality of different makes and models of vehicles via an SAE J1850 bus.

Accordingly, a vehicle controller (as illustrated in Fig. 44 above) implemented according to the SAE J1850 standard would communicate with a plurality of vehicle devices using the SAE messaging protocols defined in SAE J2178 (Class B Data Communication Network Messages) as required by the SAE J1850 standard, which provides details of the various

device codes that may be utilized to communicate with hundreds of vehicle devices, and the device codes for a given device would include at least one SAE standard device code and up to seven manufacturer specific or "reserved" device codes. See Fig. 3, reproduced below, bits 2,1,0 that illustrated binary "000" as the "Industry Std." SAE device codes, and binary "001" to "111" as reserved "Manufacturer" device codes.

Figure 3 shows the basic structure of PRNs and Tables 1 and 2 show bit assignments and address ranges based on these assignments.

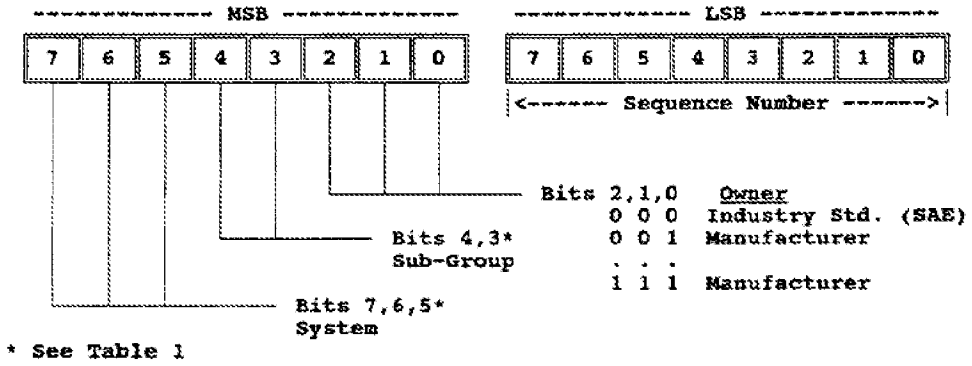


FIGURE 3 – PRN STRUCTURE

SAE J2178/2 notes, on page 213 of the SAE HS-3000 Manual, that "Some of the PRN numbers are assigned or reserved for SAE definitions but the majority are reserved for individual motor vehicle manufacturers to coordinate and assign."

Furthermore, a vehicle controller (as illustrated in Fig. 44 above) implemented according to the SAE HS-3000 Manual also performs a bus discovery procedure when interfacing with the vehicle bus that involves communicating with a vehicle device using at least one corresponding vehicle device code from a plurality thereof for different vehicles. In particular, the bus discovery procedure sends a plurality of device codes, referred to as "mode 1 PID 0 response message" in a manner appropriate for each of the SAE J1850 41.6 Kbps PWM bus, SAE J1850 10.4 Kbps VPW, and ISO 9141-2 in order to determine a type of bus used in a

vehicle. (See SAE HS-3000 Manual section 6.5.1 on page 37). As noted above, vehicle data busses, such as those described by the SAE HS-3000 Manual have been federally mandated for inclusion in all vehicles sold in the United States since at least 1996.

Thus, the Suman '537 patent is being presented in a new light in view of the SAE HS-3000 Manual that raises a substantial new question of patentability with respect to the Flick '278 patent

2. The Suman '537 Patent and the SAE HS-3000 Manual are Analogous Art to the Flick '278 Patent

The Suman '537 patent, which inherently implements the J1850 bus according to the SAE HS-3000 Manual are analogous art because they are in the same field of endeavor as the Flick '278 patent, namely location tracking units, and more specifically location tracking devices that can be installed in vehicles and communicate with vehicle devices using a vehicle bus. *See In re Klein, 647 F.3d 1343, 1349 (Fed. Cir. 2011)* (Noting that a reference is analogous when "the art is from the same field of endeavor, regardless of the problem addressed...").

3. Substantial New Question of Patentability as to Claims 1 – 22 because the Suman '537 patent, including the SAE HS-3000 Manual, Teaches all Claim Elements

Each of claims 1 – 22 require a multi-vehicle compatible controller coupled to a vehicle data bus for communication thereover with at least one vehicle device. As shown above, and in more detail in the claim charts attached as Exhibit D, the Suman '537 patent, which inherently discloses communicating with vehicle devices in accordance with the manner

disclosed in the SAE HS-3000 Manual, discloses this and all other required limitations, explicitly disclosing communicating via a "vehicle data bus", "using at least one corresponding device code from among a plurality thereof for different vehicles", and "downloading interface". In particular, the manner in which the Suman '537 patent's disclosure requires "using at least one corresponding vehicle device code from among a plurality thereof for different vehicles" can be appreciated by reviewing the details of the disclosed processes as set out in the SAE HS-3000 Manual, which provides the implementation requirements for the multiplexing communication circuit 744 described in the Suman '537 patent. Accordingly, it is submitted that all aspects of claims 1 – 22 are disclosed by the Suman '537 patent, which inherently discloses use of the processes required by the standards contained in the SAE HS-3000 Manual, in at least as complete detail as contained in the claims. A reasonable examiner would consider the teachings important in deciding whether or not claims 1 – 22 of the Flick '278 patent are patentable. For these reasons, the Suman '537 patent in view of the SAE HS-3000 Manual raises a substantial new question of patentability as to claims 1 – 22.

D. U.S. Patent No. 6,330,499 to Chou et al.

The Chou '499 patent issued December 11, 2001 and therefore is prior art to the Flick '278 patent under 35 U.S.C. §§ 102(a), 102(b), and 102(e). This reference was not considered during the prosecution of the Flick '278 patent or the currently pending Flick '587 Reexam. This reference provides a new technological teaching that raises a substantial new question of patentability.

1. Technological Teaching: Obtaining and Transmitting Location Data using a Standard Vehicle Bus and using model dependent codes

The Chou '499 patent teaches a vehicle information system including a wireless communication device, a vehicle location determining device, and a controller capable of communicating with a variety of vehicle devices via a standardized vehicle data bus using a vehicle bus interface that may support different vehicle bus standards such as CAN (Controller Area Network) and the Society of Automotive Engineers' SAE J1850 – Class B Data Communications Network Interface. (Chou, col. 3, lines 33-40). An illustration of the components of the Chou '499 patent is conceptually shown in FIG. 2:

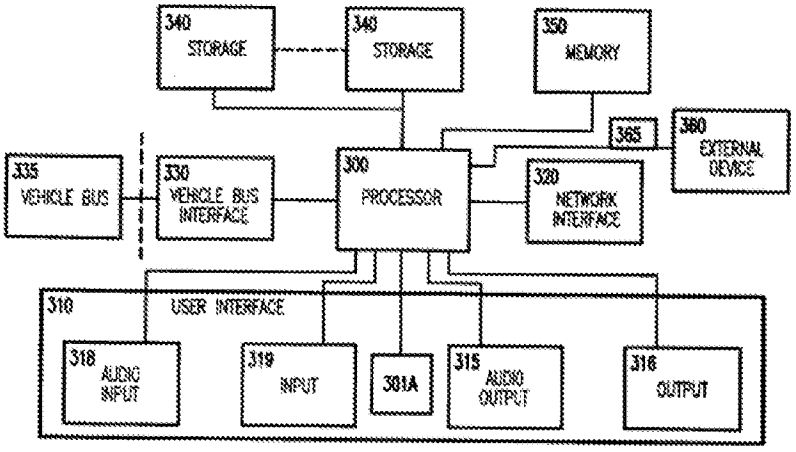


FIG.2

The Chou '499 patent further teaches multi-vehicle compatibility, whereby a vehicle bus adaptor (120C) "translates messages from the fault detector into the language of the vehicle bus. The fault code specifications and protocols of the vehicle may be ***Original Equipment Manufacturer (OEM) and model dependent***....A listing of such codes may be found in the publication of the Society of Automotive Engineers, "SAE On-Board Diagnostics for Light and Medium Duty Vehicle Standards Manual". (Chou, col. 4, lines 25-35, emphasis added).

Thus, the Chou '499 patent discloses technological teaching that the Examiner previously found to be missing from the prior art of record disclosed in the Flick '278 patent.

2. The Chou '499 patent is Analogous Art to the Flick '278 patent

The Chou '499 patent is analogous art because it is in the same field of endeavor as the Flick '278 patent, namely vehicle monitoring and tracking units, and more specifically vehicle tracking devices that can be installed in vehicles and communicate with vehicle devices using a vehicle bus. *See In re Klein, 647 F.3d 1343, 1349 (Fed. Cir. 2011)* (Noting that a reference is analogous when "the art is from the same field of endeavor, regardless of the problem addressed...").

3. Substantial New Question of Patentability as to Claims 1 – 22 because the Chou '499 Patent Teaches all Claim Elements

Each of claims 1 – 22 require a multi-vehicle compatible controller coupled to a vehicle data bus for communication thereover with at least one vehicle device. As shown above, and in more detail in the claim charts attached as Exhibit E, the Chou '499 patent discloses this and all other required limitations, explicitly disclosing communicating via a "vehicle data bus", translating "messages from the fault detector into the language of the vehicle bus" where the fault code specifications may be "Original Equipment Manufacturer (OEM) and model dependent" and a downloading interface for permitting downloading of enabling data.

Accordingly, it is submitted that all aspect of claims 1 – 22 are disclosed by the Chou '499 patent. A reasonable examiner would consider the teachings important in deciding whether or not claims 1 – 22 of the Flick '278 patent are patentable. For these reasons, the Chou '499 patent raises a substantial new question of patentability as to claims 1 – 22.

VII. PROCEEDINGS IN PENDING RE-EXAMINATION OF FLICK '278 PATENT WITH CONTROL NO. 90/013,587 (THE '587 REEXAM)

As noted above, the Flick '278 patent is currently under Ex Parte Reexamination with Control No. 90/013,587 (the Flick '587 Reexam). This Flick '587 Reexam had been requested by Requester. Requester believes that the SAE HS-3000 Manual presents the prior art that forms the basis of the Flick '587 Reexam in a new light. Patent Owner's failure to submit the SAE HS-3000 Manual in the Flick '587 Reexam and submission of declarations that are misleading in view of the SAE standards described in the SAE HS-3000 Manual are described further below.

A. Patent Owner was aware of and failed to provide material evidence in reply to the Examiner's request for evidence related to use of device codes in Flick '587 Reexam

The Ex Parte Reexamination Interview Summary mailed June 21, 2016 states that the "Examiner suggested that the Patent Owner provide ***evidence relating to the use of device codes in vehicles*** at the time of the invention ***in relation to their inherent use in Suman and Spaur***." (emphasis added). As detailed above, Suman describes communicating with vehicle devices via an SAE "J1850" bus, while Spaur describes using "standardized vehicle networks", which clearly references the SAE standardized networks federally mandated for use in all new vehicles sold in the U.S. since 1996.

In response to the Examiner's request, Patent Owner filed a "Response to the Office Action Mailed May 6, 2016 in Ex-Parte Reexamination" on July 6, 2016 that included, among various other items, a Rule 132 Declaration by Joseph C. McAlexander, III (the McAlexander 132 Declaration) and a Rule 132 Declaration by Michael J. Suman (the Suman 132

Declaration), however, Patent Owner failed to provide any of the various relevant SAE publications that were published for the express purpose of providing multivehicle compatibility to devices such as those disclosed in the Spaur '074 patent, the Suman '537 patent, and the Beckert '363 patent that communicate via the vehicle data communications bus.

Due to concurrent proceedings in which these SAE publications have been relied upon by the USPTO in initiating *ex parte* reexaminations of Patent Owner's other patents related to the use of device codes in multi-vehicle compatible controllers, Patent Owner is clearly aware of the SAE standards and the fact that they provide material evidence related to the use of device codes as inherently used by the Spaur '074 patent and the Suman '537 patent.

Accordingly, Requester cannot determine why Patent Owner failed to provide to the Patent Office this material evidence as Patent Owner was aware of the teachings of this and numerous other SAE publications, including the specific teachings related to device codes, as these publications had been submitted in at least two other pending *ex parte* reexaminations with respect to Patent Owner's patents that relate to communication with vehicle devices using device codes. In particular, Requester had previously provided this SAE HS-3000 Manual to the Patent Owner in pending Re-examination Control No. 90/013,659 for U.S. Patent Number 6,346,876 to Flick; and pending Re-examination Control No. 90/013,741 for U.S. Patent No. 6,756,885 to Flick. Furthermore, Mr. McAlexander read from the SAE HS-3000 Manual while on the witness stand in Federal Court during the trial of the Omega Patents, LLC v. CalAmp Corp. dispute earlier this year.

B. Misleading Declaration Evidence Submitted By Patent Owner

The declarations submitted by Mr. Suman (an inventor on the Suman et al. patent) and Mr. McAlexander (a technical consultant) assert that the device codes were "difficult to obtain",

"proprietary" and "not made freely available". In particular, the Rule 132 Declaration of Mr. McAlexander states on page 3 that "...Mr. Suman confirms my understanding that...the vehicle device codes were proprietary to different manufacturers, and even different model lines offered by manufacturers; and that the device codes were not made freely available, and were quite difficult to obtain." Likewise, the Rule 132 Declaration by Michael J. Suman states on pages 4-5 that "...the vehicle device codes were proprietary to different manufacturers, and even different model lines offered by manufacturers. Moreover, the device codes were not made freely available, and were quite difficult to obtain."

However, the SAE standards and the SAE HS-3000 Manual were readily available for purchase for relatively modest fees. Furthermore, Requester submits herewith a 1997 version of the SAE HS-3000 Manual that has also been previously provided to the Patent Owner in the above referenced ex parte reexaminations and was obtained by Requester from a public library. Given that these standards are explicitly referenced within the Spaur '074 patent the Suman '537 patent, it is misleading to suggest that the information was unobtainable. The information was clearly relied upon in the implementation of the described systems. Furthermore, contrary to the assertions made by Mr. Suman and Mr. McAlexander, the device codes were in fact available and not "difficult to obtain" as the device codes had been published by the Society of Automotive Engineers in numerous publicly available publications including the SAE HS-3000 Manual. Finally, Requester notes that if the assertions of Mr. Suman and Mr. McAlexander that the device codes were "difficult to obtain" etc. were in fact accurate, then it would logically follow that the invention disclosed by the Suman et al. '537 patent could not have been implemented with respect to even a single vehicle.

Accordingly, in this Request, Requester is submitting the SAE HS-3000 Manual, published in 1994 that provide details regarding hundreds of different device codes (as listed in, for example, SAE J2178/2 starting on page 211 of the HS-3000 Manual), available at the time of the invention as had been requested by the Examiner. In view of the misleading manner in which the Suman and McAlexander declarations present the Spaur '074 patent and the Suman '537 patent, Requester respectfully submits that the SAE HS-3000 Manual presents at least the Spaur '074 patent and the Suman '537 patent in a new light.

C. Mr. Suman's 132 Declaration with Respect to Multi-Vehicle Compatibility is Irrelevant – "Inherency rejections may be proper even when the inherent properties were not appreciated by the inventor"

The Suman '537 patent states "***[t]he multiplexing scheme is set forth in SAE standard J1850*** and is universally used in the automotive industry." (Col. 37, lines 15-17) and the Official Action correctly notes that "it is also inherent that the J1850 bus described in the Suman '537 patent is included in a variety of different makes and models of vehicles per the federally mandated standard." (Official Action, pages 6-7).

Patent Owner's "Response to the Office Action Mailed May 6, 2016 in Ex-Parte Reexamination" argues that the Suman '537 patent fails to disclose multi-vehicle compatible controller, and submits as supporting evidence the Suman 132 Declaration, which states:

> "…I respectfully disagree with these contentions with respect to the characterization of a multi-vehicle compatible controller. The embodiments contemplated by me at the time of my '537 patent, the disclosure in my '537 patent, and the related commercial developments within my work responsibilities

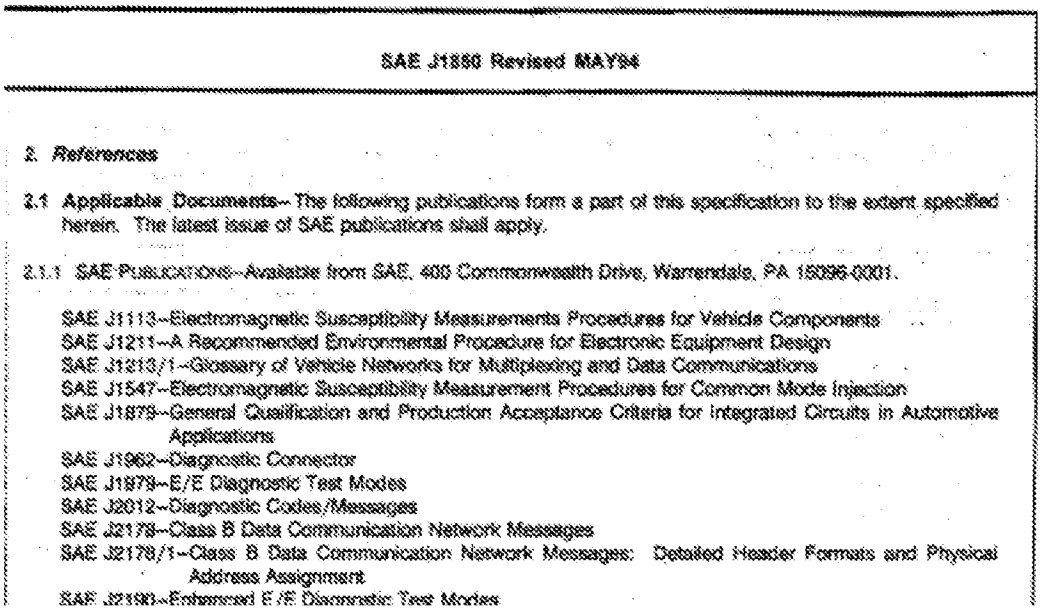
> were not directed to a multi-vehicle compatible controller and downloading interface as in the '278 patent claims. The embodiments contemplated by me at the time of my '537 patent did not include multi-vehicle compatibility, and at the time I left Johnson Controls in 2002 I never contemplated or worked with any multi-vehicle compatible controller as described in the '278 patent." (Suman Declaration, page 4, item 12).

These statements only provide evidence that Mr. Suman personally was unaware of or did not appreciate the multi-vehicle compatibility provided by the SAE J1850 multiplexing scheme that was being used by the Suman '537 patent.

However, ***"inherency rejections may be proper even when inherent properties were not appreciated by the inventor or author of the cited prior art reference."*** (See American Intellectual Property Law Association ("AIPLA"), "Practical Prosecution Training for New Lawyers", August 27, 2009, page 38). Rather, the evidence "must make clear that the missing descriptive matter is necessarily present in the thing described in the reference, and that ***it would be so recognized by persons of ordinary skill".*** (emphasis added) (See Continental Can Co. USA v. Monsanto Co., 948 F.2d 1264 (Fed. Cir.1991). (The court went on to explain that "this modest flexibility in the rule that 'anticipation' requires that every element of the claims appear in a single reference accommodates situations in which the **common knowledge of technologists** is not recorded in the reference; that is, where technological facts are known to those in the field of the invention, albeit not known to judges." (emphasis added, 948 F.2d at 1268, 20 USPQ at 1749-50.).

Accordingly, the statements by Mr. Suman in the Suman 132 Declaration are only evidence that Mr. Suman did not appreciate that using the standardized SAE J1850

multiplexing scheme would necessarily provide multi-vehicle compatibility. However, as described in detail below, the SAE standards that define communications via a J1850 vehicle bus clearly provides multi-vehicle compatibility as was appreciated by one of ordinary skill in the art, as the messaging protocol used to communicate on the J1850 bus specifically sets forth device codes that include both "standard SAE" device codes supported in many different makes and models of vehicles as well as "reserved manufacturer" specified device codes. In particular, the J1850 bus communicates with vehicle devices according to the J2178 messaging standards (See J1850, Section 2, page 153 of HS-3000 Manual, partially reproduced below), and the J2178 messaging standards set forth at least one SAE standard device code and seven manufacturer reserved device codes for each vehicle device (as described in detail above).



SAE J1850 Revised MAY94

2. References

2.1 Applicable Documents—The following publications form a part of this specification to the extent specified herein. The latest issue of SAE publications shall apply.

2.1.1 SAE PUBLICATIONS—Available from SAE, 400 Commonwealth Drive, Warrendale, PA 15096-0001.

SAE J1113—Electromagnetic Susceptibility Measurements Procedures for Vehicle Components
SAE J1211—A Recommended Environmental Procedure for Electronic Equipment Design
SAE J1213/1—Glossary of Vehicle Networks for Multiplexing and Data Communications
SAE J1547—Electromagnetic Susceptibility Measurement Procedures for Common Mode Injection
SAE J1879—General Qualification and Production Acceptance Criteria for Integrated Circuits in Automotive Applications
SAE J1962—Diagnostic Connector
SAE J1979—E/E Diagnostic Test Modes
SAE J2012—Diagnostic Codes/Messages
SAE J2178—Class B Data Communication Network Messages
SAE J2178/1—Class B Data Communication Network Messages: Detailed Header Formats and Physical Address Assignment
SAE J2190—Enhanced E/E Diagnostic Test Modes

Likewise, Mr. Suman in his Rule 132 Declaration asserts that "[i]t was expected that the vehicles in a given fleet would be the same type vehicle having the same device codes" although the Suman '537 patent explicitly describes that the fleet of vehicles could include

"taxis, police cars, trucks, or other delivery vehicles…" (Col. 2, lines 3-10). While this may be Mr. Suman's recollection, the patent clearly conveys to a person of ordinary skill in the art that the disclosed system could be used on different vehicles.

Accordingly, even though Mr. Suman did not appreciate the inherent properties of using the SAE J1850 bus to provide multi-vehicle compatibility, these inherent properties would have been recognized by a person of ordinary skill in the art and thus, the statements made by Mr. Suman in the Suman 132 Declaration are irrelevant with respect to the multi-vehicle compatibility of the Suman '537 patent.

VIII. ***SUBMISSION UNDER 37 CFR 1.501 - PATENT OWNER'S STATEMENTS FILED IN FEDERAL COURT PROCEEDING RELATING TO CLAIM SCOPE***

35 U.S.C. 301(a)(2) permits a submission under 35 U.S.C. 301 to contain written "statements of the patent owner filed in a proceeding before a federal court or the Office in which the patent owner took a position on the scope of any claim of a particular patent".

Accordingly, pursuant to 37 CFR 1.501, Requester is submitting Plaintiff's (Patent Owner's) Disclosure of Initial Infringement Contentions (Infringement Contentions), attached as Exhibit F, with respect to the Flick '278 patent from the litigation in the case of Omega Patents, LLC (the '278 Patent Owner) v. CalAmp Corp. (the Requester) in the Middle District of Florida, Case No. 6:13-cv-1950-Orl-31DAB (the CalAmp litigation).

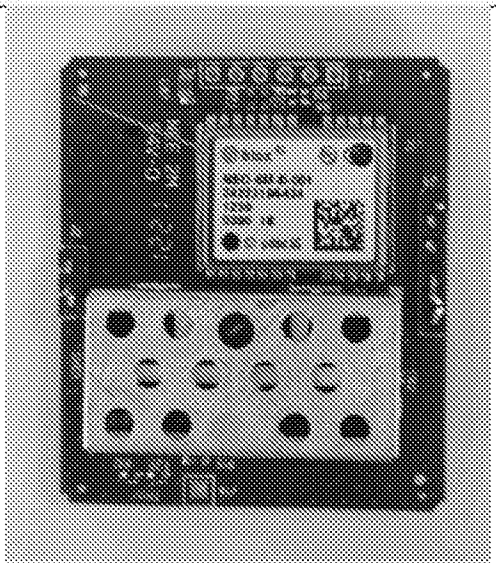
In particular, Patent Owner's Infringement Contention for claim 1, starting on page A-45, states: (partially reproduced below) "*said multi-vehicle compatible controller to be coupled to the vehicle data bus for communication thereover with at least one vehicle device using at least one corresponding vehicle device code from among a plurality thereof for different vehicles; and*", cites to: "**On initial installation, the multi-vehicle compatible controller**

generates a sequence of device codes to determine compatibility with different vehicles, including CAN 11 Bit 7DF message, CAN 29 Bit 18DB33F1 message, J1850 VPW 68 6A F1 message, J1850 PWM message, K-Line messages and J1850 VPW 6C 10 F1 message." (See e.g., Infringement Contentions, page A-50). Thus, implementing the updated version of the bus-discovery procedure utilized by vehicle standardized networks as originally detailed in the SAE HS-3000 Manual, published in 1994 and cited to in the accompanying claim charts, is the basis under which Patent Owner asserted infringement of this limitation of the patent. Specifically, the requirement in the standard to transmit a sequence of device codes to determine which of a number of different bus types is being used within a particular vehicle is asserted to satisfy the claim limitation.

Likewise, with respect to the claim 1 limitation "*a downloading interface for permitting downloading of enabling data related to the at least one corresponding vehicle device code for use by said multi-vehicle compatible controller",* Patent Owner states, starting on page A-51 (reproduced below): *"The LMU-3000 includes a serial interface that can be used for downloading of enabling data. The LMU-3000 is also advertised as having automatic, over the air unit configuration on power up, as well as over the air* ***firmware download****. CalAmp provides its users the ability to update the VBUS VehicleDB Type I File and/or the firmware and Vehicle DB Type II Ext File." (emphasis added).* Accordingly, Patent Owner acknowledges that a standard firmware update would satisfy this claim limitation. Thus, as described in detail in the accompanying claim charts, the cited references, including Suman '537 patent and the Spaur '074 patent clearly teach the downloading interface limitation of the claim.

Partially reproduced below is Patent Owner's Infringement Contentions with respect to claim 1 as provided in the CalAmp litigation (the entirety of which is attached as Exhibit F):

U.S. PATENT 8,032,278	
OMEGA PATENT CLAIMS	LMU-3000/LMU-3030[2]
1. A multi-vehicle compatible tracking unit for a vehicle comprising a vehicle data bus extending throughout the vehicle, the multi-vehicle compatible tracking unit comprising:	The LMU-3000 is a multi-vehicle compatible tracking unit for a vehicle comprising a vehicle data bus extending throughout the vehicle.
a vehicle position determining device;	The LMU-3000 includes a vehicle position determining device. The LMU-3000 includes a GPS module.

U.S. PATENT 8,032,278	
OMEGA PATENT CLAIMS	LMU-3000/LMU-3030[3]
	
a wireless communications device;	The LMU-3000 includes a wireless communications device. The LMU-3000 includes a cellular module that allows transmission to and reception from a central station.
a multi-vehicle compatible controller for cooperating with said vehicle position determining device and said wireless communications device to send vehicle position information;	The LMU-3000 includes a multi-vehicle compatible controller for cooperating with said vehicle position determining device and said wireless communications device to send vehicle position information.

U.S. PATENT 8,032,278	
OMEGA PATENT CLAIMS	LMU-3000/LMU-3030[3]
	
said multi-vehicle compatible controller to be coupled to the vehicle data bus for communication therewith at least one vehicle device using at least one corresponding vehicle device code from among a plurality thereof for	The LMU-3000 includes a said multi-vehicle compatible controller to be coupled to the vehicle data bus for communication therewith at least one vehicle device using at least one corresponding vehicle device code from among a plurality thereof for different vehicles.

U.S. PATENT 8,032,278	
OMEGA PATENT CLAIMS	LMU-3000/LMU-3030[3]
different vehicles; and	The at least one vehicle device is the vehicle's ECM. On initial installation, the multi-vehicle compatible controller generates a sequence of device codes to determine compatibility with different vehicles, including CAN 11 Bit 7DF message, CAN 29 Bit 18DB33F1 message, J1850 VPW 68 6A F1 message, J1850 PWM message, K-Line messages and J1850 VPW 6C 10 F1 message.

a downloading interface for permitting downloading of enabling data related to the at least one corresponding vehicle device code for use by said multi-vehicle compatible controller.	The LMU-3000 includes a downloading interface for permitting downloading of enabling data related to the at least one corresponding vehicle device code for use by said multi-vehicle compatible controller.

U.S. PATENT 8,032,278	
OMEGA PATENT CLAIMS	LMU-3000/LMU-3030[5]
	The LMU-3000 includes a serial interface that can be used for downloading of enabling data. The LMU-3000 is also advertised as having automatic, over the air unit configuration on power up, as well as over the air firmware download. Calamp provides its users the ability to update the VBUS VehicleDB Type I File and/or the firmware and Vehicle DB Type II Ext File.

IX. PROPOSED REJECTIONS AND DETAILED EXPLANATIONS OF THE PERTINENCY AND MANNER OF APPLYING THE CITED PRIOR ART TO EVERY CLAIM FOR WHICH REEXAMINATION IS REQUESTED

The above-referenced prior art raises substantial new questions of patentability with respect to claims 1 – 22 of the Flick '278 patent. Below, Requester sets out proposed rejections that provide a detailed explanation of the pertinency and manner of applying these patents and to each of these claims. Consistent with Patent Office practice, this detailed explanation gives "each term in the claim its broadest reasonable construction consistent with the specification," unless otherwise indicated. *See* MPEP §§ 2111, 2280; *In re Morris,* 127 F.3d 1048, 1054-55 (Fed. Cir. 1997).

SUMMARY OF PROPOSED REJECTIONS	SUPPORTING CLAIM CHART
Claims 1 – 22 are rejected under 35 U.S.C. § 102 as being anticipated by the Beckert '363 patent.	**Exhibit B**

SUMMARY OF PROPOSED REJECTIONS	**SUPPORTING CLAIM CHART**
Claims 1 – 22 are rejected under 35 U.S.C. § 103 as unpatentable over the Beckert '363 patent in view of the SAE HS-3000 Manual	**Exhibit B**
Claims 1 – 22 are rejected under 35 U.S.C. § 102 as anticipated by the Suman '537 patent.	**Exhibit C**
Claims 1 – 22 are rejected under 35 U.S.C. § 103 as unpatentable over the Suman '537 patent in view of the SAE HS-3000 Manual.	**Exhibit C**
Claims 1 – 22 are rejected under 35 U.S.C. § 103 as unpatentable over the Spaur '074 patent in view of the SAE HS-3000 Manual	**Exhibit D**
Claims 1 – 22 are rejected under 35 U.S.C. § 102 as being anticipated by the Chou '499 patent.	**Exhibit E**

A. Claims 1 – 22 are Anticipated by the Beckert '363 Patent

Each and every limitation of claims 1 – 22 is disclosed by the Beckert '363 patent as shown in detail in the claim chart attached as Exhibit B. Accordingly, the following proposed rejection is appropriate.

1. Proposed rejection

Claims 1 – 22 are rejected under 35 U.S.C. § 102(a), (b), and 35 U.S.C. § 102(e) as being unpatentable over the Beckert '363 patent.

With regard to claim 1, as set out in detail in Exhibit B, the Beckert '363 patent teaches:

- *a multi vehicle compatible tracking unit for a vehicle comprising a vehicle data bus extending throughout the vehicle.* See e.g., col. 2, lines 10-17, col. 1, lines 32-28.
- *a vehicle position determining device*. See e.g., col. 6, lines 50-53, and FIG. 3.
- *a wireless communication device*. See e.g., wireless Internet link 76, col. 5, lines 9-12 and FIGS. 1 and 3.
- *a multi-vehicle compatible controller for cooperating with said vehicle position determining device and said wireless communications device to send vehicle position information.* See e.g., col. 5, lines 9-12 and disclosure from Beckert et al. '164 patent col. 12, lines 25-30, which is incorporated by reference at col. 7, lines 44-51.
- *said multi-vehicle compatible controller to be coupled to the vehicle data bus for communication thereover with at least one vehicle device using at least one corresponding vehicle device code from among a plurality thereof for different vehicles.* See col. 6, lines 63 to col. 7, line 1, and disclosure from Beckert et al. '164 patent, col. 9, lines 29-31 which is incorporated by reference at col 7, lines 44-51, with at least one vehicle device using at least one corresponding vehicle device code from among a plurality thereof for different vehicles. The Beckert et al. '363 patent states that "Most late model vehicles are also constructed with a diagnostic system that analyzes performance of the vehicle's engine, transmission and fuel system, and other components (1006 or later for OBD II,

1993 or later for OBD I)." (Beckert '363 patent, col. 1, lines 35-26). The SAE standards, including the SAE HS-3000 Manual, provide the implementation details for communicating with vehicle devices using the vehicle bus via an OBD II diagnostic connector. The SAE HS-3000 Manual discloses using at least one corresponding vehicle device code from among a plurality thereof for different vehicles. In particular, in order to allow a controller to be compatible with various busses that are used on a plurality of different vehicles, the controller uses a bus discovery procedure that is described on page 37, section 6.5.2 INITIALIZATION DETAILS of SAE J1978 that involves sending different device codes or "messages", in the form of signals referred to as a "mode 1 PID 0 request message" in a manner appropriate for each of the SAE J1850 41.6 Kbps PWM bus, SAE J1850 10.4 Kbps VPW, and ISO 9141-2. Accordingly, it is inherent that the teachings, including the bus discovery protocol, described in SAE HS-3000 Manual form part of the system described in the Beckert et al. '363 patent as the Beckert et al. 363 patent uses the OBD II interface to communicate with vehicle device.

- *a downloading interface for permitting downloading of enabling data related to the at least one corresponding vehicle device code for use by said multi-vehicle compatible controller*. See e.g., col. 5, lines 1-12, and disclosure from Beckert et al. '164 patent, col. 12, lines 5-11, which is incorporated by reference at col. 7, lines 44-51. See also e.g., col. 2, lines 15-17, col. 5, lines 36-41, col. 7, lines 20-33, and disclosure from Beckert et al. '164 patent, col. 12, lines 12-40, which is incorporate by reference at col. 7, lines 44-51.

With regard to claim 13, as set out above with respect to claim 1 and in detail in Exhibit B, the Beckert '363 patent teaches all limitations of claim 13. Additionally, with respect to the limitation *"the wired signal downloading interface comprising a connector for temporary connection to a downloading device",* see e.g., Beckert '164 patent, col. 12, lines 5-11, which is incorporated by reference at col. 7, lines 44-51.

With regard to claim 18, as set out above with respect to claim 1 and in detail in Exhibit B, the Beckert '363 patent teaches all limitations of claim 18. Additionally, with respect to the limitation *"said wireless signal downloading interface comprises a wireless receiver for temporary connection to a downloading device",* see e.g., col. 7, lines 10-13.

With regard to claims 2-12, 14-17, and 19-22, see Proposed Rejections submitted in 'Flick 587 Reexam, Requester's Reply in Ex Parte Reexamination of U.S. Patent 8,032,278 filed on March 8, 2016, starting on page 36.

B. Claims 1 – 22 are Unpatentable over the Beckert '363 Patent in view of the SAE HS-3000 Manual

Each and every limitation of claims 1 – 22 is disclosed by the Beckert '363 patent in view of the SAE HS-3000 Manual as shown in detail in the claim chart attached as Exhibit B. Accordingly, the following proposed rejection is appropriate.

1. Proposed rejection

Claims 1 – 22 are rejected under 35 U.S.C. § 103(a) as being unpatentable over the Beckert '363 patent in view of the SAE HS-3000 Manual.

With regard to claim 1, 13 and 18, as set out in detail in Exhibit B, and described in detail above, the Beckert '363 Patent in view of the SAE HS-3000 Manual teaches all of the claim limitations. The Beckert et al. '363 patent states that "[M]ost late model vehicles are also

constructed with a diagnostic system that analyzes performance of the vehicle's engine, transmission and fuel system, and other components (1006 or later for OBD II, 1993 or later for OBD I)." (Beckert '363 patent, col. 1, lines 35-26). The SAE standards, including the SAE HS-3000 Manual, were published for the specific purpose of teaching people of ordinary skill in the art how to communicate with vehicle devices using the vehicle bus via an OBD II diagnostic connector. Accordingly, it would have been obvious to utilize the teachings described in the SAE HS-3000 Manual because the Beckert '363 patent expressly directs communicating with the OBD system built into the vehicle using the OBD interface

With regard to claims 2-12, 14-17, and 19-22, see Proposed Rejections submitted in 'Flick 587 Reexam, Requester's Reply in Ex Parte Reexamination of U.S. Patent 8,032,278 filed on March 8, 2016, starting on page 36.

C. Claims 1 – 22 are Anticipated by the Suman '537 Patent

Each and every limitation of claims 1 – 22 is disclosed by the Suman '537 patent as shown in detail in the claim chart attached as Exhibit C. Accordingly, the following proposed rejection is appropriate.

1. Proposed rejection

Claims 1 – 22 are rejected under 35 U.S.C. § 102(a), (b), and 35 U.S.C. § 102(e) as being unpatentable over the Suman '537 patent.

With regard to claim 1, as set out in detail in Exhibit C, the Suman '537 patent teaches:

- *a multi vehicle compatible tracking unit for a vehicle comprising a vehicle data bus extending throughout the vehicle.* See, e.g., col. 8, line 58-col. 9, line 16; Figs. 3, 5, 44, 45; see also col. 36, line 53-col. 37, line 17.

- *a vehicle position determining device.* See e.g., GPS or DGPS illustrated in Figs. 3, 5.
- *a wireless communication device.* See e.g., transmitter (see e.g., Figs. 1a, 1b, 2; col. 3, lines 1-3; col. 7, lines 26-30) and receiver (see e.g., Figs. 1b, 3, 44; col. 3, lines 1-3; col. 7, lines 31-34) for wirelessly receiving signals from the transmitter.
- *a multi-vehicle compatible controller for cooperating with said vehicle position determining device and said wireless communications device to send vehicle position information.* See, e.g., col. 2 lines 3-10; see also col. 6, lines 19-49; col. 11, lines 8-13; col. 12, lines 7-13; col. 14, lines 11-21.
- *said multi-vehicle compatible controller to be coupled to the vehicle data bus for communication thereover with at least one vehicle device using at least one corresponding vehicle device code from among a plurality thereof for different vehicles. The Suman '537 patent discloses that the controller is coupled to the vehicle data bus for communication thereover with at least one vehicle device, using a corresponding vehicle device code, from among a plurality of codes for different vehicles.* See, e.g., Figs. 3, 5, 44, 45, 47; see also col. 43, lines 27-47 (including sensors and controls for doors, windows, ignition, speedometer, RPMs, fuel level, turn signals, lights, gears, temperature, oil pressure, defroster, headlights, etc.). The Suman '537 patent, col. 37, lines 15 – 17: "The multiplexing scheme is set forth in SAE standard J1850 and is universally used in the automotive industry." It is inherently disclosed that the J1850 bus described in the Suman '537 patent is included in a variety of different makes

and models of vehicles per the federally mandated standard. Furthermore, as described in detail below, a J1850 bus implemented according to the SAE standards provides for communicating with at least one vehicle device using at least one corresponding vehicle device code from among a plurality thereof for different vehicles, including at least one "SAE" defined device codes and up to seven "Reserved Manufacturer" defined device codes for a particular vehicle device, as described in detail in Exhibit B.

- *a downloading interface for permitting downloading of enabling data related to the at least one corresponding vehicle device code for use by said multi-vehicle compatible controller*. See e.g., col. 36, lines 31-52.

With regard to claim 13, as set out above with respect to claim 1 and in detail in Exhibit C, the Suman '537 patent teaches all limitations of claim 13. Additionally, a cellular telephone transceiver constitutes a downloading interface and it is inherently discloses that cellular connections are temporary connections.

With regard to claim 18, as set out above with respect to claim 1 and in detail in Exhibit C, the Suman '537 patent teaches all limitations of claim 18. Additionally, a cellular telephone transceiver constitutes a wireless downloading interface and it is inherently discloses that cellular connections are temporary connections.

With regard to claims 2-12, 14-17, and 19-22, see Proposed Rejections submitted in 'Flick 587 Reexam, Ex Parte Request by Third Party filed on September 14, 2015, starting on page 21.

D. Claims 1 – 22 are Unpatentable over the Suman '537 Patent in view of the SAE HS-3000 Manual

Each and every limitation of claims 1 – 22 is disclosed by the Suman '537 patent in view of the SAE HS-3000 Manual as shown in detail in the claim chart attached as Exhibit B. Accordingly, the following proposed rejection is appropriate.

1. Proposed rejection

Claims 1 – 22 are rejected under 35 U.S.C. § 103(a) as being unpatentable over the Suman '537 patent in view of the SAE HS-3000 Manual.

With regard to claim 1, 13 and 18, as set out in detail in Exhibit C, and described in detail above, the Suman '537 Patent in view of the SAE HS-3000 Manual teaches all of the claim limitations. Furthermore, the Suman '537 patent, col. 37, lines 15 – 17: "The multiplexing scheme is set forth in SAE standard J1850 and is universally used in the automotive industry." Accordingly, at the time of the filing and at the time of the earliest priority date of the '278 patent, a person of ordinary skill the art would have considered it obvious to implement the J1850 bus according to the SAE standards since the standards were specifically published to provide the implementation details of the J1850 bus, as described by the SAE HS-3000 Manual.

With regard to claims 2-12, 14-17, and 19-22, see Proposed Rejections submitted in 'Flick 587 Reexam, Ex Parte Request by Third Party filed on September 14, 2015, starting on page 21.

E. Claims 1 – 22 are Unpatentable over the Spaur '074 Patent in view of the SAE HS-3000 Manual

Each and every limitation of claims 1 – 22 is disclosed by the Spaur '074 patent in view of the SAE HS-3000 Manual as shown in detail in the claim chart attached as Exhibit C. Accordingly, the following proposed rejection is appropriate.

1. Proposed rejection

Claims 1 – 22 are rejected under 35 U.S.C. § 103(a) as being unpatentable over the Spaur '074 patent in view of the SAE HS-3000 Manual.

With regard to claim 1, as set out in detail in Exhibit D, the Spaur '074 patent teaches:

- *a multi vehicle compatible tracking unit for a vehicle comprising a vehicle data bus extending throughout the vehicle*. See e.g., col. 6, lines 31-50.
- *a vehicle position determining device*. See e.g., GPS col. 14, lines 4-9.
- *a wireless communication device*. See e.g., col. 2, lines 41-50, col. 6, lines 1-16, and col. 7, lines 40-54.
- *a multi-vehicle compatible controller for cooperating with said vehicle position determining device and said wireless communications device to send vehicle position information*. See e.g., col. 14, lines 4-21.
- *said multi-vehicle compatible controller to be coupled to the vehicle data bus for communication thereover with at least one vehicle device using at least one corresponding vehicle device code from among a plurality thereof for different vehicles*. The Spaur '074 patent teaches communicating with vehicle devices via a "standardized network…commonly used in a number of makes and models of vehicles" (Spaur '074 patent, col. 10, lines 18-21). The SAE standards,

including the SAE HS-3000 Manual, were published for the specific purpose of teaching people of ordinary skill in the art how to communicate with vehicle devices via the "standardized networks". Accordingly, it would have been obvious to utilize the teachings described in SAE HS-3000 Manual to provide multi-vehicle compatibility because the Spaur '074 patent expressly directs using standards, such as the SAE standards, for the purpose for which the standards were created. The SAE HS-3000 Manual provides details for hundreds of different device codes for different vehicle devices, which include SAE defined device codes and manufacturer defined device codes. See e.g., SAE J2178 which starts on page 211 of the SAE HS-3000 Manual.

- a downloading interface for permitting downloading of enabling data related to the at least one corresponding vehicle device code for use by said multi-vehicle compatible controller. See e.g., col. 2, lines 37 – 46, col. 4, line 64 – col. 5, line 5, and col. 4, lines 38-45.

With regard to claim 13, as set out above with respect to claim 1 and in detail in Exhibit D, the Spaur '074 patent in view of the SAE HS-3000 Manual teaches all limitations of claim 13. Additionally, a cellular telephone transceiver constitutes a downloading interface and it is inherently discloses that cellular connections are temporary connections.

With regard to claim 18, as set out above with respect to claim 1 and in detail in Exhibit D, the Spaur '074 patent in view of the SAE HS-3000 Manual teaches all limitations of claim 18. Additionally, a cellular telephone transceiver constitutes a wireless downloading interface and it is inherently discloses that cellular connections are temporary connections.

With regard to claims 2-12, 14-17, and 19-22, see Proposed Rejections submitted in 'Flick 587 Reexam, Ex Parte Request by Third Party filed on September 14, 2015, starting on page 27.

F. Claims 1 – 22 are Anticipated by the Chou '499 Patent

Each and every limitation of claims 1 – 22 is disclosed by the Chou '499 patent as shown in detail in the claim chart attached as Exhibit E. Accordingly, the following proposed rejection is appropriate.

1. Proposed rejection

Claims 1 – 22 are rejected under 35 U.S.C. § 102(a), (b), and 35 U.S.C. § 102(e) as being unpatentable over the Chou '499 patent.

With regard to claim 1, as set out in detail in Exhibit E, the Chou '499 patent teaches:

- *a multi vehicle compatible tracking unit for a vehicle comprising a vehicle data bus extending throughout the vehicle*. See e.g., Fig. 3, and col. 3, lines 33-46.
- *a vehicle position determining device*. See e.g., col. 3, lines 54-56 disclosing GPS 317 in FIG. 1.
- *a wireless communication device*. See e.g., col. 2, lines 30-37.
- *a multi-vehicle compatible controller for cooperating with said vehicle position determining device and said wireless communications device to send vehicle position information.* See e.g., col. 3, lines 54-56 and col. 2, lines 30-37.
- *said multi-vehicle compatible controller to be coupled to the vehicle data bus for communication thereover with at least one vehicle device using at least one corresponding vehicle device code from among a plurality thereof for different*

vehicles. See e.g., FIG. 3 and col. 4, lines 20-38, disclosing that "fault code specifications and protocols of the vehicle may be Original Equipment Manufacturer (OEM) and model dependent....A listing of such codes may be found in the publication of the Society of Automotive Engineers, 'SAE SAE On-Board Diagnostics for Light and Medium Duty Vehicles Standards Manual'. The diagnostic data service 120A accepts request for vehicle parametric data and retrieves the data using the vehicle bus adapter." (emphasis added). The "SAE On-Board Diagnostics for Light and Medium Duty Vehicles Standards Manual" is the SAE HS-3000 Manual, a copy of which is attached as Exhibit G and Exhibit H. The SAE HS-3000 Manual discloses that translating messages into the language of the vehicle data bus involves selecting between an SAE standard and/or one of seven manufacturer specific version of the device code. See e.g., SAE HS-3000 Manual, page 213, Section 4 of SAE J2178/2. Furthermore, the SAE HS-3000 Manual discloses a bus discovery process involving sending different versions of the mode 1 PID 0 device code. See e.g., SAE HS-3000 Manual, page 37, section 6.5.2 INITIALIZATION DETAILS of SAE J1978.

- *a downloading interface for permitting downloading of enabling data related to the at least one corresponding vehicle device code for use by said multi-vehicle compatible controller*. See e.g., Fig. 2, item 320, col. 3, lines 15-32, and col. 10, lines 5-11 disclosing "vehicle parameter update/change".

With regard to claim 2, as set out in detail in Exhibit E, the Chou '499 patent teaches wherein said downloading interface comprises a wired signal downloading interface. See e.g., Fig. 3, item 102 and col. 3, lines 17-21.

With regard to claim 3, as set out in detail in Exhibit E, the Chou '499 patent teaches said wired signal downloading interface comprises a connector for temporary connection to a downloading device. See e.g., Fig. 3, item 102 cell phone attached to network interface 107 and col. 3, lines 17-21.

With regard to claim 4, as set out in detail in Exhibit E, the Chou '499 patent teaches wherein said downloading interface comprises a wireless signal downloading interface. See e.g., Chou Fig. 3, network interface 107 and cell phone 102 together forming the downloading interface. See also e.g., col. 3, lines 15-32.

With regard to claim 5, as set out in detail in Exhibit E, the Chou '499 patent teaches wherein said wireless signal downloading interface comprises a wireless receiver for temporary connection to a downloading device. See e.g., wireless signal downloading interface (e.g., network interface 107 and cell phone 102) comprises a wireless receiver (e.g., removable cell phone 102) for temporary connection to a downloading device. See e.g., col. 5, lines 1-5.

With regard to claim 6, as set out in detail in Exhibit E, the Chou '499 patent teaches wherein the corresponding at least one vehicle code is for reading from the at least one vehicle device. See e.g., col. 9, lines 35-48.

With regard to claim 7, as set out in detail in Exhibit E, the Chou '499 patent teaches wherein the corresponding at least one vehicle code is for writing to the at least one vehicle device. See e.g., col. 9, lines 35-48.

With regard to claim 8, as set out in detail in Exhibit E, the Chou '499 patent teaches wherein said downloading interface is also for permitting downloading of at least one

programming instruction for said multi-vehicle compatible controller. See e.g., col. 10, lines 5-11.

With regard to claim 9, as set out in detail in Exhibit E, the Chou '499 patent teaches a remote transmitter; and wherein said multi-vehicle compatible controller also performs at least one vehicle remote control function responsive to said remote transmitter. See e.g., cell phone 102, col. 4, lines 39-42 and col. 10, lines 5-10.

With regard to claim 10, as set out in detail in Exhibit E, the Chou '499 patent teaches wherein the at least one vehicle remote control function comprises at least one of a vehicle security function, a remote keyless entry function, and a remote engine starting function. See e.g., col. 10, lines 5-11.

With regard to claim 11, as set out in detail in Exhibit E, the Chou '499 patent teaches wherein said wireless position determining device comprises a Global Positioning System (GPS) receiver. See e.g. col. 3, lines 54-56.

With regard to claim 12, as set out in detail in Exhibit E, the Chou '499 patent teaches a housing containing said vehicle position determining device, said wireless communications device, said multi-vehicle compatible controller, and said downloading interface. See e.g. client computer device 101 is stored in a housing in FIG. 1.

With regard to claim 13, as set out above with respect to claim 1 and in detail in Exhibit E, the Chou '499 patent teaches all limitations of claim 13. Additionally, with respect to the limitation *"the wired signal downloading interface comprising a connector for temporary connection to a downloading device".* See e.g., col. 3, lines 15-32.

With regard to claim 14, as set out in detail in Exhibit E, the Chou '499 patent teaches wherein the corresponding at least one vehicle code is for reading from the at least one vehicle device. See e.g., col. 9, lines 35-48.

With regard to claim 15, as set out in detail in Exhibit E, the Chou '499 patent teaches wherein the corresponding at least one vehicle code is for writing to the at least one vehicle device. See e.g., col. 9, lines 35-48.

With regard to claim 16, as set out in detail in Exhibit E, the Chou '499 patent teaches wherein said downloading interface is also for permitting downloading of at least one programming instruction for said multi-vehicle compatible controller. See e.g., col. 10, lines 5-11.

With regard to claim 17, as set out in detail in Exhibit E, the Chou '499 patent teaches a remote transmitter; and wherein said multi-vehicle compatible controller also performs at least one vehicle remote control function responsive to said remote transmitter. See e.g. cell phone 102, col. 4, lines 39-42 and col. 10, lines 5-10.

With regard to claim 18, as set out above with respect to claim 1 and in detail in Exhibit E, the Chou '499 teaches all limitations of claim 18. Additionally, with respect to the limitation *"said wireless signal downloading interface comprises a wireless receiver for temporary connection to a downloading device".* See e.g., col. 3, lines 15-32.

With regard to claim 19, as set out in detail in Exhibit E, the Chou '499 patent teaches wherein the corresponding at least one vehicle code is for reading from the at least one vehicle device. See e.g., col. 9, lines 35-48.

With regard to claim 20, as set out in detail in Exhibit E, the Chou '499 patent teaches wherein the corresponding at least one vehicle code is for writing to the at least one vehicle device. See e.g., col. 9, lines 35-48.

With regard to claim 21, as set out in detail in Exhibit E, the Chou '499 patent teaches wherein said downloading interface is also for permitting downloading of at least one programming instruction for said multi-vehicle compatible controller. See e.g., col. 10, lines 5-11.

With regard to claim 22, as set out in detail in Exhibit E, the Chou '499 patent teaches a remote transmitter; and wherein said multi-vehicle compatible controller also performs at least one vehicle remote control function responsive to said remote transmitter. See e.g. cell phone 102, col. 4, lines 39-42 and col. 10, lines 5-10.

X. CONCLUSION

Each of the Beckert '363 patent, Spaur '074 patent, Suman '537 patent, Chou '499 patent, and the SAE HS-3000 Manual raise substantial new questions of patentability with respect to the Flick '278 patent. As shown in detail above, and in the attached claim charts, the elements of each claim were disclosed in the prior art. Based on the teachings of the prior art previously described, claims 1 – 22 of the Flick '278 patent fail to satisfy the requirements for patentability set out in 35 U.S.C. § 102, 35 U.S.C. § 103, and are, therefore, unpatentable. For these reasons, and those more fully stated above and in the attached claim charts, it is respectfully requested that this Request for Ex Parte Reexamination be granted and that all claims of the Flick '278 patent be finally rejected.

Dated: October 28, 2016

Respectfully submitted,

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CERTIFICATE OF SERVICE

Certificate of Service in compliance with 37 C.F.R. § 1.510(b)(5)

Pursuant to 37 C.F.R. § 1.510(b)(5) and 37 C.F.R. § 1.33(c), I hereby certify that on October 28, 2016, a complete copy of this *ex parte* reexamination request, including the accompanying transmittal, FORM PTO/SB/42, and all attachments and exhibits, are being served via First Class U.S. Mail upon Applicant at the correspondence address as shown in PAIR:

Christopher F. Regan
Allen, Dyer, Doppelt, Milbrath & Gilchrist, P.A.
P.O. Box 3791
Orlando FL 32802-3791

In accordance with 37 C.F.R. § 1.510(b)(5), on October 28, 2016.

Respectfully submitted,

By /David H. Kaveh/

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Electronic Patent Application Fee Transmittal

Application Number:	
Filing Date:	
Title of Invention:	Vehicle Tracking Unit with Downloadable Codes and Associated Methods
First Named Inventor/Applicant Name:	Kenneth E. Flick
Filer:	David Kaveh/Katrina Lee
Attorney Docket Number:	C13-03896.RE2

Filed as Large Entity

Filing Fees for ex parte reexam

Description	Fee Code	Quantity	Amount	Sub-Total in USD($)
Basic Filing:				
REQUEST FOR EX PARTE REEXAMINATION	1812	1	12000	12000
Pages:				
Claims:				
Miscellaneous-Filing:				
Petition:				
Patent-Appeals-and-Interference:				
Post-Allowance-and-Post-Issuance:				

Description	Fee Code	Quantity	Amount	Sub-Total in USD($)
Extension-of-Time:				
Miscellaneous:				
			Total in USD ($)	**12000**

Electronic Acknowledgement Receipt

EFS ID:	27358279
Application Number:	90013851
International Application Number:	
Confirmation Number:	8717
Title of Invention:	Vehicle Tracking Unit with Downloadable Codes and Associated Methods
First Named Inventor/Applicant Name:	Kenneth E. Flick
Customer Number:	71897
Filer:	David Kaveh/Katrina Lee
Filer Authorized By:	David Kaveh
Attorney Docket Number:	C13-03896.RE2
Receipt Date:	28-OCT-2016
Filing Date:	
Time Stamp:	19:38:08
Application Type:	Reexam (Third Party)

Payment information:

Submitted with Payment	yes
Payment Type	CARD
Payment was successfully received in RAM	$12000
RAM confirmation Number	103116INTEFSW19390100
Deposit Account	504407
Authorized User	Katrina Lee

The Director of the USPTO is hereby authorized to charge indicated fees and credit any overpayment as follows:

37 CFR 1.16 (National application filing, search, and examination fees)

37 CFR 1.17 (Patent application and reexamination processing fees)

37 CFR 1.19 (Document supply fees)

37 CFR 1.20 (Post Issuance fees)

37 CFR 1.21 (Miscellaneous fees and charges)

File Listing:

Document Number	Document Description	File Name	File Size(Bytes)/ Message Digest	Multi Part /.zip	Pages (if appl.)
1	Transmittal of New Application	03896re2request.pdf	119615 2f0ee900330a60ad45bfe51fb2464d55f1f090c2	no	2
Warnings:					
Information:					
2	Reexam - Info Disclosure Statement Filed by 3rd Party	03896re2ids1449.pdf	307999 9fcfcc559a8553c09c540b5edb4a81dbed3c67fd	no	2
Warnings:					
Information:					
3	Reexam - Info Disclosure Statement Filed by 3rd Party	03896re2Spaur5732074.pdf	4134842 660b750180d04c038863ca67fbff913ddb3b196b	no	15
Warnings:					
Information:					
4	Reexam - Info Disclosure Statement Filed by 3rd Party	03896re2Beckert5794164.pdf	24241737 54adf2aa05e0f339467e20ec69d2b8ffd304edcd	no	17
Warnings:					
Information:					
5	Reexam - Info Disclosure Statement Filed by 3rd Party	03896re2Beckert6009363.pdf	3930924 295e1ea5af6eaf2c31aad089b95024988ad928da	no	20
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Information:					
6	Reexam - Info Disclosure Statement Filed by 3rd Party	03896re2Suman6028537.pdf	10614233 edca37d3ffc8fc35058304fff3dc4fb66f9dd6a9	no	96
Warnings:					
Information:					

7	Reexam - Info Disclosure Statement Filed by 3rd Party	03896re2Chou6330499.pdf	16613403 7792beaa86686b070d2a8aa65146ba465595e948	no	12
Warnings:					
Information:					
8	Copy of patent for which reexamination is requested	03896re2ExhibitA.pdf	6434169 70265fe598a088a04ed02002179bc95ed78ac40c	no	30
Warnings:					
Information:					
9	Reexam - Affidavit/Decl/Exhibit Filed by 3rd Party	03896re2ExhibitC.pdf	519183 78c5f3c3c567397ddc7e1d0fd538e9367169e46a	no	23
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10	Reexam - Affidavit/Decl/Exhibit Filed by 3rd Party	03896re2ExhibitD.pdf	886046 95e30e00f69ad2c18c6f8f40b8d036d19d086138	no	28
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Information:					
11	Reexam - Affidavit/Decl/Exhibit Filed by 3rd Party	03896re2ExhibitF.pdf	998625 7e01e01c02c0495459db6c2daa142d21ea11c1bb	no	73
Warnings:					
Information:					
12	Reexam - Affidavit/Decl/Exhibit Filed by 3rd Party	03896re2ExhibitG.pdf	25979487 50921be702a4735d95a01690d9e62828d2520d3a	no	260
Warnings:					
Information:					
13	Reexam - Affidavit/Decl/Exhibit Filed by 3rd Party	03896re2ExhibitH.pdf	17272718 9716e4838f319d1eff5803bea7265c7174a5258e	no	173
Warnings:					
Information:					

14	Reexam - Affidavit/Decl/Exhibit Filed by 3rd Party	03896re2ExhibitB.pdf	645478 b3fd3d23a6560cc9ac531799f3799288733a2a90	no	41
Warnings:					
Information:					
15	Reexam - Affidavit/Decl/Exhibit Filed by 3rd Party	03896re2ExhibitE.pdf	338148 5e97348961c3acac3891aff33a197720bd2cca39	no	19
Warnings:					
Information:					
16		03896re2requestforreexamination.pdf	2016608 e3c4f0edb95e538ce99303da46019f0ba88ba271	yes	59

	Multipart Description/PDF files in .zip description		
	Document Description	**Start**	**End**
	Receipt of Original Ex Parte Reexam Request	1	58
	Reexam Certificate of Service	59	59

Warnings:					
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17	Fee Worksheet (SB06)	fee-info.pdf	30002 cbb7a5a250f93d4dafc95a433aba059bca0daac5	no	2
Warnings:					
Information:					
			Total Files Size (in bytes):	115083217	

This Acknowledgement Receipt evidences receipt on the noted date by the USPTO of the indicated documents, characterized by the applicant, and including page counts, where applicable. It serves as evidence of receipt similar to a Post Card, as described in MPEP 503.

New Applications Under 35 U.S.C. 111

If a new application is being filed and the application includes the necessary components for a filing date (see 37 CFR 1.53(b)-(d) and MPEP 506), a Filing Receipt (37 CFR 1.54) will be issued in due course and the date shown on this Acknowledgement Receipt will establish the filing date of the application.

National Stage of an International Application under 35 U.S.C. 371

If a timely submission to enter the national stage of an international application is compliant with the conditions of 35 U.S.C. 371 and other applicable requirements a Form PCT/DO/EO/903 indicating acceptance of the application as a national stage submission under 35 U.S.C. 371 will be issued in addition to the Filing Receipt, in due course.

New International Application Filed with the USPTO as a Receiving Office

If a new international application is being filed and the international application includes the necessary components for an international filing date (see PCT Article 11 and MPEP 1810), a Notification of the International Application Number and of the International Filing Date (Form PCT/RO/105) will be issued in due course, subject to prescriptions concerning national security, and the date shown on this Acknowledgement Receipt will establish the international filing date of the application.

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BIB DATA SHEET

CONFIRMATION NO. 8717

SERIAL NUMBER	FILING or 371(c) DATE RULE	CLASS	GROUP ART UNIT	ATTORNEY DOCKET NO.
90/013,851	10/28/2016	701	3993	C13-03896.RE2

APPLICANTS

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KPPB LLP, ANAHEIM, CA

**** CONTINUING DATA ***************************

This application is a REX of 11/773,272 07/03/2007 PAT 8032278
which is a CIP of 11/076,259 03/09/2005 PAT 7720597
which is a CON of 10/383,496 03/07/2003 PAT 7149623
which is a CON of 09/859,972 05/17/2001 PAT 6606561
which claims benefit of 60/264,811 01/29/2001
and claims benefit of 60/258,005 12/22/2000
and claims benefit of 60/251,552 12/06/2000
and claims benefit of 60/252,125 11/20/2000
and claims benefit of 60/236,890 09/29/2000
and claims benefit of 60/246,463 11/07/2000
and claims benefit of 60/222,777 08/03/2000
and claims benefit of 60/205,178 05/17/2000

**** FOREIGN APPLICATIONS ***************************

**** IF REQUIRED, FOREIGN FILING LICENSE GRANTED ****

Foreign Priority claimed ☐ Yes ☐ No 35 USC 119(a-d) conditions met ☐ Yes ☐ No Verified and Acknowledged _____ Examiner's Signature	☐ Met after Allowance Initials	STATE OR COUNTRY	SHEETS DRAWINGS	TOTAL CLAIMS	INDEPENDENT CLAIMS
				22	3

ADDRESS

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UNITED STATES

TITLE

Vehicle Tracking Unit with Downloadable Codes and Associated Methods

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12000	FEES: Authority has been given in Paper No._____ to charge/credit DEPOSIT ACCOUNT No._____ for following:	☐ All Fees ☐ 1.16 Fees (Filing) ☐ 1.17 Fees (Processing Ext. of time) ☐ 1.18 Fees (Issue) ☐ Other _____

BIB (Rev. 05/07).

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