AO 120 (Rev. 08/10)

TO:	Mail Stop 8 Director of the U.S. Patent and Trademark Office P.O. Box 1450 Alexandria, VA 22313-1450	REPORT ON THE FILING OR DETERMINATION OF AN ACTION REGARDING A PATENT OR TRADEMARK

In Compliance with 35 U.S.C. § 290 and/or 15 U.S.C. § 1116 you are hereby advised that a court action has been filed in the U.S. District Court for the District of Delaware on the following

☐ Trademarks or ☑ Patents. (☐ the patent action involves 35 U.S.C. § 292.):

DOCKET NO.	DATE FILED	U.S. DISTRICT COURT
	8/9/2022	for the District of Delaware
PLAINTIFF OMEGA PATENTS, LLC		DEFENDANT GEOTAB USA, INC., and GEOTAB, INC.

	PATENT OR TRADEMARK NO.	DATE OF PATENT OR TRADEMARK	HOLDER OF PATENT OR TRADEMARK
1	8,032,278 B2	10/4/2011	OMEGA PATENTS, LLC
2			
3			
4			
5			

In the above---entitled case, the following patent(s)/ trademark(s) have been included:

DATE INCLUDED	INCLUDED BY ☐ Amendment ☐ Answer ☐ Cross Bill ☐ Other Pleading	
PATENT OR TRADEMARK NO.	DATE OF PATENT OR TRADEMARK	HOLDER OF PATENT OR TRADEMARK
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In the above---entitled case, the following decision has been rendered or judgement issued:

DECISION/JUDGEMENT

CLERK	(BY) DEPUTY CLERK	DATE

Copy 1---Upon initiation of action, mail this copy to Director Copy 3---Upon termination of action, mail this copy to Director
Copy 2---Upon filing document adding patent(s), mail this copy to Director Copy 4---Case file copy

Geotab Exhibit 1002
Geotab v. Omega

AO 120 (Rev. 08/10)

TO:	REPORT ON THE FILING OR DETERMINATION OF AN ACTION REGARDING A PATENT OR TRADEMARK
Mail Stop 8 Director of the U.S. Patent and Trademark Office P.O. Box 1450 Alexandria, VA 22313-1450	

In Compliance with 35 U.S.C. § 290 and/or 15 U.S.C. § 1116 you are hereby advised that a court action has been filed in the U.S. District Court Western District of Texas on the following

☐ Trademarks or ☑ Patents. (☐ the patent action involves 35 U.S.C. § 292.):

DOCKET NO.	DATE FILED	U.S. DISTRICT COURT
6:20-cv-571	6/29/2020	Western District of Texas

PLAINTIFF	DEFENDANT
WSOU INVESTMENTS, LLC d/b/a BRAZOS LICENSING AND DEVELOPMENT	GOOGLE LLC

	PATENT OR TRADEMARK NO.	DATE OF PATENT OR TRADEMARK	HOLDER OF PATENT OR TRADEMARK
1	US 7,817,858	10/19/2010	WSOU Investments, LLC
2			
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In the above—entitled case, the following patent(s)/ trademark(s) have been included:

DATE INCLUDED	INCLUDED BY ☐ Amendment ☐ Answer ☐ Cross Bill ☐ Other Pleading	
PATENT OR TRADEMARK NO.	DATE OF PATENT OR TRADEMARK	HOLDER OF PATENT OR TRADEMARK
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In the above—entitled case, the following decision has been rendered or judgement issued:

DECISION/JUDGEMENT
1/25/2021 STIPULATION Joint Stipulation of Dismissal With Prejudice by WSOU Investments LLC (document 79)

CLERK	(BY) DEPUTY CLERK	DATE
Jeannette J. Clack	L. Rivera	01/25/2022

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Copy 2—Upon filing document adding patent(s), mail this copy to Director Copy 4—Case file copy

AO 120 (Rev. 08/10)

TO:	REPORT ON THE FILING OR DETERMINATION OF AN ACTION REGARDING A PATENT OR TRADEMARK
Mail Stop 8 Director of the U.S. Patent and Trademark Office P.O. Box 1450 Alexandria, VA 22313-1450	

In Compliance with 35 U.S.C. § 290 and/or 15 U.S.C. § 1116 you are hereby advised that a court action has been filed in the U.S. District Court for the Western District of Washington at Seattle on the following

☐ Trademarks or ☑ Patents. (☐ the patent action involves 35 U.S.C. § 292.):

DOCKET NO.	DATE FILED	U.S. DISTRICT COURT
2:20-cv-01344-JRC	9/10/2020	for the Western District of Washington at Seattle

PLAINTIFF	DEFENDANT
OMEGA PATENTS, LLC, a Georgia limited liability company	FIRSTECH, LLC, a Washington limited liability company

	PATENT OR TRADEMARK NO.	DATE OF PATENT OR TRADEMARK	HOLDER OF PATENT OR TRADEMARK
1	7,305,293 B2	12/4/2007	OMEGA PATENTS, LLC
2	8,032,278 B2	10/4/2011	OMEGA PATENTS, LLC
3	RE47,225 E	2/5/2019	OMEGA PATENTS, LLC
4	RE47,354 E	4/16/2019	OMEGA PATENTS, LLC
5			

In the above—entitled case, the following patent(s)/ trademark(s) have been included:

DATE INCLUDED	INCLUDED BY ☐ Amendment ☐ Answer ☐ Cross Bill ☐ Other Pleading	
PATENT OR TRADEMARK NO.	DATE OF PATENT OR TRADEMARK	HOLDER OF PATENT OR TRADEMARK
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In the above—entitled case, the following decision has been rendered or judgement issued:

DECISION/JUDGEMENT
The parties settled and this case was dismissed on 1/26/2022.

CLERK	(BY) DEPUTY CLERK	DATE
Ravi Subramanian	s/ Michael Williams	1/26/2022

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Copy 2—Upon filing document adding patent(s), mail this copy to Director Copy 4—Case file copy

AO 120 (Rev. 08/10)

TO:	REPORT ON THE FILING OR DETERMINATION OF AN ACTION REGARDING A PATENT OR TRADEMARK
Mail Stop 8 **Director of the U.S. Patent and Trademark Office** **P.O. Box 1450** **Alexandria, VA 22313-1450**	

In Compliance with 35 U.S.C. § 290 and/or 15 U.S.C. § 1116 you are hereby advised that a court action has been filed in the U.S. District Court for the Western District of Washington at Seattle on the following

☐ Trademarks or ☑ Patents. (☐ the patent action involves 35 U.S.C. § 292.):

DOCKET NO.	DATE FILED	U.S. DISTRICT COURT
2:20-cv-01344-JRC	9/10/2020	for the Western District of Washington at Seattle

PLAINTIFF	DEFENDANT
OMEGA PATENTS, LLC, a Georgia limited liability company	FIRSTECH, LLC, a Washington limited liability company

	PATENT OR TRADEMARK NO.	DATE OF PATENT OR TRADEMARK	HOLDER OF PATENT OR TRADEMARK
1	7,305,293 B2	12/4/2007	OMEGA PATENTS, LLC
2	8,032,278 B2	10/4/2011	OMEGA PATENTS, LLC
3	RE47,225 E	2/5/2019	OMEGA PATENTS, LLC
4	RE47,354 E	4/16/2019	OMEGA PATENTS, LLC
5			

In the above---entitled case, the following patent(s)/ trademark(s) have been included:

DATE INCLUDED	INCLUDED BY ☐ Amendment ☐ Answer ☐ Cross Bill ☐ Other Pleading	
PATENT OR TRADEMARK NO.	DATE OF PATENT OR TRADEMARK	HOLDER OF PATENT OR TRADEMARK
1		
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In the above---entitled case, the following decision has been rendered or judgement issued:

DECISION/JUDGEMENT

CLERK	(BY) DEPUTY CLERK	DATE
William M. McCool	Rachel Case	9/11/2020

Copy 1---Upon initiation of action, mail this copy to Director Copy 3---Upon termination of action, mail this copy to Director
Copy 2---Upon filing document adding patent(s), mail this copy to Director Copy 4---Case file copy

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

Bib Data Sheet

CONFIRMATION NO. 1046

SERIAL NUMBER	FILING OR 371(c) DATE	CLASS	GROUP ART UNIT	ATTORNEY DOCKET NO.
11/773,272	07/03/2007 RULE	701	3661	58106CIP1

AIA (First Inventor to File): NO

INVENTORS

Kenneth E. Flick, Douglasville, GA;

APPLICANTS

Kenneth E. Flick, Douglasville, GA;

**** CONTINUING DATA **************************

This application 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 ** 07/30/2007

Foreign Priority claimed	☐ yes ☐ no	STATE OR COUNTRY	SHEETS DRAWING	TOTAL CLAIMS	INDEPENDENT CLAIMS
35 USC 119 (a-d) conditions met	☐ yes ☐ no ☐ Met after Allowance	GA	13	30	4
Verified and Acknowledged	Examiner's Signature Initials				

ADDRESS
27975

TITLE

VEHICLE TRACKING UNIT WITH DOWNLOADABLE CODES AND ASSOCIATED METHODS

FILING FEE RECEIVED 2000	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 _____ ❑ Credit

AO 120 (Rev. 08/10)

TO:	REPORT ON THE FILING OR DETERMINATION OF AN ACTION REGARDING A PATENT OR TRADEMARK
Mail Stop 8 Director of the U.S. Patent and Trademark Office P.O. Box 1450 Alexandria, VA 22313-1450	

In Compliance with 35 U.S.C. § 290 and/or 15 U.S.C. § 1116 you are hereby advised that a court action has been filed in the U.S. District Court Middle District of Florida on the following

☐ Trademarks or ✖ Patents. (☐ the patent action involves 35 U.S.C. § 292.):

DOCKET NO.	DATE FILED	U.S. DISTRICT COURT
6:20-cv-693-Orl-41LRH	April 21, 2020	Middle District of Florida

PLAINTIFF	DEFENDANT
OMEGA PATENTS, LLC	DEI HOLDINGS, INC.

PATENT OR TRADEMARK NO.	DATE OF PATENT OR TRADEMARK	HOLDER OF PATENT OR TRADEMARK
1 See attached complaint & exhibits		

CLERK	(BY) DEPUTY CLERK	DATE
ELIZABETH M. WARREN	D. Aldana	April 22, 2020

Copy 1—Upon initiation of action, mail this copy to Director **Copy 3—Upon termination of action, mail this copy to Director**
Copy 2—Upon filing document adding patent(s), mail this copy to Director **Copy 4—Case file copy**

RE47255 8032278
8362886

AO 120 (Rev. 08/10)

TO:	Mail Stop 8 Director of the U.S. Patent and Trademark Office P.O. Box 1450 Alexandria, VA 22313-1450	REPORT ON THE FILING OR DETERMINATION OF AN ACTION REGARDING A PATENT OR TRADEMARK

In Compliance with 35 U.S.C. § 290 and/or 15 U.S.C. § 1116 you are hereby advised that a court action has been filed in the U.S. District Court Northern District of Georgia on the following

☐ Trademarks or ☑ Patents. (☐ the patent action involves 35 U.S.C. § 292.):

DOCKET NO.	DATE FILED	U.S. DISTRICT COURT
1:17-cv-2769-TWT	7/25/2017	Northern District of Georgia

PLAINTIFF	DEFENDANT
OMEGA PATENTS, LLC	ENFORA, INC.

	PATENT OR TRADEMARK NO.	DATE OF PATENT OR TRADEMARK	HOLDER OF PATENT OR TRADEMARK
1	US 6,346,876 B1	2/12/2002	Kenneth E. Flick
2	US 6,756,885 B1	6/29/2004	Omega Patents, LLC
3	US 8,032,278 B2	10/4/2011	Omega Patents, L.L.C.
4			
5			

In the above—entitled case, the following patent(s)/ trademark(s) have been included:

DATE INCLUDED	INCLUDED BY ☐ Amendment ☐ Answer ☐ Cross Bill ☐ Other Pleading		
	PATENT OR TRADEMARK NO.	DATE OF PATENT OR TRADEMARK	HOLDER OF PATENT OR TRADEMARK
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In the above—entitled case, the following decision has been rendered or judgement issued:

DECISION/JUDGEMENT

CLERK	(BY) DEPUTY CLERK	DATE

Copy 1—Upon initiation of action, mail this copy to Director **Copy 3—Upon termination of action, mail this copy to Director**
Copy 2—Upon filing document adding patent(s), mail this copy to Director **Copy 4—Case file copy**

AO 120 (Rev. 08/10)

TO:	Mail Stop 8 Director of the U.S. Patent and Trademark Office P.O. Box 1450 Alexandria, VA 22313-1450	REPORT ON THE FILING OR DETERMINATION OF AN ACTION REGARDING A PATENT OR TRADEMARK

In Compliance with 35 U.S.C. § 290 and/or 15 U.S.C. § 1116 you are hereby advised that a court action has been filed in the U.S. District Court Northern District of Georgia on the following

☐ Trademarks or ☑ Patents. (☐ the patent action involves 35 U.S.C. § 292.):

DOCKET NO.	DATE FILED	U.S. DISTRICT COURT
1:17-cv-2769-TWT	7/25/2017	Northern District of Georgia

PLAINTIFF	DEFENDANT
OMEGA PATENTS, LLC	ENFORA, INC.

	PATENT OR TRADEMARK NO.	DATE OF PATENT OR TRADEMARK	HOLDER OF PATENT OR TRADEMARK
1	US 6,346,876 B1	2/12/2002	Kenneth E. Flick
2	US 6,756,885 B1	6/29/2004	Omega Patents, LLC
3	US 8,032,278 B2	10/4/2011	Omega Patents, L.L.C.
4			
5			

In the above—entitled case, the following patent(s)/ trademark(s) have been included:

DATE INCLUDED	INCLUDED BY ☐ Amendment ☐ Answer ☐ Cross Bill ☐ Other Pleading		
	PATENT OR TRADEMARK NO.	DATE OF PATENT OR TRADEMARK	HOLDER OF PATENT OR TRADEMARK
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In the above—entitled case, the following decision has been rendered or judgement issued:

DECISION/JUDGEMENT

CLERK	(BY) DEPUTY CLERK	DATE

Copy 1—Upon initiation of action, mail this copy to Director **Copy 3—Upon termination of action, mail this copy to Director**
Copy 2—Upon filing document adding patent(s), mail this copy to Director **Copy 4—Case file copy**

AO 120 (Rev. 08/10)

TO:	REPORT ON THE FILING OR DETERMINATION OF AN ACTION REGARDING A PATENT OR TRADEMARK
Mail Stop 8 Director of the U.S. Patent and Trademark Office P.O. Box 1450 Alexandria, VA 22313-1450	

In Compliance with 35 U.S.C. § 290 and/or 15 U.S.C. § 1116 you are hereby advised that a court action has been filed in the U.S. District Court for the District of Delaware on the following

☐ Trademarks or ☑ Patents. (☐ the patent action involves 35 U.S.C. § 292.):

DOCKET NO.	DATE FILED	U.S. DISTRICT COURT
	12/20/2013	for the District of Delaware

PLAINTIFF	DEFENDANT
PARALLEL NETWORKS LICENSING, LLC	INTERNATIONAL BUSINESS MACHINES CORPORATION

	PATENT OR TRADEMARK NO.	DATE OF PATENT OR TRADEMARK	HOLDER OF PATENT OR TRADEMARK
1	US 5,894,554	4/13/1999	Parallel Networks Licensing, LLC
2	US 6,415,335 B1	7/2/2002	Parallel Networks Licensing, LLC
3			
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In the above—entitled case, the following patent(s)/ trademark(s) have been included:

DATE INCLUDED	INCLUDED BY ☐ Amendment ☐ Answer ☐ Cross Bill ☐ Other Pleading	
PATENT OR TRADEMARK NO.	DATE OF PATENT OR TRADEMARK	HOLDER OF PATENT OR TRADEMARK
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In the above—entitled case, the following decision has been rendered or judgement issued:

DECISION/JUDGEMENT
Final Judgment

CLERK	(BY) DEPUTY CLERK	DATE
JOHN A. CERINO		4-27-2017

Copy 1—Upon initiation of action, mail this copy to Director Copy 3—Upon termination of action, mail this copy to Director
Copy 2—Upon filing document adding patent(s), mail this copy to Director Copy 4—Case file copy

AO 120 (Rev. 08/10)

TO:	REPORT ON THE FILING OR DETERMINATION OF AN ACTION REGARDING A PATENT OR TRADEMARK
Mail Stop 8 Director of the U.S. Patent and Trademark Office P.O. Box 1450 Alexandria, VA 22313-1450	

In Compliance with 35 U.S.C. § 290 and/or 15 U.S.C. § 1116 you are hereby advised that a court action has been filed in the U.S. District Court Middle District of Florida, Orlando Division on the following

☐ Trademarks or ☑ Patents. (☐ the patent action involves 35 U.S.C. § 292.):

DOCKET NO.	DATE FILED	U.S. DISTRICT COURT
6:13-cv-1950	12/20/2013	Middle District of Florida, Orlando Division

PLAINTIFF	DEFENDANT
Omega Patents, LLC	Calamp Corp.

	PATENT OR TRADEMARK NO.	DATE OF PATENT OR TRADEMARK	HOLDER OF PATENT OR TRADEMARK
1	*see attached Compl		
2			
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In the above—entitled case, the following patent(s)/ trademark(s) have been included:

DATE INCLUDED	INCLUDED BY ☐ Amendment ☐ Answer ☐ Cross Bill ☐ Other Pleading		
	PATENT OR TRADEMARK NO.	DATE OF PATENT OR TRADEMARK	HOLDER OF PATENT OR TRADEMARK
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In the above—entitled case, the following decision has been rendered or judgement issued:

DECISION/JUDGEMENT
FNAL JUDGMENT entered on behalf of Plaintiff (Signed by Hon. Paul G. Byron on 4/24/17)

CLERK	(BY) DEPUTY CLERK	DATE
Elizabeth Warren, Acting Clerk of Court	R. Olsen	4/25/2017

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Copy 2—Upon filing document adding patent(s), mail this copy to Director Copy 4—Case file copy

JS 44 (Rev. 12/12)

CIVIL COVER SHEET

The JS 44 civil cover sheet and the information contained herein neither replace nor supplement the filing and service of pleadings or other papers as required by law, except as provided by local rules of court. This form, approved by the Judicial Conference of the United States in September 1974, is required for the use of the Clerk of Court for the purpose of initiating the civil docket sheet. *(SEE INSTRUCTIONS ON NEXT PAGE OF THIS FORM.)*

I. (a) PLAINTIFFS
Omega Patents, LLC

(b) County of Residence of First Listed Plaintiff Douglas County, GA
(EXCEPT IN U.S. PLAINTIFF CASES)

(c) Attorneys *(Firm Name, Address, and Telephone Number)*
Brian R. Gilchrist, Esq. and Ryan T. Santurri, Esq., Allen, Dyer, Doppelt, Milbrath & Gilchrist, P.A., 255 S. Orange Ave., Ste. 1401, Orlando, Florida 32801 Telephone: (407)841-2330

DEFENDANTS
Calamp Corp.

County of Residence of First Listed Defendant Ventura County, CA
(IN U.S. PLAINTIFF CASES ONLY)
NOTE: IN LAND CONDEMNATION CASES, USE THE LOCATION OF THE TRACT OF LAND INVOLVED.

Attorneys *(If Known)*

II. BASIS OF JURISDICTION *(Place an "X" in One Box Only)*

- ☐ 1 U.S. Government Plaintiff
- ☒ 3 Federal Question *(U.S. Government Not a Party)*
- ☐ 2 U.S. Government Defendant
- ☐ 4 Diversity *(Indicate Citizenship of Parties in Item III)*

III. CITIZENSHIP OF PRINCIPAL PARTIES *(Place an "X" in One Box for Plaintiff and One Box for Defendant)*
(For Diversity Cases Only)

	PTF	DEF		PTF	DEF
Citizen of This State	☐ 1	☐ 1	Incorporated or Principal Place of Business in This State	☐ 4	☐ 4
Citizen of Another State	☐ 2	☐ 2	Incorporated and Principal Place of Business in Another State	☒ 5	☒ 5
Citizen or Subject of a Foreign Country	☐ 3	☐ 3	Foreign Nation	☐ 6	☐ 6

IV. NATURE OF SUIT *(Place an "X" in One Box Only)*

CONTRACT	TORTS		FORFEITURE/PENALTY	BANKRUPTCY	OTHER STATUTES
☐ 110 Insurance ☐ 120 Marine ☐ 130 Miller Act ☐ 140 Negotiable Instrument ☐ 150 Recovery of Overpayment & Enforcement of Judgment ☐ 151 Medicare Act ☐ 152 Recovery of Defaulted Student Loans (Excludes Veterans) ☐ 153 Recovery of Overpayment of Veteran's Benefits ☐ 160 Stockholders' Suits ☐ 190 Other Contract ☐ 195 Contract Product Liability ☐ 196 Franchise	**PERSONAL INJURY** ☐ 310 Airplane ☐ 315 Airplane Product Liability ☐ 320 Assault, Libel & Slander ☐ 330 Federal Employers' Liability ☐ 340 Marine ☐ 345 Marine Product Liability ☐ 350 Motor Vehicle ☐ 355 Motor Vehicle Product Liability ☐ 360 Other Personal Injury ☐ 362 Personal Injury - Medical Malpractice **PERSONAL INJURY** ☐ 365 Personal Injury - Product Liability ☐ 367 Health Care/ Pharmaceutical Personal Injury Product Liability ☐ 368 Asbestos Personal Injury Product Liability **PERSONAL PROPERTY** ☐ 370 Other Fraud ☐ 371 Truth in Lending ☐ 380 Other Personal Property Damage ☐ 385 Property Damage Product Liability	☐ 625 Drug Related Seizure of Property 21 USC 881 ☐ 690 Other **LABOR** ☐ 710 Fair Labor Standards Act ☐ 720 Labor/Management Relations ☐ 740 Railway Labor Act ☐ 751 Family and Medical Leave Act ☐ 790 Other Labor Litigation ☐ 791 Employee Retirement Income Security Act **IMMIGRATION** ☐ 462 Naturalization Application ☐ 465 Other Immigration Actions	☐ 422 Appeal 28 USC 158 ☐ 423 Withdrawal 28 USC 157 **PROPERTY RIGHTS** ☐ 820 Copyrights ☒ 830 Patent ☐ 840 Trademark **SOCIAL SECURITY** ☐ 861 HIA (1395ff) ☐ 862 Black Lung (923) ☐ 863 DIWC/DIWW (405(g)) ☐ 864 SSID Title XVI ☐ 865 RSI (405(g))	☐ 375 False Claims Act ☐ 400 State Reapportionment ☐ 410 Antitrust ☐ 430 Banks and Banking ☐ 450 Commerce ☐ 460 Deportation ☐ 470 Racketeer Influenced and Corrupt Organizations ☐ 480 Consumer Credit ☐ 490 Cable/Sat TV ☐ 850 Securities/Commodities/ Exchange ☐ 890 Other Statutory Actions ☐ 891 Agricultural Acts ☐ 893 Environmental Matters ☐ 895 Freedom of Information Act ☐ 896 Arbitration ☐ 899 Administrative Procedure Act/Review or Appeal of Agency Decision ☐ 950 Constitutionality of State Statutes
REAL PROPERTY	**CIVIL RIGHTS**	**PRISONER PETITIONS**		**FEDERAL TAX SUITS**	
☐ 210 Land Condemnation ☐ 220 Foreclosure ☐ 230 Rent Lease & Ejectment ☐ 240 Torts to Land ☐ 245 Tort Product Liability ☐ 290 All Other Real Property	☐ 440 Other Civil Rights ☐ 441 Voting ☐ 442 Employment ☐ 443 Housing/ Accommodations ☐ 445 Amer. w/Disabilities - Employment ☐ 446 Amer. w/Disabilities - Other ☐ 448 Education	**Habeas Corpus:** ☐ 463 Alien Detainee ☐ 510 Motions to Vacate Sentence ☐ 530 General ☐ 535 Death Penalty **Other:** ☐ 540 Mandamus & Other ☐ 550 Civil Rights ☐ 555 Prison Condition ☐ 560 Civil Detainee - Conditions of Confinement		☐ 870 Taxes (U.S. Plaintiff or Defendant) ☐ 871 IRS—Third Party 26 USC 7609	

V. ORIGIN *(Place an "X" in One Box Only)*

☒ 1 Original Proceeding ☐ 2 Removed from State Court ☐ 3 Remanded from Appellate Court ☐ 4 Reinstated or Reopened ☐ 5 Transferred from Another District *(specify)* ☐ 6 Multidistrict Litigation

VI. CAUSE OF ACTION
Cite the U.S. Civil Statute under which you are filing *(Do not cite jurisdictional statutes unless diversity)*:
35 U.S.C. 271 et seq.
Brief description of cause:
Patent Infringement

VII. REQUESTED IN COMPLAINT: ☐ CHECK IF THIS IS A CLASS ACTION UNDER RULE 23, F.R.Cv.P. DEMAND $ CHECK YES only if demanded in complaint: JURY DEMAND: ☒ Yes ☐ No

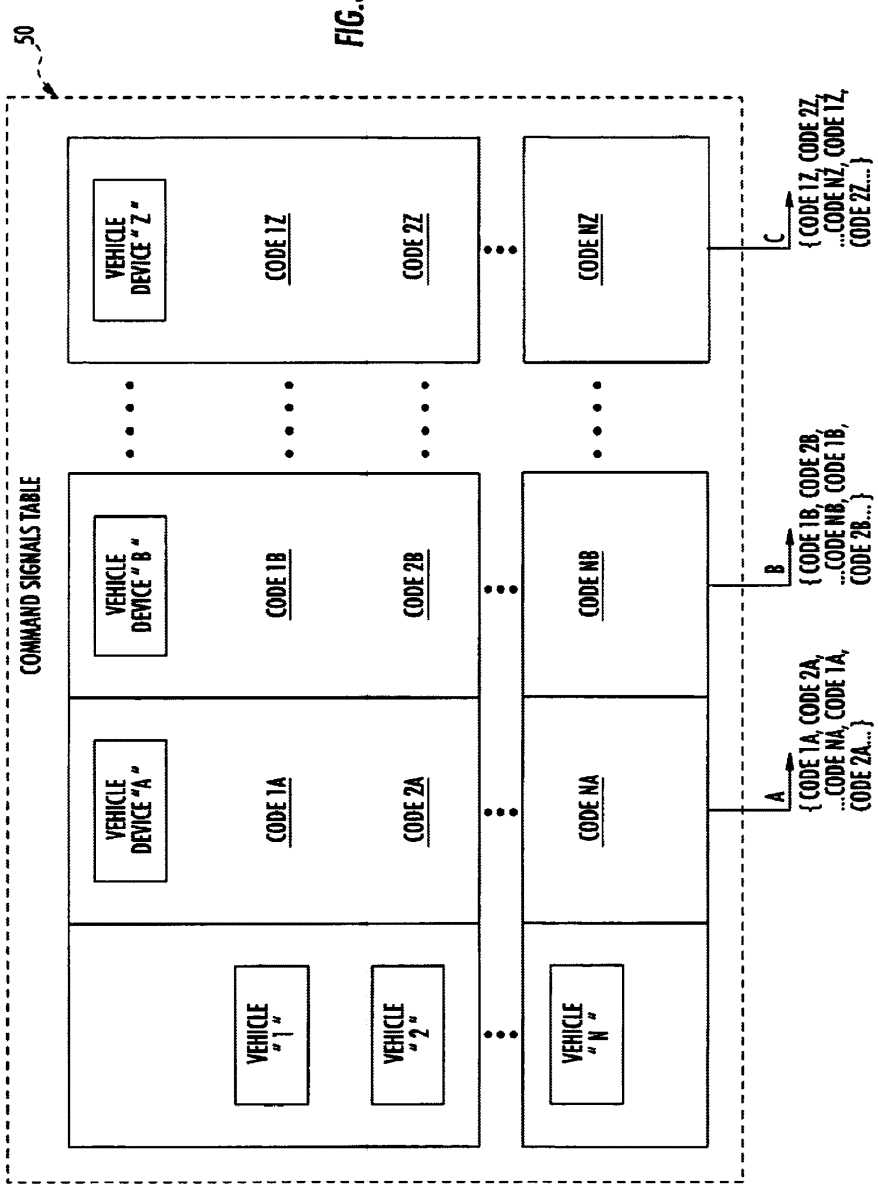
VIII. RELATED CASE(S) IF ANY *(See instructions)*: JUDGE DOCKET NUMBER

DATE 12/12/13 SIGNATURE OF ATTORNEY OF RECORD

FOR OFFICE USE ONLY

RECEIPT # AMOUNT APPLYING IFP JUDGE MAG. JUDGE

FIG.3


50
COMMAND SIGNALS TABLE
VEHICLE "1"
VEHICLE "2"
VEHICLE "N"
VEHICLE DEVICE "A"
VEHICLE DEVICE "B"
VEHICLE DEVICE "Z"
CODE 1A
CODE 2A
CODE NA
CODE 1B
CODE 2B
CODE NB
CODE 1Z
CODE 2Z
CODE NZ
A
{CODE 1A, CODE 2A, ...CODE NA, CODE 1A, CODE 2A...}
B
{CODE 1B, CODE 2B, ...CODE NB, CODE 1B, CODE 2B...}
C
{CODE 1Z, CODE 2Z, ...CODE NZ, CODE 1Z, CODE 2Z...}

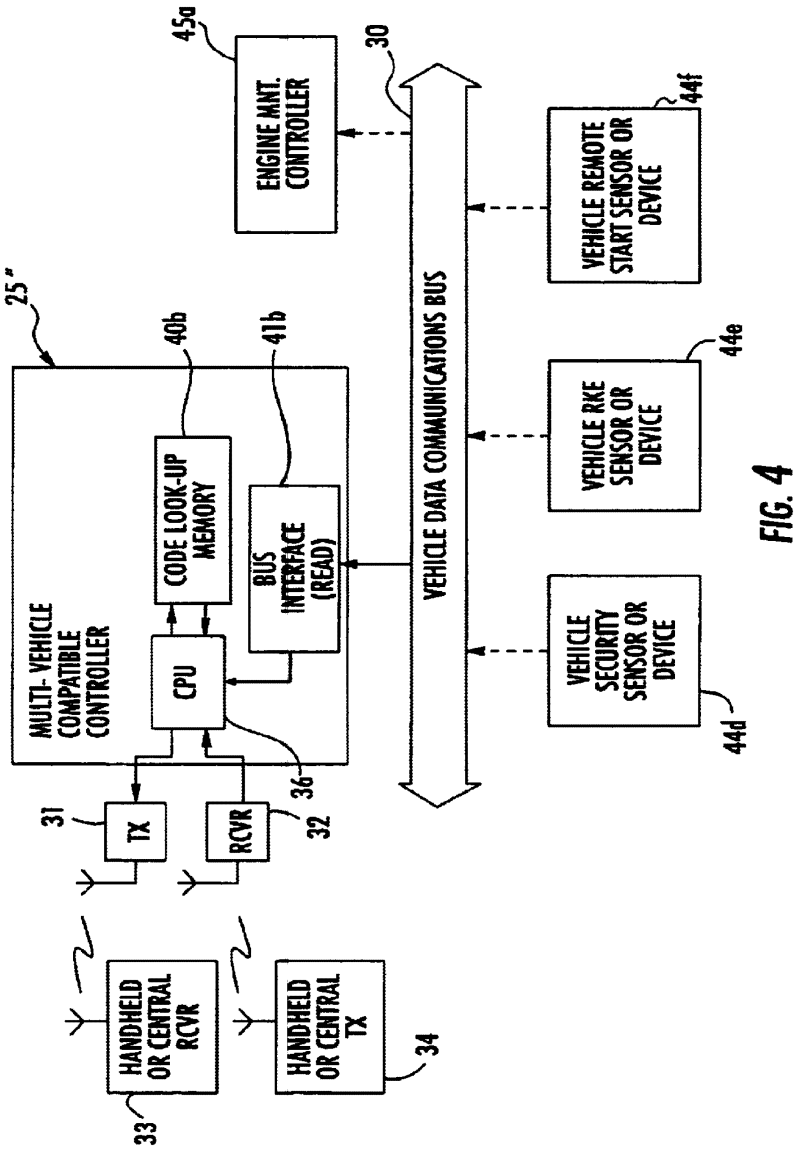


FIG. 4

Ex. 1002 - Page 14

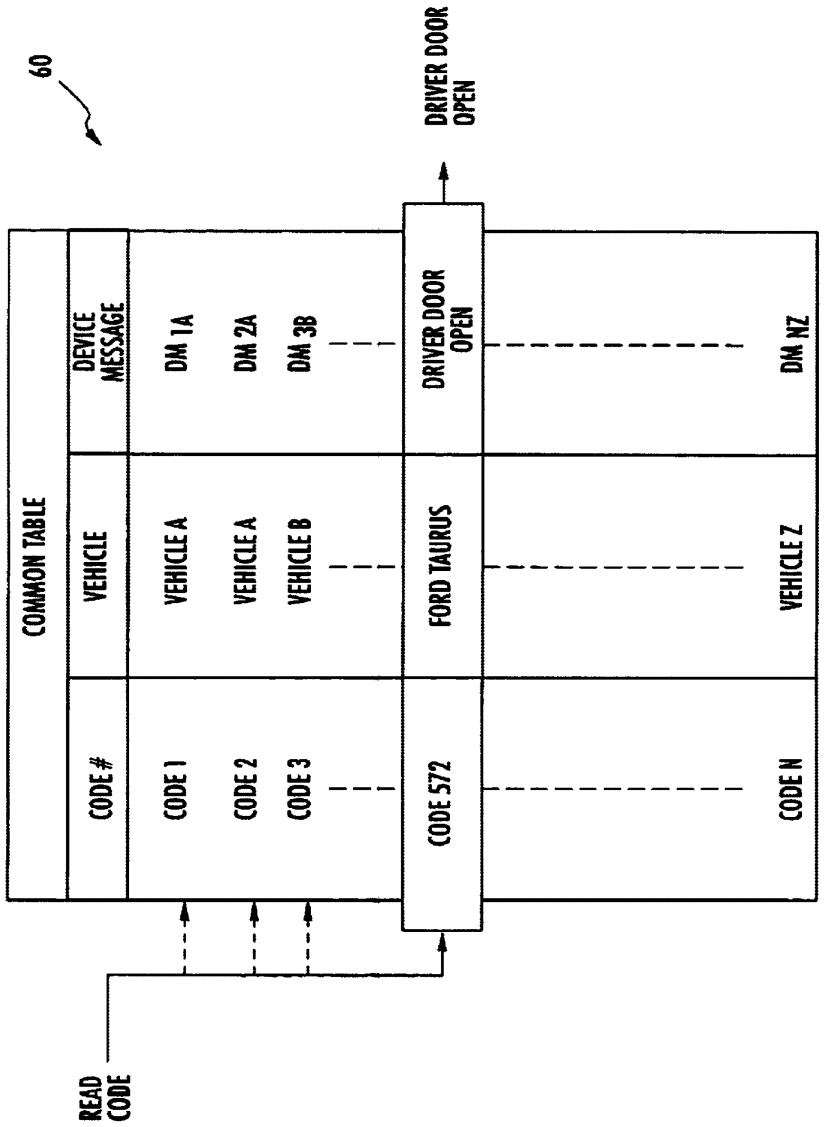


FIG. 5

Ex. 1002 - Page 15

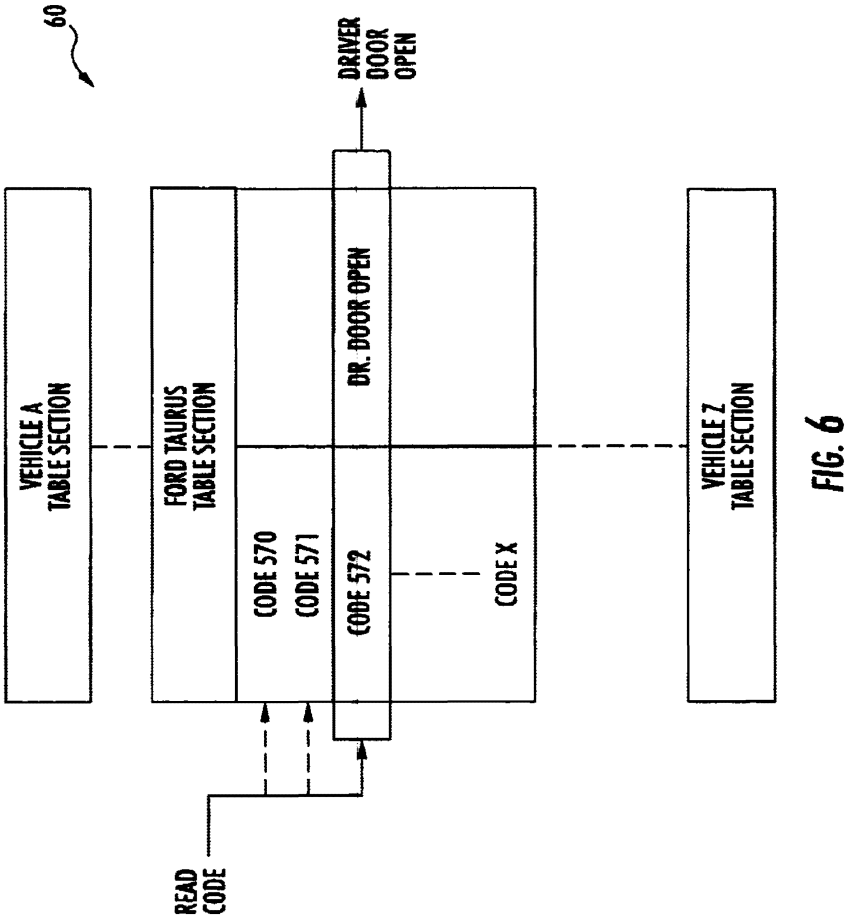

60
DRIVER DOOR OPEN
VEHICLE A TABLE SECTION
FORD TAURUS TABLE SECTION
DR. DOOR OPEN
CODE 570
CODE 571
CODE 572
CODE X
VEHICLE Z TABLE SECTION
READ CODE

FIG. 6

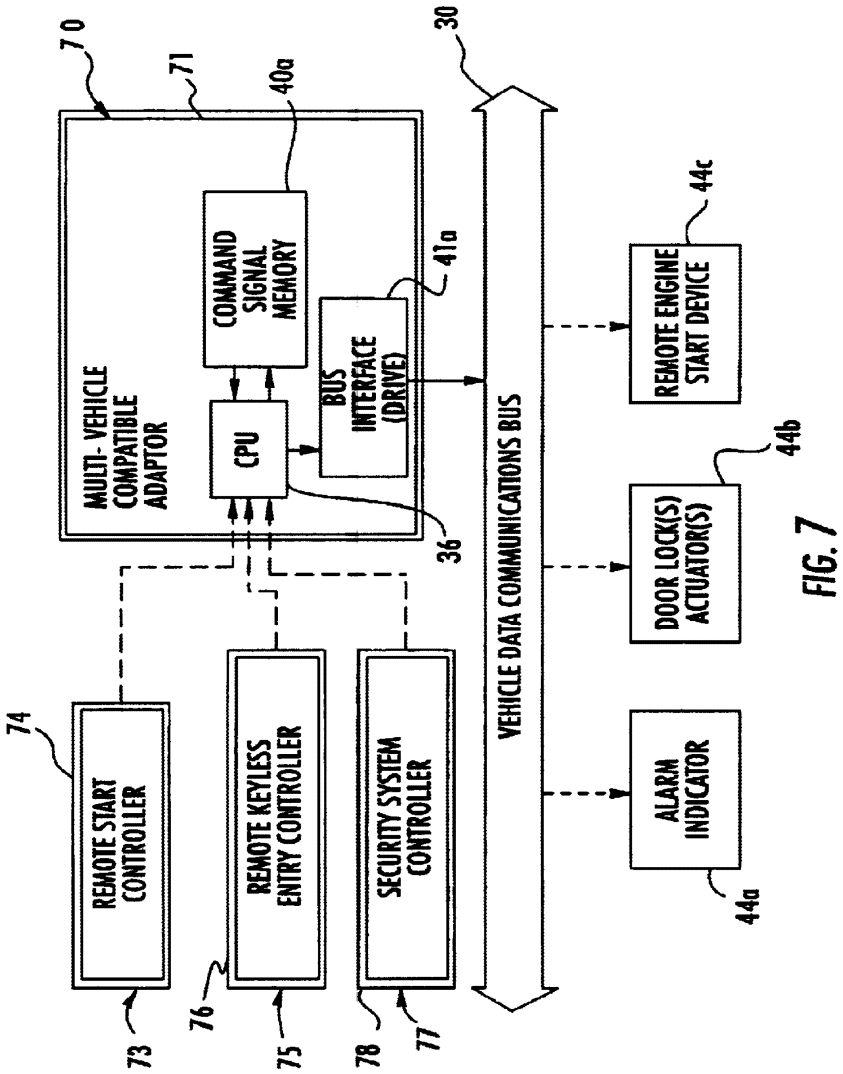


FIG. 7

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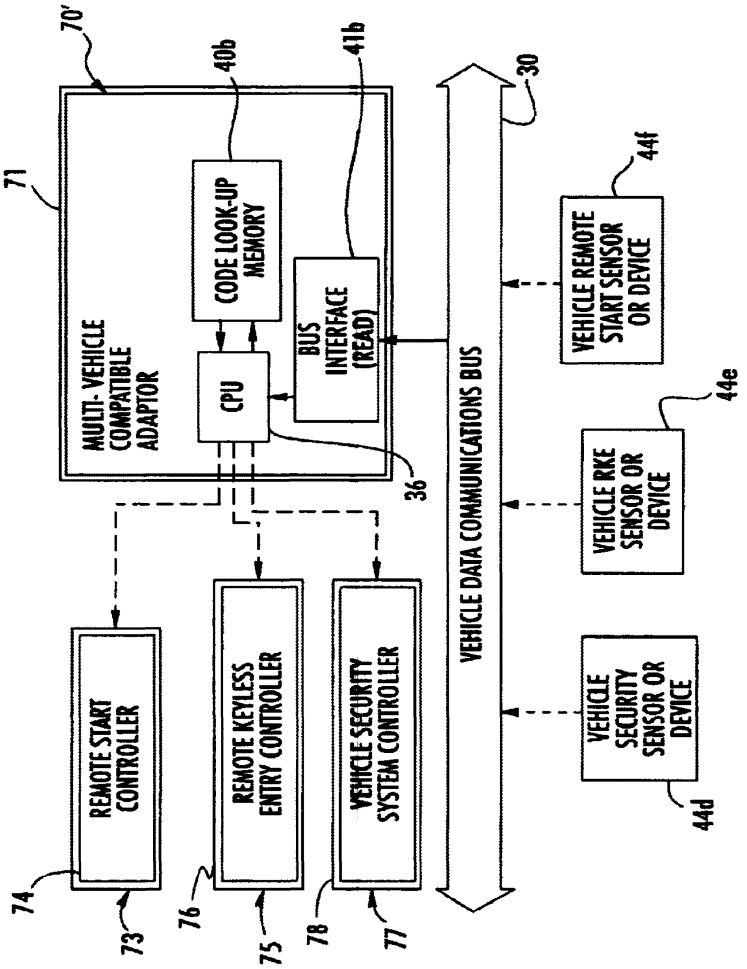


FIG. 8

Ex. 1002 - Page 18

MULTI-VEHICLE COMPATIBLE CONTROL SYSTEM FOR READING FROM A DATA BUS AND ASSOCIATED METHODS

RELATED APPLICATIONS

The present application is a continuation-in-part of U.S. patent application Ser. No. 09/382,245 filed Aug. 25, 1999 now U.S. Pat. No. 6,275,147, which in turn, is a continuation of Ser. No. 09/023,838 filed on Feb. 13, 1998 now U.S. Pat. No. 6,011,460, which in turn, is a continuation-in-part of Ser. No. 08,701,356 filed on Aug. 22, 1996, now U.S. Pat. No. 5,719,551.

FIELD OF THE INVENTION

This application is related to the field of control systems and, more particularly, to a remote control system and related methods for vehicles.

BACKGROUND OF THE INVENTION

Vehicle security systems are widely used to deter vehicle theft, prevent theft of valuables from a vehicle, deter vandalism, and to protect vehicle owners and occupants. A typical automobile security system, for example, includes a central processor or controller connected to a plurality of vehicle sensors. The sensors, for example, may detect opening of the trunk, hood, doors, windows, and also movement of the vehicle or within the vehicle. Ultrasonic and microwave motion detectors, vibration sensors, sound discriminators, differential pressure sensors, and switches may be used as sensors. In addition, radar sensors may be used to monitor the area proximate the vehicle.

The controller typically operates to give an alarm indication in the event of triggering of a vehicle sensor. The alarm indication may typically be a flashing of the lights and/or the sounding of the vehicle horn or a siren. In addition, the vehicle fuel supply and/or ignition power may be selectively disabled based upon an alarm condition.

A typical security system also includes a receiver associated with the controller that cooperates with one or more remote transmitters typically carried by the user as disclosed, for example, in U.S. Pat. No. 4,383,242 to Sassover et al. and U.S. Pat. No. 5,146,215 to Drori. The remote transmitter may be used to arm and disarm the vehicle security system or provide other remote control features from a predetermined range away from the vehicle. Also related to remote control of a vehicle function U.S. Pat. No. 5,252,966 to Lambropoulous et al. discloses a remote keyless entry system for a vehicle. The keyless entry system permits the user to remotely open the vehicle doors or open the vehicle trunk using a small handheld transmitter.

Unfortunately, the majority of vehicle security systems need to be directly connected by wires to individual vehicle devices, such as the vehicle horn or door switches of the vehicle. In other words, a conventional vehicle security system is hardwired to various vehicle components, typically by splicing into vehicle wiring harnesses or via interposing T-harnesses and connectors. The number of electrical devices in a vehicle has increased so that the size and complexity of wiring harnesses has also increased. For example, the steering wheel may include horn switches, an airbag, turn-signal and headlight switches, wiper controls, cruise control switches, ignition wiring, an emergency flasher switch, and/or radio controls. Likewise, a door of a vehicle, for example, may include window controls, locks, outside mirror switches, and/or door-panel light switches.

In response to the increased wiring complexity and costs, vehicle manufacturers have begun attempts to reduce the amount of wiring within vehicles to reduce weight, reduce wire routing problems, decrease costs, and reduce complications which may arise when troubleshooting the electrical system. For example, some manufacturers have adopted multiplexing schemes to reduce cables to three or four wires and to simplify the exchange of data among the various onboard electronic systems as disclosed, for example, in "The Thick and Thin of Car Cabling" by Thompson appearing in the IEEE Spectrum, February 1996, pp. 42–45.

Implementing multiplexing concepts in vehicles in a cost-effective and reliable manner may not be easy. Successful implementation, for example, may require the development of low or error-free communications in what can be harsh vehicle environments. 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 messages to ignore and which messages to respond to or read.

The Thompson article describes a number of multiplexed networks for vehicles. In particular, the Grand Cherokee made by Chrysler is described as having five multiplex nodes or controllers: the engine controller, the temperature controller, the airbag controller, the theft alarm, and the overhead console. Other nodes for different vehicles may include a transmission controller, a trip computer, an instrument cluster controller, an antilock braking controller, an active suspension controller, and a body controller for devices in the passenger compartment.

A number of patent references are also directed to digital or multiplex communications networks or circuits, such as may be used in a vehicle. For example, U.S. Pat. No. 4,538,262 Sinniger et al. discloses a multiplex bus system including a master control unit and a plurality of receiver-transmitter units connected thereto. Similarly, U.S. Pat. No. 4,055,772 to Leung discloses a power bus in a vehicle controlled by a low current digitally coded communications system. Other references disclosing various vehicle multiplex control systems include, for example, U.S. Pat. No. 4,760,275 to Sato et al.; U.S. Pat. No. 4,697,092 to Roggendorf et al.; and U.S. Pat. No. 4,792,783 to Burgess et al.

Several standards have been proposed for vehicle multiplex networks including, for example, the Society of Automotive Engineers "Surface Vehicle Standard, Class B Data Communications Network Interface", SAE J1850, July 1995. Another report by the SAE is the "Surface Vehicle Information Report, Chrysler Sensor and Control (CSC) Bus Multiplexing Network for Class 'A' Applications", SAE J2058, July 1990. Many other networks are also being implemented or proposed for communications between vehicle devices and nodes or controllers.

Unfortunately, conventional vehicle control systems, such as aftermarket vehicle security systems, are for hardwired connection to vehicle devices and are not readily adaptable to a vehicle including a data communications bus. Moreover, a vehicle security system if adapted for a communications bus and devices for one particular model, model year, and manufacturer, may not be compatible with any other models, model years, or manufacturers. Other systems for the control of vehicle functions may also suffer from such shortcomings.

SUMMARY OF THE INVENTION

In view of the foregoing background it is therefore an object of the invention to provide a remote 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.

This and other objects, features and advantages in accordance with the present invention are provided by a control system including a transmitter and a receiver for receiving signals from the transmitter, and a multi-vehicle compatible controller cooperating with the transmitter and receiver. 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. Such an arrangement provides for a relatively simple and straightforward approach to interface with a vehicle having a data communications bus.

The multi-vehicle compatible controller may comprise a memory for the stored device codes, and a processor cooperating with the memory for determining the match between the read device code and the stored device codes. The at least one vehicle device may include a plurality of vehicle devices, and, accordingly, the multi-vehicle compatible controller stores a respective set of device codes for each of the vehicle devices.

The invention is useful for a number of vehicle remote control functions. For example, the stored device codes may relate to vehicle security. In other words, the multi-vehicle compatible controller may be an alarm or security system controller. The stored vehicle codes may also relate to keyless entry for the vehicle. By way of further example, the stored device codes may relate to remote starting a vehicle engine.

The multi-vehicle compatibility concept may be extended to an adaptor device for after-market installation, and be especially advantageous when used in combination with a conventional remote function controller. In other words, the multi-vehicle compatible controller may comprise a multi-vehicle compatible adaptor connected to the data communications bus for determining the match between the read device code and the stored device codes and generating an output signal responsive thereto, and a controller connected to the multi-vehicle compatible adaptor and being responsive to output signals therefrom. Of course, the controller and adaptor may be positioned in respective different housings.

The control system can be operated directly by the user, or via an intervening communications network. In other words, in some embodiments, the transmitter may be a remote handheld transmitter to be carried by a user when away from the vehicle, and the receiver is at the vehicle. In other embodiments, the transmitter may include at least a central station transmitter, and the receiver is at the vehicle. The central station transmitter may be part of a satellite or cellular telephone network.

In yet other embodiments, the receiver may be a handheld unit carried by the user or a central station receiver, such as to notify the user or others of a vehicle security breach, for example. In these embodiments, the transmitter is then located at the vehicle.

Another aspect of the invention relates to a control method for a vehicle comprising a data communications bus and at least one vehicle device connected thereto. The method preferably comprises storing a set of device codes for a given vehicle device for a plurality of different vehicles, reading a device code from the data communications bus, and 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 method may further include receiving a signal from a transmitter, and wherein performing the function is also based upon receiving the signal from the transmitter.

Another method aspect of the invention is for adapting a control system for a vehicle to be compatible with a plurality of different vehicles, with each vehicle comprising a data communications bus and at least one vehicle device connected thereto. The control system preferably comprises a transmitter, a receiver for receiving signals from the transmitter, and a controller cooperating with the transmitter and the receiver. More particularly, the method for adapting preferably comprises storing a set of device codes for a given vehicle device for a plurality of different vehicles, reading a device code from the data communications bus, and determining a match between a read device code and the stored device codes for performing at least one vehicle function and to thereby provide compatibility with a plurality of different vehicles.

BRIEF DESCRIPTION OF THE DRAWINGS

FIG. **1** is a schematic block diagram of a vehicle control system including the multi-vehicle compatible controller connected to a data communications bus and other hard-wired devices in accordance with the invention.

FIG. **2** is a more detailed schematic block diagram of an embodiment of the multi-vehicle compatible controller illustrating the command signal generation in accordance with the invention.

FIG. **3** is a schematic diagram illustrating processing of command signals by the multi-vehicle compatible controller of FIG. **2**.

FIG. **4** is a more detailed schematic block diagram of an embodiment of the multi-vehicle compatible controller illustrating the code signal look-up in accordance with the invention.

FIG. **5** is a schematic diagram illustrating processing of a code read from the data communications bus in accordance with a first embodiment of the multi-vehicle compatible controller of FIG. **4**.

FIG. **6** is a schematic diagram illustrating processing of a code read from the data communications bus in accordance with a second embodiment of the multi-vehicle compatible controller of FIG. **4**.

FIG. **7** is a schematic block diagram of a multi-vehicle compatible adaptor in accordance with the present invention and illustrating the command signal processing portion.

FIG. **8** is a schematic block diagram of a multi-vehicle compatible adaptor in accordance with the present invention and illustrating the read code processing.

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. Prime and multiple prime notation are used in alternate embodiments to indicate similar elements.

Referring initially to FIG. **1**, a control system **20** for a vehicle **21** is now described. The control system **20** includes a multi-vehicle compatible controller **25** connected to a data communications bus **30** in the vehicle **21**. The data communications bus **30** may be any of several types, such as compatible with the J1850 or CAN standards, or other type of bus as will be appreciated by those skilled in the art. The multi-vehicle compatible controller **25**, as its name suggests, provides compatibility with different codes used on the data bus and which may vary by vehicle as described in greater detail below.

The control system **20** preferably includes a transmitter, and a receiver for receiving signals from the transmitter. As shown in the illustrated embodiment, both a transmitter **31** and a receiver **32** are provided at the vehicle **21**. In addition, both a receiver **33** and a transmitter **34** are provided remotely or away from the vehicle. The first transmitter/receiver pair **31**, **33** may be used, for example, to provide a remote alert or page to a user when away from the vehicle of a security breach at the vehicle, for example. The second transmitter/receiver pair **32**, **34** 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. As will also be appreciated by those skilled in the art, in other embodiments, only one of these pairs of transmitters and receivers may be provided in the control system.

The remote transmitter **34** may be a small portable unit including a housing, function control switches carried by the housing, a battery within the housing, and the associated transmitter circuitry. This type of remote handheld transmitter is commonly used in conventional vehicle security systems, remote start systems, and remote keyless entry systems. The communications from the remote transmitter **34** to the receiver **32** at the vehicle is typically a direct radio frequency link, that is, there is no intervening communications links. However, in other embodiments, the remote transmitter **34** may indirectly communicate with the receiver **32** via other communications infrastructure, such as via satellite, or cellular communications, via the public switched telephone network (PSTN) and/or over the world wide web or Internet, as will be appreciated by those skilled in the art.

The remote transmitter **34** may also be a passive transponder type device, that takes power from an associated transponder reader as will be appreciated by those skilled in the art, and automatically transmits a signal to the reader. For example, the transponder may be of the type carried in conjunction with the vehicle keys, or may be embedded in the key as will be readily appreciated by those skilled in the art.

The remote transmitter **34** may also include one or more central station transmitters, such as may be provided by a satellite transmitter or cellular telephone transmitter, for example. Such a central station transmitter may also be connected to other communications infrastructure.

The remote receiver **33** may also be a small portable unit including a housing, one or more indicators carried by the housing, a battery within the housing, and the associated receiver circuitry. This type of remote receiver may also directly communicate with the vehicle transmitter **31**, or there may be intervening communications links as will be appreciated by those skilled in the art. In some embodiments, the remote transmitter **34** and remote receiver **33** may be packaged together in a common handheld housing. Of course the remote receiver **33** may also include one or more central stations along the lines as described above for the central station remote transmitter.

The multi-vehicle compatible controller **25** may also include a central processing unit (CPU) **36** and one or more memories **40** connected thereto. Although the memory **40** is illustrated as a separate device, those of skill in the art will recognize that the memory may alternately be embedded on the same integrated circuit as the processing circuitry of the CPU.

The multi-vehicle compatible controller **25** also may optionally include a hardwire interface **42** which may be directly connected to one or more vehicle devices **44**. For example, in some embodiments for a security system, direct connections may be made to one or more vehicle sensors, an indicator LED, a siren, or the headlight relay. For a remote start system, hardwire connections may be made to a starter motor relay, for example. Those of skill in the art will recognize other devices **44** that may be directly connected to the multi-vehicle compatible controller **25** via the hardwire interface **42**. The hardwire interface **42** may included circuitry for sending signals to or reading signals from the vehicle devices **44** as will be appreciated by those skilled in the art. In some embodiments, the hardwire interface **42** may not be needed or incorporated in the multi-vehicle compatible controller **25**.

The multi-vehicle compatible controller **25** also illustratively includes a bus interface **41** cooperating with the CPU **36** to perform at least one of reading signals from the data communications bus **30**, or generating signals on the data bus. The bus interface **41** includes circuitry for interfacing to the proper signal levels and formats on the data communications bus **30** as will be appreciated by those skilled in the art without further discussion herein.

As will also be readily appreciated by those skilled in the art, the vehicle **21** includes a number of electrical/electronic devices that can be controlled and/or the status thereof read via the data communications bus **30**. For simplicity of explanation, these devices are schematically illustrated by the two blocks **44**, **45**, respectively labeled "vehicle devices (sensors, actuators, etc.)," and "vehicle controllers (engine controller, transmission controller, etc.)." In other words, the vehicle devices connected to the data bus **30** 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.

The multi-vehicle compatibility controller **25** may provide its multi-vehicle compatibility in one or both directions of communications via the data communications bus **30**. Referring now additionally to FIGS. **2** and **3**, the drive or generation of signals on the data bus portion of communication is now further described. In this embodiment, the multi-vehicle compatible controller **25'** illustratively includes a command signal memory **40***a*, and a bus interface **41***a* only for the drive direction for simplicity of explanation.

The devices connected to the data communications bus **30** illustratively include an alarm indicator **44***a*, such as can be provided by a separate siren or the vehicle horn, for example. The alarm indicator **44***a* would likely be included for a security system. The vehicle devices may also include one or more door lock actuators **44***b* as would be likely used

by a security system or remote keyless entry system, for example, as would be readily appreciated by those skilled in the art.

For a remote start system, one or more remote starting device **44***c* may be connected to the data communications bus **30** as shown in the illustrated embodiment. Such a remote starting device **44***c* may be a starter relay, for example, controlled by signals from the data communications bus. The remote starting device **44***c* could also be a device or circuit to bypass an engine immobilizer circuit as will be appreciated by those skilled in the art.

The vehicle device to which signals are to be sent by the multi-vehicle controller **25'** may also include another controller, such as the schematically illustrated engine management controller **45***a*. The engine management controller **45***a* could be sent signals such as to prevent or enable starting for security or remote start applications as will be appreciated by those skilled in the art.

The multi-vehicle compatible controller **25'** may also include an optional hardwire interface and other components as mentioned above. For clarity and simplicity of explanation, these components need no further description.

In accordance with this aspect of the invention, the multi-vehicle compatible controller **25'** preferably generates at least one set of command signals on the data communications bus **30** for the at least one vehicle device. The at least one set of command signals preferably comprises at least one working command signal and at least one non-working command signal for a given vehicle to thereby provide compatibility with the plurality of different vehicles. In other words, multiple signals or codes can be generated on the data communications bus **30**, and only that code for the given vehicle and device will cause an operation or response from the vehicle device. This provides for a relatively simple and straightforward approach to interface or cooperate with a vehicle having a data communications bus **30**, and wherein the controller is advantageously compatible with a number of different vehicles. Since typically it may be desired to interface to a plurality of vehicle devices, the multi-vehicle compatible controller **25'** may generate a respective set of command signals for each of the vehicle devices.

Such multi-vehicle compatibility provided by the controller **25'** is especially advantageous in after-market systems, such as for security, remote keyless entry, or remote starting for example. The ability to interface through the data communications bus **30** also significantly reduces the wiring complexity needed to interface to the associated vehicle devices.

The multi-vehicle compatible controller **25'** may sequentially generate the different command signals (working and non-working) for an intended vehicle device. To ensure effective communications even in the presence of noise, for example, the multi-vehicle compatible controller **25'** may generate the set of command signals a plurality of times, such as, for example, two to five times. The need to effectively communicate should be balanced against possible traffic congestion on the data bus **30** as will be appreciated by those skilled in the art.

Referring now more specifically to the diagram of FIG. **3**, the operation of the multi-vehicle controller **25'** is further described. The controller **25'** may operate by arranging in the command signals memory **40***a* a common table **50** as shown. The CPU **36** upon determining that an action needs to be performed, such as unlocking the driver's door, for example, would identify the appropriate column from the table **50** from among the columns labeled "vehicle device A" to "vehicle device Z". For example, the appropriate column may be "vehicle device B", in which case the CPU would then read the memory locations in this column to generate on the bus **30** the appropriate set of codes to lock the driver's door for each of the N vehicles with which the multi-vehicle compatible controller **25'** is compatible. Of course, only one of the codes would be a working code, and the other codes would cause no vehicle function to be performed. For example, if vehicle **2** was the vehicle in which the multi-vehicle compatible controller **25'** were installed, only the code **2**B would cause the driver's door to unlock.

The actual coded signals would be compatible with the particular data communications bus **30** as will be appreciated by those skilled in the art. The codes may be binary codes, which for convenience can be represented more simply by corresponding hexadecimal codes as would also be appreciated by those skilled in the art. For example, for an unlock all vehicle doors to be commanded in a 1995 Jeep Grand Cherokee, the code may be 03868004, for a 2000 Jeep Grand Cherokee, the code may be 0422A00400. As will be readily appreciated by those skilled in the art, such codes can be obtained from the manufacturers directly, or may be read from the data bus **30** using any one of a number of commercially available diagnostic tools for reading the data bus **30**, for example.

The set of command signals may be repeated as mentioned above, and as schematically illustrated at the lower portion of the table **50**. Of course, the memory **40***a* may store the actual codes, but may also store data enabling generation of the set of command signals by the CPU **36**. This may be particularly so where certain portions of the code, e.g. preamble, or some other portion, are common across either multiple vehicles, and/or over multiple vehicle devices.

The number of vehicles and number of devices to be controlled using the multi-vehicle compatible controller **25'** can both be relatively large to cover a substantial portion of the vehicle marketplace. Alternatively, the multiple command signal concept may also be advantageously used to provide compatibility for as few as two vehicles, and even a single vehicle device.

Turning now to FIGS. **4–6**, the other direction of communication is now described. In particular, the reverse direction or reading of signals from the data communications bus **30** is now described. Many of the components are the same as those described above, and, hence, need no further description. In the illustrated embodiment, the CPU **36** is connected to a code look-up memory **40***b*. In addition, only the read or receive side of the bus interface **41***b* is schematically illustrated. The data bus **30** also illustratively connects one or more of vehicle security sensors or devices **44***d*, vehicle remote keyless entry sensors or devices, and vehicle remote start sensors or devices **44***f* to the multi-vehicle compatible controller **25"**. An engine management controller **45***a* is also illustratively connected to the data communications bus **30** as may be used for vehicle security or remote starting as mentioned above. Considered in somewhat different terms, the multi-vehicle compatible controller **25"** may be for one or more of the conventional vehicle remote control functions broadly considered as vehicle security, remote keyless entry, or remote starting. Other similar control functions for a vehicle are also contemplated by the present invention.

The compatibility to read a code and determine the message or content thereof for a vehicle device from among a plurality of vehicles can be used alone or in combination with the compatibility for writing or generating signals on

EXHIBIT A

the bus described above. More particularly, the multi-vehicle compatible controller **25**" 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 **30**, 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. Such an arrangement provides for a relatively simple and straightforward approach to interface with a vehicle having a data communications bus **30**.

As noted briefly above, the multi-vehicle compatible controller **25**" may comprise the code look-up memory **40***b* for the stored device codes, and a processor or CPU **36** cooperating with the memory for determining the match between the read device code and the stored device codes. The at least one vehicle device may include a plurality of vehicle devices, and, accordingly, the memory **40***b* of the multi-vehicle compatible controller **25**" preferably stores a respective set of device codes for each of the plurality of vehicle devices.

Referring now more specifically to FIG. **5**, the look-up table feature of the multi-vehicle compatible controller **25**" is now described. A common table **60** may be created which contains a column for the vehicle codes in some predefined sequence, such as in a numerical order beginning with a first code, Code **1**, and ending with a last code, Code N, as illustrated. The central column in the illustrated embodiment includes the corresponding vehicle identification with the vehicles extending from a first vehicle, Vehicle A, to a last vehicle, Vehicle Z. The number of codes and vehicles may be selected so that a given multi-vehicle compatible controller **25**" is useable across an economically large number of vehicles as will be appreciated by those skilled in the art.

The last or rightmost column in the illustrated table **60** is the device data or message corresponding to the associated vehicle and code. These device messages extend from a first message, DM_{1A}, to a last device message, DM_{NZ}. The messages may be of many different types, such as driver door open or closed, hood open or closed, shock sensor triggered, brake pressure indicated, gearshift selector in Park, etc. as will be appreciated by those skilled in the art.

By way of example, the common table **60** includes a blocked row schematically illustrating a match for a Code **572**. This code is for a Ford Taurus and indicates that the driver's door is open. This type of data may be useful in any of the illustrated implementations including vehicle security, remote keyless entry, or remote starting. The CPU **36** would read the code on the data bus **30** and compare the code against the stored codes to determine a match. The CPU **36** is likely to buffer some or all of a code when received to subsequently be compared using the table **60** as will be understood by those skilled in the art. In other embodiments, individual bits or blocks thereof may be compared as they are received.

An alternate embodiment of the common table **60** is now explained with reference to FIG. **6**. In this case the overall or common table **60'**, may be considered parsed or divided into a plurality of vehicle table sections. The first table section is for vehicle A, and the last for vehicle Z in the illustrated embodiment. This embodiment also illustrates the driver door for the Ford Taurus as being matched from the read signal from the data communications bus **30**. What is of interest in this embodiment, is that upon initial set-up or an initial learning period, only the codes for the learned vehicle need then later be compared to the read code. Accordingly, a time savings may be realized.

Those of skill in the art will recognize that the tables **60** and **60'** of FIGS. **5** and **6** are exemplary illustrations from among many possible configurations of look-up tables that may be used in accordance with the present invention. Other configurations are also contemplated by the present invention.

Since it may also be desirable to re-install the multi-vehicle compatible controller **25**" in another vehicle, the controller may be reset and another vehicle learned or configured during an initial set-up. This concept is generally described as an embodiment of a desired signal enabling function or feature in related parent U.S. patent application Ser. No. 09/382,245 filed Aug. 25, 1999, which in turn, is a continuation of U.S. Pat. No. 6,011,460, which in turn, is a continuation-in-part of U.S. Pat. No. 5,719,551, and the disclosure of each of which are incorporated herein by reference in its entirety.

Turning now to FIG. **7**, we again revisit the command signal concept for driving the communications bus **30** with a plurality of signal codes to provide the multi-vehicle compatibility. In this variation, the multi-vehicle controller is divided into two sections or portions. More particularly, the multi-vehicle compatibility is provided by the illustrated multi-vehicle compatible adaptor **70**. The adaptor **70** illustratively includes the CPU **36**, the command signal memory **40***a*, and the bus interface **41***a*. The adaptor **70** also includes its own housing **71**. The adaptor **70**, may include a hardwire interface as discussed above, or such could already be provided with any of the controllers **73**, **75** or **77** as would more typically be the case.

The adaptor **70** is fed signals from one or more of the illustrated conventional controllers, that is, one or more of the remote start controller **73**, the remote keyless entry controller **75** or the security system controller **77**. Each of the these controllers **73**, **75** and **77** may also include its own respective housing **74**, **76** and **78**.

As will be appreciated by those skilled in the art, one scenario where the adaptor **70** may be especially useful is to adapt a conventional security or other system controller to operate via the data communications bus **30**. Since the data bus technology is being slowly phased in by automobile manufacturers, suppliers may provide their conventional systems for conventional vehicles, and add the adaptor **70** with the conventional controller when the vehicle requires interface to the data communications bus **30**.

Turning now to FIG. **8**, it can be seen that similar concepts can be extended to the multi-vehicle compatible adaptor **70'** for the other direction of communication, that is, from the data communications bus **30** to one or more of the controllers **73**, **75** and **77**. The adaptor **70'** illustratively includes the CPU **36**, bus interface circuit **41***b* for reading the bus, and the code look-up memory **40***b* as described above with reference to FIG. **4**.

The operation of the multi-vehicle compatible adaptor **70'** will be readily understood by those of skill in the art based upon the above provided descriptions relating to FIGS. **4–6** without requiring further discussion herein. Of course, as will be appreciated by those skilled in the art, the adaptors **70**, **70'** may be used independently, may be used together, or may be combined into a single unit.

Other features relating to vehicle control systems are disclosed in copending patent applications entitled "REMOTE START SYSTEM FOR A VEHICLE HAVING A DATA COMMUNICATIONS BUS AND RELATED METHODS" (attorney docket no. 16635E) and "MULTI-VEHICLE COMPATIBLE CONTROL SYSTEM GENER-

ATING COMMAND SIGNALS ON A DATA BUS AND ASSOCIATED METHODS" (attorney docket no. 16635G), 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 illustrated 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:

1. A control system for a vehicle comprising a data communications bus and at least one vehicle device connected thereto, the control system comprising:

a transmitter and a receiver for receiving signals from said transmitter; and

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 with a plurality of different vehicles.

2. A control system according to claim **1** wherein said multi-vehicle compatible controller comprises a memory for the stored device codes.

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.

4. A control system according to claim **1** wherein the at least one vehicle device comprises a plurality of vehicle devices; and wherein said multi-vehicle compatible controller stores a respective set of device codes for each of the plurality of vehicle devices.

5. A control system according to claim **1** wherein the at least one vehicle device comprises a vehicle sensor; and wherein the stored device codes relate to the vehicle sensor.

6. A control system according to claim **5** wherein the stored device codes relate to vehicle security.

7. A control system according to claim **5** wherein the stored vehicle codes relate to keyless entry for the vehicle.

8. A control system according to claim **5** wherein the stored device codes relate to remote starting a vehicle engine.

9. A control system according to claim **1** wherein said multi-vehicle compatible controller comprises:

a multi-vehicle compatible adaptor connected to the data communications bus for determining the match between the read device code and the stored device codes and generating an output signal responsive thereto; and

a controller connected to said multi-vehicle compatible adaptor and being responsive to output signals therefrom.

10. A control system according to claim **9** wherein said controller further comprises a first housing; and said multi-vehicle adaptor comprises a second housing.

11. A control system according to claim **1** wherein said transmitter comprises a remote handheld transmitter to be carried by a user when away from the vehicle; and wherein said receiver is at the vehicle.

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.

13. A control system according to claim **1** wherein said receiver comprises a remote receiver to be carried by a user when away from the vehicle; and wherein said transmitter is at the vehicle.

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.

15. A control system according to claim **1** wherein said transmitter comprises a transponder transmitter to be carried by a user; and wherein said receiver is at the vehicle.

16. An adaptor for adapting a control system for a vehicle to be compatible with a plurality of different vehicles, each vehicle comprising a data communications bus and at least one vehicle device connected thereto, the control system comprising a transmitter and a receiver for receiving signals from the transmitter, and a controller cooperating with the transmitter and receiver, the adaptor comprising:

a housing; and

a multi-vehicle compatible adaptor circuit mounted in said housing 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.

17. An adaptor according to claim **16** wherein said multi-vehicle compatible adaptor circuit comprises a memory for the stored device codes.

18. An adaptor according to claim **17** wherein said multi-vehicle compatible adaptor circuit comprises a processor cooperating with said memory for determining the match between the read device code and the stored device codes.

19. An adaptor according to claim **16** wherein the at least one vehicle device comprises a plurality of vehicle devices; and wherein said multi-vehicle compatible adaptor circuit stores a respective set of device codes for each of the plurality of vehicle devices.

20. An adaptor according to claim **16** wherein the at least one vehicle device comprises a vehicle sensor; and wherein the stored device codes relate to the vehicle sensor.

21. An adaptor according to claim **16** wherein the stored vehicle codes relate to vehicle security.

22. An adaptor according to claim **16** wherein the stored vehicle codes relate to keyless entry for the vehicle.

23. An adaptor according to claim **16** wherein the stored vehicle codes relate to remote starting a vehicle engine.

24. A control method for a vehicle comprising a data communications bus and at least one vehicle device connected thereto, the method comprising:

storing a set of device codes for a given vehicle device for a plurality of different vehicles;

reading a device code from the data communications bus; and

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.

25. A method according to claim **24** further comprising receiving a signal from a transmitter; and wherein performing the function is also based upon receiving the signal from the transmitter.

26. A method according to claim **25** wherein the transmitter comprises a handheld remote transmitter to be carried by a user when away from the vehicle.

27. A method according to claim **25** wherein the transmitter comprises at least a central station transmitter.

28. A method according to claim **25** wherein the transmitter comprises a handheld transponder to be carried by a user when away from the vehicle.

29. A method according to claim **24** wherein the function comprises transmitting a signal from the vehicle to a remote receiver.

30. A method according to claim **29** wherein the remote receiver comprises a handheld receiver to be carried by the user when away from the vehicle.

31. A method according to claim **29** wherein the remote receiver comprises at least one central station remote receiver.

32. A method according to claim **24** wherein the at least one vehicle device comprises a plurality of vehicle devices; and wherein storing comprises storing a respective set of device codes for each of the plurality of vehicle devices.

33. A method according to claim **24** wherein the at least one vehicle device comprises a vehicle sensor; and wherein the stored device codes relate to the vehicle sensor.

34. A method according to claim **24** wherein the stored vehicle codes relate to vehicle security.

35. A method according to claim **24** wherein the stored vehicle codes relate to keyless entry for the vehicle.

36. A method according to claim **24** wherein the stored vehicle codes relate to remote starting a vehicle engine.

37. A method for adapting a control system for a vehicle to be compatible with a plurality of different vehicles, each vehicle comprising a data communications bus and at least one vehicle device connected thereto, the control system comprising a transmitter and a receiver for receiving signals from the transmitter, and a controller at the vehicle and cooperating with the transmitter and receiver, the method comprising:

storing a set of device codes for a given vehicle device for a plurality of different vehicles;

reading a device code from the data communications bus; and

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.

38. A method according to claim **37** wherein the receiver is at the vehicle and the transmitter is remote therefrom; and further comprising receiving a signal from the transmitter and performing the function further based thereon.

39. A method according to claim **37** wherein the transmitter is at the vehicle and the receiver is remote therefrom; and wherein the function comprises transmitting a signal from the vehicle to the remote receiver.

40. A method according to claim **37** wherein the at least one vehicle device comprises a plurality of vehicle devices; and wherein storing comprises storing a respective set of device codes for each of the plurality of vehicle devices.

41. A method according to claim **37** wherein the at least one vehicle device comprises a vehicle sensor; and wherein the stored device codes relate to the vehicle sensor.

42. A method according to claim **37** wherein the stored vehicle codes relate to vehicle security.

43. A method according to claim **37** wherein the stored vehicle codes relate to keyless entry for the vehicle.

44. A method according to claim **37** wherein the stored vehicle codes relate to remote starting a vehicle engine.

* * * * *

EXHIBIT E

US007671727B2

(12) **United States Patent**
Flick

(10) **Patent No.: US 7,671,727 B2**
(45) **Date of Patent: Mar. 2, 2010**

(54) **SPEED EXCEEDED NOTIFICATION DEVICE FOR VEHICLE HAVING A DATA BUS AND ASSOCIATED METHODS**

(75) Inventor: **Kenneth E. Flick**, Douglasville, GA (US)

(73) Assignee: **Omega Patents, L.L.C.**, Douglasville, GA (US)

(*) Notice: Subject to any disclaimer, the term of this patent is extended or adjusted under 35 U.S.C. 154(b) by 340 days.

(21) Appl. No.: **11/844,703**

(22) Filed: **Aug. 24, 2007**

(65) **Prior Publication Data**

US 2008/0030316 A1 Feb. 7, 2008

Related U.S. Application Data

(63) Continuation-in-part of application No. 11/076,259, filed on Mar. 9, 2005, 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.**
B60Q 1/54 (2006.01)

(52) **U.S. Cl.** **340/466**; 340/441; 340/936; 340/426.19; 340/988; 701/213

(58) **Field of Classification Search** 340/441, 340/936, 989, 426.19, 466, 988, 901, 902, 340/992, 993; 701/213, 207, 209, 24, 33, 701/35, 36

See application file for complete search history.

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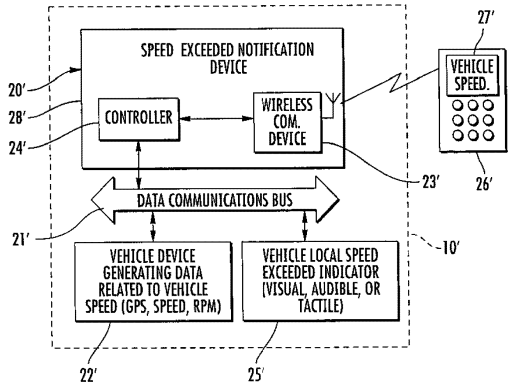
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Primary Examiner—Daryl Pope
(74) *Attorney, Agent, or Firm*—Allen, Dyer, Doppelt, Milbrath & Gilchrist, P.A

(57) **ABSTRACT**

A speed exceeded notification device is for a vehicle of a type including 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 may include a wireless communications device, and a controller to be coupled to the vehicle data communications bus. The controller may be 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. Based thereon, the controller may cooperate with the wireless communications device to send a remote vehicle speed exceeded notification.

25 Claims, 6 Drawing Sheets



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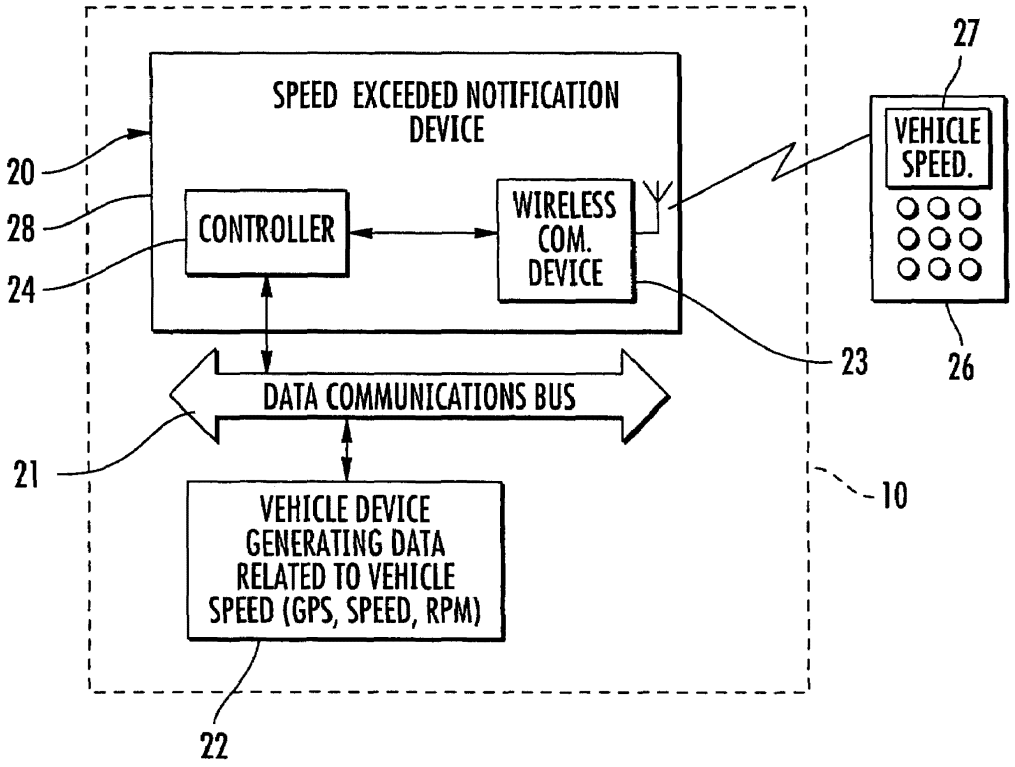

SPEED EXCEEDED NOTIFICATION DEVICE
CONTROLLER
WIRELESS COM. DEVICE
DATA COMMUNICATIONS BUS
VEHICLE DEVICE GENERATING DATA RELATED TO VEHICLE SPEED (GPS, SPEED, RPM)
VEHICLE SPEED.
20
28
24
21
22
23
26
27
10

FIG. 1

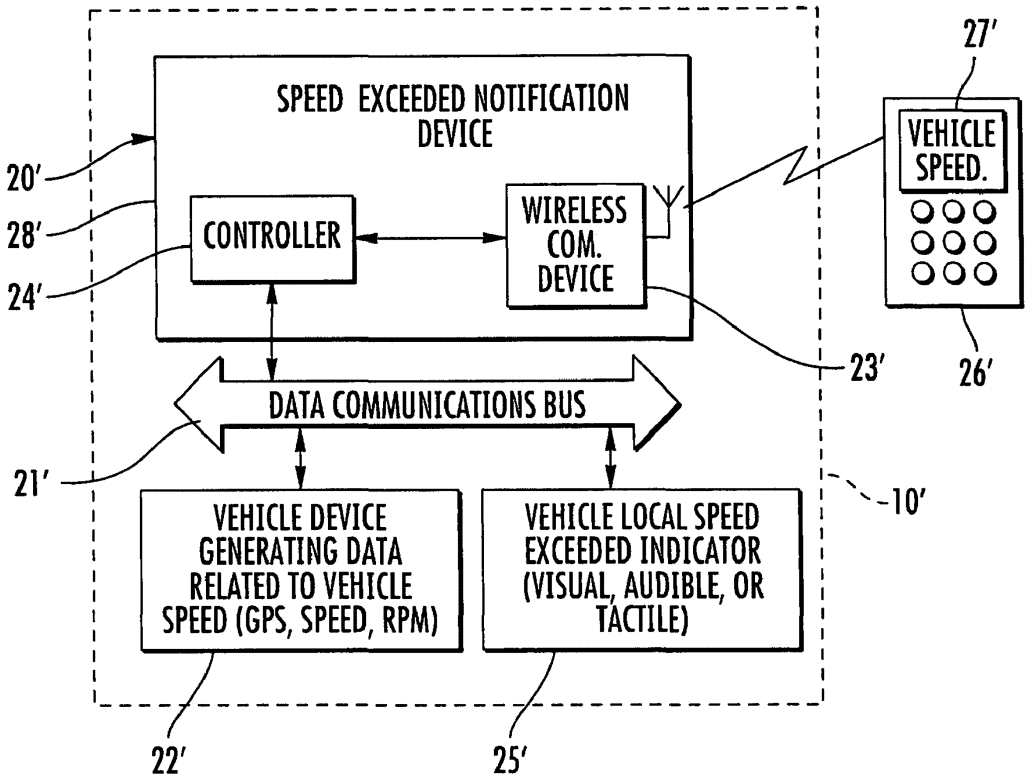

SPEED EXCEEDED NOTIFICATION DEVICE
CONTROLLER
WIRELESS COM. DEVICE
DATA COMMUNICATIONS BUS
VEHICLE DEVICE GENERATING DATA RELATED TO VEHICLE SPEED (GPS, SPEED, RPM)
VEHICLE LOCAL SPEED EXCEEDED INDICATOR (VISUAL, AUDIBLE, OR TACTILE)
VEHICLE SPEED.
20′
28′
24′
21′
22′
25′
23′
26′
27′
10′

FIG. 2

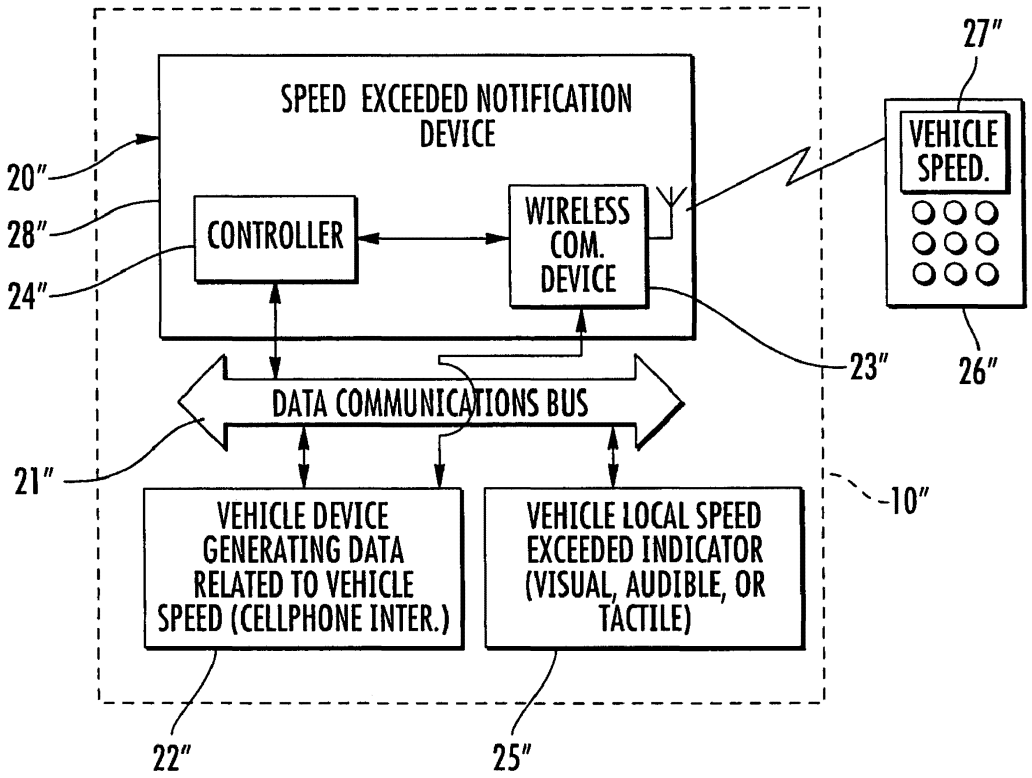

SPEED EXCEEDED NOTIFICATION DEVICE
CONTROLLER
WIRELESS COM. DEVICE
DATA COMMUNICATIONS BUS
VEHICLE DEVICE GENERATING DATA RELATED TO VEHICLE SPEED (CELLPHONE INTER.)
VEHICLE LOCAL SPEED EXCEEDED INDICATOR (VISUAL, AUDIBLE, OR TACTILE)
VEHICLE SPEED.
20″
28″
24″
21″
22″
25″
23″
26″
27″
10″

FIG. 3

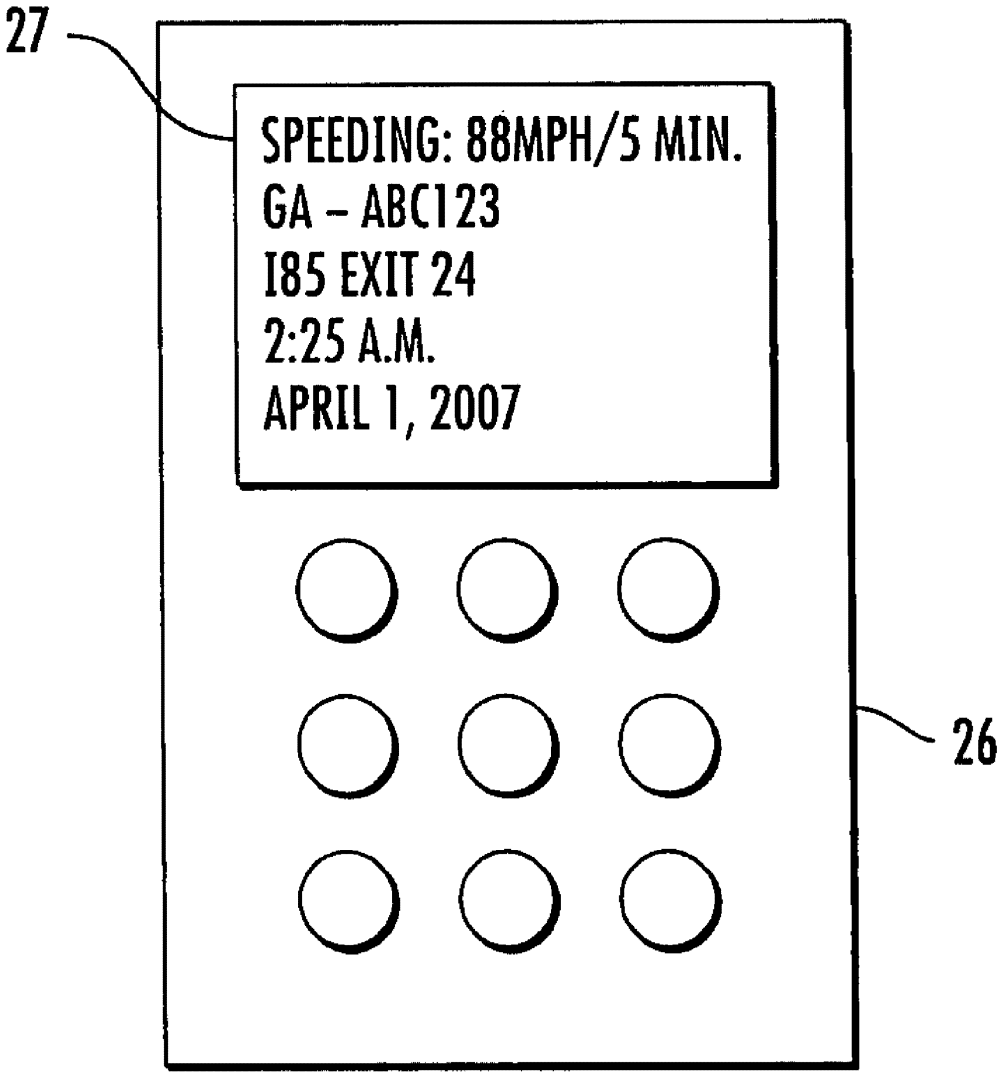

27
SPEEDING: 88MPH/5 MIN.
GA – ABC123
I85 EXIT 24
2:25 A.M.
APRIL 1, 2007
26

FIG. 4

DISMISSAL AGREEMENT

This Agreement is made effective as of the 9th day of June, 2010, by and between Plaintiff OMEGA PATENTS, LLC ("Plaintiff" or "Omega"), and Defendant CALAMP CORP. ("Defendant," or "CALAMP").

WHEREAS, Plaintiff has asserted various claims against Defendants in an action entitled OMEGA PATENTs, LLC vs. CALAMP CORP., No. 1:09-cv-3474-JOF (the "Action"), presently pending in the United States District Court for the Northern District of Georgia (the "Court"); and

WHEREAS, Plaintiff and Defendant desire to work towards an amicable resolution without the time constraints of the existing action;

NOW, THEREFORE, in consideration of the respective undertakings of the parties to this Agreement, and for other good and valuable consideration, the sufficiency of which is acknowledged, parties hereto agree to the terms set forth below:

1. Upon execution of this Agreement, but in no case later than June 11, 2010, Plaintiff will instruct their counsel of record to execute and file with the Court a Request for Dismissal Without Prejudice, thereby dismissing Plaintiff's complaint without prejudice. Each Party shall bear its own costs and attorneys' fees. The dismissal shall not be used in any manner against Plaintiff in any subsequent proceeding in which Defendant seeks relief.

2. Defendant agrees that it will not file for declaratory judgment relief against Plaintiff regarding the following patents:

U.S. Letters Patent No. 6,509,868 B2;
U.S. Letters Patent No. 6,606,561 B2;
U.S. Letters Patent No. 6,737,989 B2;
U.S. Letters Patent No. 6,741,187 B2;
U.S. Letters Patent No. 6,765,499 B2;
U.S. Letters Patent No. 6,798,355 B2;
U.S. Letters Patent No. 7,149,623 B2; and
U.S. Letters Patent No. 7,343,244 B2.

3. Defendant agrees that if Plaintiff files suit against it in the future for infringement of one or more of U.S. Letters Patent No. 6,509,868 B2, U.S. Letters Patent No. 6,606,561 B2, U.S. Letters Patent No. 6,737,989 B2, U.S. Letters Patent No. 6,741,187 B2, U.S. Letters Patent No. 6,765,499 B2, U.S. Letters Patent No. 6,798,355 B2, U.S. Letters Patent No. 7,149,623 B2 or U.S. Letters Patent No. 7,343,244 B2 in the U.S. District Court for the Middle District of Florida, Orlando Division, that Defendant will not move to dismiss such suit based on lack of personal jurisdiction, improper venue or forum non conveniens; Defendants expressly consent to jurisdiction and venue in this District. Except as expressly stated herein, Defendant reserves the right to raise any and all defenses available to it in any suit filed against it in any jurisdiction by Plaintiff.

4. Each Party to this Agreement acknowledges and affirms that such Party has been advised and has had the opportunity to consult with an attorney prior to signing this Agreement; that this Agreement was drafted and reviewed by each Party's counsel; that such Party has fully read and reviewed the terms and provisions of this Agreement; that such Party understands, accepts, and agrees to the content and consequences hereof freely and without reservation; and that such Party has

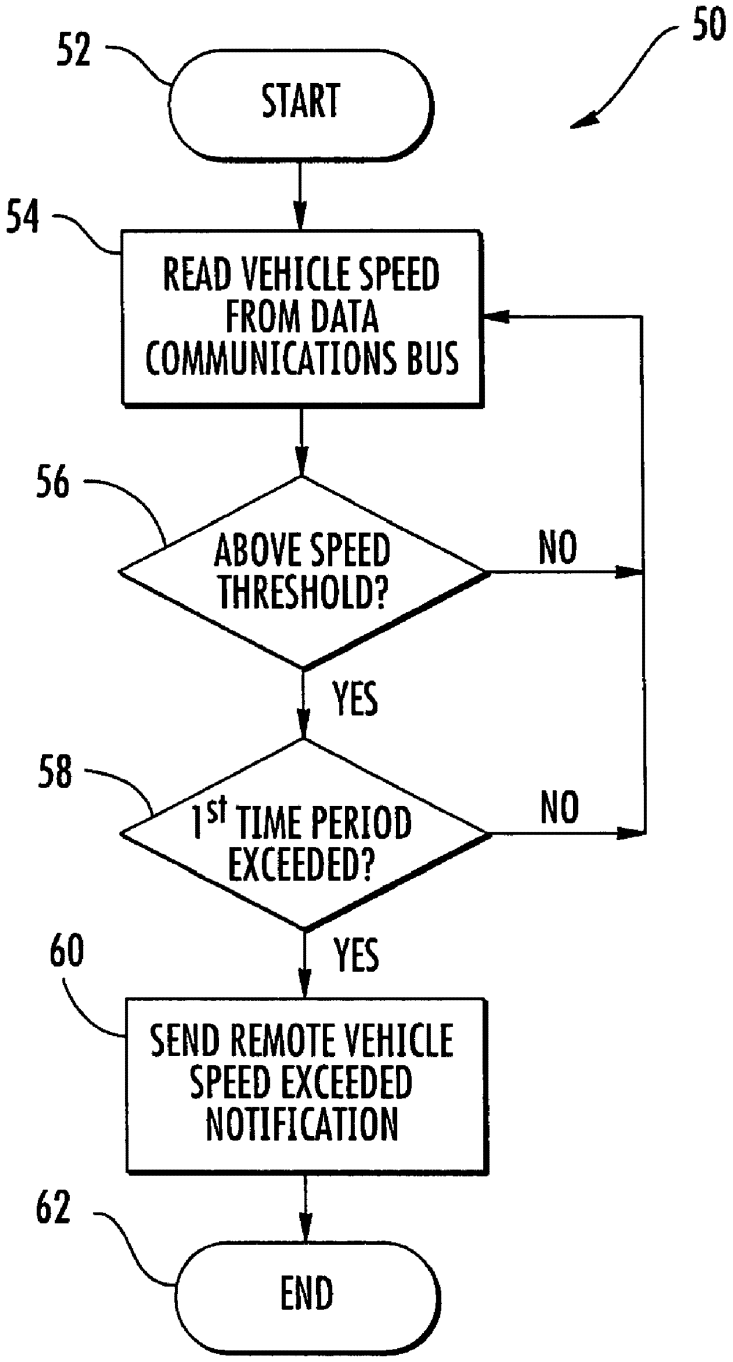

50
52
START
54
READ VEHICLE SPEED FROM DATA COMMUNICATIONS BUS
56
ABOVE SPEED THRESHOLD?
NO
YES
58
1st TIME PERIOD EXCEEDED?
NO
YES
60
SEND REMOTE VEHICLE SPEED EXCEEDED NOTIFICATION
62
END

FIG. 5

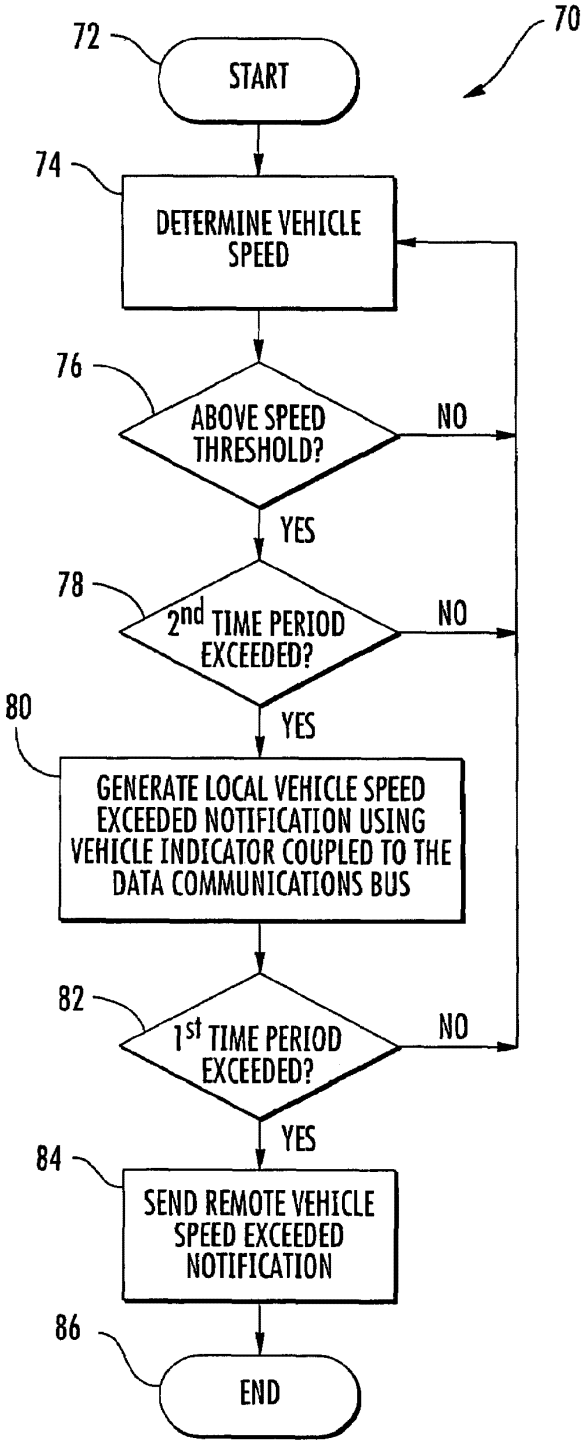

70
72
START
74
DETERMINE VEHICLE SPEED
76
ABOVE SPEED THRESHOLD?
NO
YES
78
2nd TIME PERIOD EXCEEDED?
NO
YES
80
GENERATE LOCAL VEHICLE SPEED EXCEEDED NOTIFICATION USING VEHICLE INDICATOR COUPLED TO THE DATA COMMUNICATIONS BUS
82
1st TIME PERIOD EXCEEDED?
NO
YES
84
SEND REMOTE VEHICLE SPEED EXCEEDED NOTIFICATION
86
END

FIG. 6

SPEED EXCEEDED NOTIFICATION DEVICE FOR VEHICLE HAVING A DATA BUS 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; which 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 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; 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 vehicle speed exceeded notification device, 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.

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 a pager of events such as a car alarm being triggered. Users could control the vehicle remote devices via the phone, the web, or a 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.

A number of significance advances in vehicle tracking technology are disclosed, for example, in U.S. Pat. No. 7,015,830 to Flick, and assigned to the assignee of the present invention. This patent discloses a vehicle tracking unit for a vehicle of a type including a vehicle data bus extending throughout the vehicle and at least one operable vehicle device connected thereto. The at least one operable vehicle device may be responsive to at least one data bus code on the vehicle data bus. The vehicle tracking unit may include a vehicle position determining device, a wireless communications device, and a controller cooperating with the vehicle position determining device and the wireless communications device to send vehicle position information to a user. Moreover, the controller may generate the at least one data bus code on the vehicle data bus to control the at least one operable vehicle device based upon a command signal received by the wireless communications device.

Another significant advance in vehicle tracking relates to speed exceeded notifications and is disclosed in U.S. Pat. No. 6,888,495 to Flick and assigned to the assignee of the present invention. The patent discloses a tracking system controller being switchable to be in an armed mode for cooperating with a vehicle position determining device and a wireless communications device to generate, and send a speeding alert message based upon the vehicle exceeding a speed threshold for longer than a predetermined time indicative of aggressive driving of the vehicle. A monitoring station may generate a series of speeding alert message notifications for a user based upon receiving the speeding alert message from the vehicle tracking unit. The monitoring station may cancel any remaining speeding alert message notifications of the series based upon a cancellation command response from an entity already having received the speeding alert message notification. Accordingly, if the user may be reached at different telephone numbers or different users are desirably notified of the alert, then unnecessary notifications are avoided. Of course, other approaches for using a vehicle tracker to influence/monitor a vehicle regarding excessive speed may also be desirable.

SUMMARY OF THE INVENTION

In view of the foregoing background, it is therefore an object of the present invention to provide a speed exceeded notification device which may be readily used in a vehicle including a data communications bus and related methods.

This and other objects, features, and advantages in accordance with the present invention are provided by a speed exceeded notification device to be installed in a vehicle of a type comprising a vehicle data communications bus extending throughout the vehicle. The vehicle may have at least one vehicle device generating data related to vehicle speed on the vehicle data communications bus, for example. The speed exceeded notification device may comprise a wireless communications device, and a controller to be coupled to the vehicle data communications bus. In addition, the controller may be 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. Based on the exceeding of the speed threshold, the controller may cooperate with the wireless communications device to send a remote vehicle speed exceeded notification, for example. Accordingly, the speed exceeded notification device is readily integrated in a vehicle having a data communications bus, and this may be especially useful in vehicle aftermarket applications, where such functionality is desirably added to a vehicle after its manufacture.

The controller may also be for determining when the vehicle speed exceeds the speed threshold for a second time period less than the first time period and, in response thereto, generating a local vehicle speed exceeded notification. In other words, the device may provide a pre-warning in the form of the local speed exceeded notification so that the driver

is encouraged to slow down before a full speeding notification will be sent from the vehicle, such as to an employer or authority figure.

The local vehicle speed exceeded notification may comprise at least one of an audible notification, a visual notification, and a tactile notification, for example. At least one of the speed threshold, the first time period, and the second time period may be user selectable.

The at least one vehicle device generating data related to vehicle speed on the vehicle data communications bus may include a vehicle position determining device. For example, the vehicle position determining device may include a Global Positioning System (GPS) receiver. Alternatively, the positioning determining device may cooperate with the wireless communications device, particularly where the wireless communications device comprises a cellular communications device, for example.

The remote vehicle speed exceeded notification may further comprise an identity of the vehicle, a speed of the vehicle, and/or a vehicle position, for example. The remote vehicle speed exceeded notification may further comprise a time the vehicle exceeded the speed threshold.

A method aspect is for generating a 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 may comprise 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 method may also comprise using the controller 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.

BRIEF DESCRIPTION OF THE DRAWINGS

FIG. **1** is a schematic block diagram of a speed exceeded notification device in accordance with the invention.

FIG. **2** is schematic block diagram of another embodiment of a speed exceeded notification device in accordance with the invention.

FIG. **3** is schematic block diagram of yet another embodiment of a speed exceeded notification device in accordance with the invention.

FIG. **4** is an enlarged schematic front view of the cellular telephone as in the system of FIG. **1** illustrating a remote speed exceeded notification.

FIG. **5** is a flowchart of operation of a speed exceeded notification device in accordance with the present invention.

FIG. **6** is another flowchart of operation of another embodiment of a speed exceeded notification device in accordance with the present 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 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 and multiple prime notation are used to indicate similar elements in alternative embodiments.

Referring initially to FIG. **1**, a first embodiment of a speed exceeded notification device **20** is now described. The speed exceeded notification device **20** is illustratively installed in a vehicle **10** of a type comprising a vehicle data communications bus **21** extending throughout the vehicle. Illustratively, a vehicle device **22** generates data related to vehicle speed on the vehicle data communications bus **21**. Of course, in other embodiments, more than one vehicle device may generate data related to the vehicle speed. The data related to the vehicle speed may include a vehicle speed signal that includes a digital vehicle speed code. Alternatively or additionally, the data related to vehicle speed may be geographical position data, such as based upon GPS position data; or engine RPM in combination with transmission gearing, for example, that may be used to calculate the vehicle speed.

The speed exceeded notification device **20** includes a wireless communications device **23** and a controller **24** coupled to the vehicle data communications bus **21**. The controller **24** is for reading the data related to vehicle speed from the vehicle data communications bus **21**, and for determining when a vehicle speed exceeds a speed threshold for a first time period. The speed threshold may be user selectable and may be in a range of about 55 to 80 miles per hour, for example. The speed threshold may also be determined based upon the vehicle's location, and a look-up table having the speeds for various roads, as will be appreciated by those skilled in the art.

The first time period may also be user selectable and may be in a range of about 30 seconds to 5 minutes. Of course, other speed ranges, and time durations may also be used. If the speed threshold is exceeded for the first time period, the controller **24** cooperates with the wireless communications device **23** to send a remote vehicle speed exceeded notification.

The controller **24** may be provided by a processor operating under stored program control, and/or may include discrete analog and digital circuits as will be appreciated by those skilled in the art. The controller **24**, in some embodiments, may be a multi-vehicle compatible controller such as described in U.S. Pat. Nos. 6,346,876; 6,756,885; 6,756,886; 6,812,829; 7,010,402; 7,046,126; 7,068,153; 7,091,822 and 7,224,083 all assigned to the assignee of the present invention and incorporated herein by reference. In other embodiments, the controller **24** may be a single vehicle or single vehicle platform controller as will also be appreciated by those skilled in the art.

The wireless communications device **23** may be a cellular telephone communication device that sends the remote vehicle speed exceeded notification as a text message, for example. In another embodiment, the wireless communications device **23** may be another type of wireless communications device using another protocol, for example, and may send the notification in another format, such as an email, or voice message, for example, as will be appreciated by those skilled in the art. Of course, the wireless communications device **23** may be included within a common housing **28** of the device **20**, or may be a separate and removable device, such as the user's personal cellular telephone.

A remote wireless device, such as the illustrated cellphone **26**, is for receiving the remote vehicle speed exceeded signal from the wireless device **23** at the vehicle. The remote wireless device may be a PDA, pager, etc. or other wireless device capable of receiving messages from the wireless communications device **23**. The remote wireless device **26** may also be a fixed central monitoring station that may act upon the speeding notification, or that may forward the speeding notification

onto a subscriber, such as an employer, parent or relative, or other authority figure as will be appreciated by those skilled in the art. The remote wireless device in the form of the cellphone **26** illustratively includes a display **27** that may be used to display a speeding notification. The remote wireless device **26** may communicate directly with the wireless communications device **23** in the vehicle **10**, or may communicate via intervening cellular communications infrastructure, and/or Internet infrastructure as will also be appreciated by those skilled in the art.

Referring now to the embodiment shown in FIG. **2**, the illustrated controller **24'** of the speed exceeded notification device **20'** may also determine when the vehicle speed exceeds the speed threshold for a second time period less than the first time period. If the vehicle speed exceeds the speed threshold for a second time period less than the first time period, the controller **24'** generates a local vehicle speed exceeded notification on a vehicle indicator **25'**. The second time period may also be user selectable and may be in a range of about 2 seconds to 1 minute, for example. In other words, this local vehicle speed notification may serve as a warning to the driver to slow down before the remote speed exceeded notification is sent.

The vehicle local speed exceeded indicator **25'** may produce an audible notification, such as a door chime, a horn honk, a radio volume adjustment, or an automated voice message for example. Alternatively or additionally, the vehicle local speed exceeded indicator **25'** may produce a visual notification, such as a flash of the dome light, illumination or flashing of a dashboard light, or operation of any other visual indicator, for example. In addition, the vehicle local speed exceeded indicator **25'** may be a tactile notification indicator, such as a causing steering wheel vibration, seat vibration, etc. The local indication may be repetitive and increasing in urgency as the full first time period is approached. For example, the repetition frequency. audible pitch, or volume may be progressively increasing. The local speed notification on the vehicle indicator **25'** allows the driver of the vehicle to reduce the speed of the vehicle and avoid sending of the remote vehicle speed exceeded notification to the remote wireless device **26'**.

Moreover, in the illustrated embodiment, this vehicle local speed exceeded indicator **25'** is connected to the vehicle data bus **21'** and may be an existing vehicle device as installed during vehicle manufacture, or may be added as an aftermarket item as will be appreciated by those skilled in the art. In some other embodiments, the local speed exceeded indicator **25'** may be hardwired to the controller **24'**, and may even be contained within the housing **28'** of the speed exceeded notification device **20'** as will also be appreciated by those skilled in the art. Those other elements shown in FIG. **2**, and not discussed in detail, are indicated by prime notation and are similar to those elements discussed above with respect to FIG. **1**.

Referring now additionally to the embodiment shown in FIG. **3**, another variation is now described as relating to generating the vehicle speed data. In this embodiment of the speed exceeded notification device **20"**, the data related to the vehicle speed is generated based upon cooperation with the wireless communications device **23"**. For example, the wireless communications device **23"** may be a cellular telephone based device that generates position data either based upon an internal GPS receiver, or based upon triangulation or other cellular telephone-based position determining approaches. In other words, the vehicle device generating data related to vehicle speed **22"**, on the vehicle data communications bus **21"** may be an interface circuit between the wireless communications device **23"** and the data communications bus as will be appreciated by those skilled in the art. Those other elements shown in FIG. **3**, and not discussed in detail, are indicated by double prime notation and are similar to those elements discussed above with respect to FIGS. **1** and **2**.

Referring additionally to FIG. **4**, an exemplary remote vehicle speed exceeded notification is shown on the display **27** of the remote wireless device **26** and includes an identity of the vehicle by its license plate number, GA-ABC123. The remote vehicle speed exceeded notification also includes a speed of the vehicle, 88 mph for a time of 5 minutes; a vehicle position, I85 at Exit 24; and the time and date the vehicle exceeded the speed threshold, 2:25 AM, Apr. 1, 2007. Of course, additional or alternative vehicle information may be sent by the controller **24** to the remote vehicle speed exceeded display device **26**, as will be appreciated by those having ordinary skill in the art. For example, a speed versus time profile could be generated on the display **27**. Additionally, the controller **24** can advantageously send the remote vehicle speed exceeded notifications to the remote wireless device **26** in real time when the speed and time thresholds are exceeded, on a regular schedule, or based on any other triggering event, such as a collision indicated by an airbag deployment, for example.

Referring now additionally to the flowchart **50** of FIG. **5**, a method for speed exceeded notification in a vehicle of a type comprising a vehicle data communications bus extending throughout the vehicle is now described. After the start at Block **52**, the method includes using a controller **24** coupled to the vehicle data communications bus **21** for reading the data related to vehicle speed from the vehicle data communications bus (Block **54**). From the vehicle data it is determined when a vehicle speed exceeds a speed threshold (Block **56**) for a first time period (Block **58**). The method further includes using the controller **24** cooperating with the wireless communications device **23** to send a remote vehicle speed exceeded notification to the remote wireless device **26** (Block **60**) if both the speed threshold (Block **56**) and time threshold (Block **58**) have been exceeded, before ending at Block **62**.

Referring now additionally to the flowchart **70** of FIG. **6**, another method is described for speed exceeded notification in a vehicle of a type comprising a vehicle data communications bus **21** extending throughout the vehicle, and at least one vehicle indicator **25** coupled to the vehicle data communications bus **21**. Beginning at Block **72**, the method includes using a controller **24** coupled to the vehicle data communications bus **21** for determining a vehicle speed (Block **74**). The controller **24** determines if the vehicle exceeds the speed threshold (Block **76**), and if for a second time period (Block **78**). If the speed threshold is exceeded for the second time period, the controller **24** generates a local vehicle speed exceeded notification using a vehicle indicator **25** coupled to the vehicle data communications bus (Block **80**). The controller **24** then determines when the vehicle speed exceeds a speed threshold for a first time period (Block **82**) longer than the second time period, and based thereon cooperates with the wireless communications device **23** to send a remote vehicle speed exceeded notification (Block **84**) before stopping at Block **86**.

This application is related to copending patent applications entitled, VEHICLE DEVICE TO ACTIVATE A VISUAL OR AUDIBLE ALERT AND ASSOCIATED METHODS, and SPEED EXCEEDED NOTIFICATION DEVICE FOR VEHICLE HAVING A DATA BUS AND ASSOCIATED METHODS, which are filed on the same date and by the same assignee and inventor, the disclosures of which are hereby incorporated by reference in their entirety. 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. Therefore, it is understood that the invention is not to be limited to the specific embodiments disclosed, and

that other modifications and embodiments are intended to be included within the scope of the appended claims.

That which is claimed is:

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:

a wireless communications device; and

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.

2. The speed exceeded notification device according to claim **1** wherein said controller is also for determining when the vehicle speed exceeds the speed threshold for a second time period less than the first time period and generating a local vehicle speed exceeded notification.

3. The speed exceeded notification device according to claim **2** wherein the local vehicle speed exceeded notification comprises at least one of an audible notification, a visual notification, and a tactile notification.

4. The speed exceeded notification device according to claim **2** wherein at least one of the speed threshold, the first time period, and the second time period is user selectable.

5. The speed exceeded notification device according to claim **1** wherein the at least one vehicle device generating data related to vehicle speed on the vehicle data communications bus comprises a vehicle position determining device.

6. The speed exceeded notification device according to claim **5** wherein said vehicle position determining device comprises a Global Positioning System (GPS) receiver.

7. The speed exceeded notification device according to claim **5** wherein the vehicle position determining device cooperates with said wireless communications device.

8. The speed exceeded notification device according to claim **7** wherein said wireless communications device comprises a cellular communications device.

9. The speed exceeded notification device according to claim **1** wherein the remote vehicle speed exceeded notification further comprises an identity of the vehicle.

10. The speed exceeded notification device according to claim **1** wherein the remote vehicle speed exceeded notification further comprises a speed of the vehicle.

11. The speed exceeded notification device according to claim **1** wherein the remote vehicle speed exceeded notification further comprises a vehicle position.

12. The speed exceeded notification device according to claim **1** wherein the remote vehicle speed exceeded notification further comprises a time the vehicle exceeded the speed threshold.

13. 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:

a wireless communications device; and

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,

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, and

determining when the vehicle speed exceeds the speed threshold for a second time period less than the first time period and generating a local vehicle speed exceeded notification so that a driver of the vehicle can reduce the speed of the vehicle and avoid sending of the remote vehicle speed exceeded notification.

14. The speed exceeded notification device according to claim **13** wherein the local vehicle speed exceeded notification comprises at least one of an audible notification, a visual notification, and a tactile notification.

15. The speed exceeded notification device according to claim **13** wherein at least one of the speed threshold, the first time period, and the second time period is user selectable.

16. The speed exceeded notification device according to claim **13** wherein the at least one vehicle device generating data related to vehicle speed on the vehicle data communications bus comprises a vehicle position determining device.

17. The speed exceeded notification device according to claim **16** wherein the vehicle position determining device cooperates with said wireless communications device.

18. The speed exceeded notification device according to claim **13** 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.

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:

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

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.

20. The method according to claim **19** further comprising also using the controller for determining when the vehicle speed exceeds the speed threshold for a second time period less than the first time period and generating a local vehicle speed exceeded notification.

21. The method according to claim **20** wherein the local vehicle speed exceeded notification comprises at least one of an audible notification, a visual notification, and a tactile notification.

22. The method according to claim **20** wherein at least one of the speed threshold, the first time period, and the second time period is user selectable.

23. The method according to claim **19** wherein the at least one vehicle device generating data related to vehicle speed on the vehicle data communications bus comprises a vehicle position determining device.

24. The method according to claim **23** wherein the vehicle position determining device cooperates with the wireless communications device.

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.

* * * * *

UNITED STATES PATENT AND TRADEMARK OFFICE

CERTIFICATE OF CORRECTION

PATENT NO. : 7,671,727 B2
APPLICATION NO. : 11/844703
DATED : March 2, 2010
INVENTOR(S) : Flick et al.

It is certified that error appears in the above-identified patent and that said Letters Patent is hereby corrected as shown below:

Column 3, Line 41	Delete: "is schematic" Insert: --is a schematic--
Column 3, Line 44	Delete: "is schematic" Insert: --is a schematic--
Column 5, Line 33	Delete: "such as a causing" Insert: --such as causing a--

Signed and Sealed this

Seventeenth Day of August, 2010

David J. Kappos

David J. Kappos
Director of the United States Patent and Trademark Office

EXHIBIT F

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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(73) Assignee: **Omega Patents, L.L.C.**, Douglasville, GA (US)

(*) 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**

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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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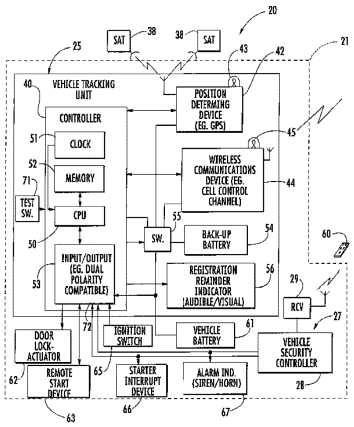
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(57) **ABSTRACT**

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 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.

22 Claims, 13 Drawing Sheets



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* cited by examiner

not executed this Agreement in reliance on any promise, representation, or warranty not contained herein.

5. Each of the Parties to this Agreement represents that it has the full power and authority to enter into and consummate the obligations created hereby. Each of the Parties to this Agreement warrants that such Party has full authority to enter into this Agreement and to enter into the undertakings and obligations set forth in this Agreement. The Parties hereby warrant that they have not assigned or transferred their respective claims to any other party or person.

6. Each of the Parties hereto has been fully and competently represented by counsel of its own choosing in the negotiation and drafting of this Agreement. Accordingly, the Parties agree that the rule of construction of contracts resolving any ambiguities against the drafting party shall be inapplicable to this Agreement. Each of the Parties hereto further acknowledges that it has read this entire Agreement and fully understands its terms, conditions and effects.

7. This Agreement forms the entire understanding and agreement between the parties hereto concerning the matters addressed herein and supersedes all other prior or contemporaneous agreements between the parties on such matters, either oral or written. This Agreement may not be modified except by a writing executed by all parties. In executing this Agreement and making the settlement contained herein, none of the parties is relying upon any promise, representation, or statement not contained within this Agreement. This Agreement shall be deemed effective when it has been executed by the last party to sign. This Agreement may be executed in counterparts, each of which shall be deemed an original hereof.

IN WITNESS WHEREOF, the Parties hereto, intending to be legally bound hereby, have each caused to be affixed hereto its or his/her hand and seal the day indicated.

OMEGA PATENTS LLC

By: _____
KENNETH E FLICK

Title: PRES

Date: 6-10-10

CALAMP CORP

By: _____
Richard Vitelle

Title: CFO

Date: 6/10/10

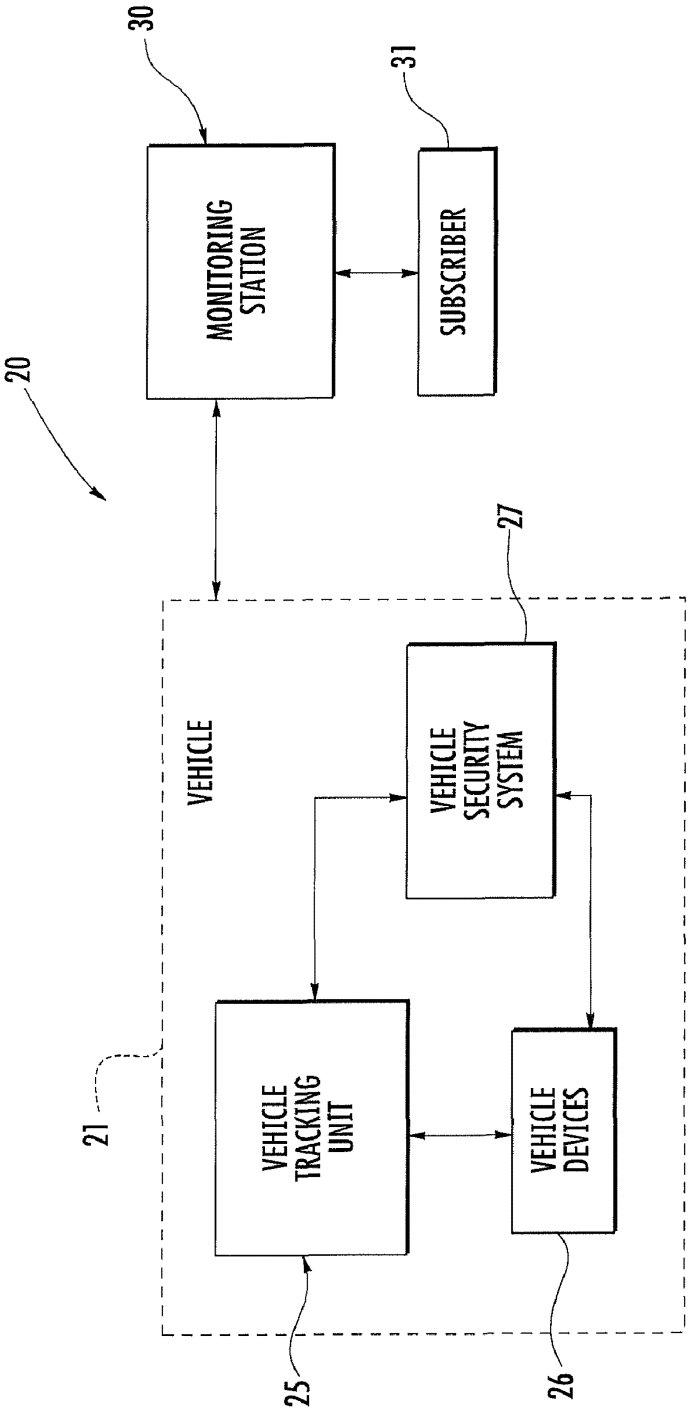

30
31
MONITORING STATION
SUBSCRIBER
20
27
VEHICLE
VEHICLE SECURITY SYSTEM
21
VEHICLE TRACKING UNIT
VEHICLE DEVICES
25
26

FIG. 1

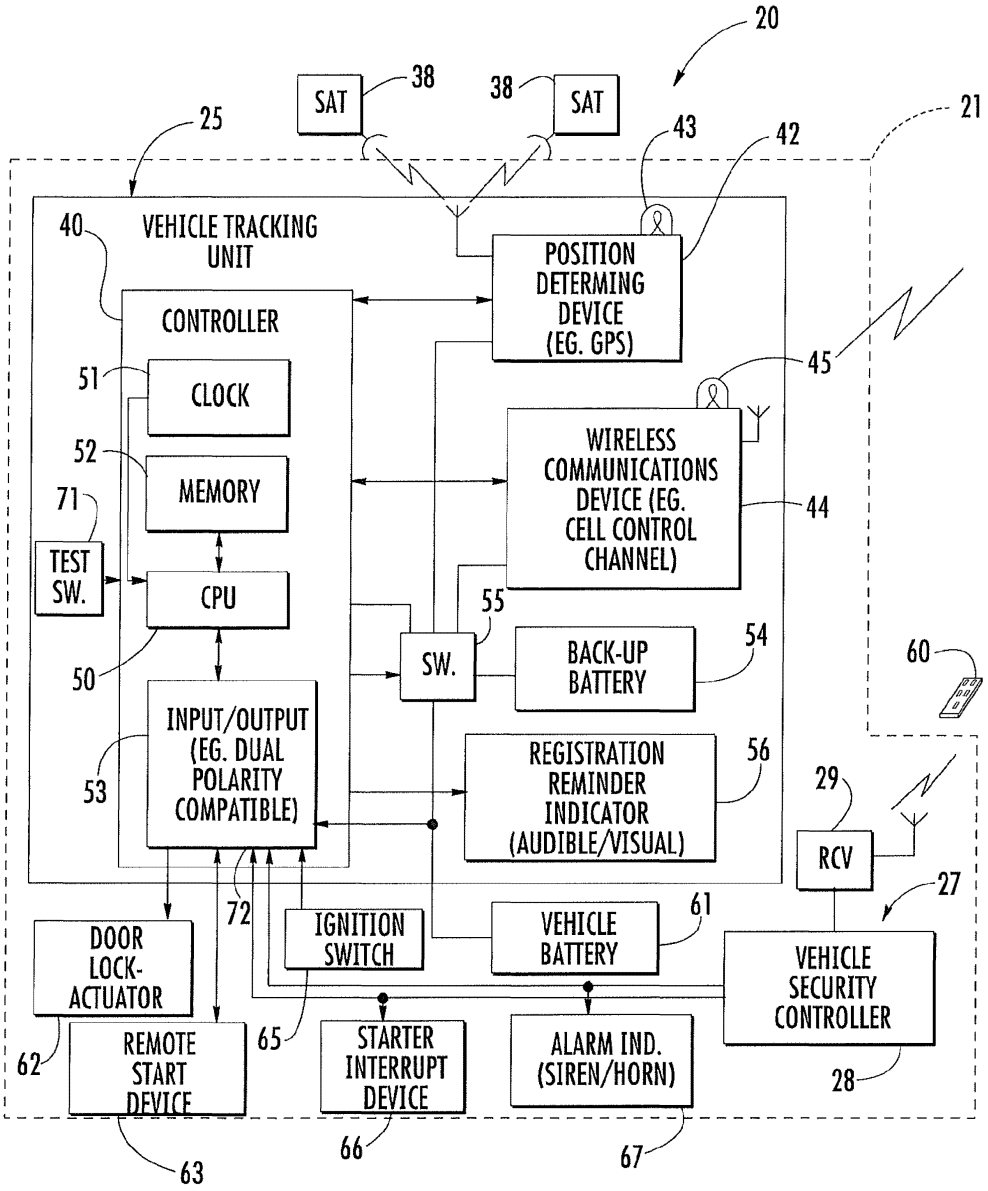

20
SAT
38
38
SAT
25
21
43
42
40
VEHICLE TRACKING UNIT
POSITION DETERMING DEVICE (EG. GPS)
CONTROLLER
45
51
CLOCK
52
MEMORY
WIRELESS COMMUNICATIONS DEVICE (EG. CELL CONTROL CHANNEL)
71
44
TEST SW.
CPU
55
SW.
BACK-UP BATTERY
54
60
50
INPUT/OUTPUT (EG. DUAL POLARITY COMPATIBLE)
53
REGISTRATION REMINDER INDICATOR (AUDIBLE/VISUAL)
56
29
RCV
27
72
IGNITION SWITCH
VEHICLE BATTERY
61
DOOR LOCK-ACTUATOR
VEHICLE SECURITY CONTROLLER
62
REMOTE START DEVICE
65
STARTER INTERRUPT DEVICE
ALARM IND. (SIREN/HORN)
28
63
66
67

FIG. 2

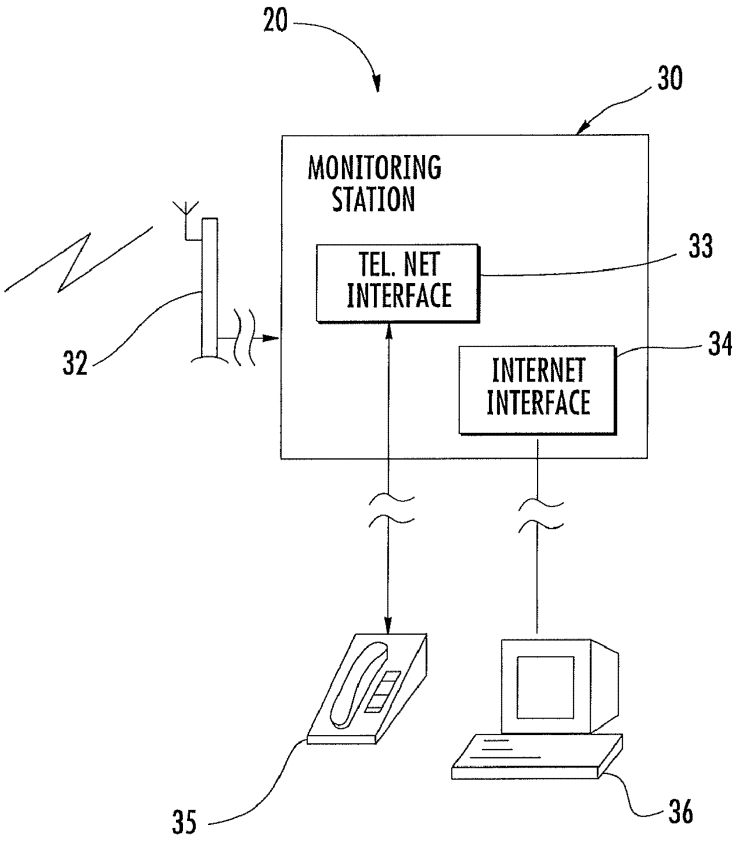

20
30
MONITORING STATION
TEL. NET INTERFACE
33
INTERNET INTERFACE
34
32
35
36

FIG. 3

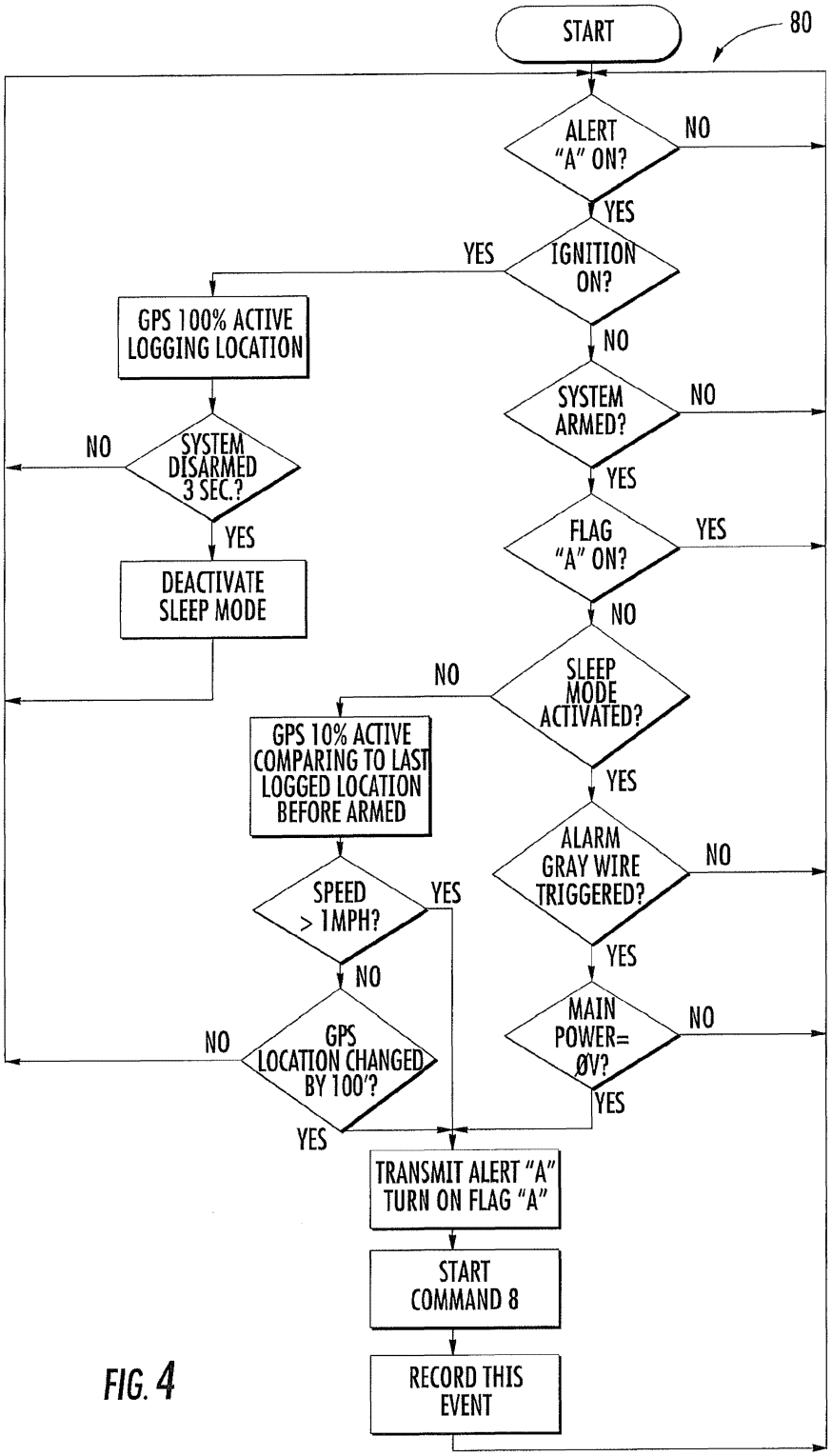

START
80
ALERT "A" ON?
NO
YES
IGNITION ON?
YES
NO
GPS 100% ACTIVE LOGGING LOCATION
SYSTEM ARMED?
NO
YES
NO
SYSTEM DISARMED 3 SEC.?
YES
FLAG "A" ON?
YES
DEACTIVATE SLEEP MODE
NO
NO
SLEEP MODE ACTIVATED?
GPS 10% ACTIVE COMPARING TO LAST LOGGED LOCATION BEFORE ARMED
YES
ALARM GRAY WIRE TRIGGERED?
NO
SPEED > 1MPH?
YES
YES
NO
MAIN POWER= ØV?
NO
NO
GPS LOCATION CHANGED BY 100'?
YES
YES
TRANSMIT ALERT "A" TURN ON FLAG "A"
START COMMAND 8
RECORD THIS EVENT

FIG. 4

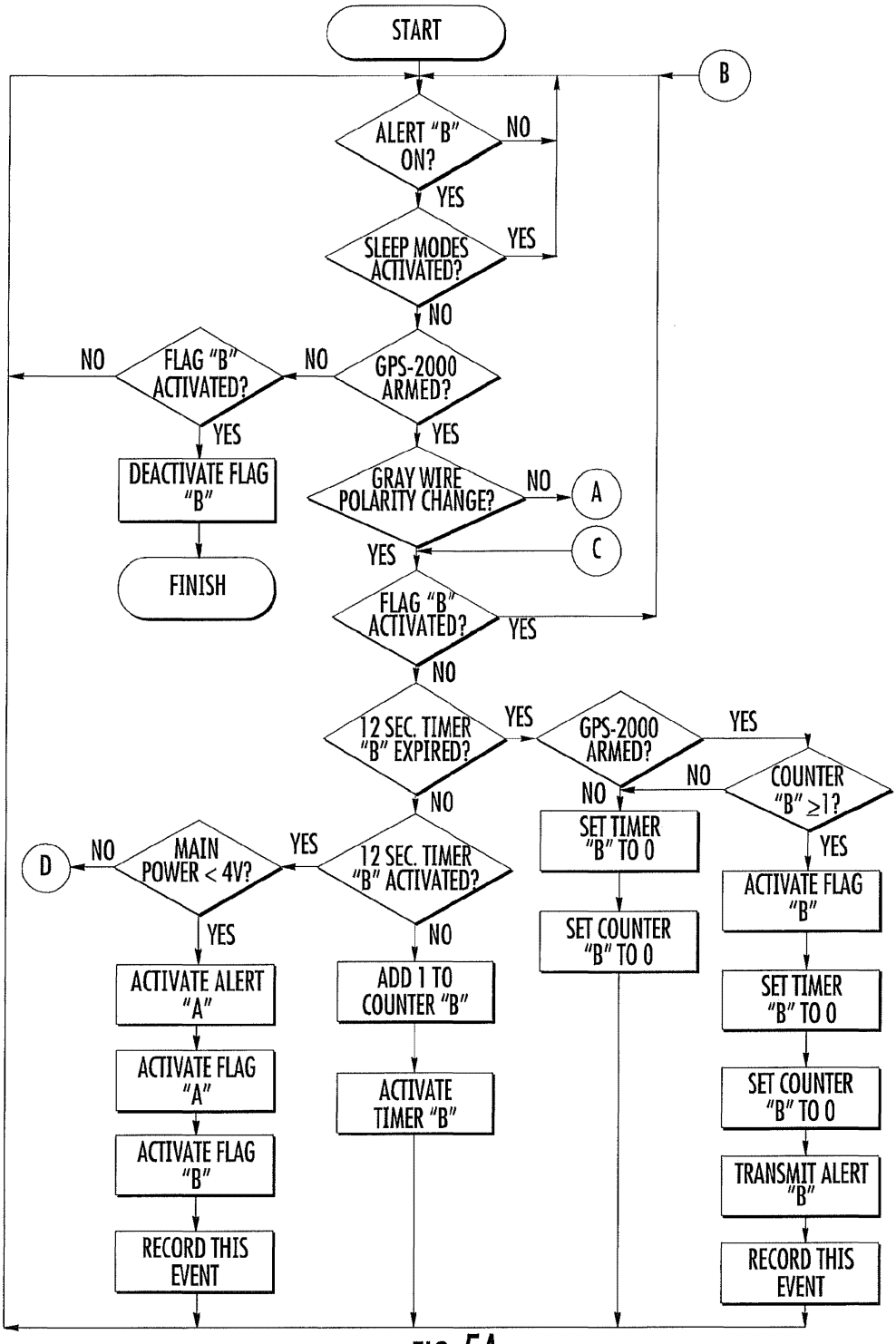

START
B
ALERT "B" ON?
NO
YES
SLEEP MODES ACTIVATED?
YES
NO
FLAG "B" ACTIVATED?
NO
GPS-2000 ARMED?
NO
YES
YES
DEACTIVATE FLAG "B"
GRAY WIRE POLARITY CHANGE?
NO
A
C
YES
FINISH
FLAG "B" ACTIVATED?
YES
NO
12 SEC. TIMER "B" EXPIRED?
YES
GPS-2000 ARMED?
YES
NO
NO
COUNTER "B" ≥1?
NO
SET TIMER "B" TO 0
YES
D
NO
MAIN POWER < 4V?
YES
12 SEC. TIMER "B" ACTIVATED?
ACTIVATE FLAG "B"
SET COUNTER "B" TO 0
YES
NO
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

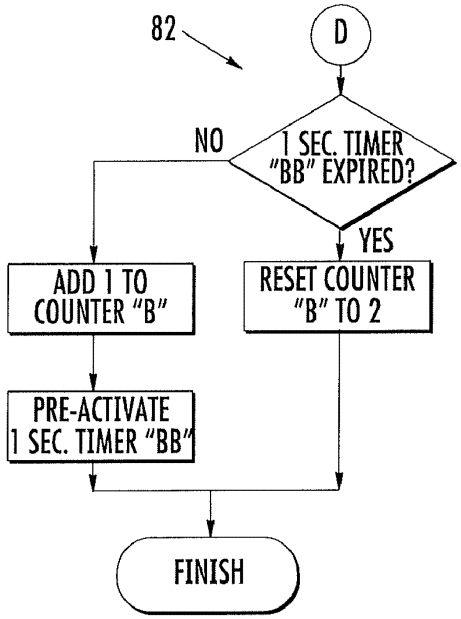

82
D
1 SEC. TIMER "BB" EXPIRED?
NO
YES
ADD 1 TO COUNTER "B"
RESET COUNTER "B" TO 2
PRE-ACTIVATE 1 SEC. TIMER "BB"
FINISH

FIG. 5B

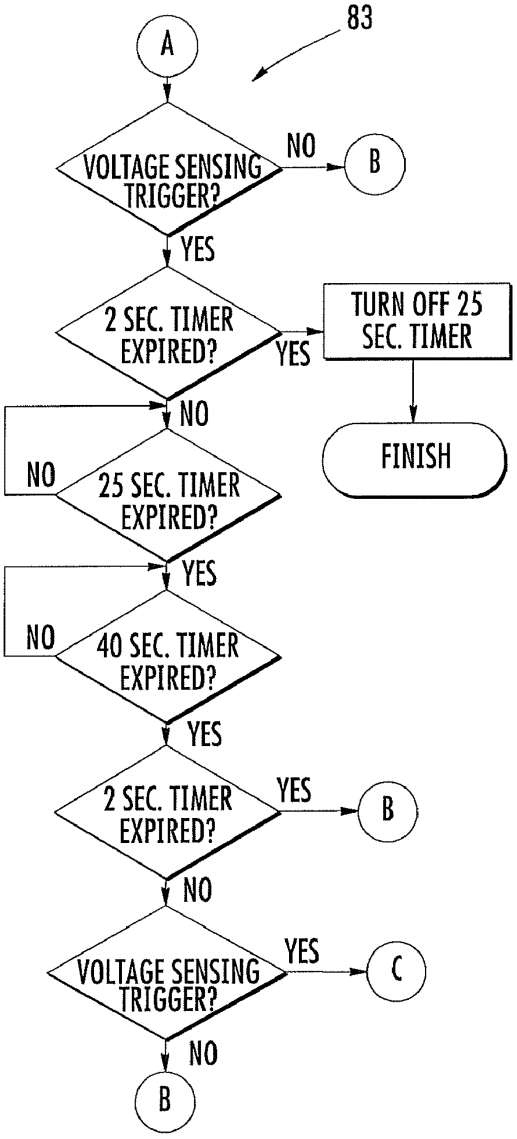

83
A
VOLTAGE SENSING TRIGGER?
NO
B
YES
2 SEC. TIMER EXPIRED?
YES
TURN OFF 25 SEC. TIMER
FINISH
NO
NO
25 SEC. TIMER EXPIRED?
YES
NO
40 SEC. TIMER EXPIRED?
YES
2 SEC. TIMER EXPIRED?
YES
B
NO
VOLTAGE SENSING TRIGGER?
YES
C
NO
B

FIG. 5C

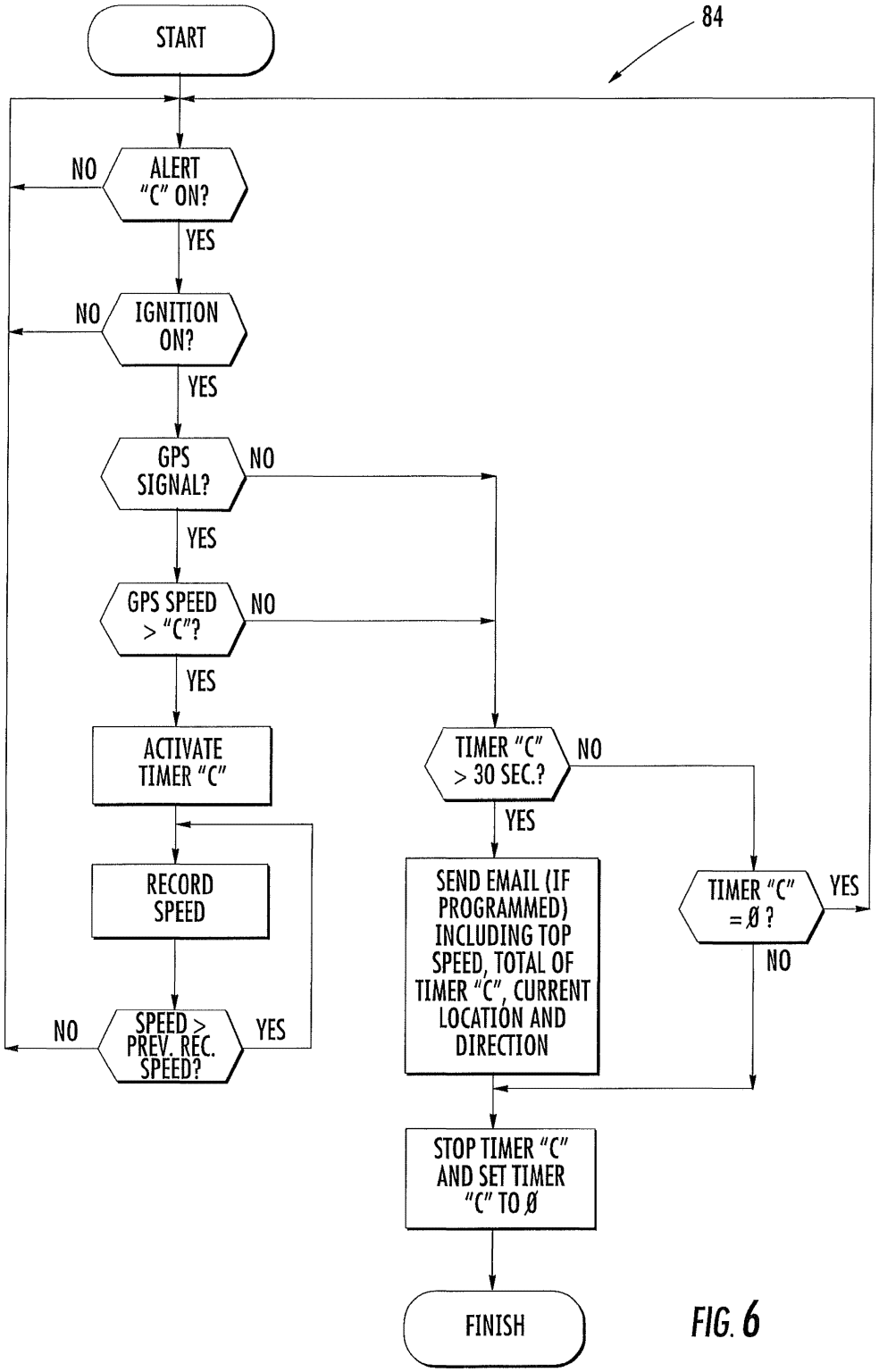

84
START
ALERT "C" ON?
NO
YES
IGNITION ON?
NO
YES
GPS SIGNAL?
NO
YES
GPS SPEED > "C"?
NO
YES
ACTIVATE TIMER "C"
RECORD SPEED
SPEED > PREV. REC. SPEED?
NO
YES
TIMER "C" > 30 SEC.?
NO
YES
SEND EMAIL (IF PROGRAMMED) INCLUDING TOP SPEED, TOTAL OF TIMER "C", CURRENT LOCATION AND DIRECTION
TIMER "C" = Ø ?
YES
NO
STOP TIMER "C" AND SET TIMER "C" TO Ø
FINISH

FIG. 6

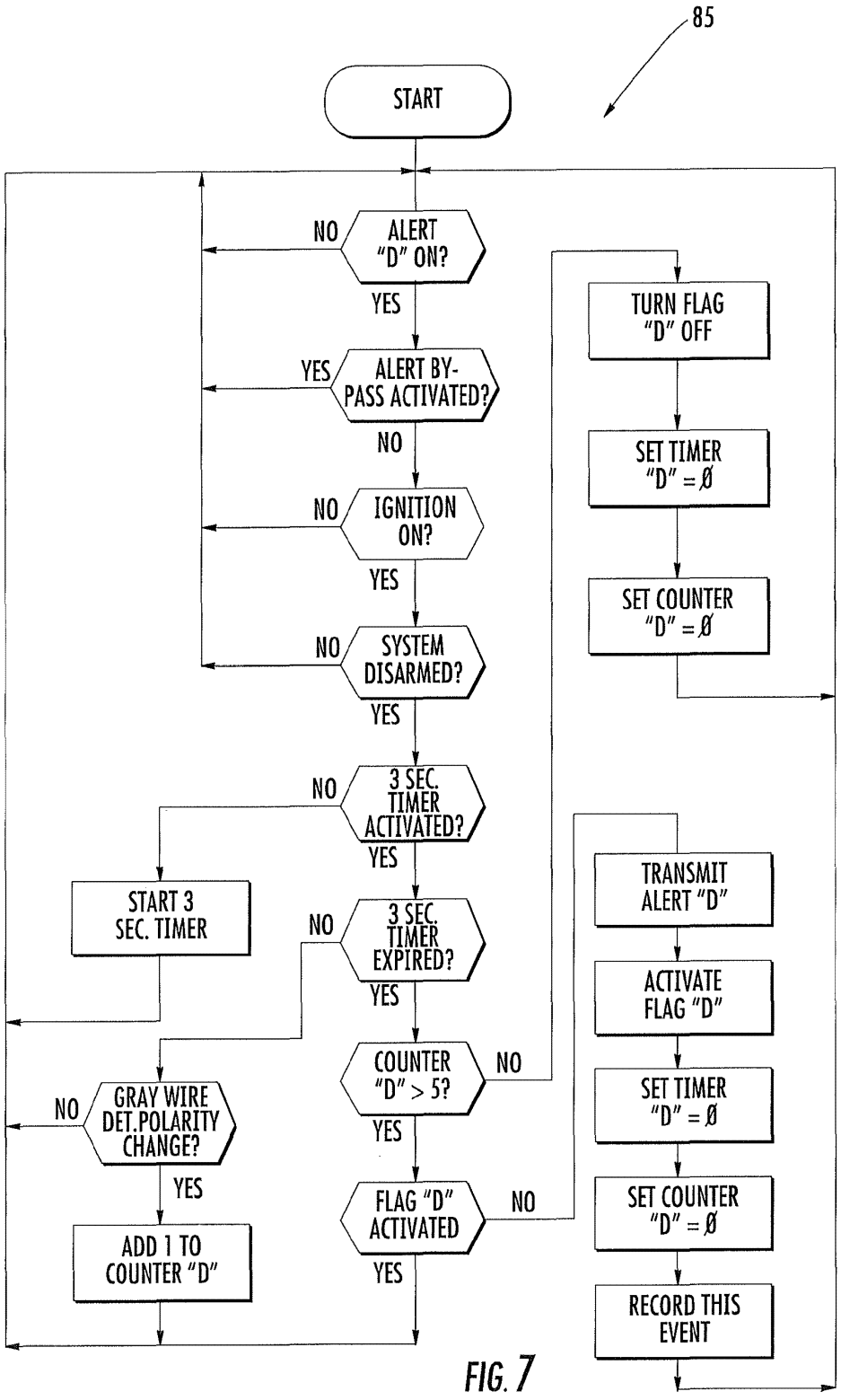

85
START
NO
ALERT "D" ON?
YES
YES
ALERT BY-PASS ACTIVATED?
NO
NO
IGNITION ON?
YES
NO
SYSTEM DISARMED?
YES
NO
3 SEC. TIMER ACTIVATED?
YES
START 3 SEC. TIMER
NO
3 SEC. TIMER EXPIRED?
YES
COUNTER "D" > 5?
NO
YES
NO
GRAY WIRE DET.POLARITY CHANGE?
YES
ADD 1 TO COUNTER "D"
FLAG "D" ACTIVATED
NO
YES
TURN FLAG "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

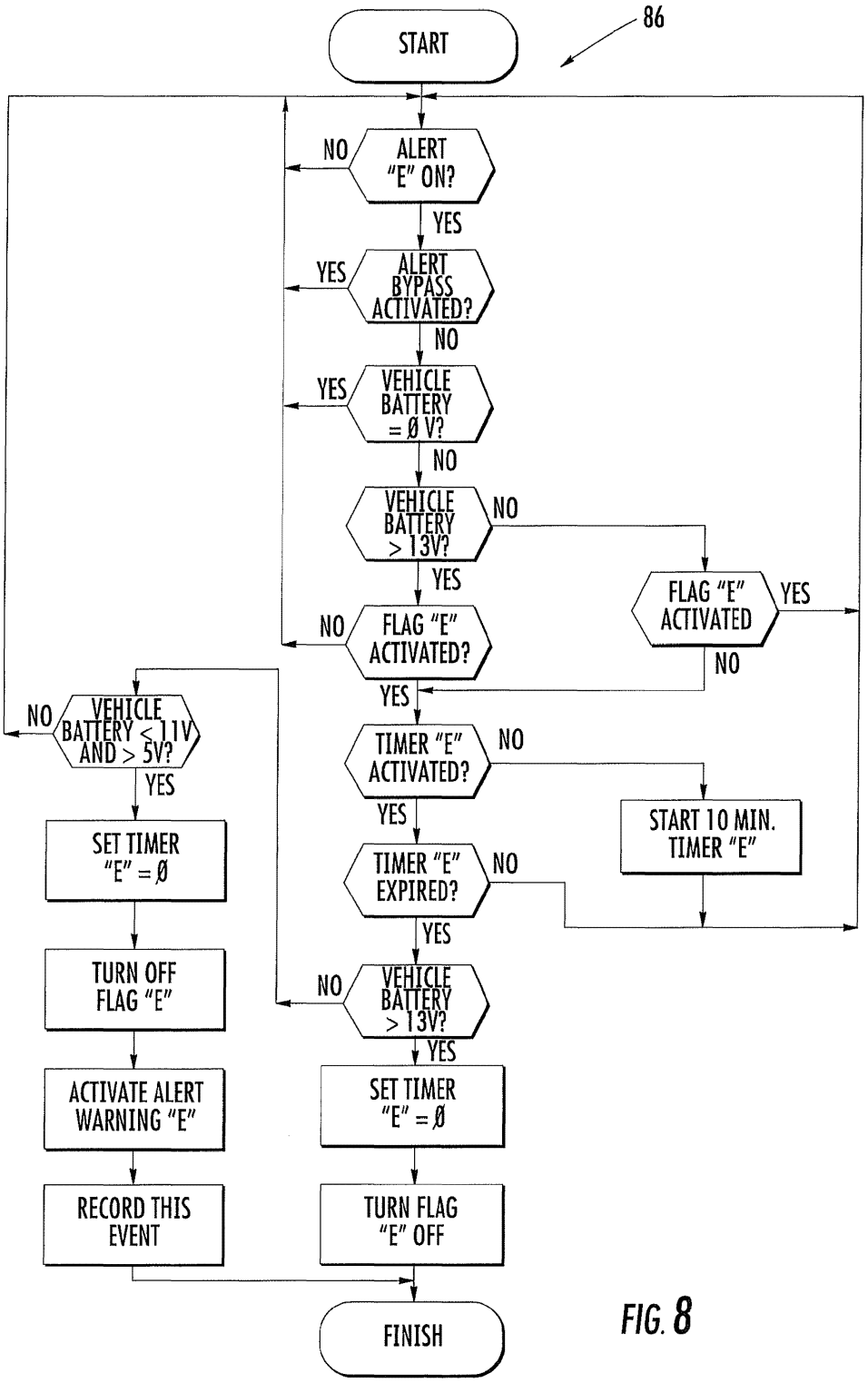

86
START
ALERT "E" ON?
NO
YES
ALERT BYPASS ACTIVATED?
YES
NO
VEHICLE BATTERY = Ø V?
YES
NO
VEHICLE BATTERY > 13V?
NO
YES
FLAG "E" ACTIVATED
YES
NO
FLAG "E" ACTIVATED?
NO
YES
VEHICLE BATTERY < 11V AND > 5V?
NO
YES
TIMER "E" ACTIVATED?
NO
YES
START 10 MIN. TIMER "E"
SET TIMER "E" = Ø
TIMER "E" EXPIRED?
NO
YES
TURN OFF FLAG "E"
VEHICLE BATTERY > 13V?
NO
YES
ACTIVATE ALERT WARNING "E"
SET TIMER "E" = Ø
RECORD THIS EVENT
TURN FLAG "E" OFF
FINISH

FIG. 8

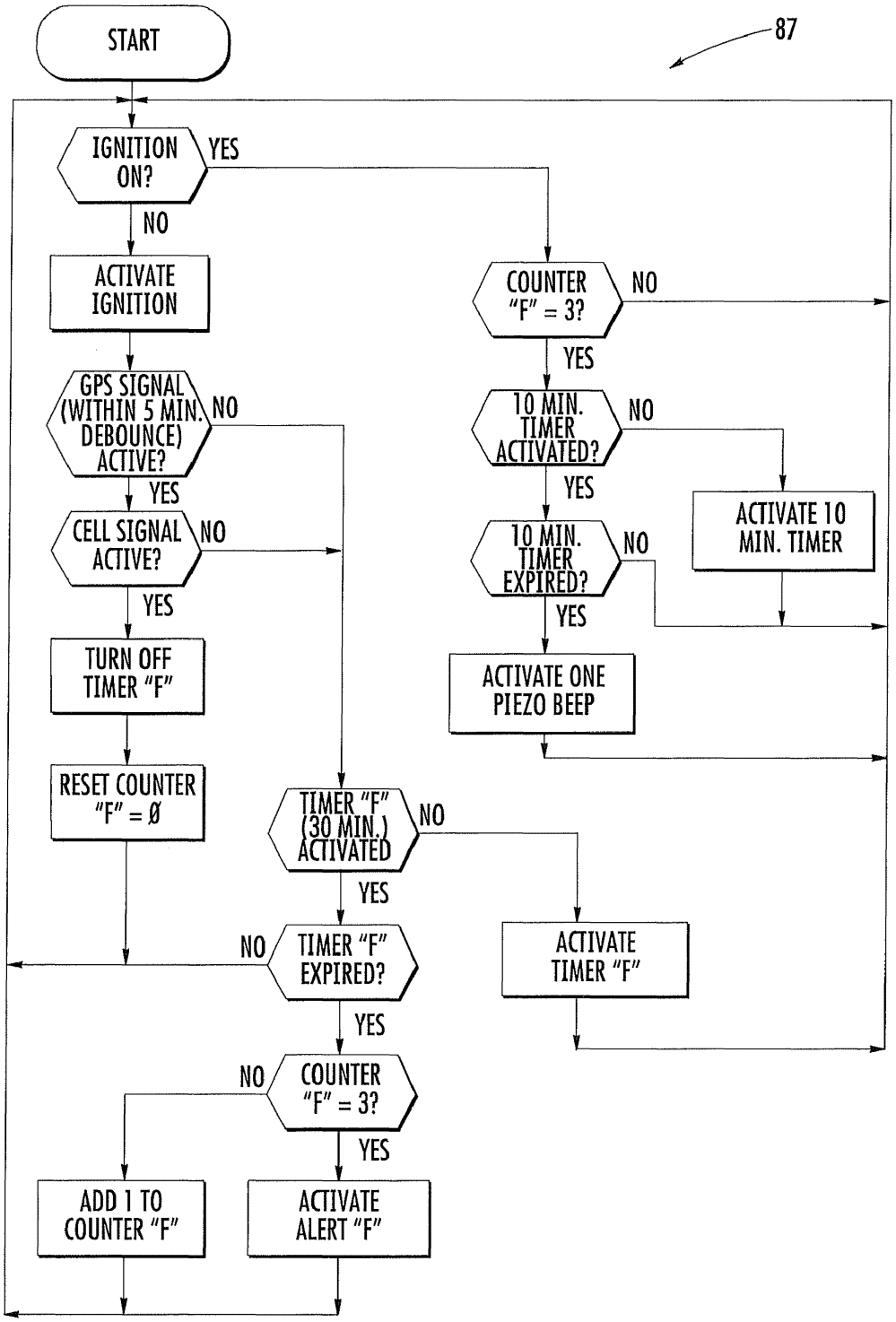

START
87
IGNITION ON?
YES
NO
ACTIVATE IGNITION
GPS SIGNAL (WITHIN 5 MIN. DEBOUNCE) ACTIVE?
NO
YES
CELL SIGNAL ACTIVE?
NO
YES
TURN OFF TIMER "F"
RESET COUNTER "F" = Ø
TIMER "F" (30 MIN.) ACTIVATED
NO
YES
TIMER "F" EXPIRED?
NO
YES
COUNTER "F" = 3?
NO
YES
ADD 1 TO COUNTER "F"
ACTIVATE ALERT "F"
ACTIVATE TIMER "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

FIG. 9

EXHIBIT B

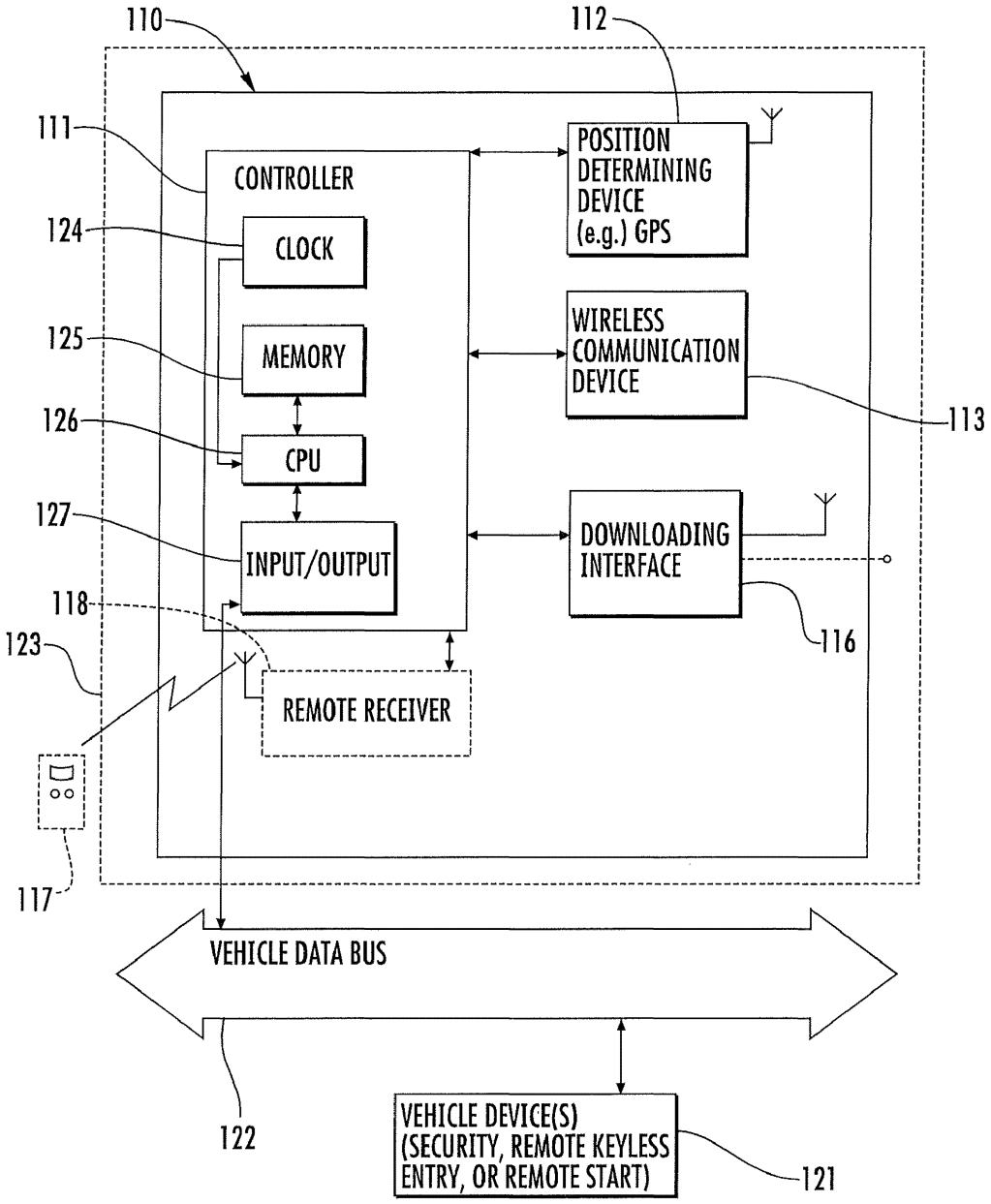

110
112
111
CONTROLLER
124
CLOCK
125
MEMORY
126
CPU
127
INPUT/OUTPUT
118
123
REMOTE RECEIVER
117
POSITION DETERMINING DEVICE (e.g.) GPS
WIRELESS COMMUNICATION DEVICE
113
DOWNLOADING INTERFACE
116
VEHICLE DATA BUS
122
VEHICLE DEVICE(S) (SECURITY, REMOTE KEYLESS ENTRY, OR REMOTE START)
121

FIG. 10

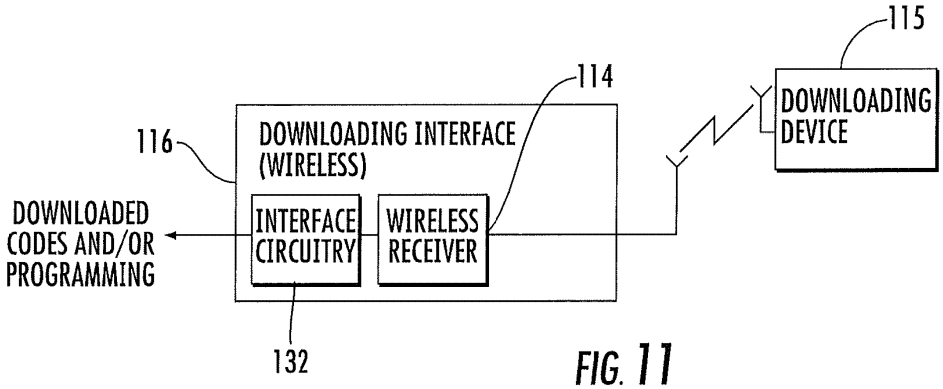


FIG. 11

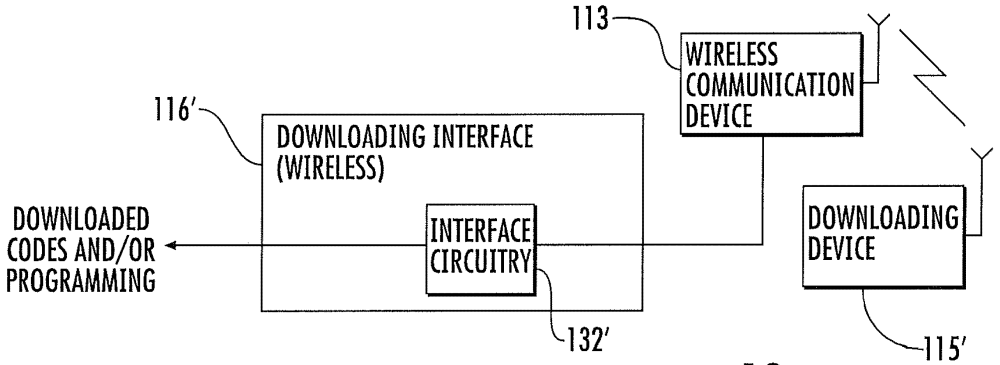


FIG. 12

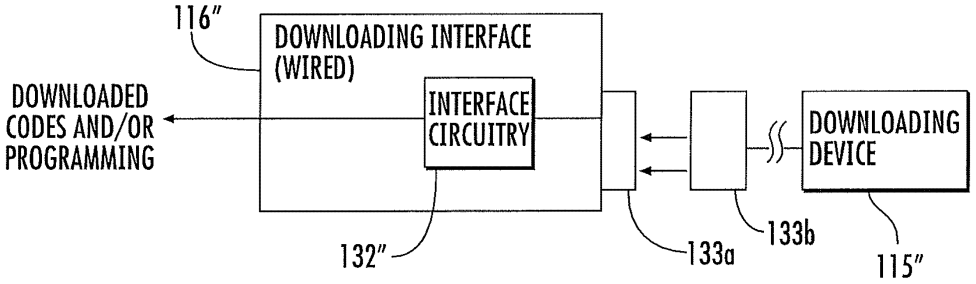


FIG. 13

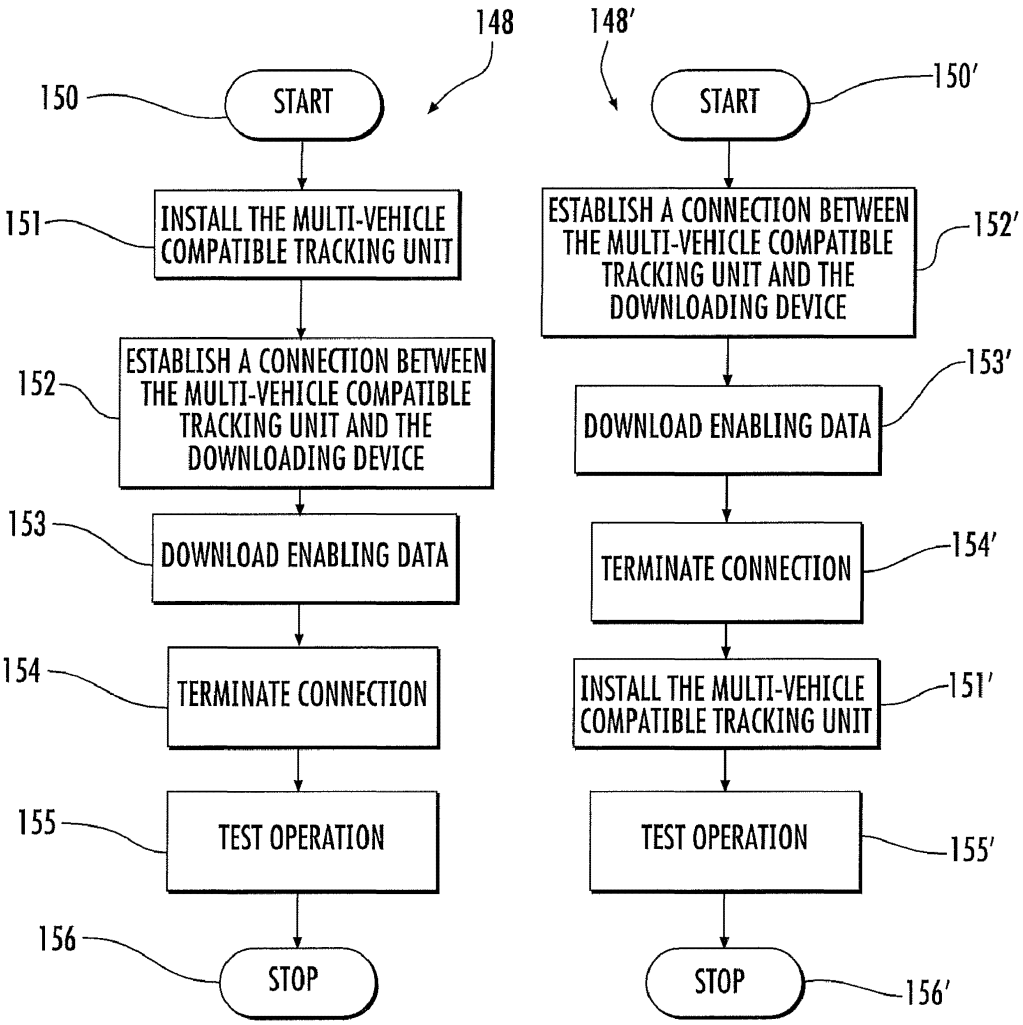

148
150
START
151
INSTALL THE MULTI-VEHICLE COMPATIBLE TRACKING UNIT
152
ESTABLISH A CONNECTION BETWEEN THE MULTI-VEHICLE COMPATIBLE TRACKING UNIT AND THE DOWNLOADING DEVICE
153
DOWNLOAD ENABLING DATA
154
TERMINATE CONNECTION
155
TEST OPERATION
156
STOP
148'
START
150'
ESTABLISH A CONNECTION BETWEEN THE MULTI-VEHICLE COMPATIBLE TRACKING UNIT AND THE DOWNLOADING DEVICE
152'
DOWNLOAD ENABLING DATA
153'
TERMINATE CONNECTION
154'
INSTALL THE MULTI-VEHICLE COMPATIBLE TRACKING UNIT
151'
TEST OPERATION
155'
STOP
156'

FIG. 14

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 thereover with 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. **5**A-**5**C 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

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(54) **MULTI-VEHICLE COMPATIBLE CONTROL SYSTEM GENERATING COMMAND SIGNALS ON A DATA BUS AND ASSOCIATED METHODS**

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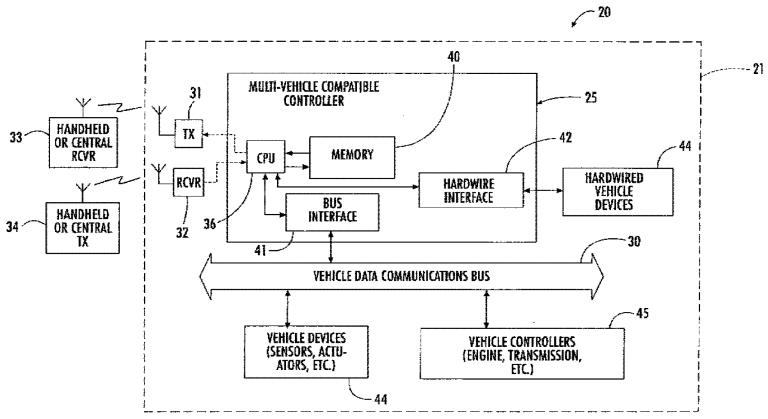
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(57) **ABSTRACT**

A control system includes a transmitter and a receiver for receiving signals from the remote transmitter, and a multi-vehicle compatible controller cooperating with the transmitter and receiver. The multi-vehicle compatible controller preferably 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 may include at least one working command signal and at least one non-working command signal for a given vehicle to thereby provide compatibility with a plurality of different vehicles. 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. Such an arrangement provides for a relatively simple and straightforward approach to interface with a vehicle having a data communications bus. The features are also readily implemented in an adaptor to use with conventional security or other control system controllers for vehicles.

51 Claims, 8 Drawing Sheets



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. **5**A-**5**C): 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. **5**A-**5**C).

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 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. 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, implemented 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.

* * * * *

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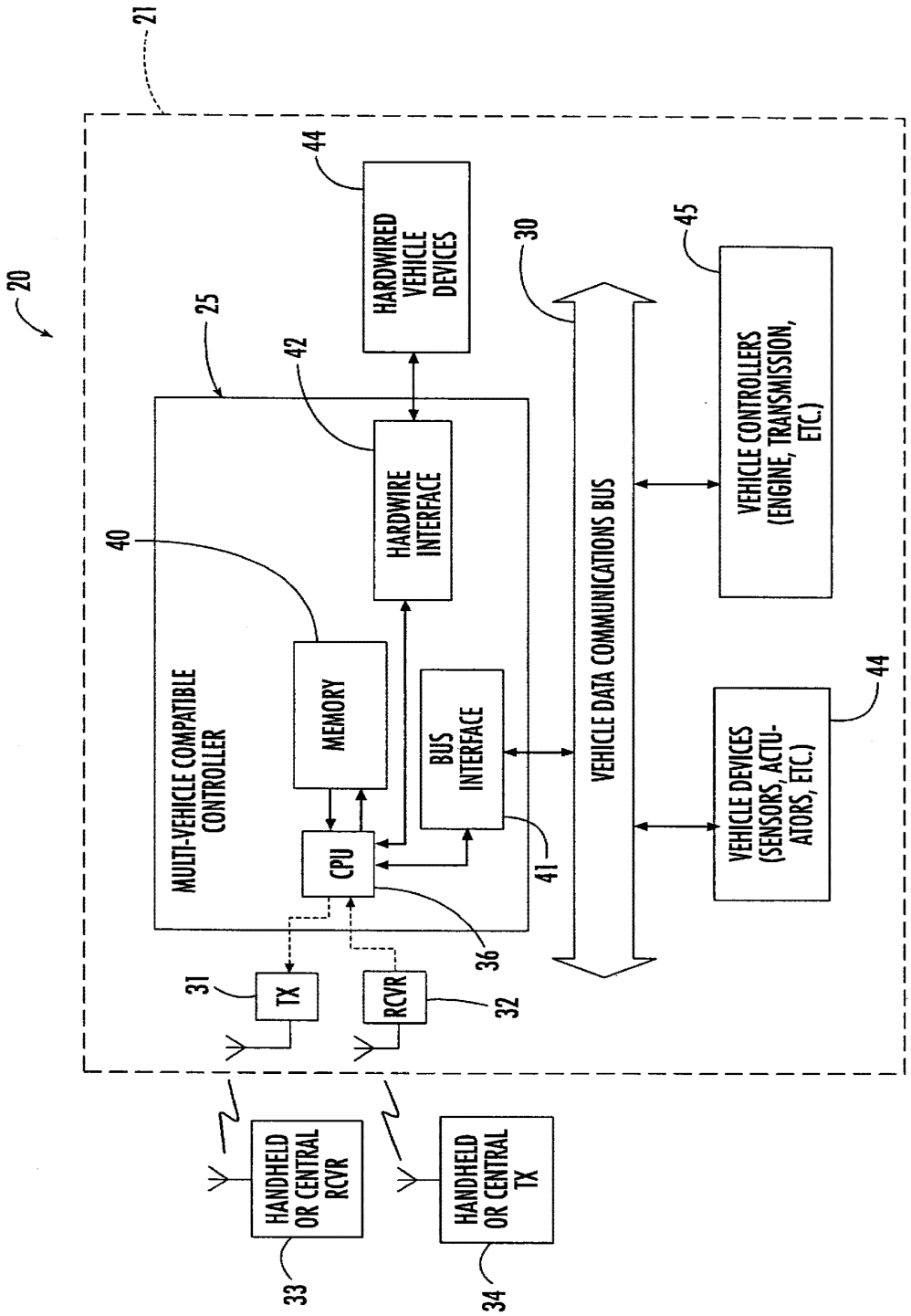


FIG. 1.

Ex. 1002 - Page 76

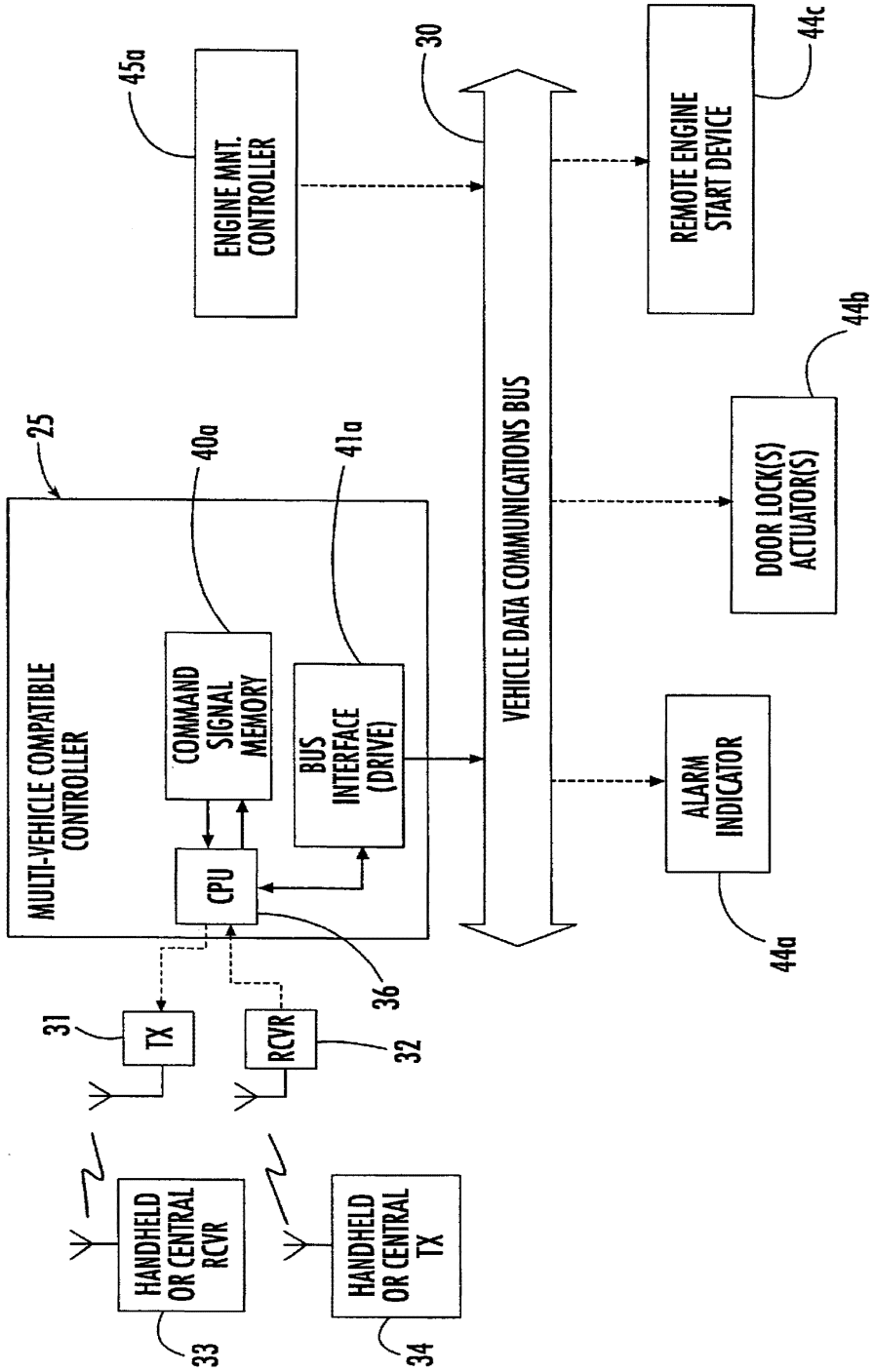


FIG. 2.

Ex. 1002 - Page 77

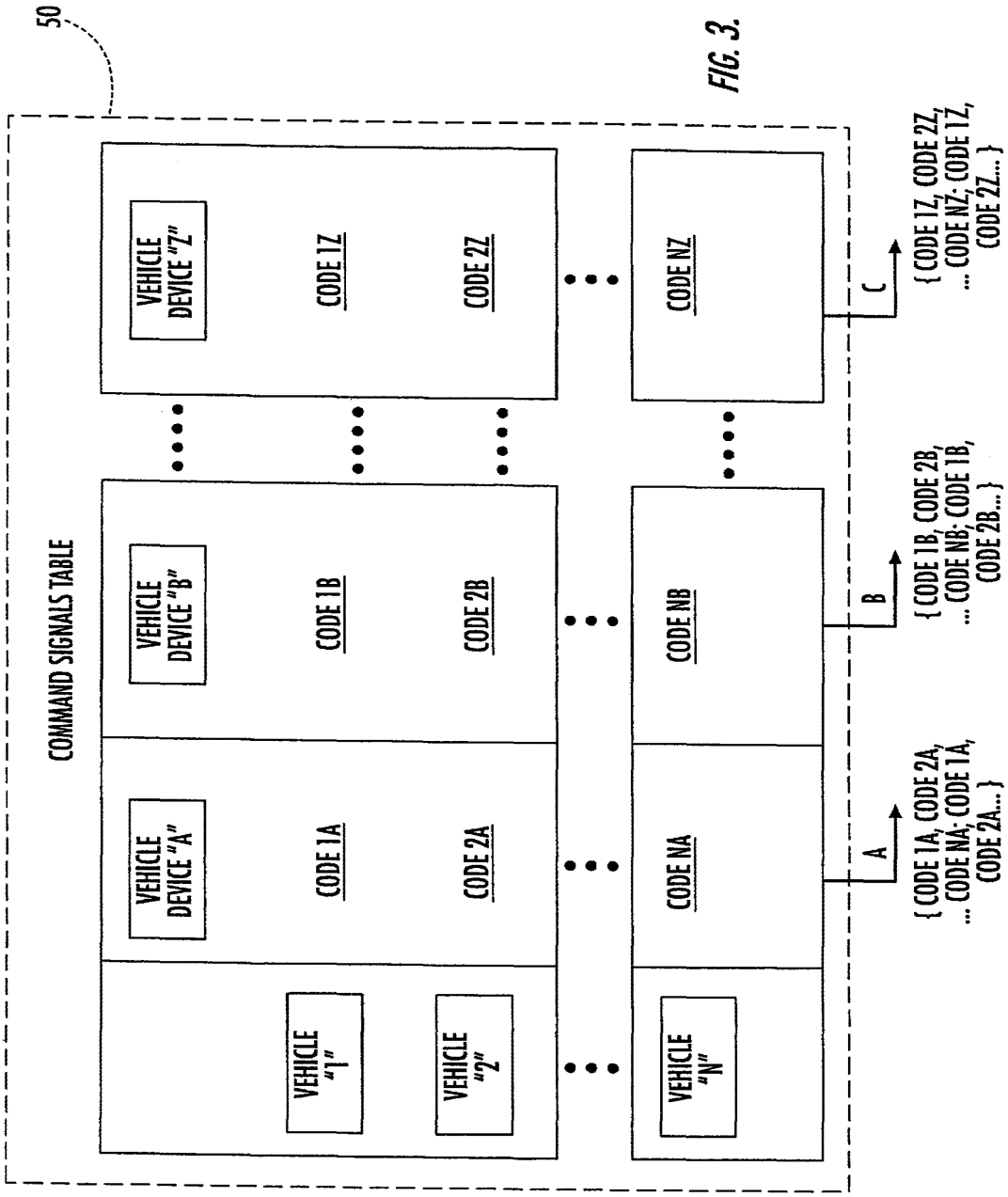


FIG. 3.

Ex. 1002 - Page 78

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;

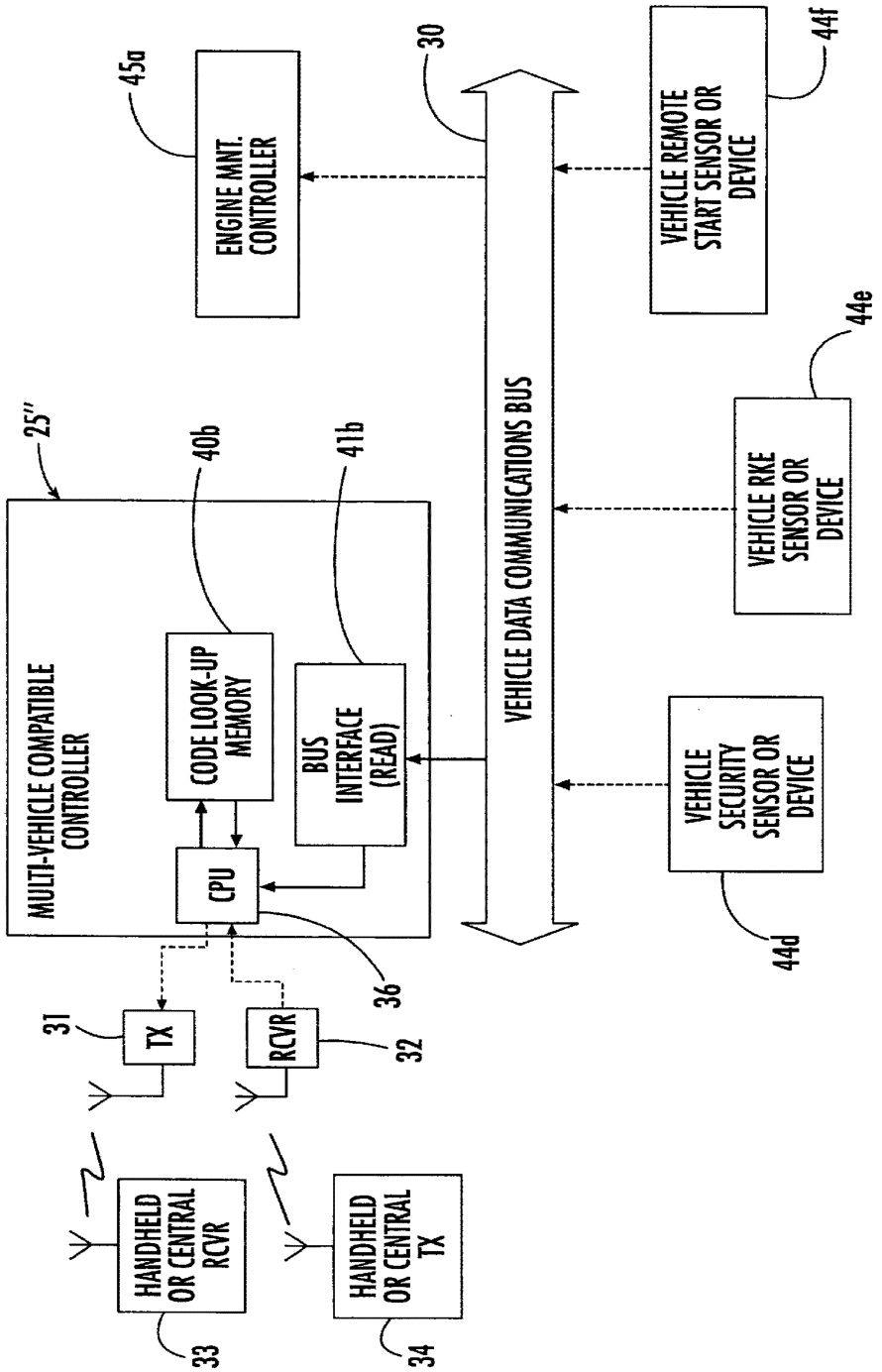


FIG. 4.

Ex. 1002 - Page 80

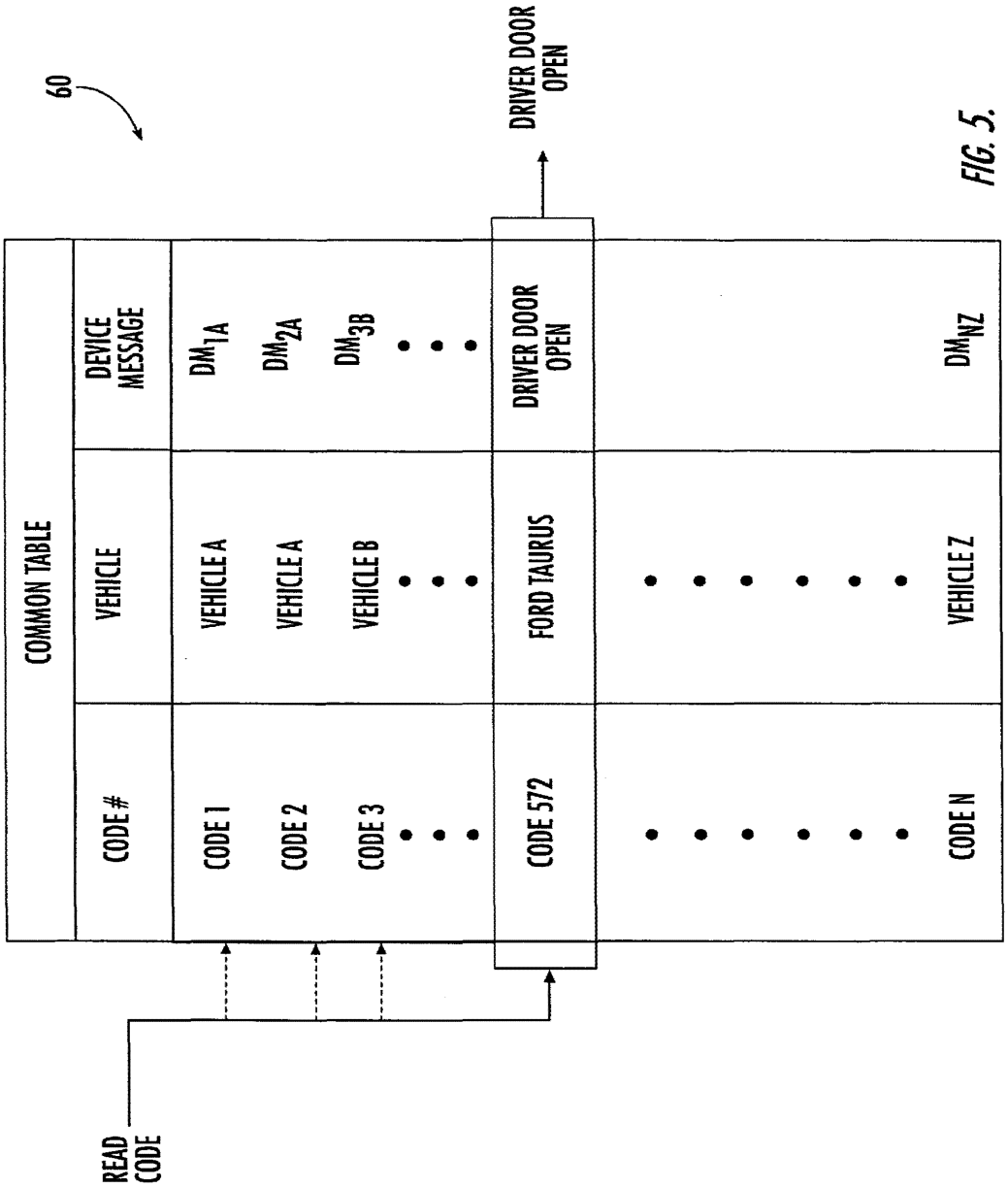


FIG. 5.

Ex. 1002 - Page 81

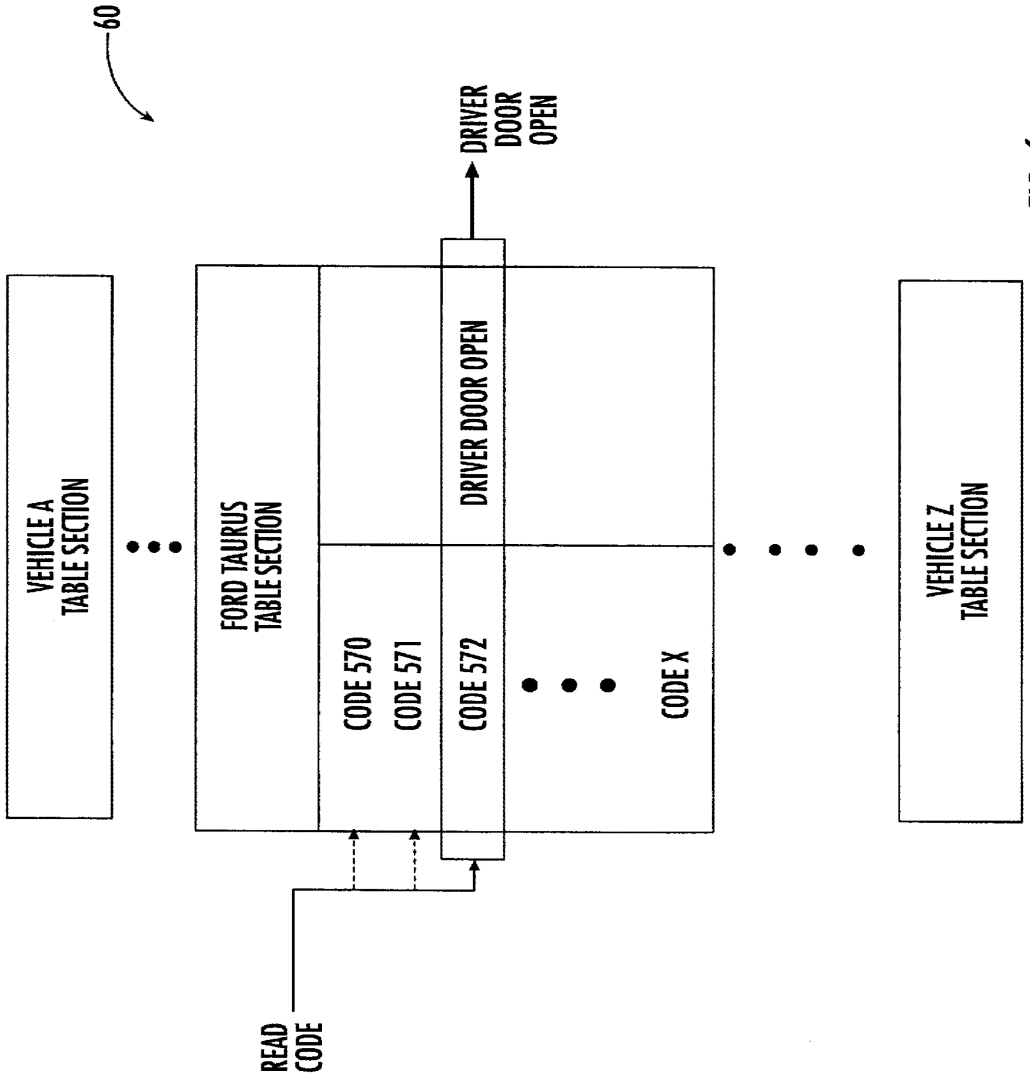


FIG. 6.

Ex. 1002 - Page 82

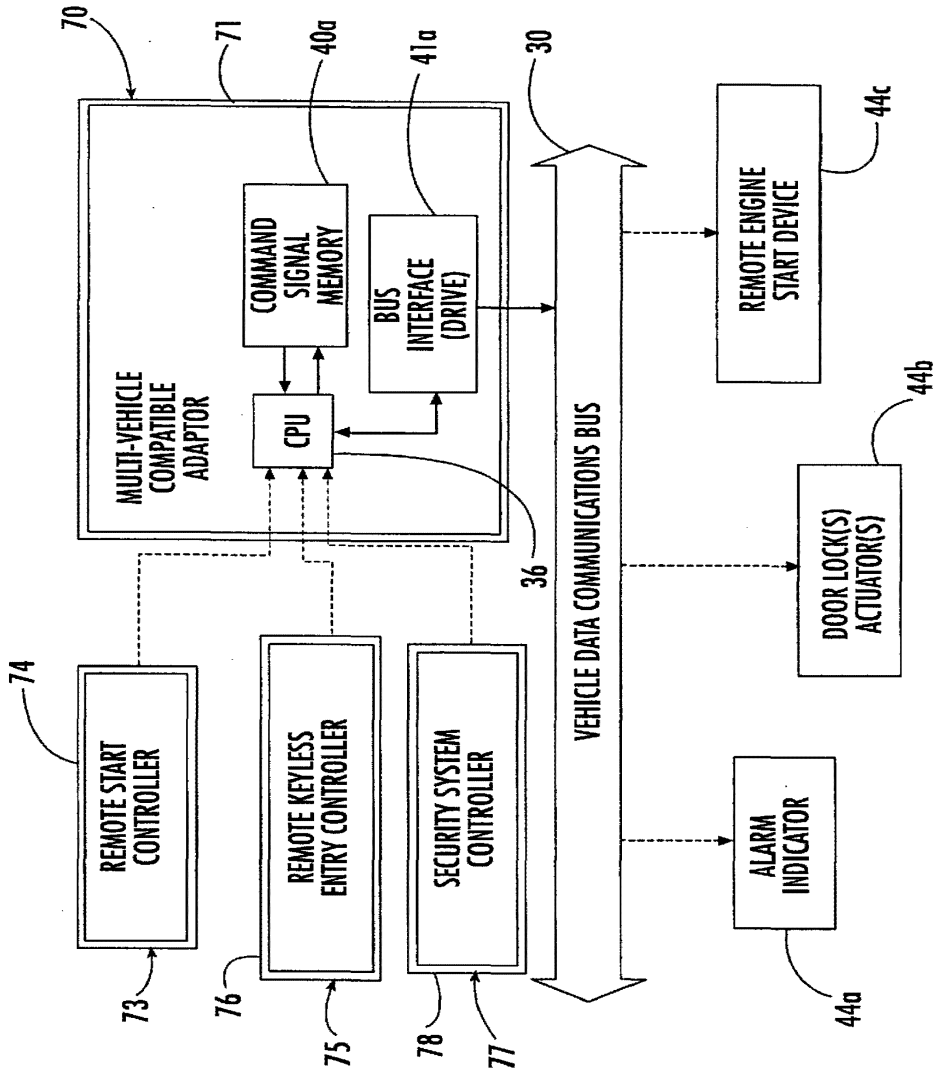


FIG. 7.

Ex. 1002 - Page 83

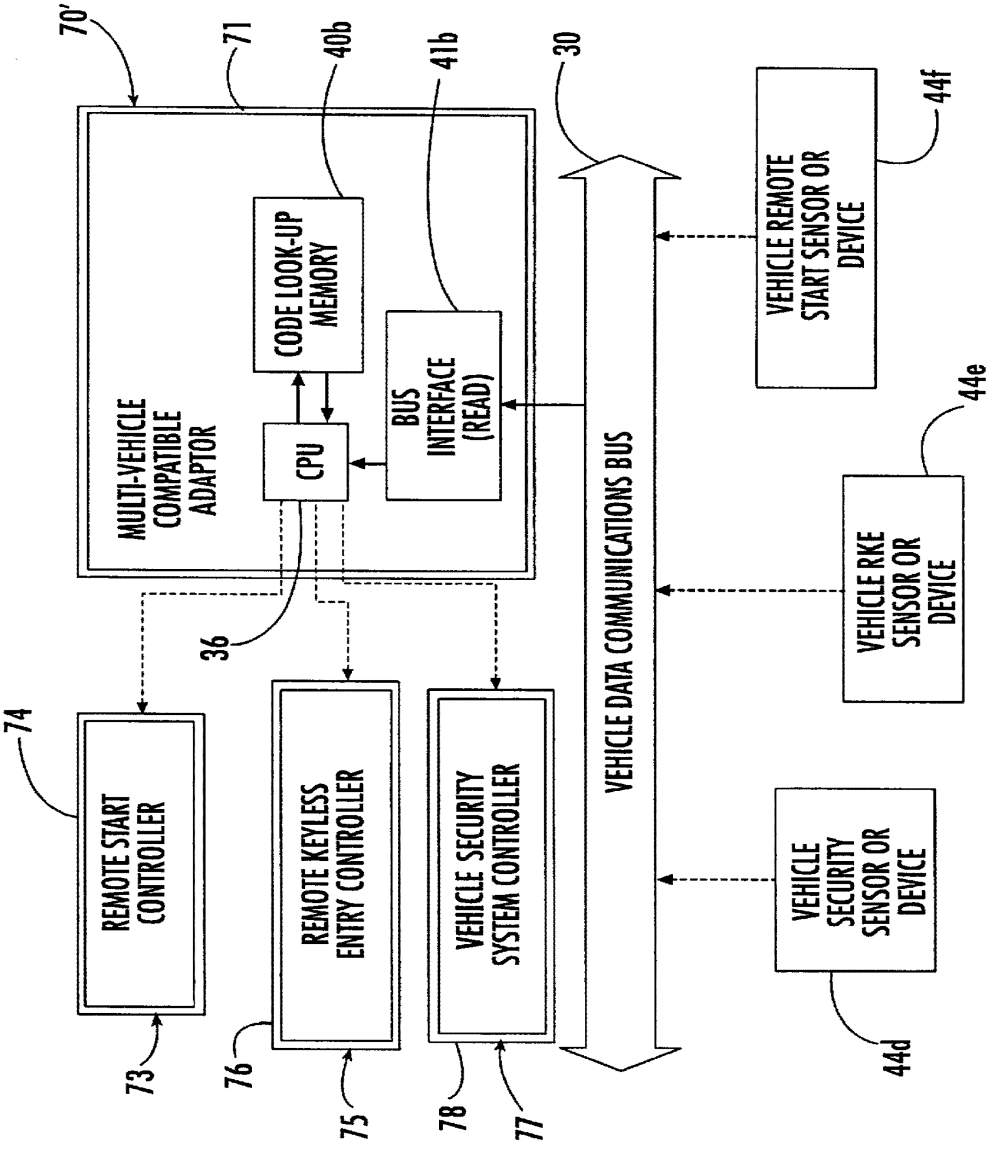


FIG. 8.

Ex. 1002 - Page 84

MULTI-VEHICLE COMPATIBLE CONTROL SYSTEM GENERATING COMMAND SIGNALS ON A DATA BUS AND ASSOCIATED METHODS

RELATED APPLICATIONS

The present application is a continuation-in-part of U.S. patent application Ser. No. 09/382,245 filed Aug. 25, 1999, U.S. Pat. No. 6,275,147 which in turn, is a continuation of Ser. No. 09/023,838 now U.S. Pat. No. 6,011,460, filed Feb. 13, 1998 which in turn, is a continuation-in-art of Ser. No. 08/701,356 now U.S. Pat. No. 5,719,551 filed Aug. 22, 1996.

FIELD OF THE INVENTION

This application is related to the field of control systems and, more particularly, to a remote control system and related methods for vehicles.

BACKGROUND OF THE INVENTION

Vehicle security systems are widely used to deter vehicle theft, prevent theft of valuables from a vehicle, deter vandalism, and to protect vehicle owners and occupants. A typical automobile security system, for example, includes a central processor or controller connected to a plurality of vehicle sensors. The sensors, for example, may detect opening of the trunk, hood, doors, windows, and also movement of the vehicle or within the vehicle. Ultrasonic and microwave motion detectors, vibration sensors, sound discriminators, differential pressure sensors, and switches may be used as sensors. In addition, radar sensors may be used to monitor the area proximate the vehicle.

The controller typically operates to give an alarm indication in the event of triggering of a vehicle sensor. The alarm indication may typically be a flashing of the lights and/or the sounding of the vehicle horn or a siren. In addition, the vehicle fuel supply and/or ignition power may be selectively disabled based upon an alarm condition.

A typical security system also includes a receiver associated with the controller that cooperates with one or more remote transmitters typically carried by the user as disclosed, for example, in U.S. Pat. No. 4,383,242 to Sassover et al. and U.S. Pat. No. 5,146,215 to Drori. The remote transmitter may be used to arm and disarm the vehicle security system or provide other remote control features from a predetermined range away from the vehicle. Also related to remote control of a vehicle function U.S. Pat. No. 5,252,966 to Lambropoulous et al. discloses a remote keyless entry system for a vehicle. The keyless entry system permits the user to remotely open the vehicle doors or open the vehicle trunk using a small handheld transmitter.

Unfortunately, the majority of vehicle security systems need to be directly connected by wires to individual vehicle devices, such as the vehicle horn or door switches of the vehicle. In other words, a conventional vehicle security system is hardwired to various vehicle components, typically by splicing into vehicle wiring harnesses or via interposing T-harnesses and connectors. The number of electrical devices in a vehicle has increased so that the size and complexity of wiring harnesses has also increased. For example, the steering wheel may include horn switches, an airbag, turn-signal and headlight switches, wiper controls, cruise control switches, ignition wiring, an emergency flasher switch, and/or radio controls. Likewise, a door of a vehicle, for example, may include window controls, locks, outside mirror switches, and/or door-panel light switches.

In response to the increased wiring complexity and costs, vehicle manufacturers have begun attempts to reduce the amount of wiring within vehicles to reduce weight, reduce wire routing problems, decrease costs, and reduce complications which may arise when troubleshooting the electrical system. For example, some manufacturers have adopted multiplexing schemes to reduce cables to three or four wires and to simplify the exchange of data among the various onboard electronic systems as disclosed, for example, in "The Thick and Thin of Car Cabling" by Thompson appearing in the IEEE Spectrum, February 1996, pp. 42–45.

Implementing multiplexing concepts in vehicles in a cost-effective and reliable manner may not be easy. Successful implementation, for example, may require the development of low or error-free communications in what can be harsh vehicle environments. 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 messages to ignore and which messages to respond to or read.

The Thompson article describes a number of multiplexed networks for vehicles. In particular, the Grand Cherokee made by Chrysler is described as having five multiplex nodes or controllers: the engine controller, the temperature controller, the airbag controller, the theft alarm, and the overhead console. Other nodes for different vehicles may include a transmission controller, a trip computer, an instrument cluster controller, an antilock braking controller, an active suspension controller, and a body controller for devices in the passenger compartment.

A number of patent references are also directed to digital or multiplex communications networks or circuits, such as may be used in a vehicle. For example, U.S. Pat. No. 4,538,262 Sinniger et al. discloses a multiplex bus system including a master control unit and a plurality of receiver-transmitter units connected thereto. Similarly, U.S. Pat. No. 4,055,772 to Leung discloses a power bus in a vehicle controlled by a low current digitally coded communications system. Other references disclosing various vehicle multiplex control systems include, for example, U.S. Pat. No. 4,760,275 to Sato et al.; U.S. Pat. No. 4,697,092 to Roggendorf et al.; and U.S. Pat. No. 4,792,783 to Burgess et al.

Several standards have been proposed for vehicle multiplex networks including, for example, the Society of Automotive Engineers "Surface Vehicle Standard, Class B Data Communications Network Interface", SAE J1850, July 1995. Another report by the SAE is the "Surface Vehicle Information Report, Chrysler Sensor and Control (CSC) Bus Multiplexing Network for Class 'A' Applications", SAE J2058, July 1990. Many other networks are also being implemented or proposed for communications between vehicle devices and nodes or controllers.

Unfortunately, conventional vehicle control systems, such as aftermarket vehicle security systems, are for hardwired connection to vehicle devices and are not readily adaptable to a vehicle including a data communications bus. Moreover, a vehicle security system if adapted for a communications bus and devices for one particular model, model year, and manufacturer, may not be compatible with any other models, model years, or manufacturers. Other systems for the control of vehicle functions may also suffer from such shortcomings.

SUMMARY OF THE INVENTION

In view of the foregoing background it is therefore an object of the invention 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.

This and other objects, features and advantages in accordance with the invention are provided by a vehicle control system including a transmitter and a receiver for receiving signals from the transmitter, and a multi-vehicle compatible controller cooperating with the transmitter and receiver. The multi-vehicle compatible controller preferably 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 preferably comprises at least one working command signal and at least one non-working command signal for a given vehicle to thereby provide compatibility with a plurality of different vehicles. In other words, 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. Such an arrangement provides for a relatively simple and straightforward approach to interface with a vehicle having a data communications bus.

The at least one vehicle device may, of course, comprise a plurality of vehicle devices. Accordingly, the multi-vehicle compatible controller may generate a respective set of command signals for each of the vehicle devices. In one embodiment, the multi-vehicle compatible controller generates the different command signals sequentially. Of course, the multi-vehicle compatible controller may preferably generate command signals, with each representing digitally coded information, and the multi-vehicle compatible controller may include a memory for storing data relating to the command signals.

The remote control system may be for vehicle security, remote keyless entry, or remote vehicle starting, or combinations of such features, for example. More particularly, the at least one vehicle device may comprise an alarm indicating device, and the at least one set of command signals may be for operating the alarm indicating device. The at least one vehicle device may be one or more door lock actuators, and the at least one set of command signals may be for operating the door lock actuators. In addition, the at least one vehicle device may comprise at least one device relating to starting a vehicle engine, and the at least one set of command signals may be for operating such a device.

In accordance with another aspect of the invention, the multi-vehicle compatible controller may generate each command signal of a set of command signals a plurality of times. This may ensure that the signal is received even when there is other data traffic on the data communications bus.

The multi-vehicle compatibility concept may be extended to an adaptor device, such as for after-market installation, and may be especially advantageous when used in combination with a conventional vehicle function controller. In other words, the multi-vehicle compatible controller may comprise a controller, such as a conventional security, keyless entry, or remote start controller, and a multi-vehicle adaptor connected to the controller. The multi-vehicle adaptor may generate the at least one set of command signals on the data communications bus responsive to a signal from the controller.

The control system can be operated directly by the user, or via an intervening communications network. In other words, in some embodiments, the transmitter may be a remote handheld transmitter to be carried by a user when away from the vehicle, and the receiver is at the vehicle. In other embodiments, the transmitter may include at least a central station transmitter, and the receiver is at the vehicle. The central station transmitter may be part of a satellite or cellular telephone network.

In yet other embodiments, the receiver may be a handheld unit carried by the user or a central station receiver, such as to notify the user or others of a vehicle security breach, for example. In these embodiments, the transmitter is then located at the vehicle.

The multi-vehicle compatible controller may, in some embodiments, also be for reading signals on the data communications bus. This reading function may also have multi-vehicle compatibility.

A method aspect of the invention is directed to 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 preferably comprises generating at least one set of command signals on the data communications bus for the at least one vehicle device and wherein the at least one set of command signals preferably comprises at least one working command signal and at least one non-working command signal for a given vehicle to thereby provide compatibility with a plurality of different vehicles. The method may also include receiving signals at the vehicle from a remote transmitter, and the generation of command signals may be further based on receiving such signals.

Another method aspect of the invention is for adapting a control system for a vehicle to be compatible with different vehicles, wherein each vehicle includes a data communications bus and at least one vehicle device connected to the data communications bus. The control system preferably includes a transmitter and a receiver for receiving signals from the transmitter, and a controller cooperating with the transmitter and receiver. The method for adapting preferably comprises monitoring an output of the controller, and generating at least one set of command signals on the data communications bus responsive to the output of the controller. Again, the at least one set of command signals preferably includes at least one working command signal and at least one non-working command signal for a given vehicle to thereby provide compatibility with a plurality of different vehicles.

BRIEF DESCRIPTION OF THE DRAWINGS

FIG. **1** is a schematic block diagram of a vehicle control System including the multi-vehicle compatible controller connected to a data communications bus and other hard-wired devices in accordance with the invention.

FIG. **2** is a more detailed schematic block diagram of an embodiment of the multi-vehicle compatible controller illustrating the command signal generation in accordance with the invention.

FIG. **3** is a schematic diagram illustrating processing of command signals by the multi-vehicle compatible controller of FIG. **2**.

FIG. **4** is a more detailed schematic block diagram of an embodiment of the multi-vehicle compatible controller illustrating the code signal look-up in accordance with the invention.

FIG. **5** is a schematic diagram illustrating processing of a code read from the data communications bus in accordance with a first embodiment of the multi-vehicle compatible controller of FIG. **4**.

FIG. **6** is a schematic diagram illustrating processing of a code read from the data communications bus in accordance

with a second embodiment of the multi-vehicle compatible controller of FIG. **4**.

FIG. **7** is a schematic block diagram of a multi-vehicle compatible adaptor in accordance with the present invention and illustrating the command signal processing portion.

FIG. **8** is a schematic block diagram of a multi-vehicle compatible adaptor in accordance with the present invention and illustrating the read code processing.

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. Prime and multiple prime notation are used in alternate embodiments to indicate similar elements.

Referring initially to FIG. **1**, a control system **20** for a vehicle **21** is now described. The control system includes a multi-vehicle compatible controller **25** connected to a data communications bus **30** in the vehicle **21**. The data communications bus **30** may be any of several types, such as compatible with the J1850 or CAN standards, or other type of bus as will be appreciated by those skilled in the art. The multi-vehicle compatible controller **25**, as its name suggests, provides compatibility with different codes used on the data bus and which may vary by vehicle as described in greater detail below.

The control system **20** preferably includes a transmitter, and a receiver for receiving signals from the transmitter. As shown in the illustrated embodiment, both a transmitter **31** and a receiver **32** are provided at the vehicle **21**. In addition, both a receiver **33** and a transmitter **34** are provided remotely or away from the vehicle. The first transmitter/receiver pair **31**, **33** may be used, for example, to provide a remote alert or page to a user when away from the vehicle of a security breach at the vehicle, for example. The second transmitter/receiver pair **32**, **34** 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. As will also be appreciated by those skilled in the art, in other embodiments, only one of these pairs of transmitters and receivers may be provided in the control system.

The remote transmitter **34** may be a small portable unit including a housing, function control switches carried by the housing, a battery within the housing, and the associated transmitter circuitry. This type of remote handheld transmitter is commonly used in conventional vehicle security systems, remote start systems, and remote keyless entry systems. The communications from the remote transmitter **34** to the receiver **32** at the vehicle is typically a direct radio frequency link, that is, there is no intervening communications links. However, in other embodiments, the remote transmitter **34** may indirectly communicate with the receiver **32** via other communications infrastructure, such as via satellite, or cellular communications, via the public switched telephone network (PSTN) and/or over the world wide web or Internet, as will be appreciated by those skilled in the art.

The remote transmitter **34** may also be a passive transponder type device, that takes power from an associated transponder reader as will be appreciated by those skilled in the art, and automatically transmits a signal to the reader. For example, the transponder may be of the type carried in conjunction with the vehicle keys, or may be embedded in the key as will be readily appreciated by those skilled in the art.

The remote transmitter **34** may also include one or more central station transmitters, such as may be provided by a satellite transmitter or cellular telephone transmitter, for example. Such a central station transmitter may also be connected to other communications infrastructure.

The remote receiver **33** may also be a small portable unit including a housing, one or more indicators carried by the housing, a battery within the housing, and the associated receiver circuitry. This type of remote receiver may also directly communicate with the vehicle transmitter **31**, or there may be intervening communications links as will be appreciated by those skilled in the art. In some embodiments, the remote transmitter **34** and remote receiver **33** may be packaged together in a common handheld housing. Of course the remote receiver **33** may also include one or more central stations along the lines as described above for the central station remote transmitter.

The multi-vehicle compatible controller **25** may also include a central processing unit (CPU) **36** and one or more memories **40** connected thereto. Although the memory **40** is illustrated as a separate device, those of skill in the art will recognize that the memory may alternately be embedded on the same integrated circuit as the processing circuitry of the CPU.

The multi-vehicle compatible controller **25** also may optionally include a hardwire interface **42** which may be directly connected to one or more vehicle devices **44**. For example, in some embodiments for a security system, direct connections may be made to one or more vehicle sensors, an indicator LED, a siren, or the headlight relay. For a remote start system, hardwire connections may be made to a starter motor relay, for example. Those of skill in the art will recognize other devices **44** that may be directly connected to the multi-vehicle compatible controller **25** via the hardwire interface **42**. The hardwire interface **42** may included circuitry for sending signals to or reading signals from the vehicle devices **44** as will be appreciated by those skilled in the art. In some embodiments, the hardwire interface **42** may not be needed or incorporated in the multi-vehicle compatible controller **25**.

The multi-vehicle compatible controller **25** also illustratively includes a bus interface **41** cooperating with the CPU **36** to perform at least one of reading signals from the data communications bus **30**, or generating signals on the data bus. The bus interface **41** includes circuitry for interfacing to the proper signal levels and formats on the data communications bus **30** as will be appreciated by those skilled in the art without further discussion herein.

As will also be readily appreciated by those skilled in the art, the vehicle **21** includes a number of electrical/electronic devices that can be controlled and/or the status thereof read via the data communications bus **30**. For simplicity of explanation, these devices are schematically illustrated by the two blocks **44**, **45**, respectively labeled "vehicle devices (sensors, actuators, etc.)," and "vehicle controllers (engine controller, transmission controller, etc.)." In other words, the

vehicle devices connected to the data bus **30** 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.

The multi-vehicle compatibility controller **25** may provide its multi-vehicle compatibility in one or both directions of communications via the data communications bus **30**. Referring now additionally to FIGS. **2** and **3**, the drive or generation of signals on the data bus portion of communication is now further described. In this embodiment, the multi-vehicle compatible controller **25'** illustratively includes a command signal memory **40***a*, and a bus interface **41***a* only for the drive direction for simplicity of explanation.

The devices connected to the data communications bus **30** illustratively include an alarm indicator **44***a*, such as can be provided by a separate siren or the vehicle horn, for example. The alarm indicator **44***a* would likely be included for a security system. The vehicle devices may also include one or more door lock actuators **44***b* as would be likely used by a security system or remote keyless entry system, for example, as would be readily appreciated by those skilled in the art.

For a remote start system, one or more remote starting device **44***c* may be connected to the data communications bus **30** as shown in the illustrated embodiment. Such a remote starting device **44***c* may be a starter relay, for example, controlled by signals from the data communications bus. The remote starting device **44***c* could also be a device or circuit to bypass an engine immobilizer circuit as will be appreciated by those skilled in the art.

The vehicle device to which signals are to be sent by the multi-vehicle controller **25'** may also include another controller, such as the schematically illustrated engine management controller **45***a*. The engine management controller **45***a* could be sent signals such as to prevent or enable starting for security or remote start applications as will be appreciated by those skilled in the art.

The multi-vehicle compatible controller **25'** may also include an optional hardwire interface and other components as mentioned above. For clarity and simplicity of explanation, these components need no further description.

In accordance with this aspect of the invention, the multi-vehicle compatible controller **25'** preferably generates at least one set of command signals on the data communications bus **30** for the at least one vehicle device. The at least one set of command signals preferably comprises at least one working command signal and at least one non-working command signal for a given vehicle to thereby provide compatibility with the plurality of different vehicles. In other words, multiple signals or codes can be generated on the data communications bus **30**, and only that code for the given vehicle and device will cause an operation or response from the vehicle device. This provides for a relatively simple and straightforward approach to interface or cooperate with a vehicle having a data communications bus **30**, and wherein the controller is advantageously compatible with a number of different vehicles. Since typically it may be desired to interface to a plurality of vehicle devices, the multi-vehicle compatible controller **25'** may generate a respective set of command signals for each of the vehicle devices.

Such multi-vehicle compatibility provided by the controller **25'** is especially advantageous in after-market systems, such as for security, remote keyless entry, or remote starting for example. The ability to interface through the data communications bus **30** also significantly reduces the wiring complexity needed to interface to the associated vehicle devices.

The multi-vehicle compatible controller **25'** may sequentially generate the different command signals (working and non-working) for an intended vehicle device. To ensure effective communications even in the presence of noise, for example, the multi-vehicle compatible controller **25'** may generate the set of command signals a plurality of times, such as, for example, two to five times. The need to effectively communicate should be balanced against possible traffic congestion on the data bus **30** as will be appreciated by those skilled in the art.

Referring now more specifically to the diagram of FIG. **3**, the operation of the multi-vehicle controller **25'** is further described. The controller **25'** may operate by arranging in the command signals memory **40***a* a common table **50** as shown. The CPU **36** upon determining that an action needs to be performed, such as unlocking the driver's door, for example, would identify the appropriate column from the table **50** from among the columns labeled "vehicle device A" to "vehicle device Z". For example, the appropriate column may be "vehicle device B", in which case the CPU would then read the memory locations in this column to generate on the bus **30** the appropriate set of codes to lock the driver's door for each of the N vehicles with which the multi-vehicle compatible controller **25'** is compatible. Of course, only one of the codes would be a working code, and the other codes would cause no vehicle function to be performed. For example, if vehicle **2** was the vehicle in which the multi-vehicle compatible controller **25'** were installed, only the code **2**B would cause the driver's door to unlock.

The actual coded signals would be compatible with the particular data communications bus **30** as will be appreciated by those skilled in the art. The codes may be binary codes, which for convenience can be represented more simply by corresponding hexadecimal codes as would also be appreciated by those skilled in the art. For example, for an unlock all vehicle doors to be commanded in a 1995 Jeep Grand Cherokee, the code may be 03868004, for a 2000 Jeep Grand Cherokee, the code may be 0422A00400. As will be readily appreciated by those skilled in the art, such codes can be obtained from the manufacturers directly, or may be read from the data bus **30** using any one of a number of commercially available diagnostic tools for reading the data bus **30**, for example.

The set of command signals may be repeated as mentioned above, and as schematically illustrated at the lower portion of the table **50**. Of course, the memory **40***a* may store the actual codes, but may also store data enabling generation of the set of command signals by the CPU **36**. This may be particularly so where certain portions of the code, e.g. preamble, or some other portion, are common across either multiple vehicles, and/or over multiple vehicle devices.

The number of vehicles and number of devices to be controlled using the multi-vehicle compatible controller **25'** can both be relatively large to cover a substantial portion of the vehicle marketplace. Alternatively, the multiple command signal concept may also be advantageously used to provide compatibility for as few as two vehicles, and even a single vehicle device.

Turning now to FIGS. **4–6**, the other direction of communication is now described. In particular, the reverse direction or reading of signals from the data communications bus **30** is now described. Many of the components are the same as those described above, and, hence, need no further description. In the illustrated embodiment, the CPU **36** is connected to a code look-up memory **40***b*. In addition, only the read or receive side of the bus interface **41***b* is

schematically illustrated. The data bus **30** also illustratively connects one or more of vehicle security sensors or devices **44***d*, vehicle remote keyless entry sensors or devices, and vehicle remote start sensors or devices **44***f* to the multi-vehicle compatible controller **25"**. An engine management controller **45***a* is also illustratively connected to the data communications bus **30** as may be used for vehicle security or remote starting as mentioned above. Considered in somewhat different terms, the multi-vehicle compatible controller **25"** may be for one or more of the conventional vehicle remote control functions broadly considered as vehicle security, remote keyless entry, or remote starting. Other similar control functions for a vehicle are also contemplated by the present invention.

The compatibility to read a code and determine the message or content thereof for a vehicle device from among a plurality of vehicles can be used alone or in combination with the compatibility for writing or generating signals on the bus described above. More particularly, the multi-vehicle compatible controller **25"** 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 **30**, 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. Such an arrangement provides for a relatively simple and straightforward approach to interface with a vehicle having a data communications bus **30**.

As noted briefly above, the multi-vehicle compatible controller **25"** may comprise the code look-up memory **40***b* for the stored device codes, and a processor or CPU **36** cooperating with the memory for determining the match between the read device code and the stored device codes. The at least one vehicle device may include a plurality of vehicle devices, and, accordingly, the memory **40***b* of the multi-vehicle compatible controller **25"** preferably stores a respective set of device codes for each of the plurality of vehicle devices.

Referring now more specifically to FIG. **5**, the look-up table feature of the multi-vehicle compatible controller **25"** is now described. A common table **60** may be created which contains a column for the vehicle codes in some predefined sequence, such as in a numerical order beginning with a first code, Code 1, and ending with a last code, Code N, as illustrated. The central column in the illustrated embodiment includes the corresponding vehicle identification with the vehicles extending from a first vehicle, Vehicle A, to a last vehicle, Vehicle Z. The number of codes and vehicles may be selected so that a given multi-vehicle compatible controller **25"** is useable across an economically large number of vehicles as will be appreciated by those skilled in the art.

The last or rightmost column in the illustrated table **60** is the device data or message corresponding to the associated vehicle and code. These device messages extend from a first message, DM_{1A}, to a last device message, DM_{NZ}. The messages may be of many different types, such as driver door open or closed, hood open or closed, shock sensor triggered, brake pressure indicated, gearshift selector in Park, etc. as will be appreciated by those skilled in the art.

By way of example, the common table **60** includes a blocked row schematically illustrating a match for a Code **572**. This code is for a Ford Taurus and indicates that the driver's door is open. This type of data may be useful in any of the illustrated implementations including vehicle security, remote keyless entry, or remote starting. The CPU **36** would read the code on the data bus **30** and compare the code against the stored codes to determine a match. The CPU **36** is likely to buffer some or all of a code when received to subsequently be compared using the table **60** as will be understood by those skilled in the art. In other embodiments, individual bits or blocks thereof may be compared as they are received.

An alternate embodiment of the common table **60** is now explained with reference to FIG. **6**. In this case the overall or common table **60'**, may be considered parsed or divided into a plurality of vehicle table sections. The first table section is for vehicle A, and the last for vehicle Z in the illustrated embodiment. This embodiment also illustrates the driver door for the Ford Taurus as being matched from the read signal from the data communications bus **30**. What is of interest in this embodiment, is that upon initial set-up or an initial learning period, only the codes for the learned vehicle need then later be compared to the read code. Accordingly, a time savings may be realized.

Those of skill in the art will recognize that the tables **60** and **60'** of FIGS. **5** and **6** are exemplary illustrations from among many possible configurations of look-up tables that may be used in accordance with the present invention. Other configurations are also contemplated by the present invention.

Since it may also be desirable to re-install the multi-vehicle compatible controller **25"** in another vehicle, the controller may be reset and another vehicle learned or configured during an initial set-up. This concept is generally described as an embodiment of a desired signal enabling function or feature in related parent U.S. patent application Ser. No. 09/382,245 filed Aug. 25, 1999, which in turn, is a continuation of U.S. Pat. No. 6,011,460, which in turn, is a continuation-in-part of U.S. Pat. No. 5,719,551, and the disclosure of each of which are incorporated herein by reference in its entirety.

Turning now to FIG. **7**, we again revisit the command signal concept for driving the communications bus **30** with a plurality of signal codes to provide the multi-vehicle compatibility. In this variation, the multi-vehicle controller is divided into two sections or portions. More particularly, the multi-vehicle compatibility is provided by the illustrated multi-vehicle compatible adaptor **70**. The adaptor **70** illustratively includes the CPU **36**, the command signal memory **40***a*, and the bus interface **41***a*. The adaptor **70** also includes its own housing **71**. The adaptor **70**, may include a hardwire interface as discussed above, or such could already be provided with any of the controllers **73**, **75** or **77** as would more typically be the case.

The adaptor **70** is fed signals from one or more of the illustrated conventional controllers, that is, one or more of the remote start controller **73**, the remote keyless entry controller **75** or the security system controller **77**. Each of the these controllers **73**, **75** and **77** may also include its own respective housing **74**, **76** and **78**.

As will be appreciated by those skilled in the art, one scenario where the adaptor **70** may be especially useful is to adapt a conventional security or other system controller to operate via the data communications bus **30**. Since the data bus technology is being slowly phased in by automobile manufacturers, suppliers may provide their conventional systems for conventional vehicles, and add the adaptor **70** with the conventional controller when the vehicle requires interface to the data communications bus **30**.

Turning now to FIG. **8**, it can be seen that similar concepts can be extended to the multi-vehicle compatible adaptor **70'** for the other direction of communication, that is, from the

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

data communications bus **30** to one or more of the controllers **73**, **75** and **77**. The adaptor **70'** illustratively includes the CPU **36**, bus interface circuit **41***b* for reading the bus, and the code look-up memory **40***b* as described above with reference to FIG. **4**.

The operation of the multi-vehicle compatible adaptor **70'** will be readily understood by those of skill in the art based upon the above provided descriptions relating to FIGS. **4–6** without requiring further discussion herein. Of course, as will be appreciated by those skilled in the art, the adaptors **70**, **70'** may be used independently, may be used together, or may be combined into a single unit.

Other features relating to vehicle control systems are disclosed in copending patent applications entitled "REMOTE START SYSTEM FOR A VEHICLE HAVING A DATA COMMUNICATIONS BUS AND RELATED METHODS" (attorney docket no. 16635E) and "MULTI-VEHICLE COMPATIBLE CONTROL SYSTEM FOR READING FROM A DATA BUS AND ASSOCIATED METHODS" (attorney docket no. 16635H), 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 illustrated 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:

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 transmitter and a receiver for receiving signals from said transmitter; and

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 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.

2. A control system according to claim **1** wherein the at least one vehicle device comprises a plurality of vehicle devices; and wherein said multi-vehicle compatible controller generates a respective set of command signals for each vehicle device of the plurality thereof.

3. A control system according to claim **1** wherein said multi-vehicle compatible controller generates command signals sequentially.

4. A control system according to claim **1** wherein said multi-vehicle compatible controller generates command signals each representing digitally coded information.

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.

6. A control system according to claim **1** wherein the at least one vehicle device comprises an alarm indicating device; and wherein the at least one set of command signals is for operating the alarm indicating device.

7. A control system according to claim **1** wherein the at least one vehicle device comprises at least one vehicle door lock actuator; and wherein the at least one set of command signals is for operating the at least one door lock actuator.

8. A control system according to claim **1** where the at least one vehicle device comprises at least one device relating to starting a vehicle engine; and wherein the at least one set of command signals is for operating the at least one vehicle device relating to starting the vehicle engine.

9. A control system according to claim **1** wherein said multi-vehicle compatible controller generates each command signal of the at least one set of command signals a plurality of times.

10. A control system according to claim **1** wherein said multi-vehicle compatible controller comprises:

a controller for generating at least one controller signal; and

a multi-vehicle compatible adaptor connected to said controller for generating the at least one set of command signals on the data communications bus responsive to the at least one controller signal.

11. A control system according to claim **10** wherein said controller further comprises a first housing; and said multi-vehicle adaptor comprises a second housing.

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 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.

13. A control system according to claim **1** wherein said transmitter comprises a remote handheld transmitter to be carried by a user when away from the vehicle; and wherein said receiver is at the vehicle.

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.

15. A control system according to claim **1** wherein said receiver comprises a remote receiver to be carried by a user when away from the vehicle; and wherein said transmitter is at the vehicle.

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.

17. A control system according to claim **1** wherein said transmitter comprises a transponder transmitter to be carried by a user; and wherein said receiver is at the vehicle.

18. An adaptor for adapting a control system for a vehicle to be compatible with a plurality of different vehicles, each vehicle comprising a data communications bus and at least one vehicle device connected thereto, the control system comprising a transmitter and a receiver for receiving signals from the remote transmitter, and a controller cooperating with the transmitter and receiver, the adaptor comprising:

a housing; and

a multi-vehicle compatible adaptor circuit mounted in said housing for generating at least one set of command signals on the data communications bus responsive to the controller, 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.

19. An adaptor according to claim 18 wherein the at least one vehicle device comprises a plurality of vehicle devices; and wherein said multi-vehicle compatible adaptor circuit generates a respective set of command signals for each vehicle device of the plurality thereof.

20. An adaptor according to claim 18 wherein said multi-vehicle compatible adaptor circuit generates command signals sequentially.

21. An adaptor according to claim 18 wherein said multi-vehicle compatible adaptor circuit generates command signals each representing digitally coded information.

22. An adaptor according to claim 18 wherein said multi-vehicle compatible adaptor circuit comprises a memory for storing data relating to the at least one set of command signals.

23. An adaptor according to claim 18 wherein the at least one vehicle device comprises an alarm indicating device; and wherein the at least one set of command signals is for operating the alarm indicating device.

24. An adaptor according to claim 18 wherein the at least one vehicle device comprises at least one vehicle door lock actuator; and wherein the at least one set of command signals is for operating the at least one door lock actuator.

25. An adaptor according to claim 18 where the at least one vehicle device comprises at least one device relating to starting a vehicle engine; and wherein the at least one set of command signals is for operating the at least one vehicle device relating to starting the vehicle engine.

26. An adaptor according to claim 18 wherein said multi-vehicle compatible adaptor circuit generates each command signal of the at least one set of command signals a plurality of times.

27. An adaptor according to claim 18 wherein said multi-vehicle compatible adaptor circuit 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, 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.

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:

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.

29. A method according to claim 28 further comprising receiving a signal from a transmitter; and wherein generating the at least one set of command signals is responsive to receiving the signal from the transmitter.

30. A method according to claim 29 wherein the transmitter comprises a handheld remote transmitter to be carried by a user when away from the vehicle.

31. A method according to claim 29 wherein the transmitter comprises at least a central station transmitter.

32. A method according to claim 29 wherein the transmitter comprises a handheld transponder to be carried by a user when away from the vehicle.

33. A method according to claim 28 wherein the at least one vehicle device comprises a plurality of vehicle devices; and further comprising generating a respective set of command signals for each vehicle device of the plurality thereof.

34. A method according to claim 28 wherein the command signals are generated sequentially.

35. A method according to claim 28 the command signals each represent digitally coded information.

36. A method according to claim 28 further comprising storing in a memory data relating to the at least one set of command signals.

37. A method according to claim 28 wherein the at least one vehicle device comprises an alarm indicating device; and wherein the at least one set of command signals is for operating the alarm indicating device.

38. A method according to claim 28 wherein the at least one vehicle device comprises at least one vehicle door lock actuator; and wherein the at least one set of command signals is for operating the at least one door lock actuator.

39. A method according to claim 28 where the at least one vehicle device comprises at least one device relating to starting a vehicle engine; and wherein the at least one set of command signals is for operating the at least one vehicle device relating to starting the vehicle engine.

40. A method according to claim 28 wherein each command signal of the at least one set of command signals is generated a plurality of times.

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;

reading a device code from the data communications bus; and

determining a match between a read device code and the stored device codes to thereby provide reading compatibility with a plurality of different vehicles.

42. A method for adapting a control system for a vehicle to be compatible with plurality of different vehicles, each vehicle comprising a data communications bus and at least one vehicle device connected to the data communications bus, the control system comprising a transmitter and a receiver for receiving signals from the transmitter, and a controller cooperating with the transmitter and receiver, the method comprising:

monitoring an output of the controller; and

generating at least one set of command signals on the data communications bus responsive to the output of the controller, 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.

43. A method according to claim 42 wherein the at least one vehicle device comprises a plurality of vehicle devices; and further comprising generating a respective set of command signals for each vehicle device of the plurality thereof.

44. A method according to claim 42 wherein the command signals are generated sequentially.

45. A method according to claim 42 wherein the command signals each represent digitally coded information.

46. A method according to claim 42 further comprising storing in a memory data relating to the at least one set of command signals.

47. A method according to claim 42 wherein the at least one vehicle device comprises an alarm indicating device; and wherein the at least one set of command signals is for operating the alarm indicating device.

48. A method according to claim **42** wherein the at least one vehicle device comprises at least one vehicle door lock actuator; and wherein the at least one set of command signals is for operating the at least one door lock actuator.

49. A method according to claim **42** where the at least one vehicle device comprises at least one device relating to starting a vehicle engine; and wherein the at least one set of command signals is for operating the at least one vehicle device relating to starting the vehicle engine.

50. A method according to claim **42** wherein each command signal of the at least one set of command signals is generated a plurality of times.

51. A method according to claim **42** further comprising:

storing a set of device codes for a given vehicle device for a plurality of different vehicles;

reading a device code from the data communications bus; and

determining a match between a read device code and the stored device codes to thereby provide reading compatibility with a plurality of different vehicles reading signals on the data communications bus.

* * * * *

EXHIBIT C

US006737989B2

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Flick

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(45) Date of Patent: May 18, 2004

(54) **VEHICLE TRACKER INCLUDING VARIABLE FREQUENCY TRANSMISSION AND RELATED 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 17 days.

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(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. 60/246,463, filed on Nov. 7, 2000, provisional application No. 60/236,890, filed on Sep. 29, 2000, provisional application No. 60/222,777, filed on Aug. 3, 2000, and provisional application No. 60/205,178, filed on May 17, 2000.

(51) **Int. Cl.**[7] **G08G 1/123**

(52) **U.S. Cl.** **340/989**; 340/426.2; 701/209

(58) **Field of Search** 340/989, 426.2, 340/992, 539.32, 539.21, 426.19, 995.23, 995.21; 701/209

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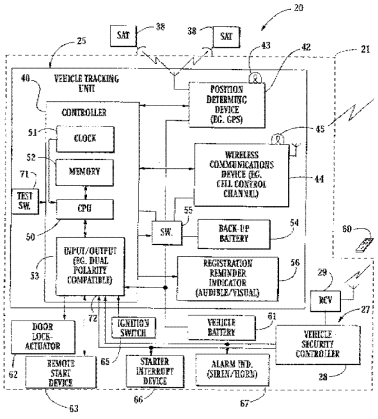
Primary Examiner—John Tweel

(74) *Attorney, Agent, or Firm*—Allen, Dyer, Doppelt, Milbrath & Gilchrist, P.A.

(57) **ABSTRACT**

A tracking unit for a vehicle may include a vehicle position determining device, a wireless communications device, and a controller cooperating with the wireless communications device and the vehicle position determining device to determine and send vehicle position information to a monitoring station. The controller may store a user selected reference location and send the vehicle position information based upon the vehicle moving beyond a radial threshold distance from the user selected reference location. More particularly, the vehicle position information may be sent a threshold time after the vehicle moves beyond the radial threshold distance from the user selected reference location if the vehicle has not moved back within the radial threshold distance. Additionally, the vehicle tracking unit may further include at least one input device to be positioned within the vehicle for setting the user selected reference location.

48 Claims, 36 Drawing Sheets



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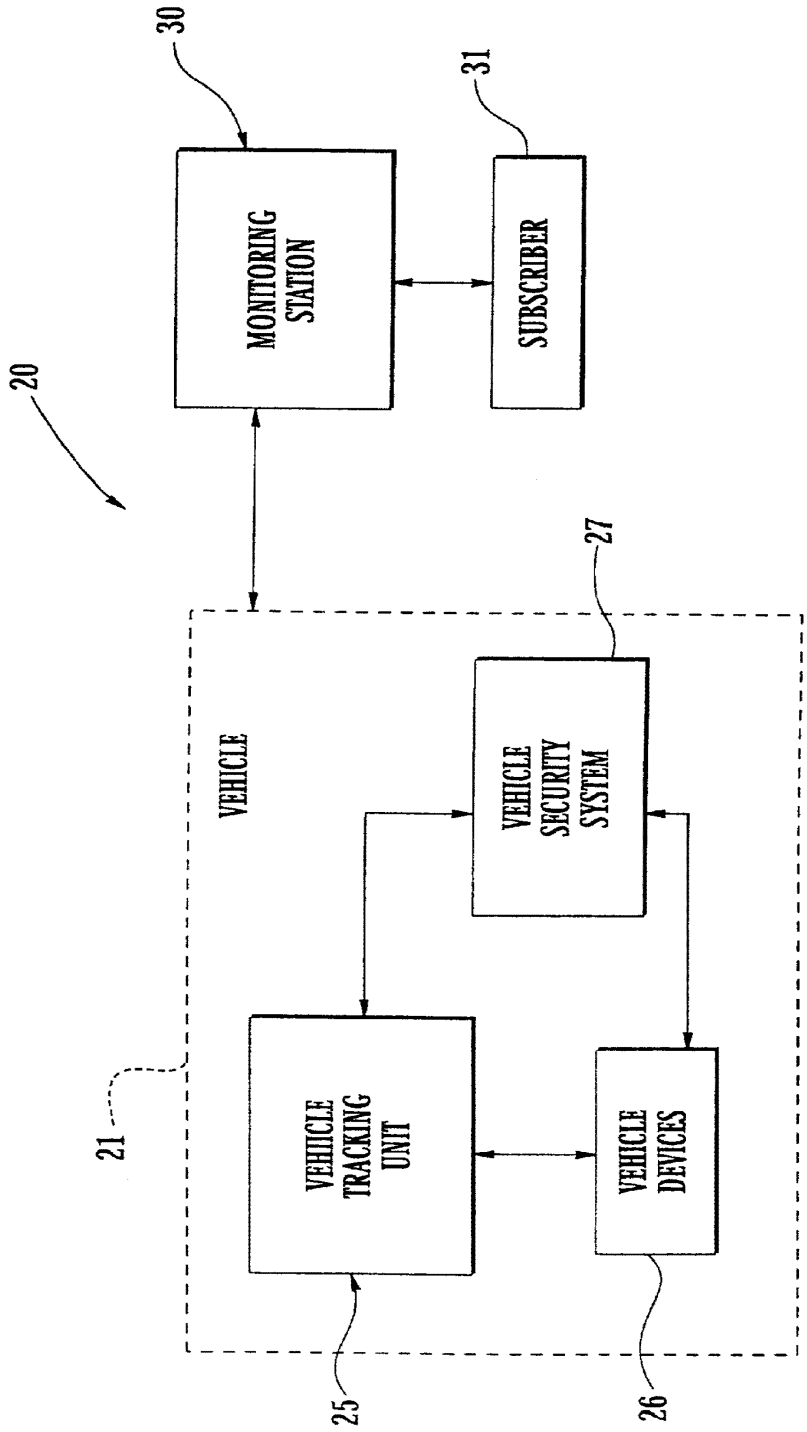


FIG. 1.

Ex. 1002 - Page 97

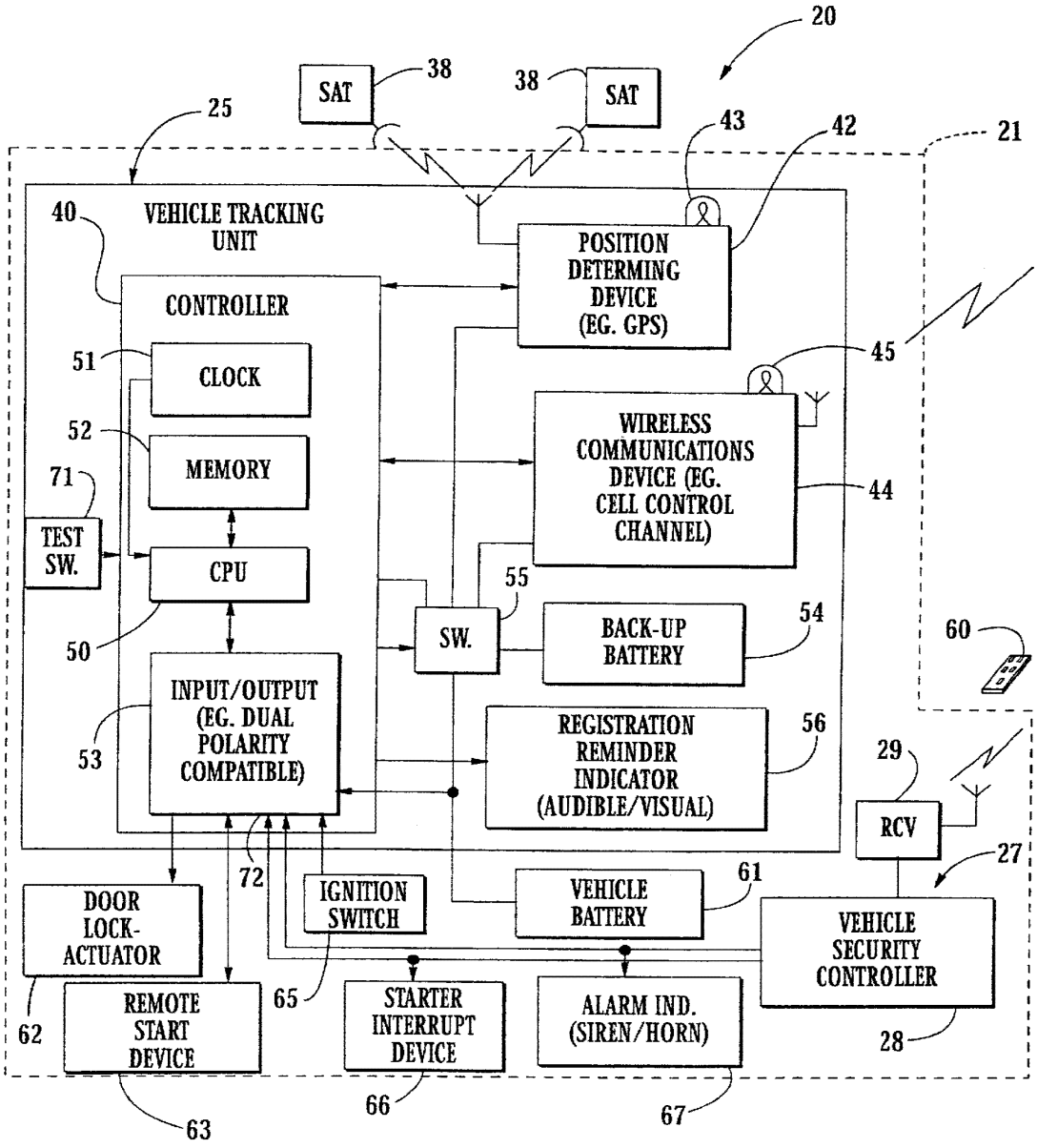

20
SAT
38
38
SAT
25
43
42
21
40
VEHICLE TRACKING UNIT
POSITION DETERMING DEVICE (EG. GPS)
CONTROLLER
45
51
CLOCK
WIRELESS COMMUNICATIONS DEVICE (EG. CELL CONTROL CHANNEL)
52
MEMORY
71
44
TEST SW.
CPU
55
60
50
SW.
BACK-UP BATTERY
54
INPUT/OUTPUT (EG. DUAL POLARITY COMPATIBLE)
53
REGISTRATION REMINDER INDICATOR (AUDIBLE/VISUAL)
56
29
RCV
27
72
IGNITION SWITCH
VEHICLE BATTERY
61
DOOR LOCK-ACTUATOR
VEHICLE SECURITY CONTROLLER
65
62
REMOTE START DEVICE
STARTER INTERRUPT DEVICE
ALARM IND. (SIREN/HORN)
28
63
66
67

FIG. 2.

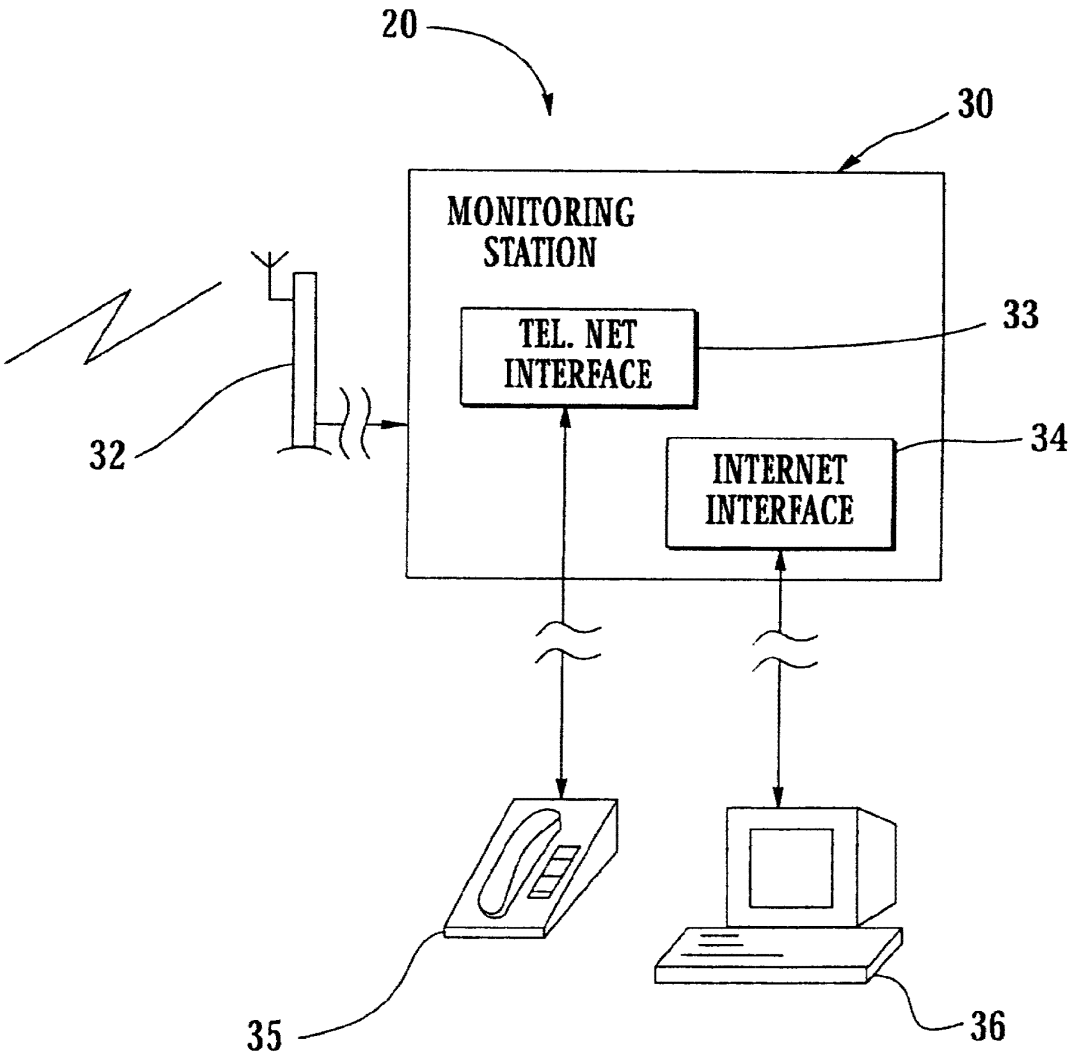

20
30
MONITORING STATION
TEL. NET INTERFACE
33
INTERNET INTERFACE
34
32
35
36

FIG. 3.

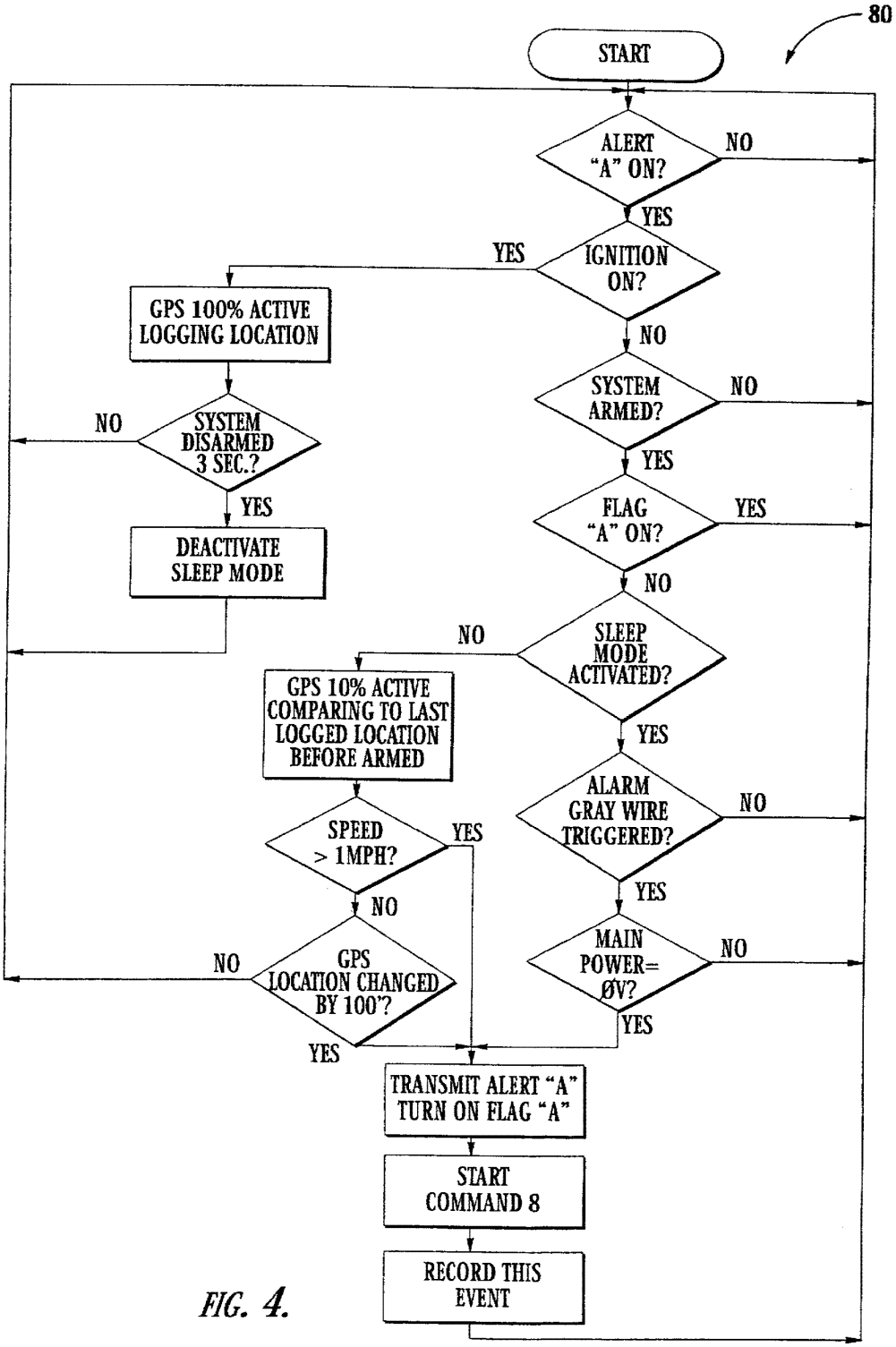

80
START
ALERT "A" ON?
NO
YES
IGNITION ON?
YES
GPS 100% ACTIVE LOGGING LOCATION
NO
SYSTEM ARMED?
NO
YES
SYSTEM DISARMED 3 SEC.?
NO
YES
DEACTIVATE SLEEP MODE
FLAG "A" ON?
YES
NO
SLEEP MODE ACTIVATED?
NO
GPS 10% ACTIVE COMPARING TO LAST LOGGED LOCATION BEFORE ARMED
YES
ALARM GRAY WIRE TRIGGERED?
NO
YES
SPEED > 1MPH?
YES
NO
MAIN POWER= ØV?
NO
YES
GPS LOCATION CHANGED BY 100'?
NO
YES
TRANSMIT ALERT "A" TURN ON FLAG "A"
START COMMAND 8
RECORD THIS EVENT

FIG. 4.

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

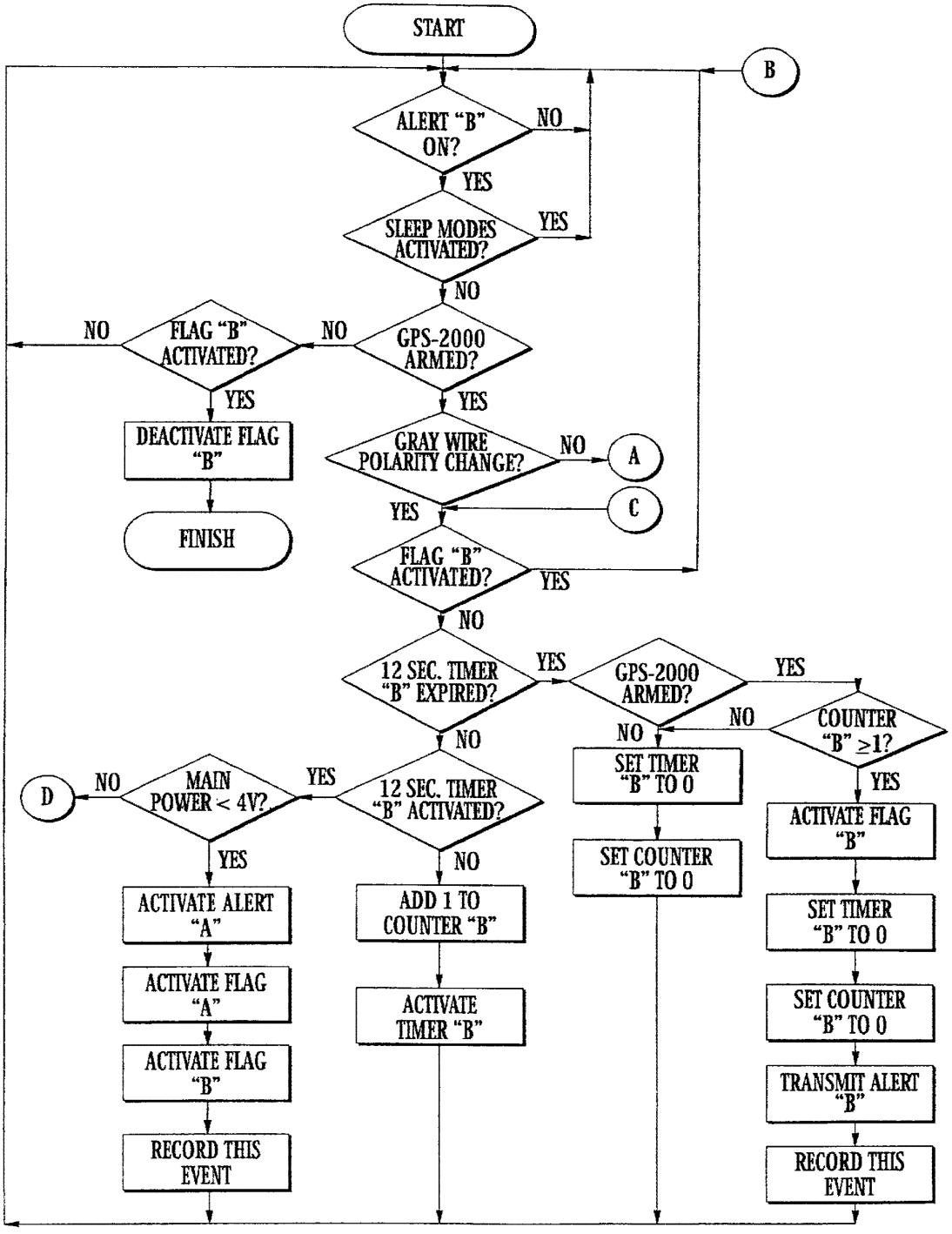

START
B
ALERT "B" ON?
NO
YES
SLEEP MODES ACTIVATED?
YES
NO
NO
FLAG "B" ACTIVATED?
NO
GPS-2000 ARMED?
YES
YES
DEACTIVATE FLAG "B"
GRAY WIRE POLARITY CHANGE?
NO
A
C
YES
FINISH
FLAG "B" ACTIVATED?
YES
NO
12 SEC. TIMER "B" EXPIRED?
YES
GPS-2000 ARMED?
YES
NO
NO
COUNTER "B" ≥1?
NO
YES
D
NO
MAIN POWER < 4V?
YES
12 SEC. TIMER "B" ACTIVATED?
YES
SET TIMER "B" TO 0
ACTIVATE FLAG "B"
NO
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.

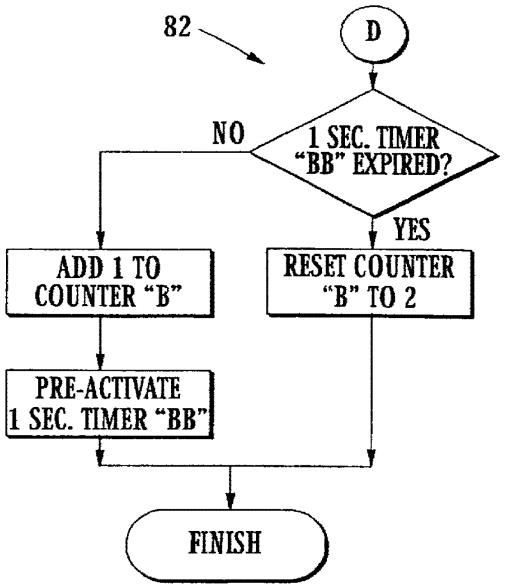

82
D
1 SEC. TIMER "BB" EXPIRED?
NO
YES
ADD 1 TO COUNTER "B"
RESET COUNTER "B" TO 2
PRE-ACTIVATE 1 SEC. TIMER "BB"
FINISH

FIG. 5B.

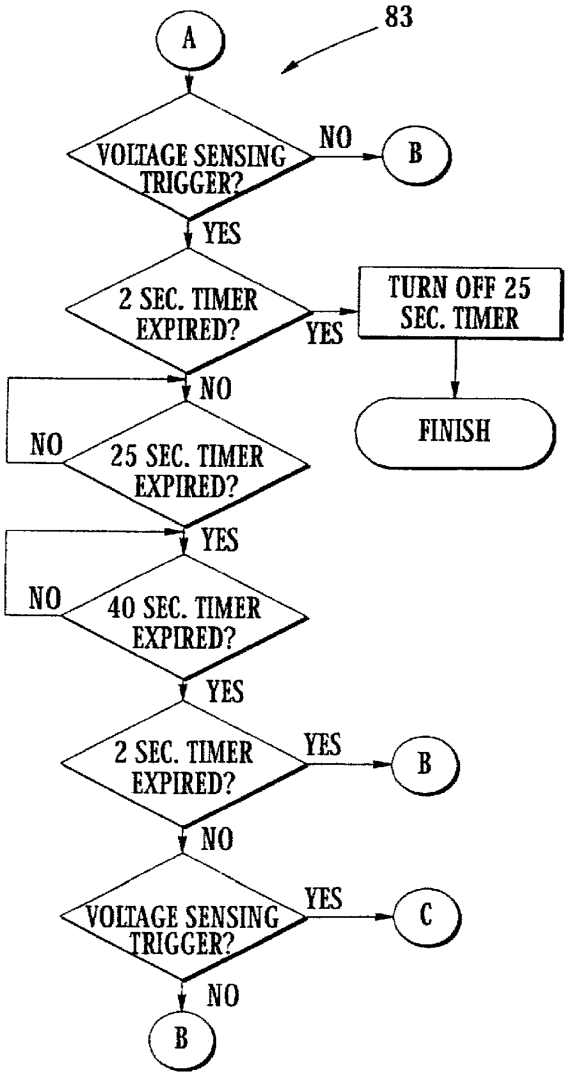

83
A
VOLTAGE SENSING TRIGGER?
NO
B
YES
2 SEC. TIMER EXPIRED?
YES
TURN OFF 25 SEC. TIMER
FINISH
NO
NO
25 SEC. TIMER EXPIRED?
YES
NO
40 SEC. TIMER EXPIRED?
YES
2 SEC. TIMER EXPIRED?
YES
B
NO
VOLTAGE SENSING TRIGGER?
YES
C
NO
B

FIG. 5C.

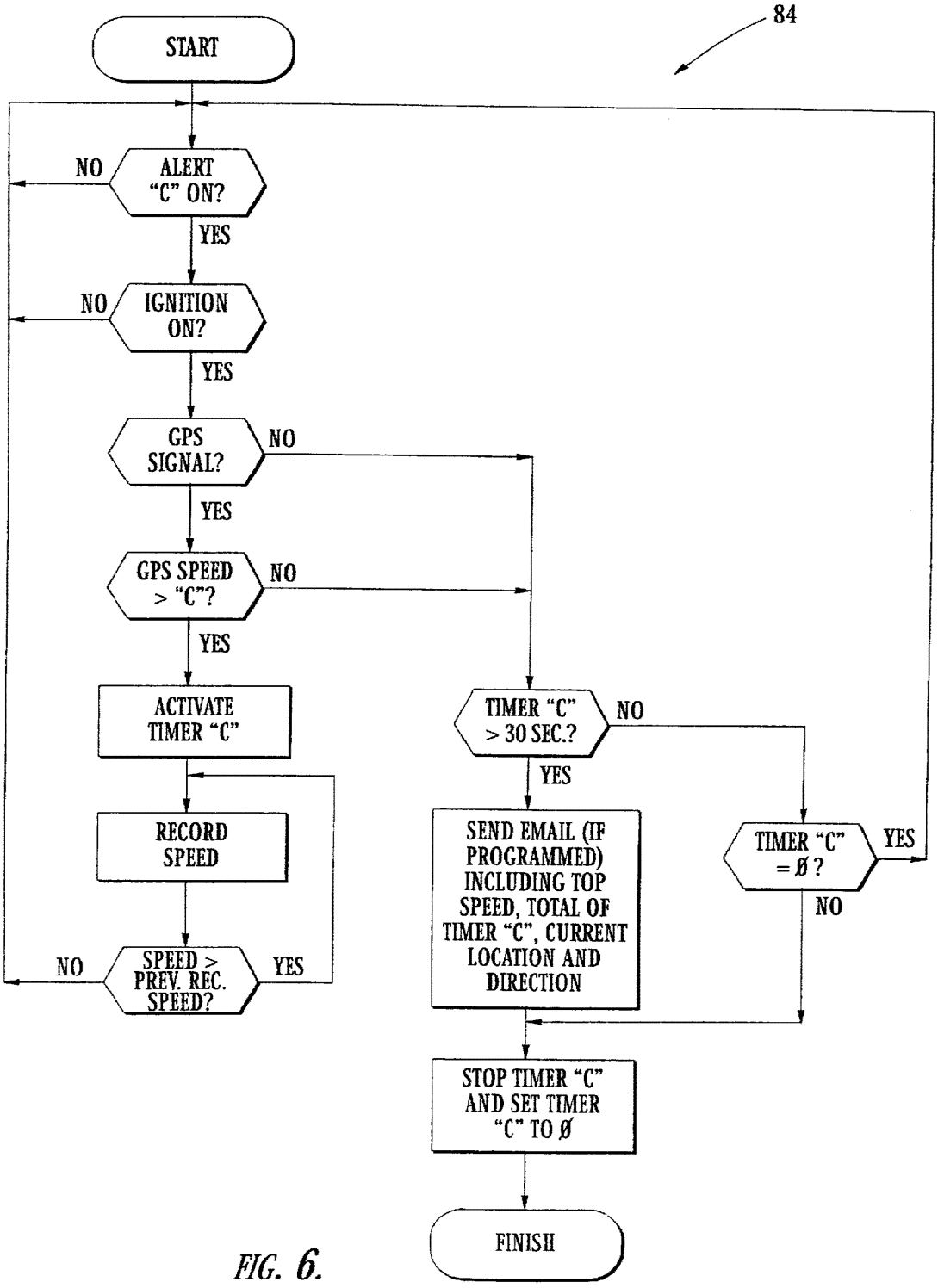

84
START
ALERT "C" ON?
NO
YES
IGNITION ON?
NO
YES
GPS SIGNAL?
NO
YES
GPS SPEED > "C"?
NO
YES
ACTIVATE TIMER "C"
RECORD SPEED
SPEED > PREV. REC. SPEED?
NO
YES
TIMER "C" > 30 SEC.?
NO
YES
SEND EMAIL (IF PROGRAMMED) INCLUDING TOP SPEED, TOTAL OF TIMER "C", CURRENT LOCATION AND DIRECTION
TIMER "C" = Ø ?
YES
NO
STOP TIMER "C" AND SET TIMER "C" TO Ø
FINISH

FIG. 6.

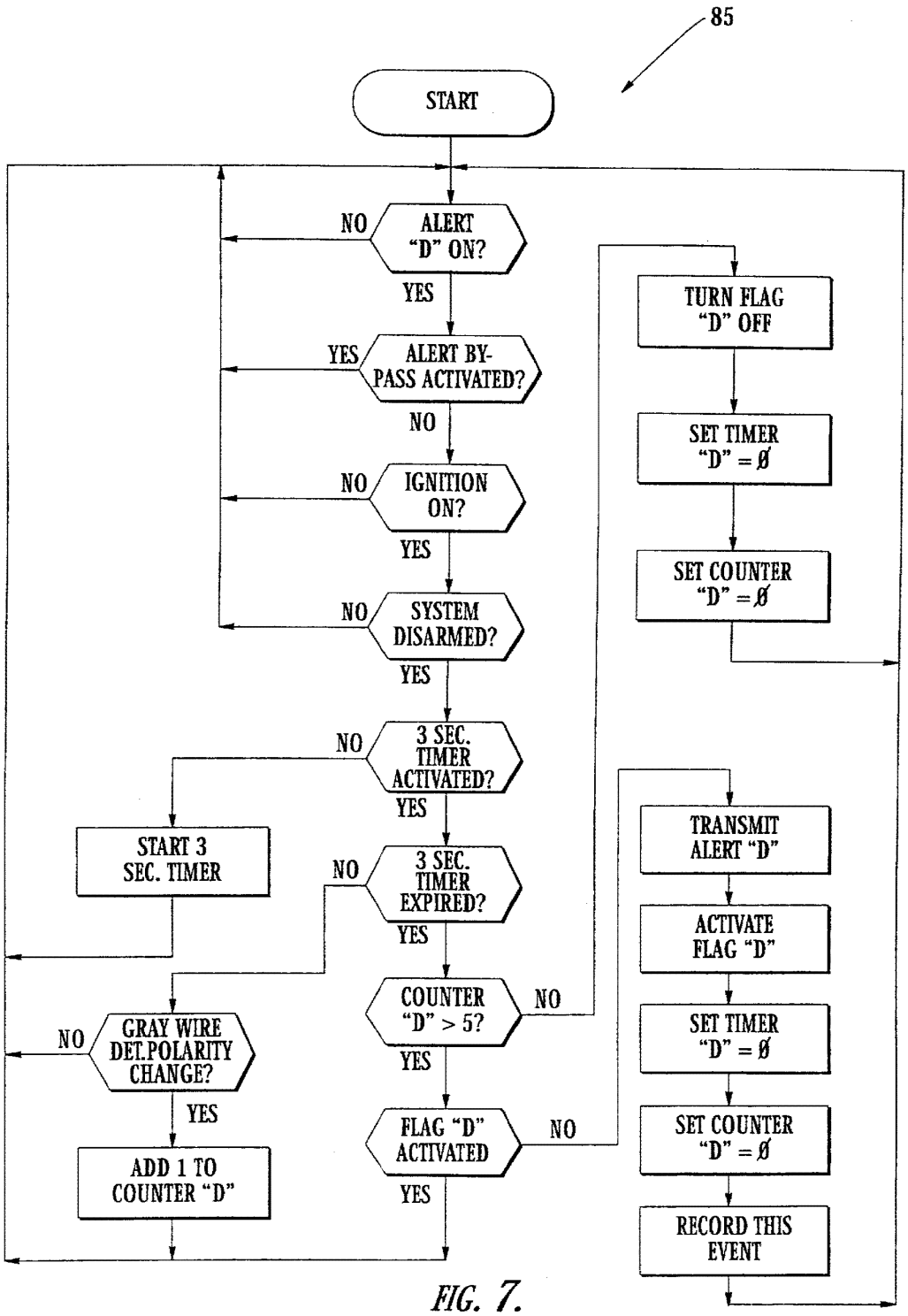

85
START
NO
ALERT "D" ON?
YES
YES
ALERT BY-PASS ACTIVATED?
NO
NO
IGNITION ON?
YES
NO
SYSTEM DISARMED?
YES
NO
3 SEC. TIMER ACTIVATED?
YES
START 3 SEC. TIMER
NO
3 SEC. TIMER EXPIRED?
YES
NO
GRAY WIRE DET.POLARITY CHANGE?
YES
ADD 1 TO COUNTER "D"
COUNTER "D" > 5?
NO
YES
FLAG "D" ACTIVATED
NO
YES
TURN FLAG "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.

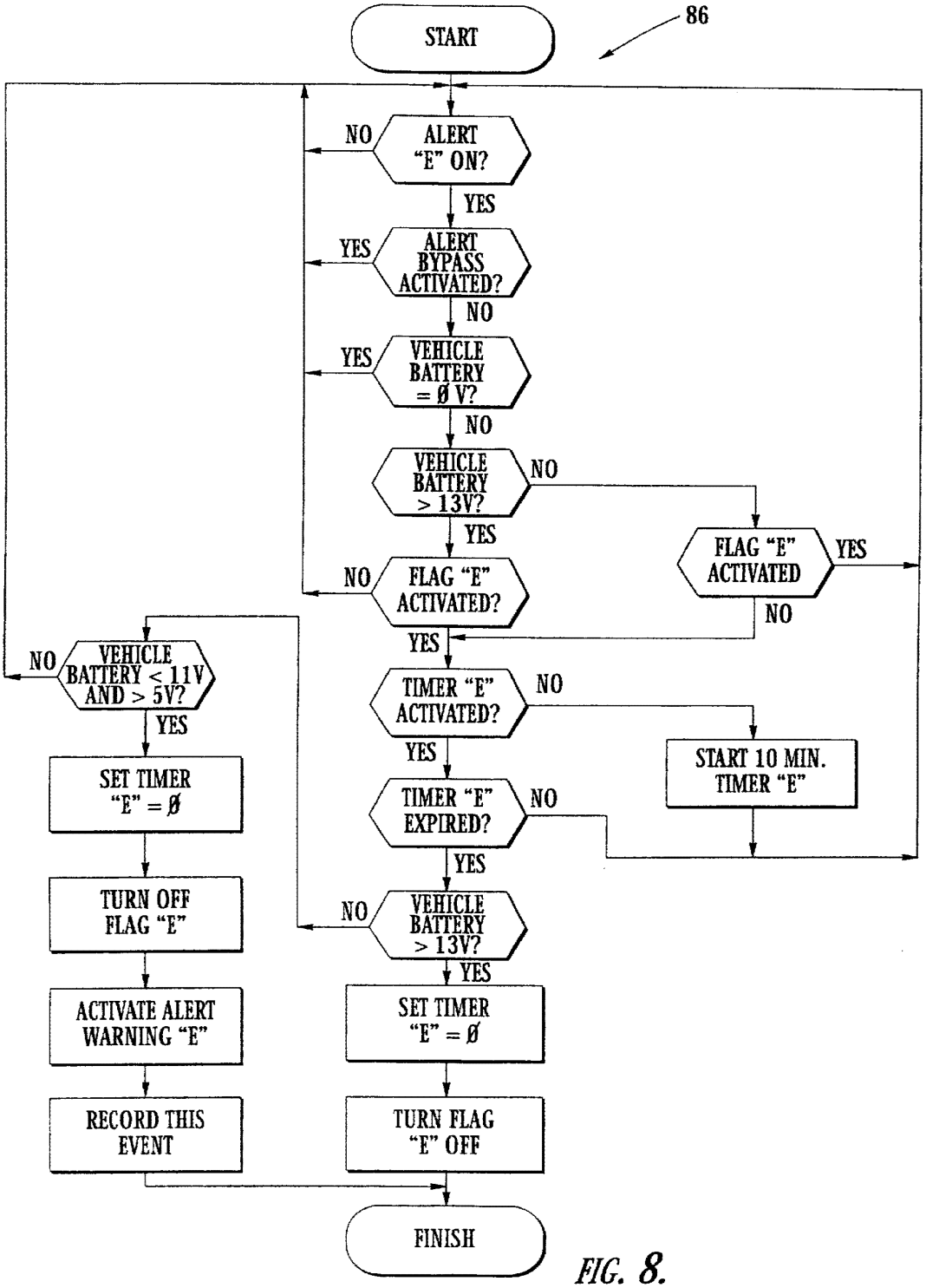

86
START
ALERT "E" ON?
NO
YES
ALERT BYPASS ACTIVATED?
YES
NO
VEHICLE BATTERY = Ø V?
YES
NO
VEHICLE BATTERY > 13V?
NO
YES
FLAG "E" ACTIVATED
YES
NO
FLAG "E" ACTIVATED?
NO
YES
VEHICLE BATTERY < 11V AND > 5V?
NO
YES
TIMER "E" ACTIVATED?
NO
YES
START 10 MIN. TIMER "E"
SET TIMER "E" = Ø
TIMER "E" EXPIRED?
NO
YES
TURN OFF FLAG "E"
VEHICLE BATTERY > 13V?
NO
YES
ACTIVATE ALERT WARNING "E"
SET TIMER "E" = Ø
RECORD THIS EVENT
TURN FLAG "E" OFF
FINISH

FIG. 8.

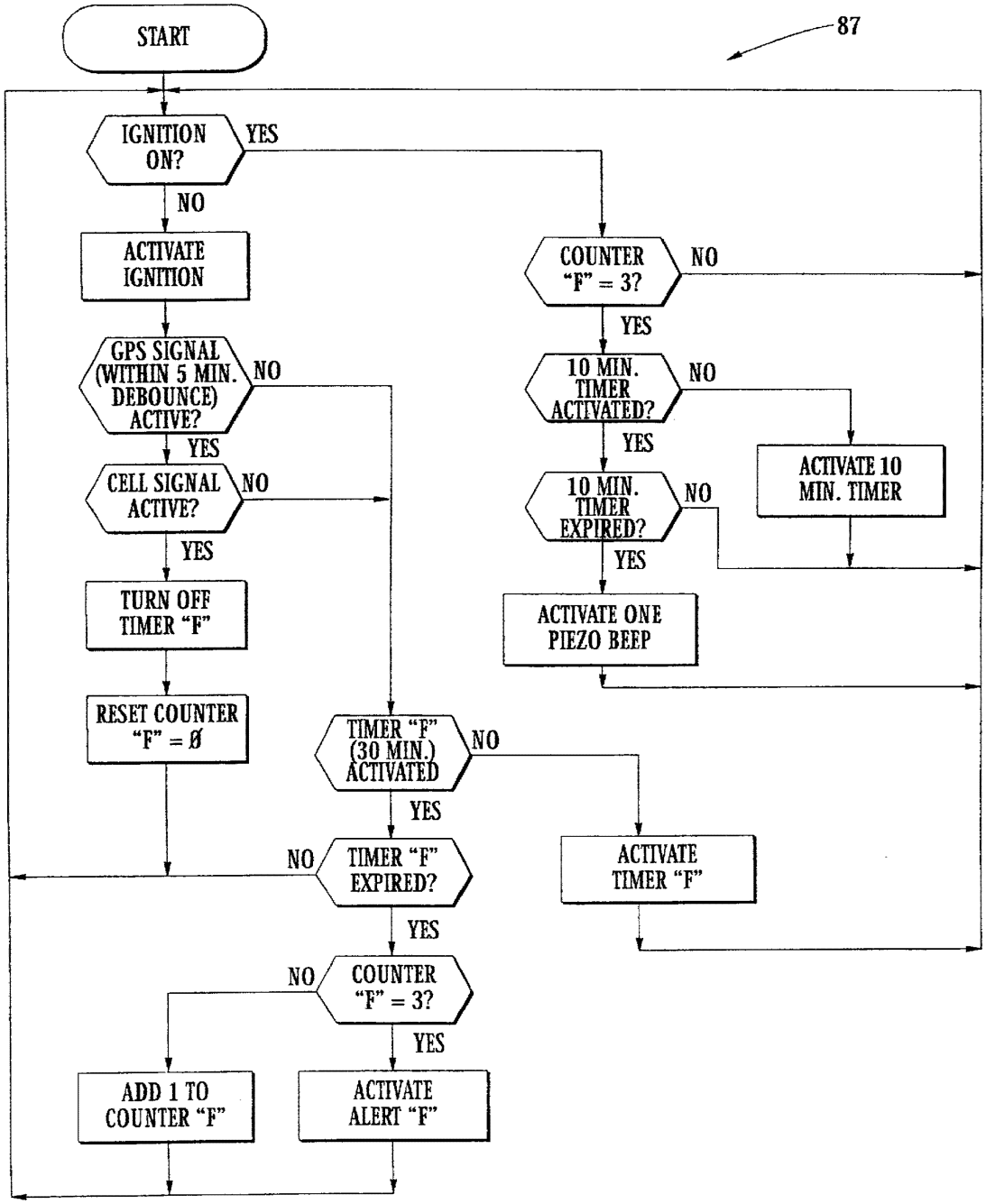

87
START
IGNITION ON?
YES
NO
ACTIVATE IGNITION
GPS SIGNAL (WITHIN 5 MIN. DEBOUNCE) ACTIVE?
NO
YES
CELL SIGNAL ACTIVE?
NO
YES
TURN OFF TIMER "F"
RESET COUNTER "F" = Ø
COUNTER "F" = 3?
NO
YES
10 MIN. TIMER ACTIVATED?
NO
YES
ACTIVATE 10 MIN. TIMER
10 MIN. TIMER EXPIRED?
NO
YES
ACTIVATE ONE PIEZO BEEP
TIMER "F" (30 MIN.) ACTIVATED
NO
YES
ACTIVATE TIMER "F"
NO
TIMER "F" EXPIRED?
YES
NO
COUNTER "F" = 3?
YES
ADD 1 TO COUNTER "F"
ACTIVATE ALERT "F"

FIG. 9.

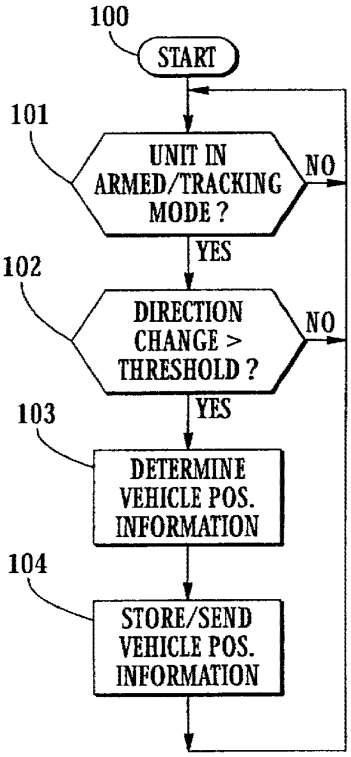

100
START
101
UNIT IN ARMED/TRACKING MODE ?
NO
YES
102
DIRECTION CHANGE > THRESHOLD ?
NO
YES
103
DETERMINE VEHICLE POS. INFORMATION
104
STORE/SEND VEHICLE POS. INFORMATION

FIG. 10.

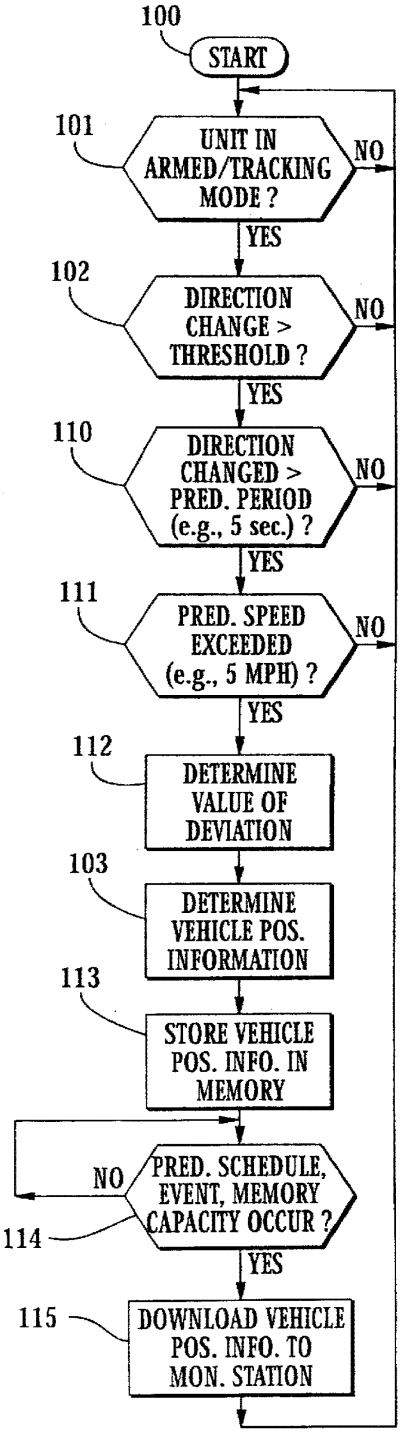

100
START
101
UNIT IN ARMED/TRACKING MODE ?
NO
YES
102
DIRECTION CHANGE > THRESHOLD ?
NO
YES
110
DIRECTION CHANGED > PRED. PERIOD (e.g., 5 sec.) ?
NO
YES
111
PRED. SPEED EXCEEDED (e.g., 5 MPH) ?
NO
YES
112
DETERMINE VALUE OF DEVIATION
103
DETERMINE VEHICLE POS. INFORMATION
113
STORE VEHICLE POS. INFO. IN MEMORY
NO
PRED. SCHEDULE, EVENT, MEMORY CAPACITY OCCUR ?
114
YES
115
DOWNLOAD VEHICLE POS. INFO. TO MON. STATION

FIG. 11.

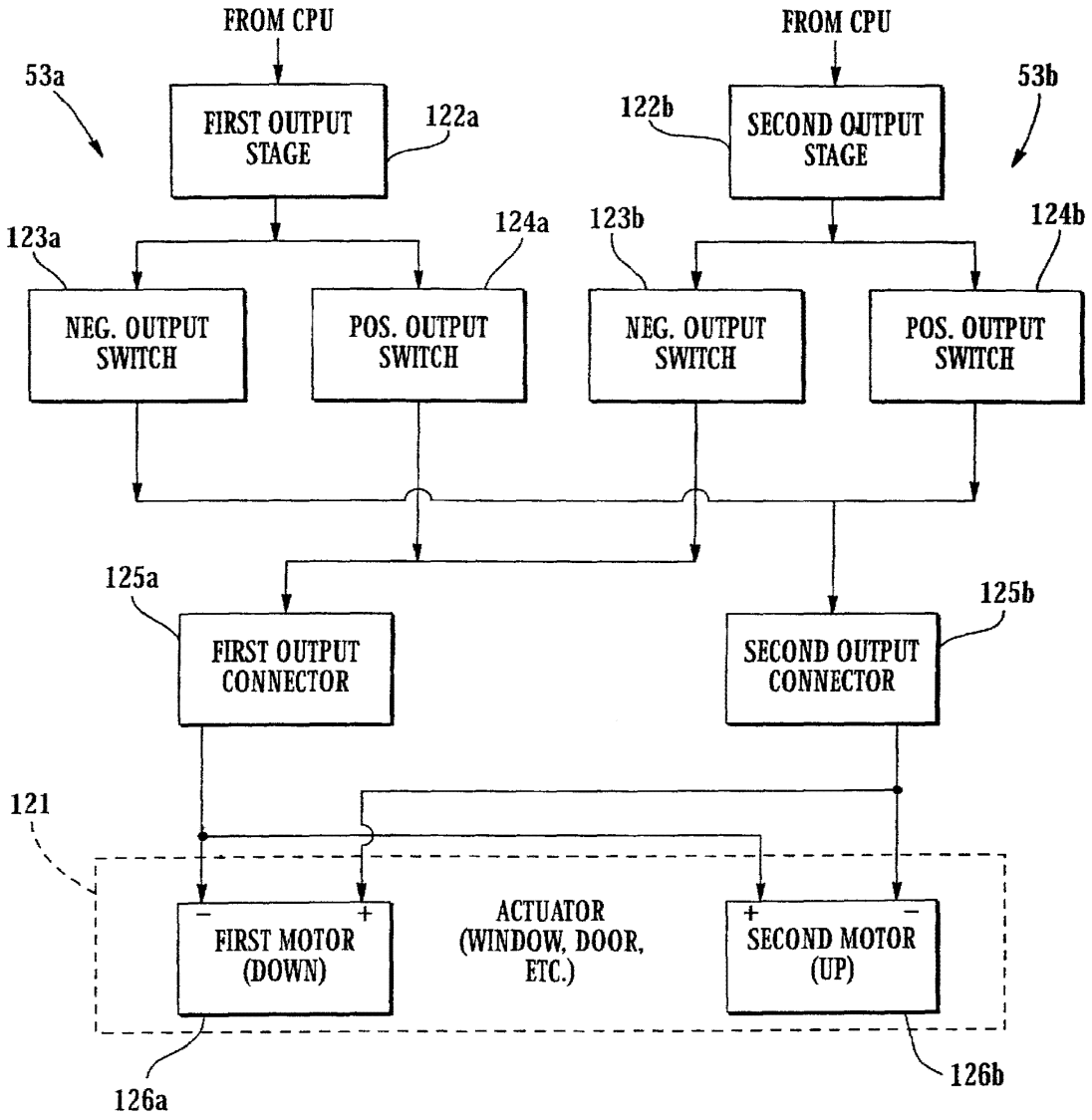

FROM CPU
FROM CPU
53a
53b
FIRST OUTPUT STAGE
122a
122b
SECOND OUTPUT STAGE
123a
124a
123b
124b
NEG. OUTPUT SWITCH
POS. OUTPUT SWITCH
NEG. OUTPUT SWITCH
POS. OUTPUT SWITCH
125a
125b
FIRST OUTPUT CONNECTOR
SECOND OUTPUT CONNECTOR
121
FIRST MOTOR (DOWN)
ACTUATOR (WINDOW, DOOR, ETC.)
SECOND MOTOR (UP)
126a
126b

FIG. 12.

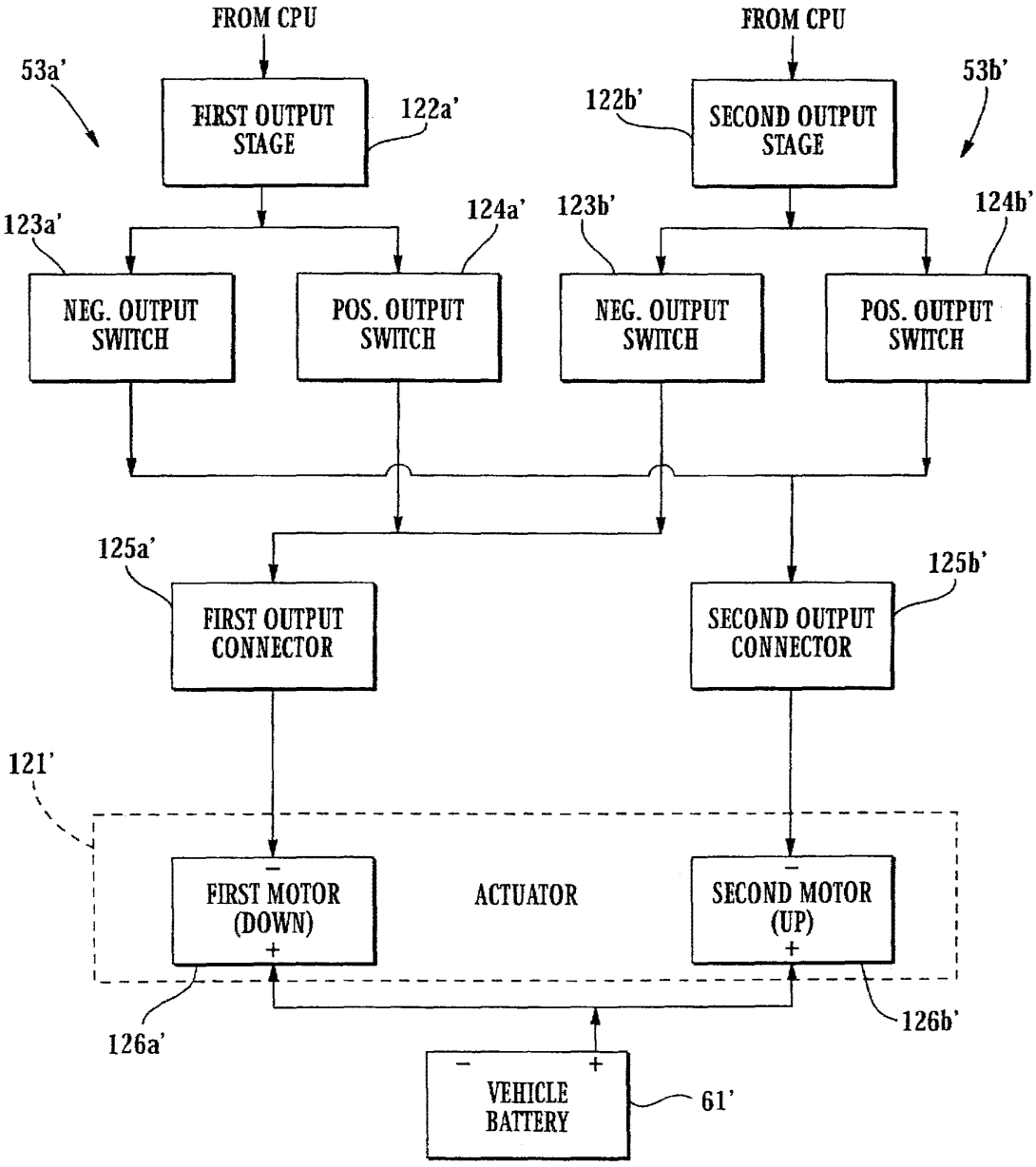

FROM CPU
FROM CPU
53a'
53b'
FIRST OUTPUT STAGE
122a'
122b'
SECOND OUTPUT STAGE
123a'
124a'
123b'
124b'
NEG. OUTPUT SWITCH
POS. OUTPUT SWITCH
NEG. OUTPUT SWITCH
POS. OUTPUT SWITCH
125a'
125b'
FIRST OUTPUT CONNECTOR
SECOND OUTPUT CONNECTOR
121'
FIRST MOTOR (DOWN)
ACTUATOR
SECOND MOTOR (UP)
126a'
126b'
VEHICLE BATTERY
61'

FIG. 13.

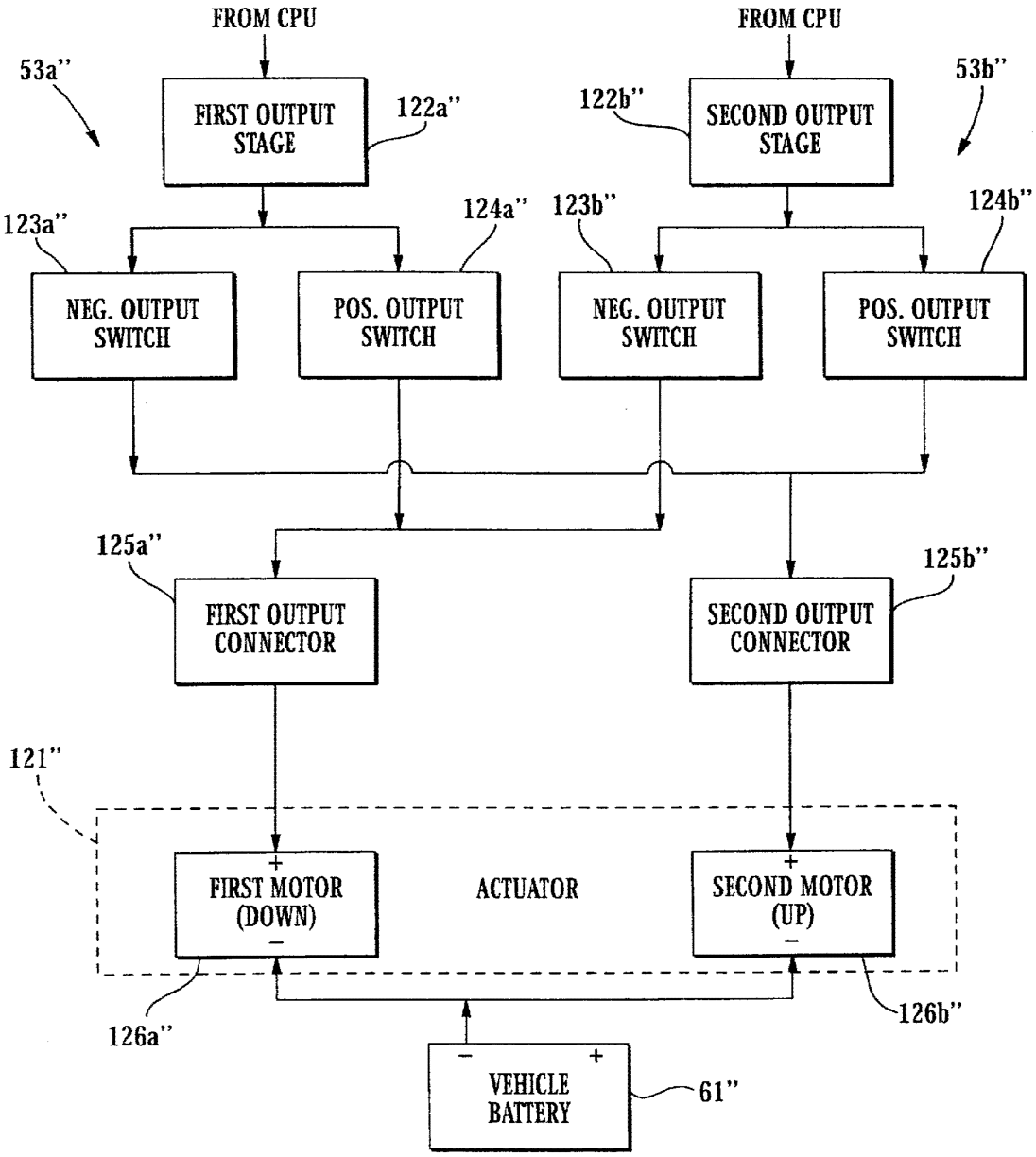

FROM CPU
FROM CPU
53a"
53b"
FIRST OUTPUT STAGE
122a"
122b"
SECOND OUTPUT STAGE
123a"
124a"
123b"
124b"
NEG. OUTPUT SWITCH
POS. OUTPUT SWITCH
NEG. OUTPUT SWITCH
POS. OUTPUT SWITCH
125a"
125b"
FIRST OUTPUT CONNECTOR
SECOND OUTPUT CONNECTOR
121"
+
FIRST MOTOR (DOWN)
−
ACTUATOR
+
SECOND MOTOR (UP)
−
126a"
126b"
−
+
VEHICLE BATTERY
61"

FIG. 14.

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,

INJUNCTIVE RELIEF REQUESTED

JURY TRIAL REQUESTED

Defendant.
_____/

COMPLAINT

Plaintiff Omega Patents, LLC, through its undersigned counsel, for its complaint against Defendant CALAMP CORP., states:

PARTIES, JURISDICTION AND VENUE

1. Plaintiff Omega Patents, LLC ("Omega") is a Georgia limited liability company.

2. Defendant CalAmp Corp., ("CalAmp") is, upon information and belief, a Delaware corporation, which sells and offers for sale infringing products in the United States, including within this Judicial District.

3. This Court has jurisdiction over the subject matter of this action as to CalAmp pursuant to 28 U.S.C. §§ 1331 and 1338(a).

4. This Court has *in personam* jurisdiction as to CalAmp because, upon information and belief, CalAmp is subject to both general and specific jurisdiction in this State. More particularly, upon information and belief, CalAmp

S:\AIMDOCS\OMEGA\0058319\WJ2665.DOC

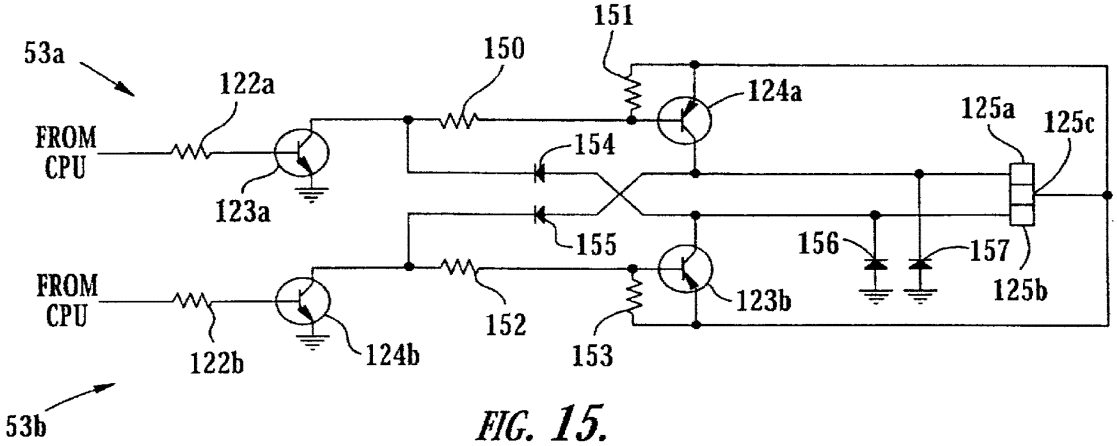

53a
122a
FROM CPU
123a
150
151
124a
154
155
125a
125c
156
157
125b
123b
FROM CPU
122b
124b
152
153
53b

FIG. 15.

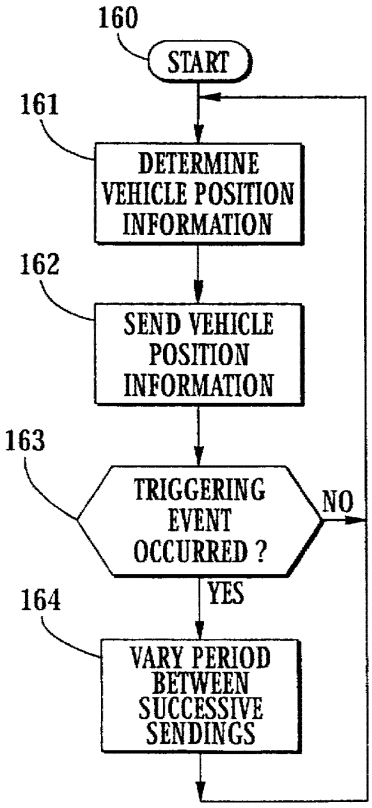

160
START
161
DETERMINE VEHICLE POSITION INFORMATION
162
SEND VEHICLE POSITION INFORMATION
163
TRIGGERING EVENT OCCURRED ?
NO
YES
164
VARY PERIOD BETWEEN SUCCESSIVE SENDINGS

FIG. 16.

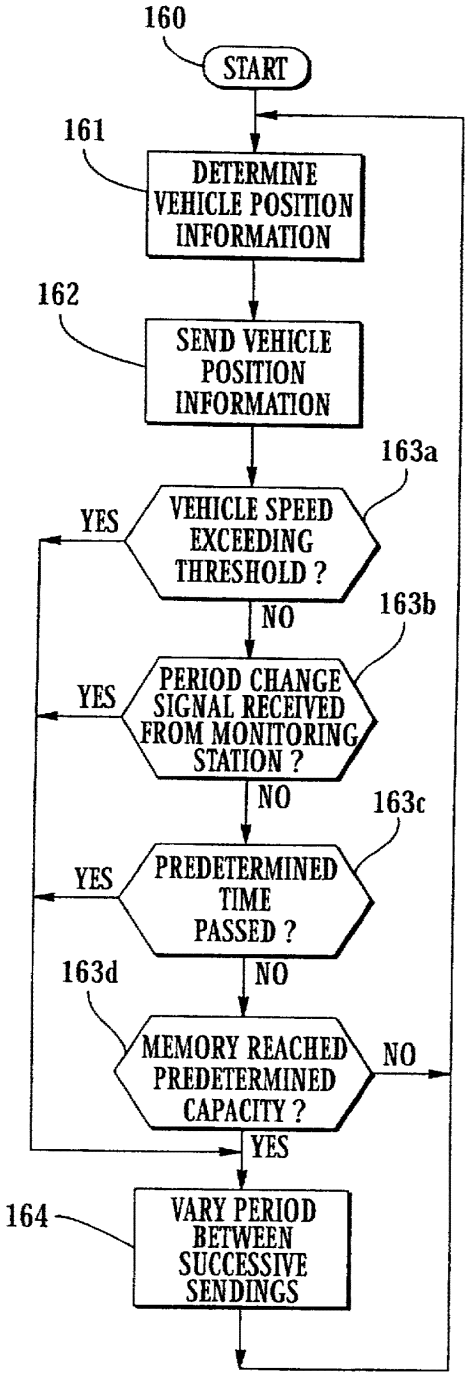

160
START
161
DETERMINE VEHICLE POSITION INFORMATION
162
SEND VEHICLE POSITION INFORMATION
163a
VEHICLE SPEED EXCEEDING THRESHOLD ?
YES
NO
163b
PERIOD CHANGE SIGNAL RECEIVED FROM MONITORING STATION ?
YES
NO
163c
PREDETERMINED TIME PASSED ?
YES
NO
163d
MEMORY REACHED PREDETERMINED CAPACITY ?
NO
YES
164
VARY PERIOD BETWEEN SUCCESSIVE SENDINGS

FIG. 17.

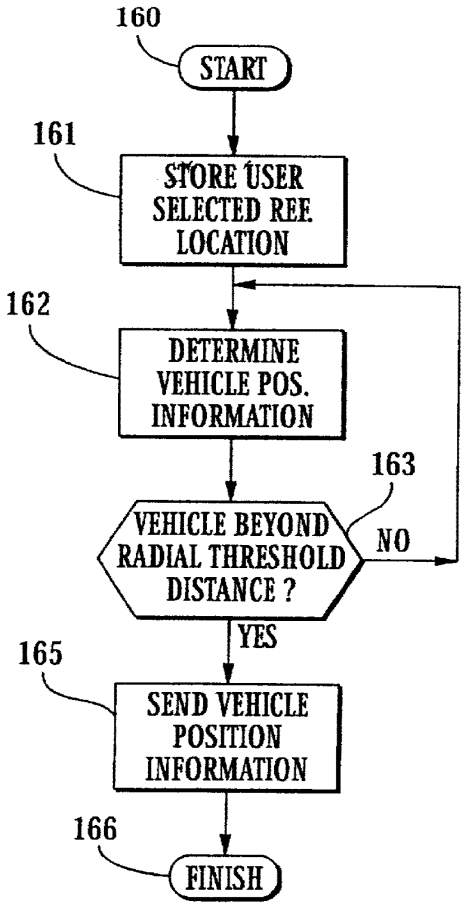


FIG. 18A.

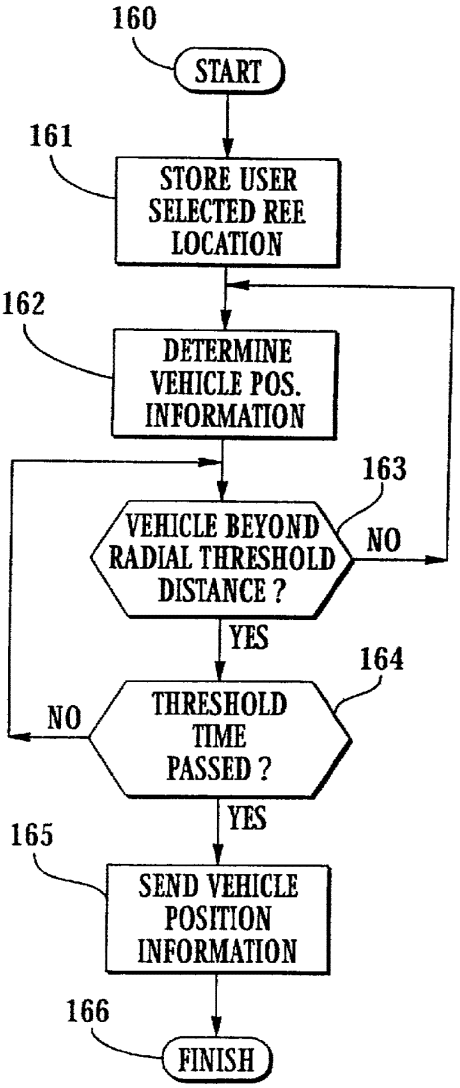


FIG. 18B.

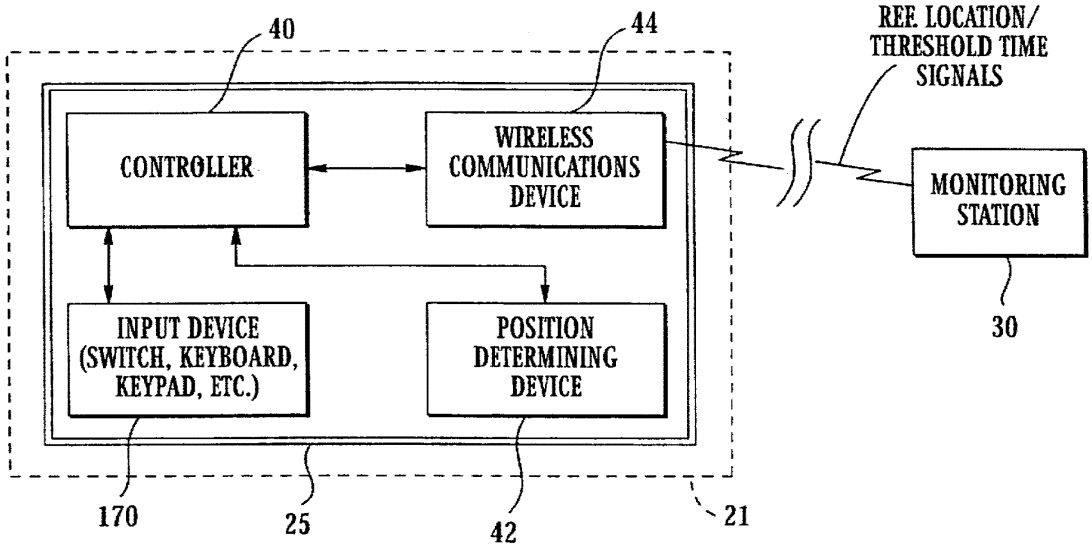

40
44
REF. LOCATION/
THRESHOLD TIME
SIGNALS
CONTROLLER
WIRELESS
COMMUNICATIONS
DEVICE
MONITORING
STATION
30
INPUT DEVICE
(SWITCH, KEYBOARD,
KEYPAD, ETC.)
POSITION
DETERMINING
DEVICE
170
25
42
21

FIG. 19.

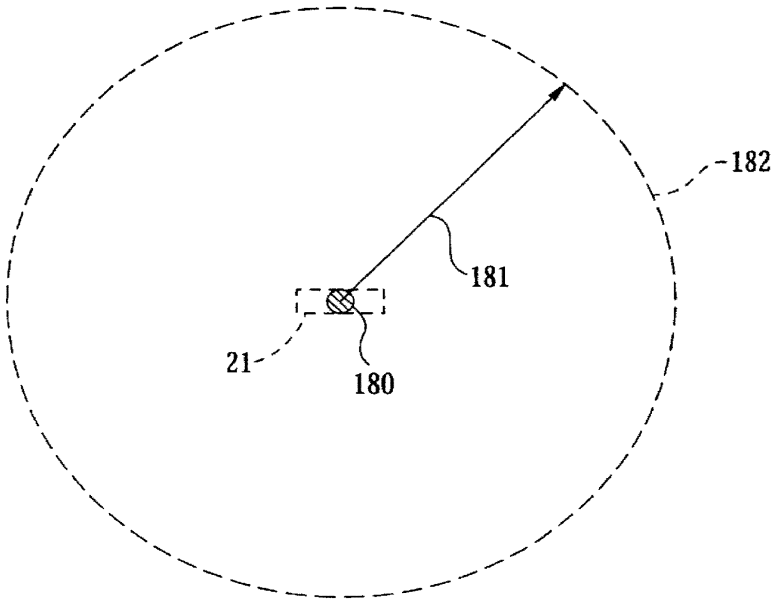

182
181
21
180

FIG. 20.

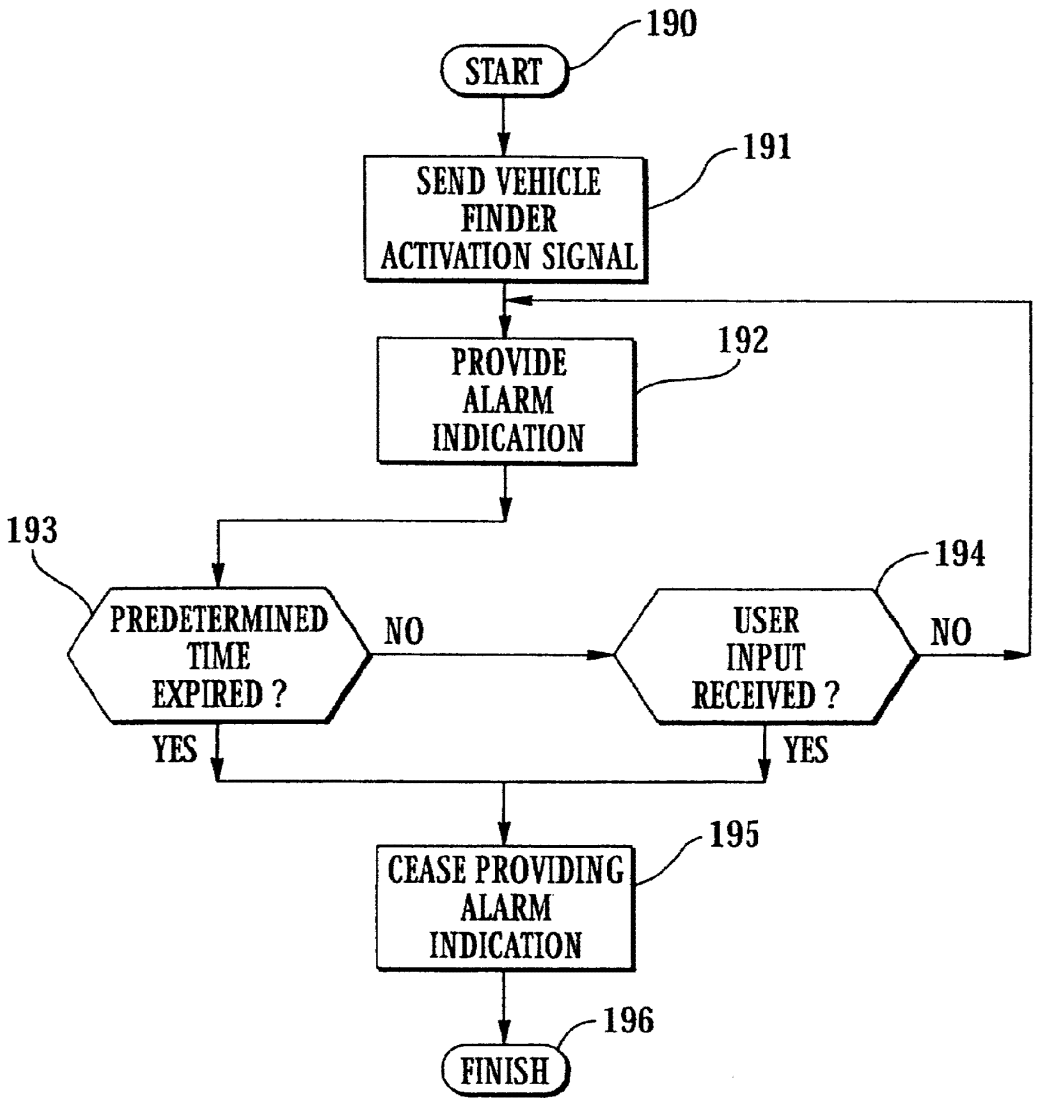

190
START
191
SEND VEHICLE FINDER ACTIVATION SIGNAL
192
PROVIDE ALARM INDICATION
193
PREDETERMINED TIME EXPIRED ?
NO
194
USER INPUT RECEIVED ?
NO
YES
YES
195
CEASE PROVIDING ALARM INDICATION
196
FINISH

FIG. 21.

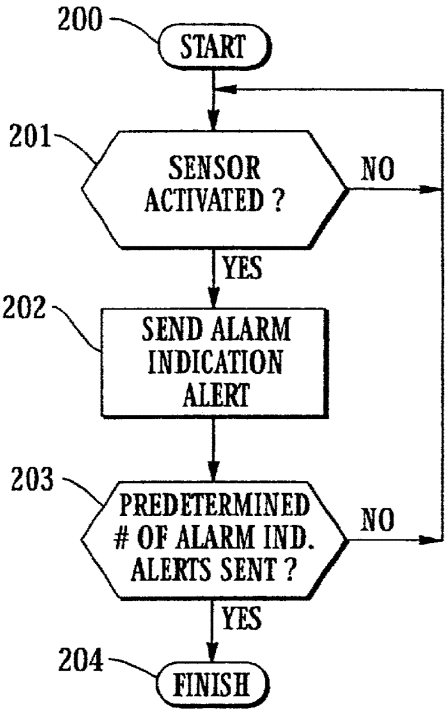

200
START
201
SENSOR ACTIVATED ?
NO
YES
202
SEND ALARM INDICATION ALERT
203
PREDETERMINED # OF ALARM IND. ALERTS SENT ?
NO
YES
204
FINISH

FIG. 22.

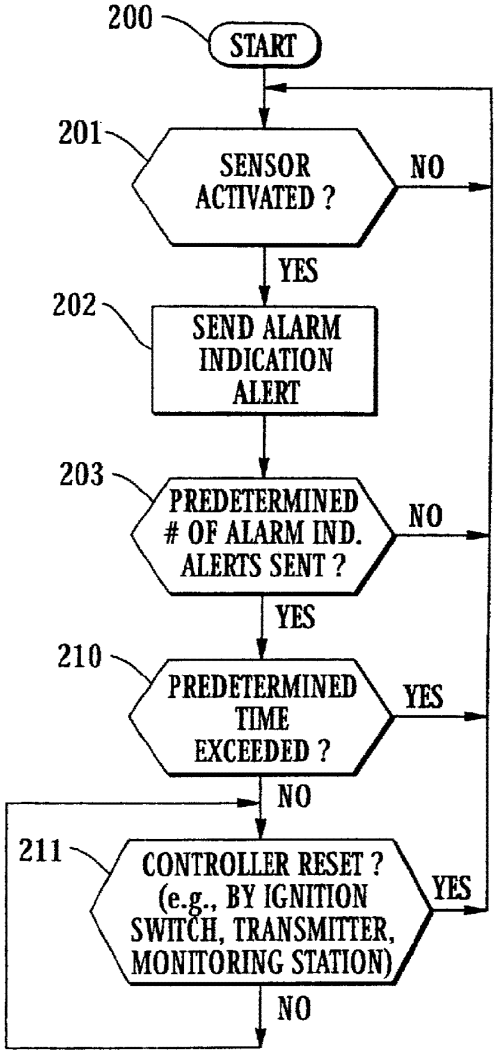

200
START
201
SENSOR ACTIVATED ?
NO
YES
202
SEND ALARM INDICATION ALERT
203
PREDETERMINED # OF ALARM IND. ALERTS SENT ?
NO
YES
210
PREDETERMINED TIME EXCEEDED ?
YES
NO
211
CONTROLLER RESET ? (e.g., BY IGNITION SWITCH, TRANSMITTER, MONITORING STATION)
YES
NO

FIG. 23.

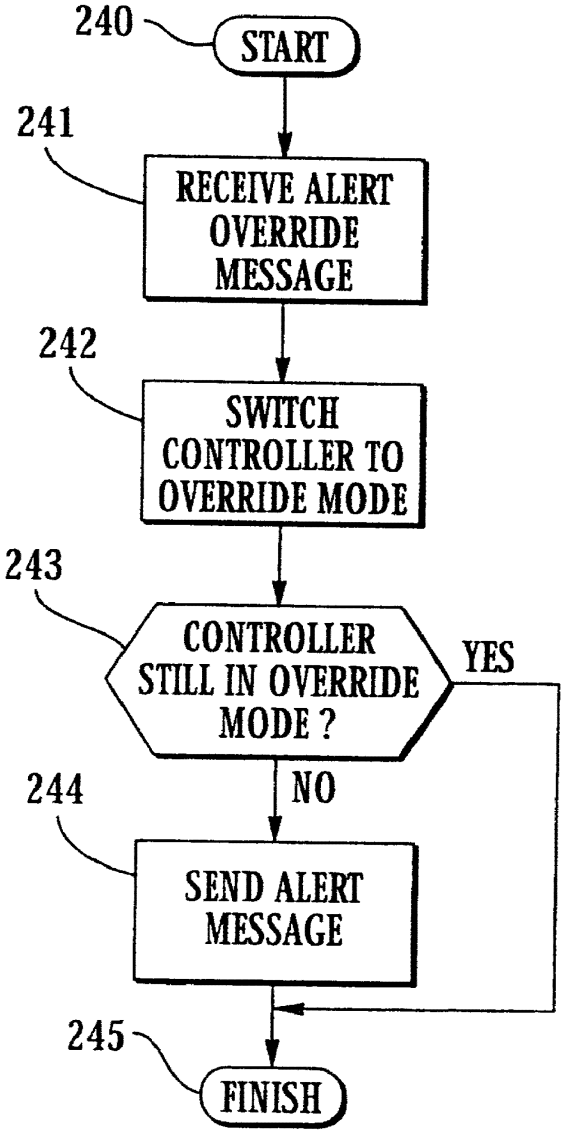

240
START
241
RECEIVE ALERT OVERRIDE MESSAGE
242
SWITCH CONTROLLER TO OVERRIDE MODE
243
CONTROLLER STILL IN OVERRIDE MODE ?
YES
NO
244
SEND ALERT MESSAGE
245
FINISH

FIG. 24.

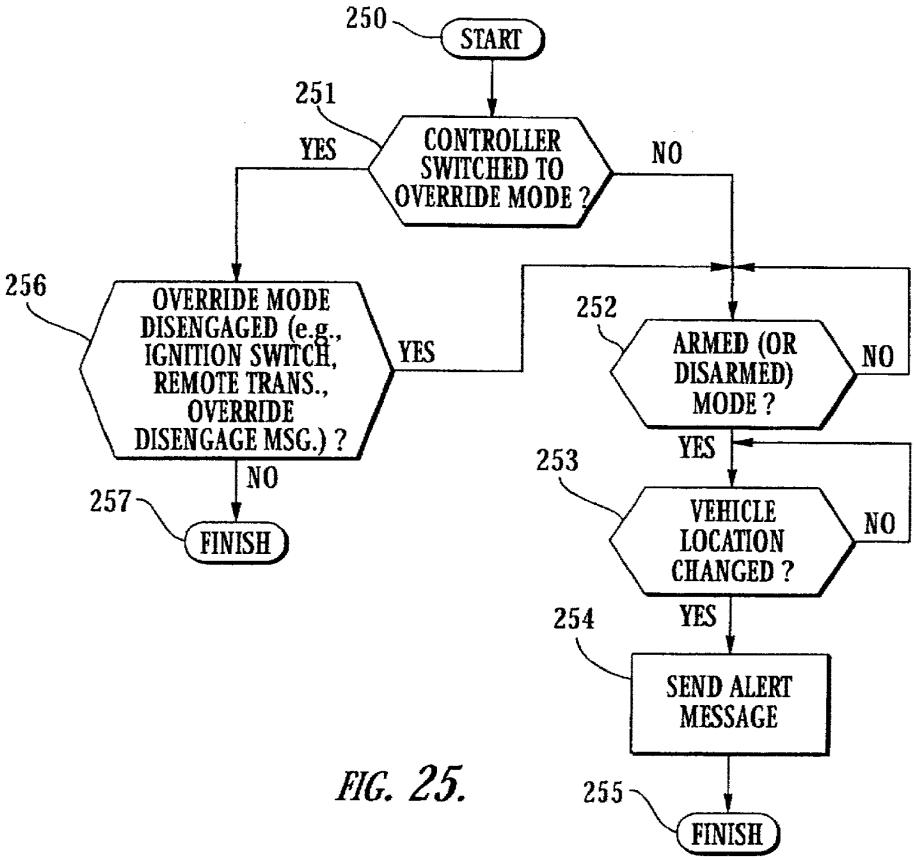

250
START
251
CONTROLLER SWITCHED TO OVERRIDE MODE ?
YES
NO
256
OVERRIDE MODE DISENGAGED (e.g., IGNITION SWITCH, REMOTE TRANS., OVERRIDE DISENGAGE MSG.) ?
YES
NO
257
FINISH
252
ARMED (OR DISARMED) MODE ?
NO
YES
253
VEHICLE LOCATION CHANGED ?
NO
YES
254
SEND ALERT MESSAGE
255
FINISH

FIG. 25.

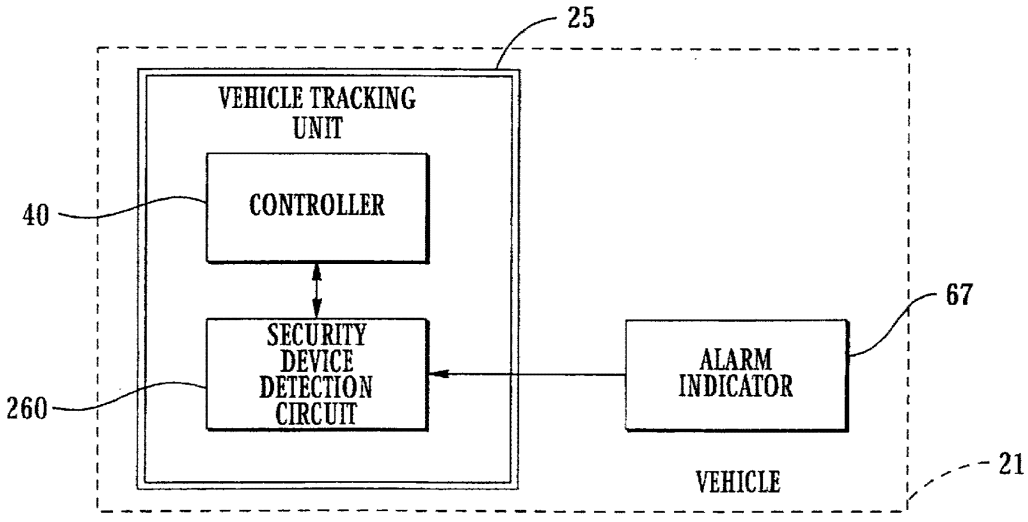

25
VEHICLE TRACKING UNIT
40
CONTROLLER
SECURITY DEVICE DETECTION CIRCUIT
260
ALARM INDICATOR
67
VEHICLE
21

FIG. 26.

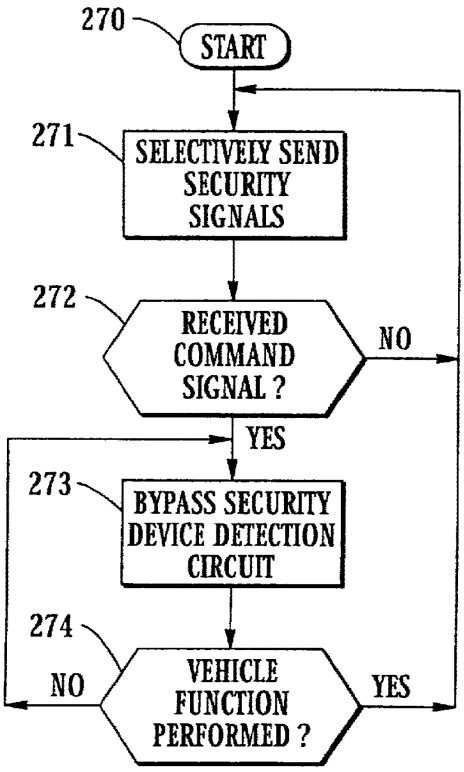

270
START
271
SELECTIVELY SEND SECURITY SIGNALS
272
RECEIVED COMMAND SIGNAL ?
NO
YES
273
BYPASS SECURITY DEVICE DETECTION CIRCUIT
274
NO
VEHICLE FUNCTION PERFORMED ?
YES

FIG. 27.

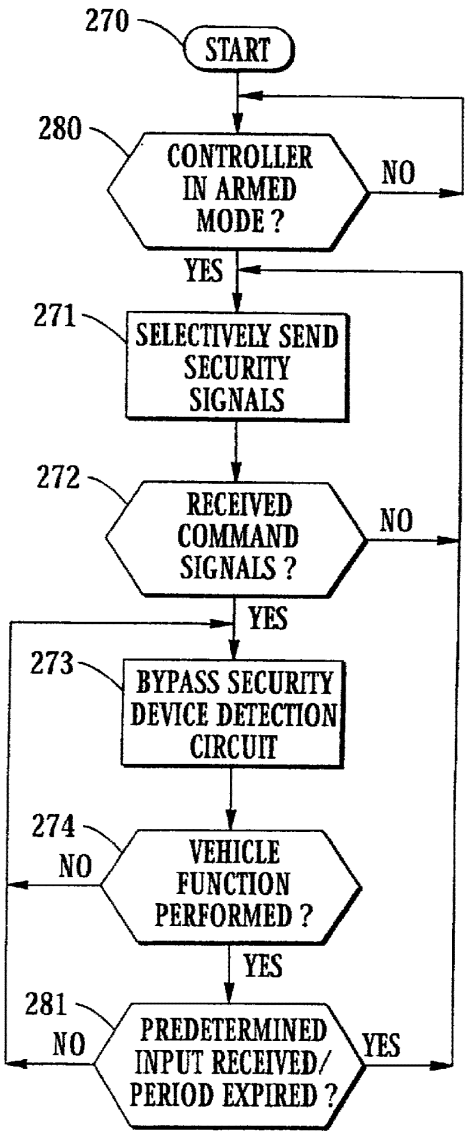

270
START
280
CONTROLLER IN ARMED MODE ?
NO
YES
271
SELECTIVELY SEND SECURITY SIGNALS
272
RECEIVED COMMAND SIGNALS ?
NO
YES
273
BYPASS SECURITY DEVICE DETECTION CIRCUIT
274
NO
VEHICLE FUNCTION PERFORMED ?
YES
281
NO
PREDETERMINED INPUT RECEIVED/ PERIOD EXPIRED ?
YES

FIG. 28.

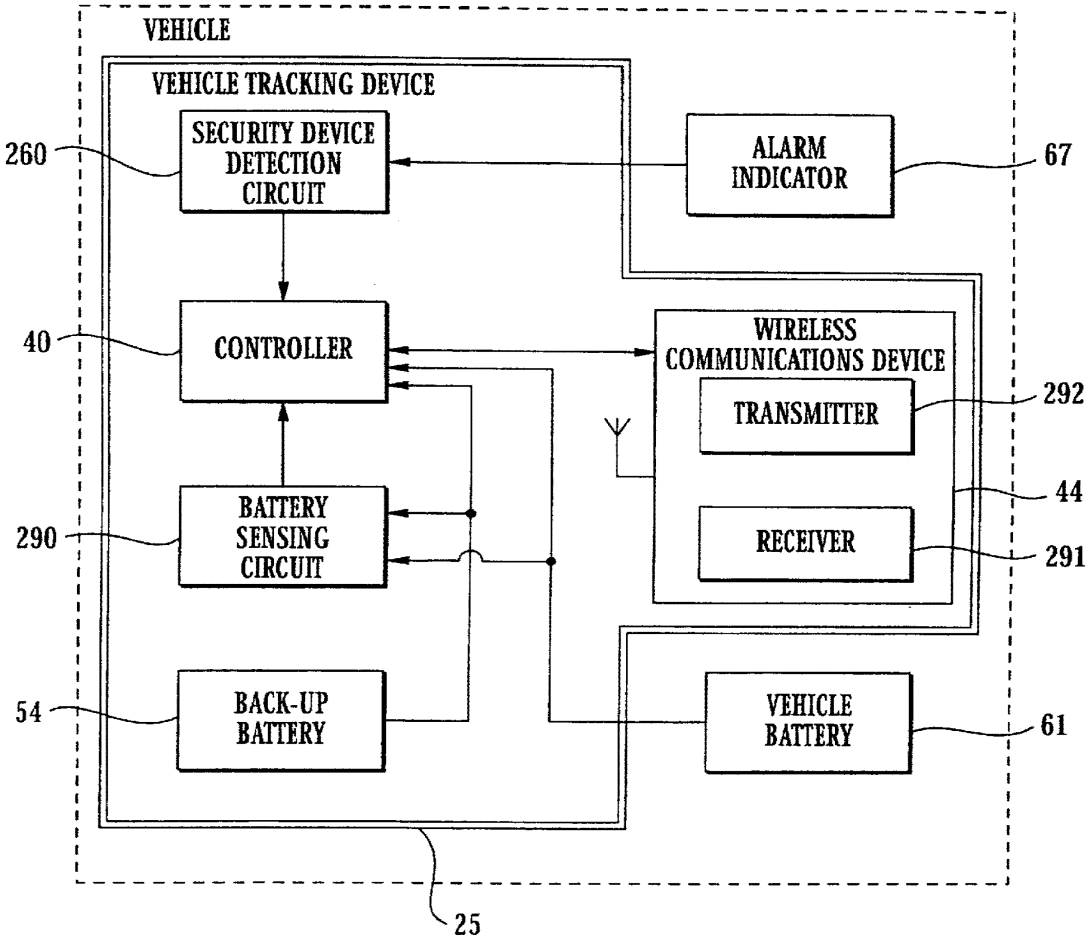

VEHICLE
VEHICLE TRACKING DEVICE
SECURITY DEVICE DETECTION CIRCUIT
260
ALARM INDICATOR
67
CONTROLLER
40
WIRELESS COMMUNICATIONS DEVICE
TRANSMITTER
292
44
BATTERY SENSING CIRCUIT
290
RECEIVER
291
BACK-UP BATTERY
54
VEHICLE BATTERY
61
25

FIG. 29.

regularly conducts business activity in the State of Florida and sells and offers to sell products that infringe one or more claims of Omega's patents in the State of Florida. Additionally, CalAmp expressly consented to jurisdiction and venue in this District and Division pursuant to a negotiated settlement agreement. A copy of the Settlement Agreement is attached hereto as Exhibit A.

5. Venue properly lies within this judicial district and division, pursuant to 28 U.S.C. §§1391(c) and 1400(b), and by express consent of CalAmp.

STATEMENT OF FACTS

6. Omega is the sole and exclusive owner of the following valid and enforceable United States Patents (collectively, the "Patents-in-Suit"):

PATENT NO.	TITLE
6,346,876 B1 ("the '876 Patent")	Multi-vehicle compatible control system generating command signals on a data bus and associated methods
6,737,989 B2 ("the '989 Patent")	Vehicle tracker including variable frequency transmission and related methods
6,756,885 B1 ("the '885 Patent")	Multi-vehicle compatible control system for reading from a data bus and associated methods
7,671,727 B2 ("the '727 Patent")	Speed exceeded notification device for vehicle having a data bus and associated methods
8,032,278 B2 ("the '278 Patent")	Vehicle tracking unit with downloadable codes and associated methods

True and correct copies of the Patents-in-Suit are attached hereto as Exhibit B-F.

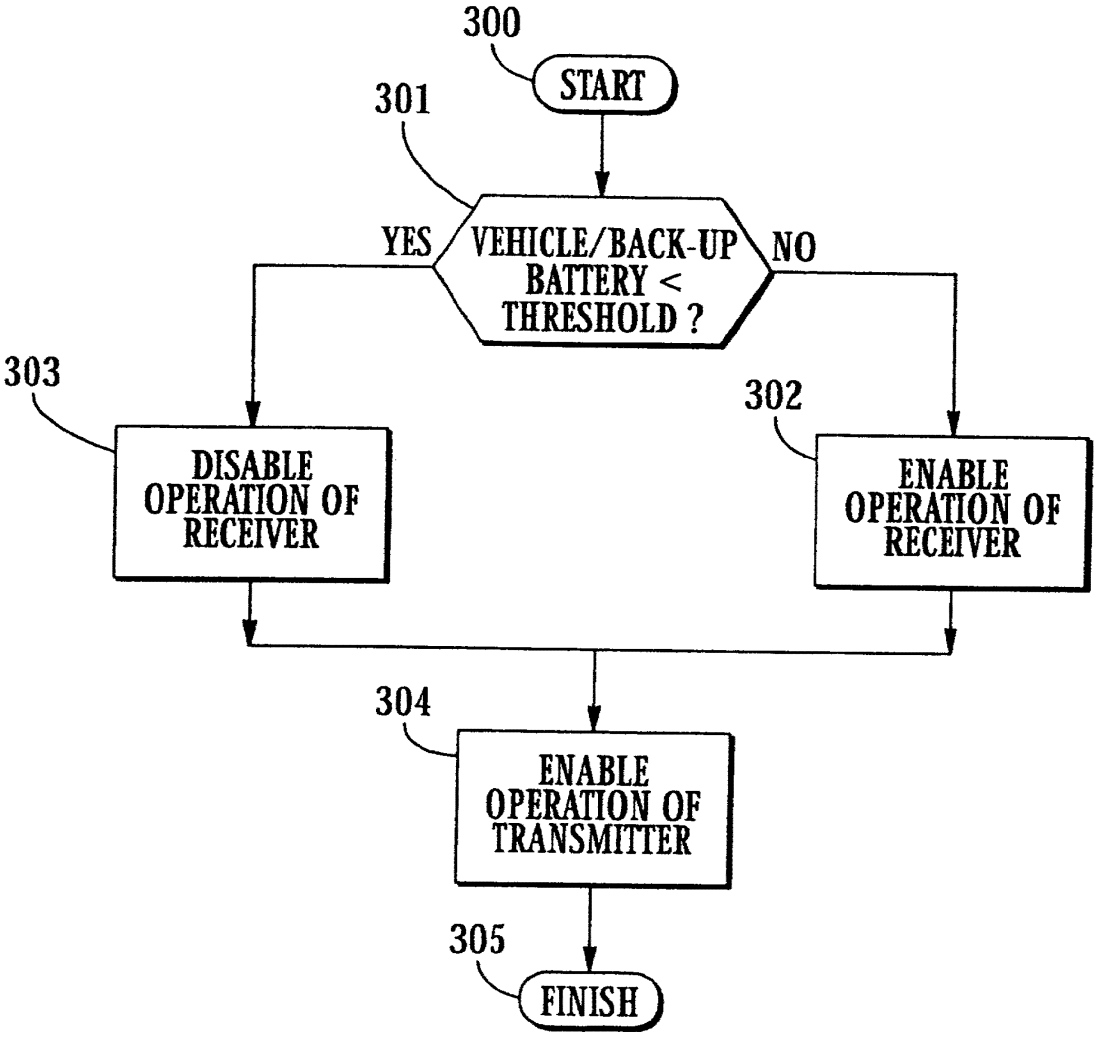

300
START
301
VEHICLE/BACK-UP BATTERY < THRESHOLD ?
YES
NO
303
DISABLE OPERATION OF RECEIVER
302
ENABLE OPERATION OF RECEIVER
304
ENABLE OPERATION OF TRANSMITTER
305
FINISH

FIG. 30.

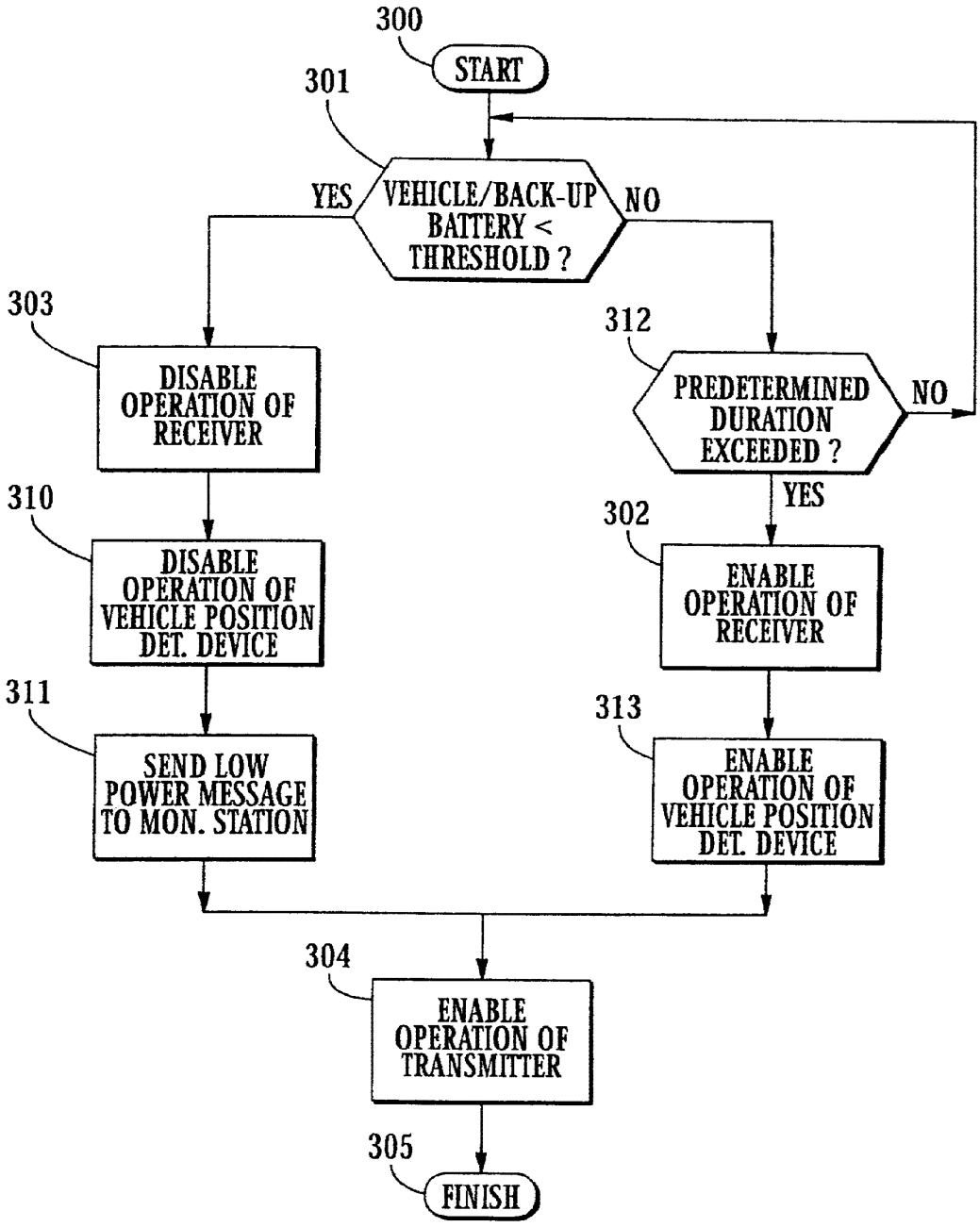

300
START
301
VEHICLE/BACK-UP BATTERY < THRESHOLD ?
YES
NO
303
DISABLE OPERATION OF RECEIVER
310
DISABLE OPERATION OF VEHICLE POSITION DET. DEVICE
311
SEND LOW POWER MESSAGE TO MON. STATION
312
PREDETERMINED DURATION EXCEEDED ?
NO
YES
302
ENABLE OPERATION OF RECEIVER
313
ENABLE OPERATION OF VEHICLE POSITION DET. DEVICE
304
ENABLE OPERATION OF TRANSMITTER
305
FINISH

FIG. 31.

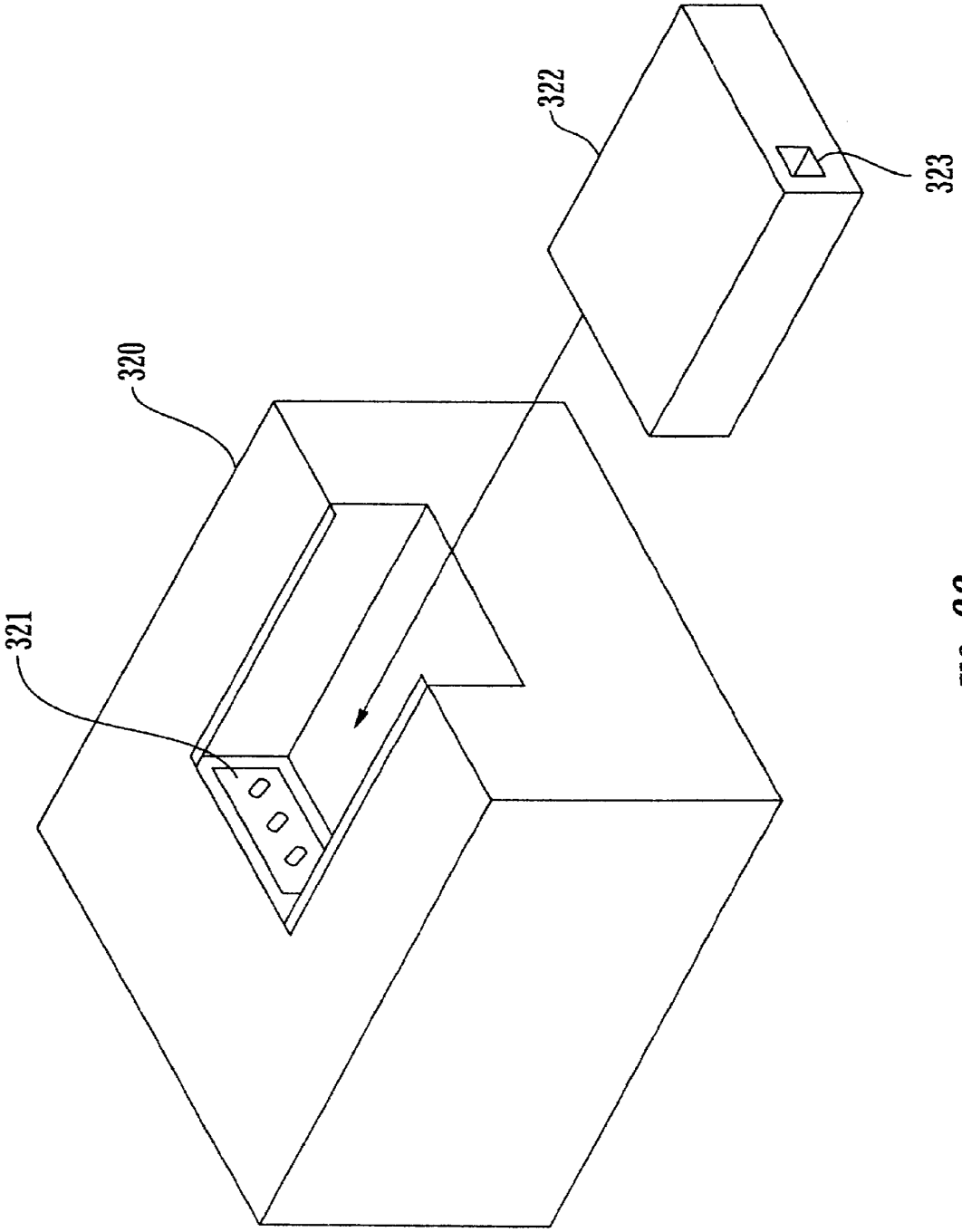


FIG. 32.

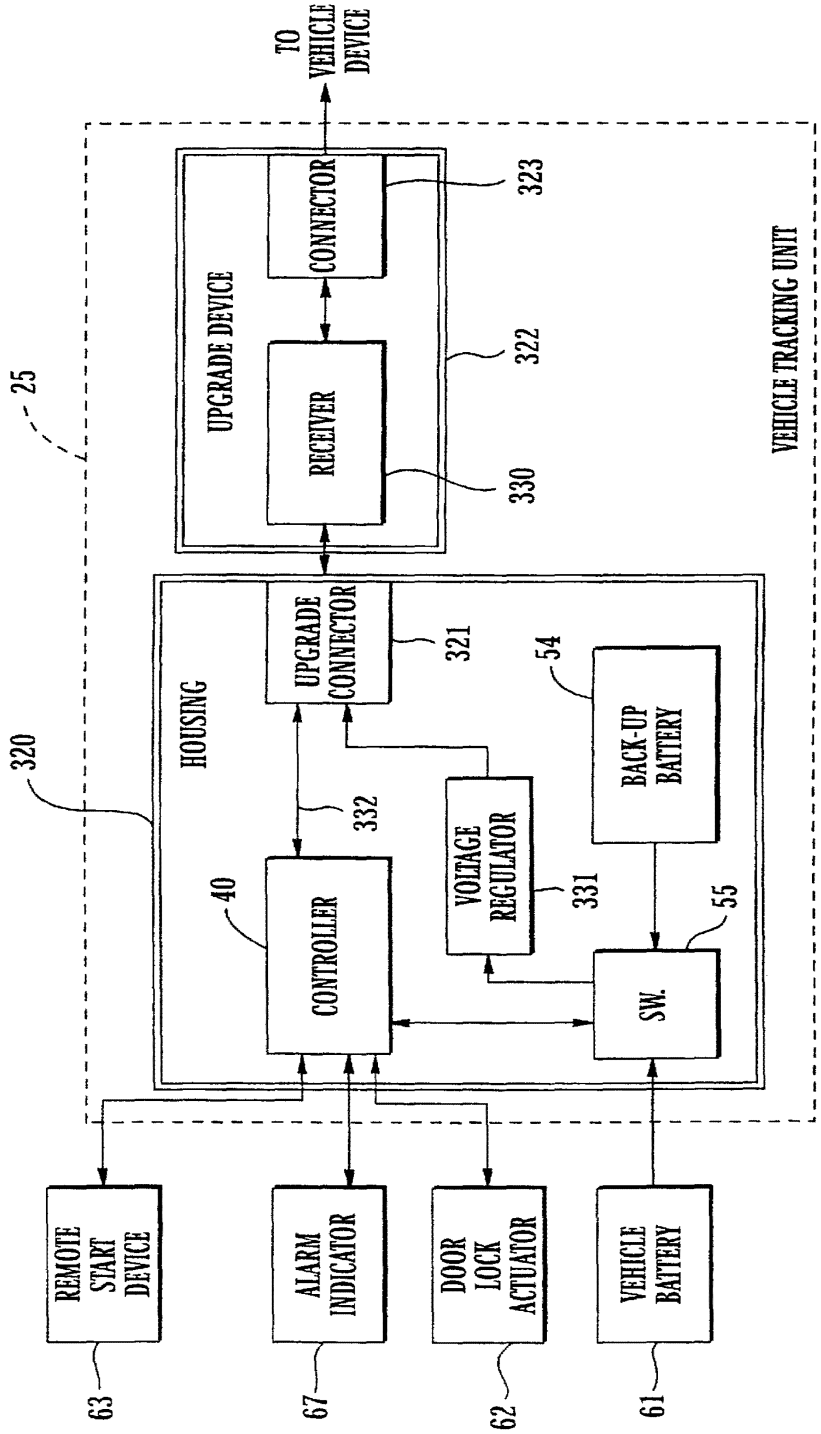


FIG. 33.

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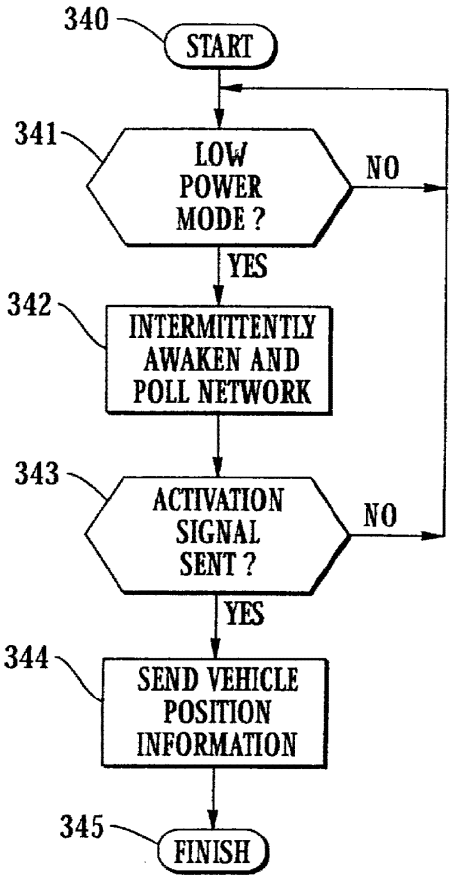

340
START
341
LOW POWER MODE ?
NO
YES
342
INTERMITTENTLY AWAKEN AND POLL NETWORK
343
ACTIVATION SIGNAL SENT ?
NO
YES
344
SEND VEHICLE POSITION INFORMATION
345
FINISH

FIG. 34.

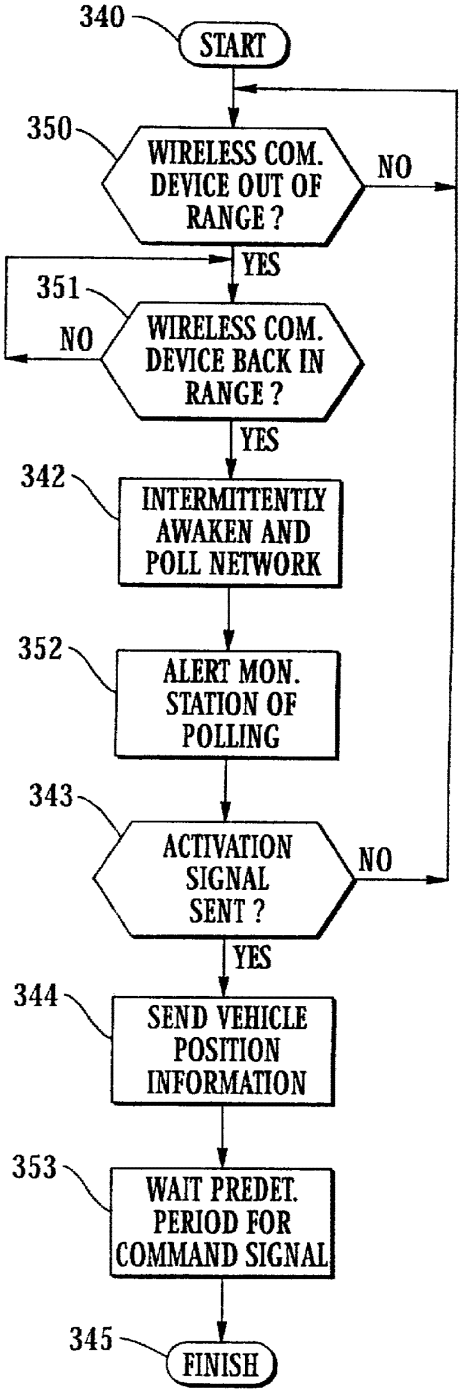

340
START
350
WIRELESS COM. DEVICE OUT OF RANGE ?
NO
YES
351
NO
WIRELESS COM. DEVICE BACK IN RANGE ?
YES
342
INTERMITTENTLY AWAKEN AND POLL NETWORK
352
ALERT MON. STATION OF POLLING
343
ACTIVATION SIGNAL SENT ?
NO
YES
344
SEND VEHICLE POSITION INFORMATION
353
WAIT PREDET. PERIOD FOR COMMAND SIGNAL
345
FINISH

FIG. 35.

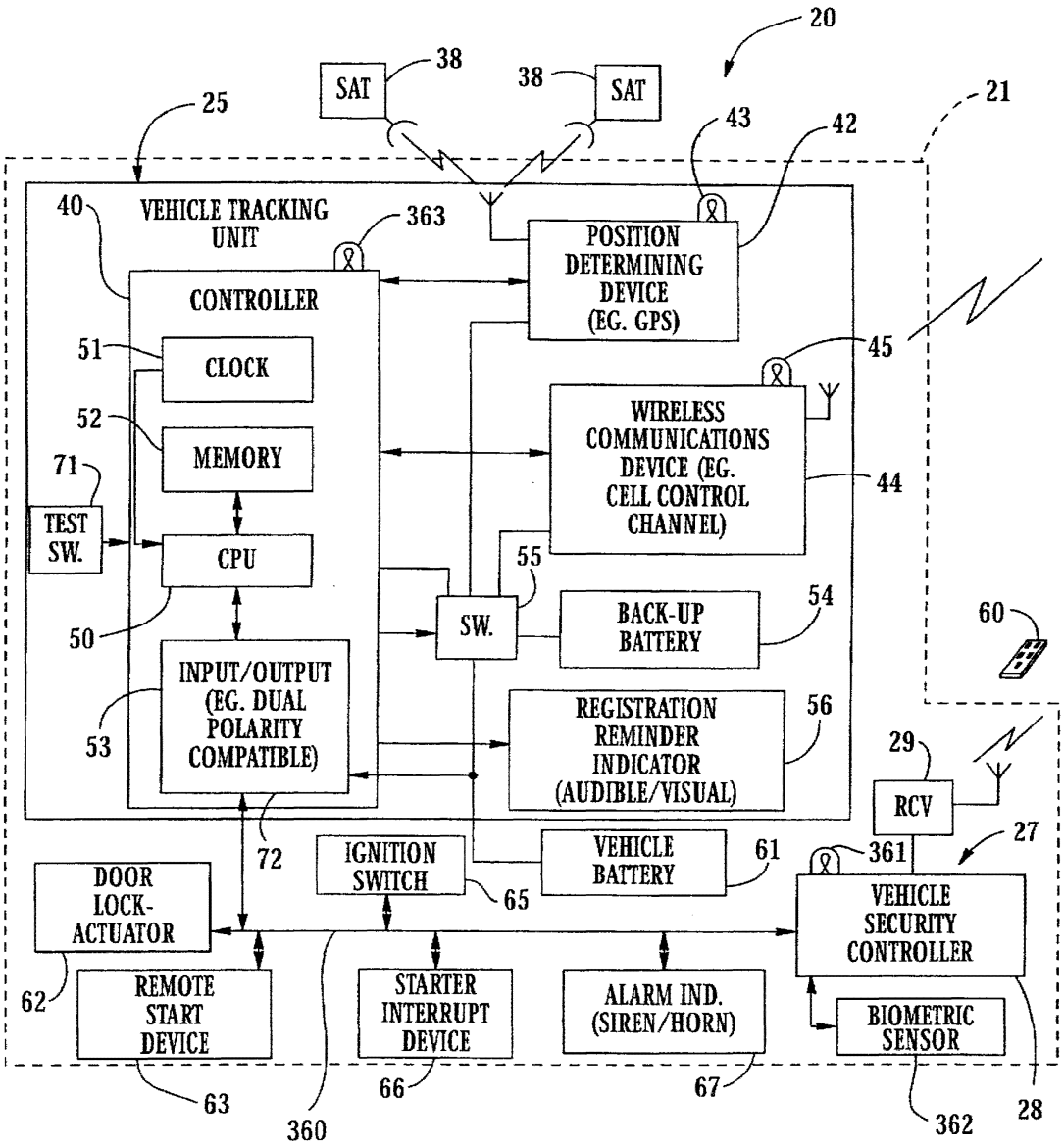

20
SAT
38
38
SAT
25
21
43
42
40
VEHICLE TRACKING UNIT
363
POSITION DETERMINING DEVICE (EG. GPS)
CONTROLLER
51
CLOCK
45
52
MEMORY
WIRELESS COMMUNICATIONS DEVICE (EG. CELL CONTROL CHANNEL)
71
44
TEST SW.
CPU
55
50
SW.
BACK-UP BATTERY
54
60
INPUT/OUTPUT (EG. DUAL POLARITY COMPATIBLE)
53
REGISTRATION REMINDER INDICATOR (AUDIBLE/VISUAL)
56
29
RCV
72
IGNITION SWITCH
VEHICLE BATTERY
61
361
27
DOOR LOCK-ACTUATOR
65
VEHICLE SECURITY CONTROLLER
62
REMOTE START DEVICE
STARTER INTERRUPT DEVICE
ALARM IND. (SIREN/HORN)
BIOMETRIC SENSOR
63
66
67
360
362
28

FIG. 36.

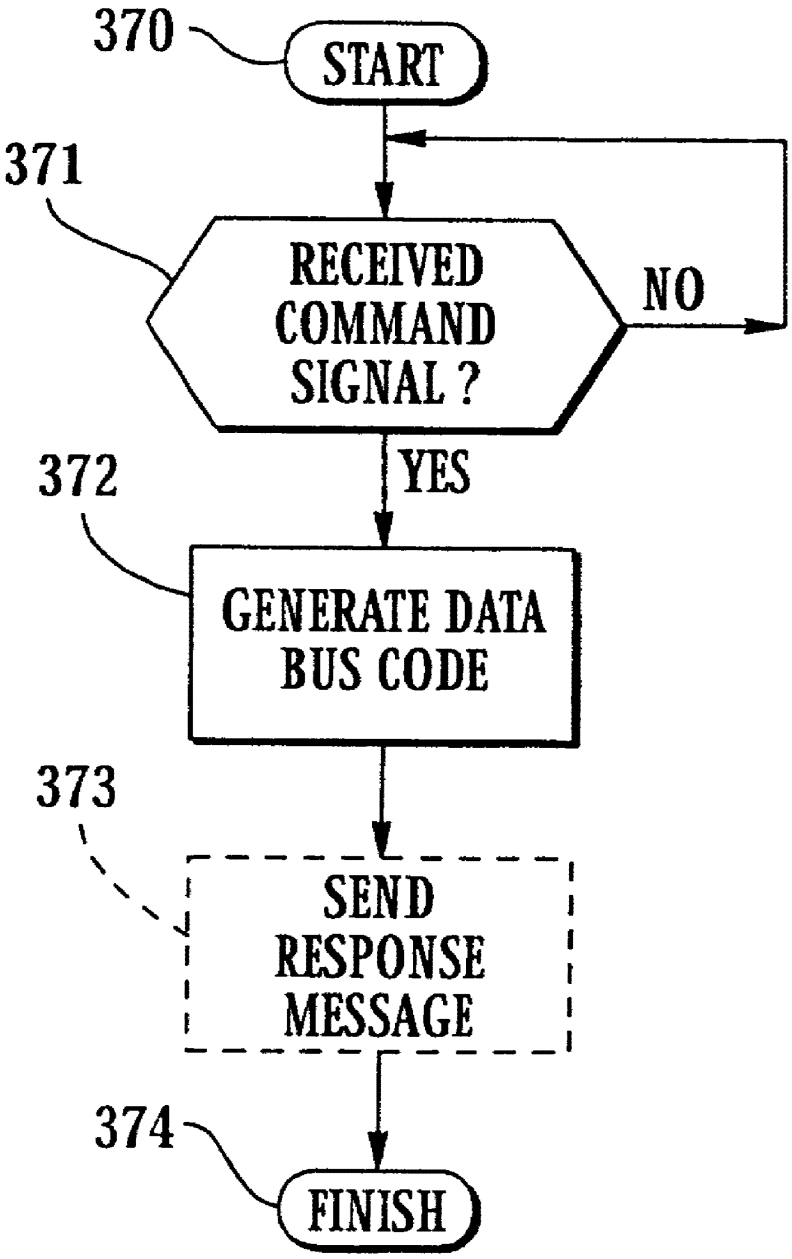

370
START
371
RECEIVED COMMAND SIGNAL ?
NO
YES
372
GENERATE DATA BUS CODE
373
SEND RESPONSE MESSAGE
374
FINISH

FIG. 37.

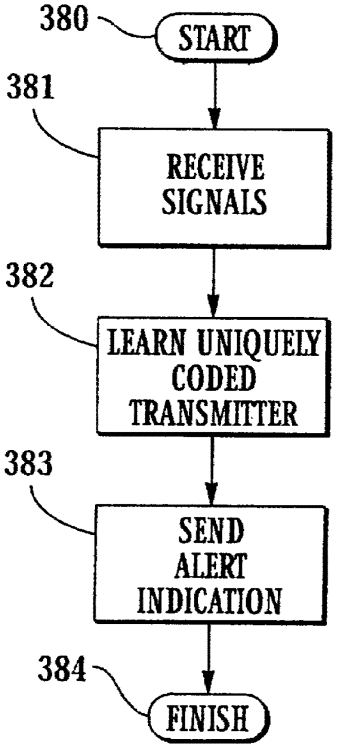

380
START
381
RECEIVE SIGNALS
382
LEARN UNIQUELY CODED TRANSMITTER
383
SEND ALERT INDICATION
384
FINISH

FIG. 38.

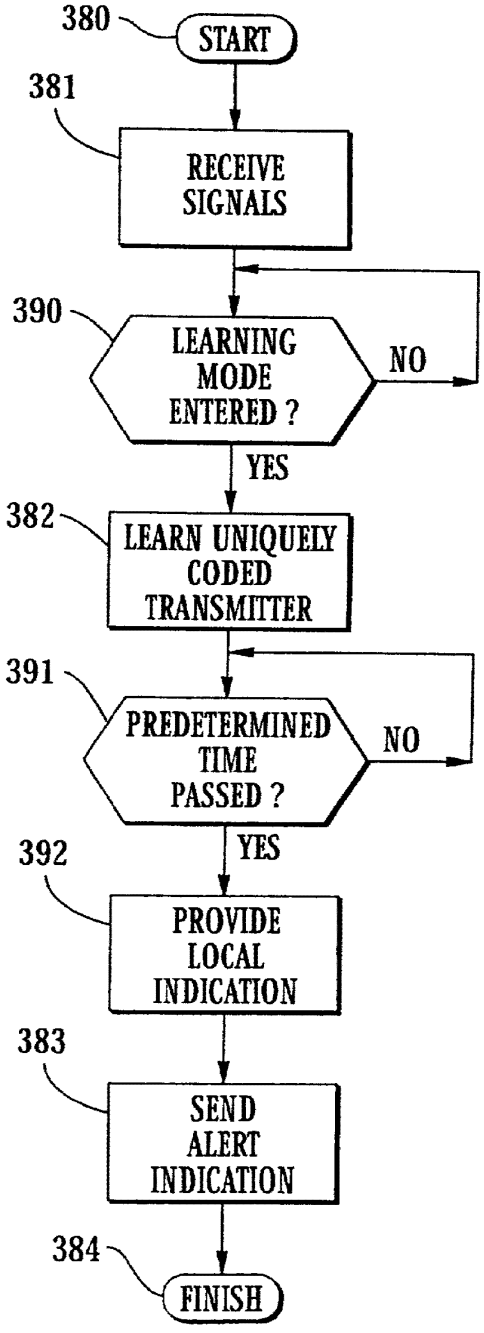

380
START
381
RECEIVE SIGNALS
390
LEARNING MODE ENTERED ?
NO
YES
382
LEARN UNIQUELY CODED TRANSMITTER
391
PREDETERMINED TIME PASSED ?
NO
YES
392
PROVIDE LOCAL INDICATION
383
SEND ALERT INDICATION
384
FINISH

FIG. 39.

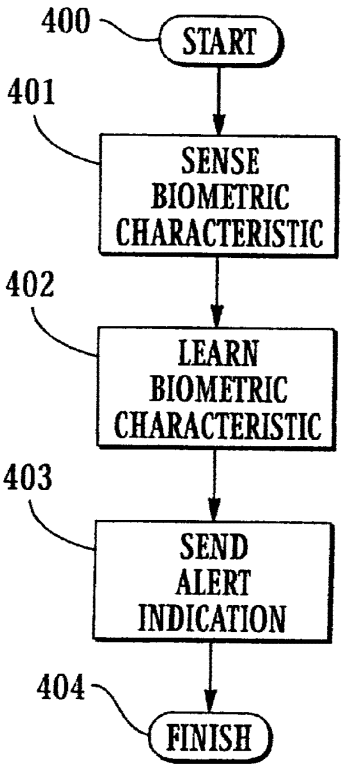

400
START
401
SENSE BIOMETRIC CHARACTERISTIC
402
LEARN BIOMETRIC CHARACTERISTIC
403
SEND ALERT INDICATION
404
FINISH

FIG. 40.

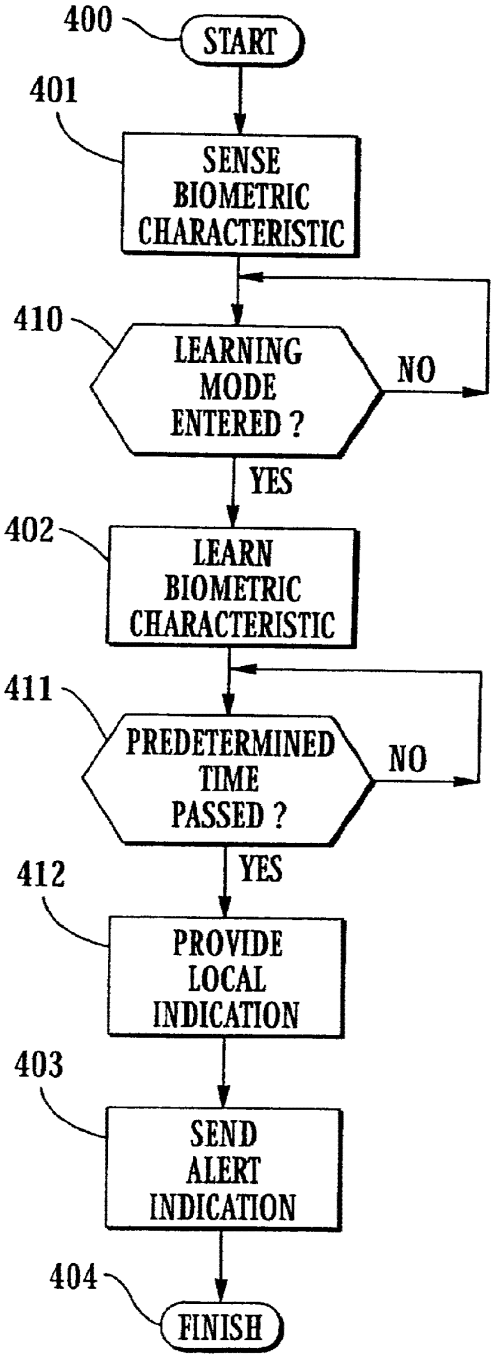

400
START
401
SENSE BIOMETRIC CHARACTERISTIC
410
LEARNING MODE ENTERED ?
NO
YES
402
LEARN BIOMETRIC CHARACTERISTIC
411
PREDETERMINED TIME PASSED ?
NO
YES
412
PROVIDE LOCAL INDICATION
403
SEND ALERT INDICATION
404
FINISH

FIG. 41.

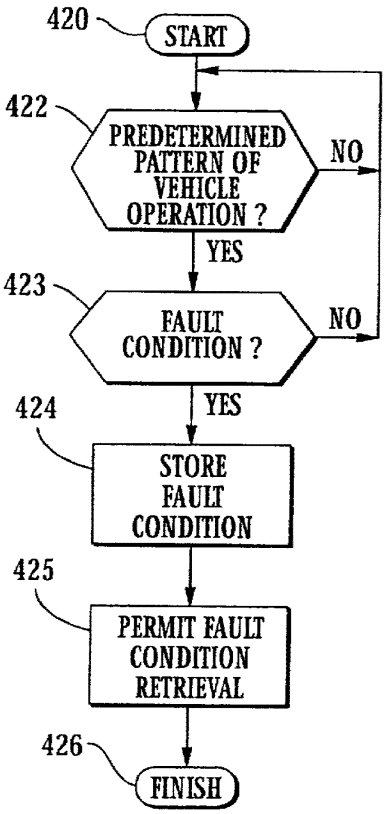

420
START
422
PREDETERMINED PATTERN OF VEHICLE OPERATION ?
NO
YES
423
FAULT CONDITION ?
NO
YES
424
STORE FAULT CONDITION
425
PERMIT FAULT CONDITION RETRIEVAL
426
FINISH

FIG. 42.

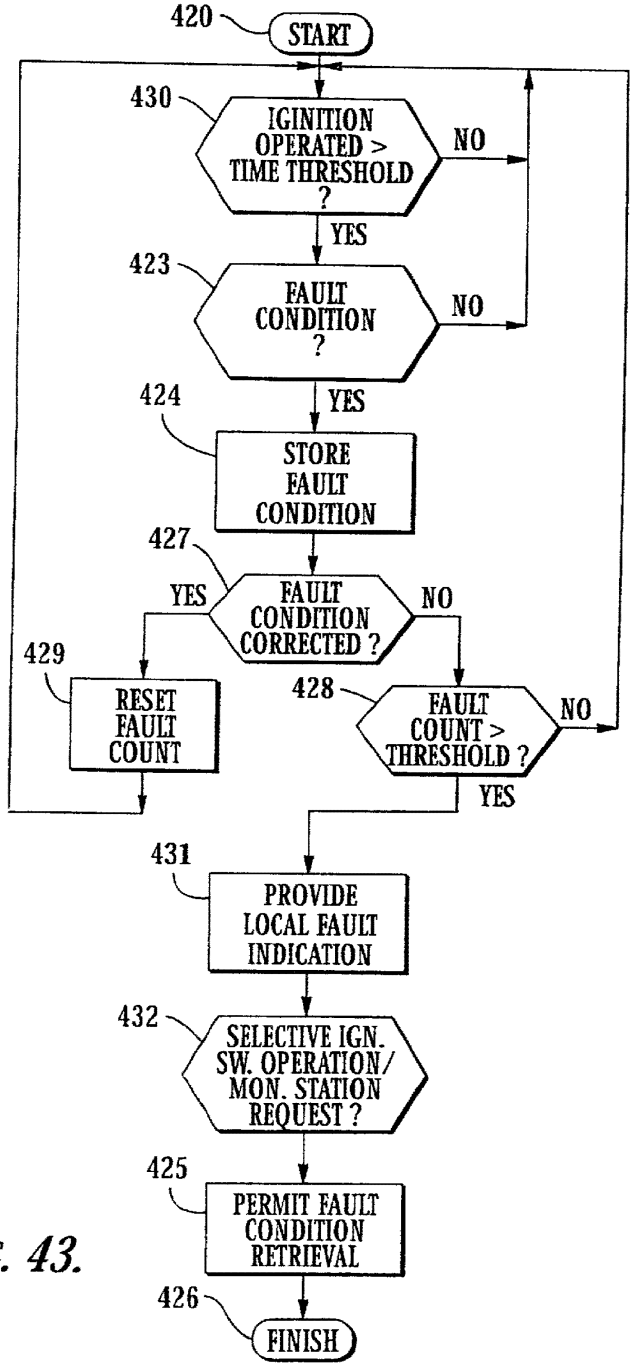

420
START
430
IGINITION OPERATED > TIME THRESHOLD ?
NO
YES
423
FAULT CONDITION ?
NO
YES
424
STORE FAULT CONDITION
427
YES
FAULT CONDITION CORRECTED ?
NO
429
RESET FAULT COUNT
428
FAULT COUNT > THRESHOLD ?
NO
YES
431
PROVIDE LOCAL FAULT INDICATION
432
SELECTIVE IGN. SW. OPERATION/ MON. STATION REQUEST ?
425
PERMIT FAULT CONDITION RETRIEVAL
426
FINISH

FIG. 43.

7. Kenneth E. Flick, the inventor of the Patents-in-Suit, is recognized as an innovator in the vehicle security systems industry. Mr. Flick has invented many improvements for the vehicle security industry, including innovations covering vehicle tracking.

8. The Patents-in-Suit claim some of Mr. Flick's inventions in the field. Mr. Flick has assigned all of his rights to the inventions claimed in the Patents-in-Suit to Omega.

9. Upon information and belief, CalAmp has sold and offered for sale in the United States and in this Judicial District vehicle tracking products that directly or indirectly infringe upon one or more claims of the Patents-in-Suit.

10. Omega has not granted CalAmp a license to practice the Patents-in-Suit for the accused products.

COUNT I

Action for Infringement of the Patents-in-Suit

11. Count I is an action by Omega against CalAmp for monetary damages and injunctive relief for CalAmp's infringement of the Patents-in-Suit.

12. Omega herein restates and reincorporates into this Count the allegations of Paragraphs 1 through 11 herein.

13. Upon information and belief, CalAmp has made and/or offered for sale and sold and/or distributed vehicle tracking products, including but not limited to a product identified as the LMU-3000, that infringe directly, by inducement and/or contributorily, one or more claims of the Patents-in-Suit.

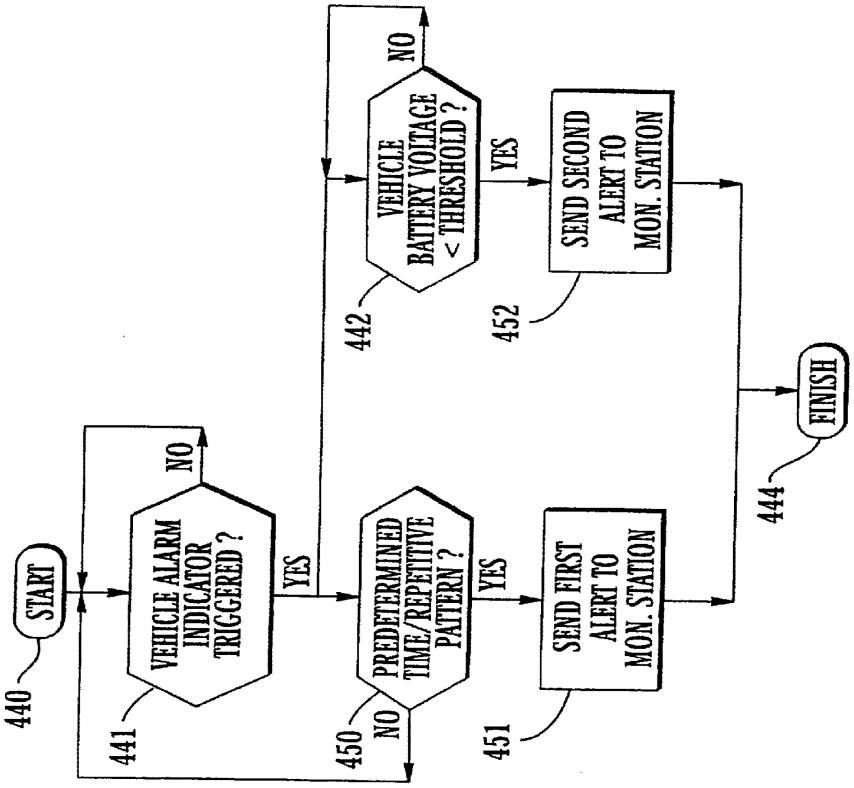


FIG. 45.

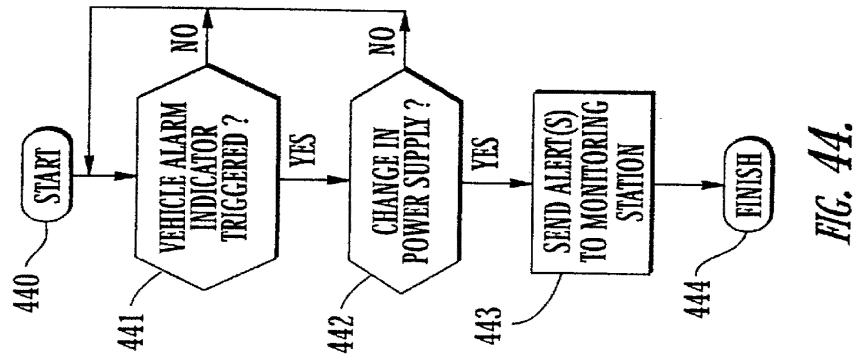


FIG. 44.

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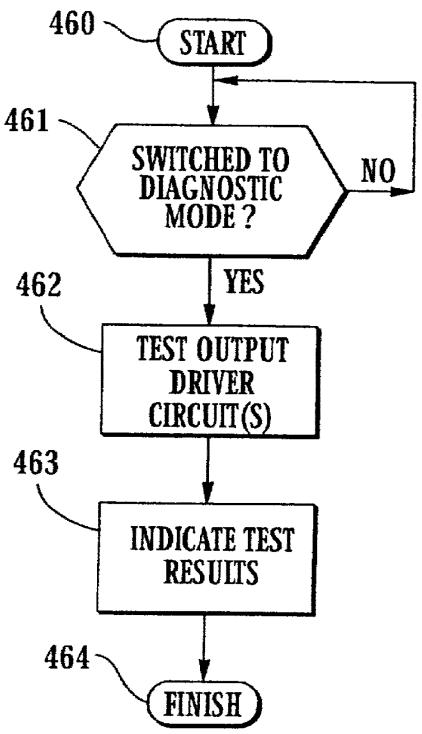

460
START
461
SWITCHED TO DIAGNOSTIC MODE ?
NO
YES
462
TEST OUTPUT DRIVER CIRCUIT(S)
463
INDICATE TEST RESULTS
464
FINISH

FIG. 46.

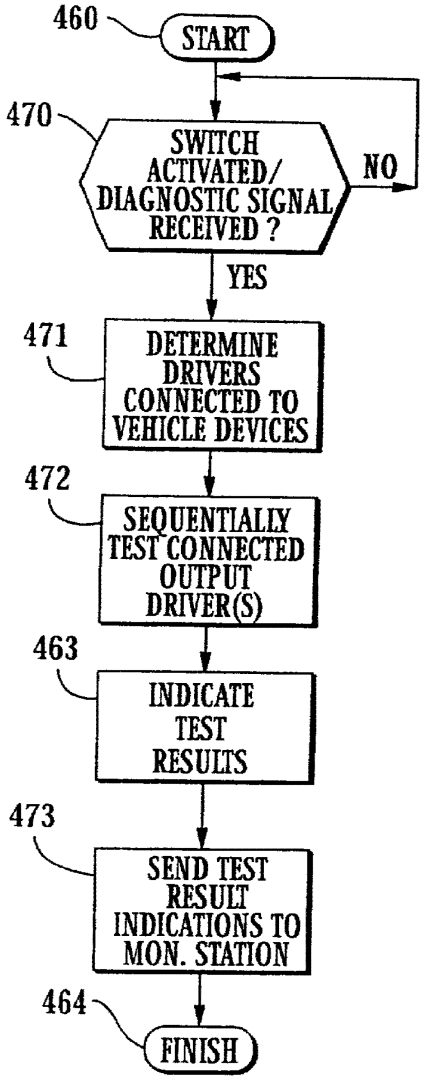

460
START
470
SWITCH ACTIVATED/ DIAGNOSTIC SIGNAL RECEIVED ?
NO
YES
471
DETERMINE DRIVERS CONNECTED TO VEHICLE DEVICES
472
SEQUENTIALLY TEST CONNECTED OUTPUT DRIVER(S)
463
INDICATE TEST RESULTS
473
SEND TEST RESULT INDICATIONS TO MON. STATION
464
FINISH

FIG. 47.

VEHICLE TRACKER INCLUDING VARIABLE FREQUENCY TRANSMISSION AND RELATED METHODS

RELATED APPLICATIONS

The present application is a continuation-in-part of U.S. patent application Ser. No. 09/859,727 filed May 17, 2001, which, in turn, is based upon copending provisional application Serial No. 60/264,811 filed on Jan. 29, 2001; Ser. No. 60/258,005, filed Dec. 22, 2000; Ser. No. 60/251,552, filed Dec. 6, 2000; Ser. No. 60/252,125, filed Nov. 20, 2000; Ser. No. 60/236,890, filed Sep. 29, 2000; Ser. No. 60/246,463, filed Nov. 7, 2000; Ser. No. 60/222,777, filed Aug. 3, 2000; and Ser. No. 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 and alerting system for a vehicle.

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 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.

Many conventional vehicle tracking units include many input and output connections. Accordingly, such units may be difficult to install in a vehicle. This is especially so since the space available to access and connect to vehicle wires is likely to be restricted. Accordingly, errors in the initial installation may occur. Accurate diagnosis of any such errors may be time consuming and add further to the installation costs. Maintenance of an installed system may also be complicated if each connection must be individually checked and rechecked.

One application for which vehicle tracking units are presently being used is as electronic tethers. For example, a vehicle tracking unit may be used for determining whether vehicles have been removed from a car dealership's lot. In such applications, the vehicle tracking units are typically programmed with a predetermined area, which is sometimes referred to as a "G.O. fence," and if the vehicle travels outside thereof it is considered stolen. Yet, this approach may be problematic because the predetermined area is typically defined to be overly large because false alarms may otherwise result during test drives. If the predetermined area becomes too large, this may delay response times.

Furthermore, such predetermined areas are typically defined by one or more rectangular boundaries. An example of one such vehicle tracking system using rectangular boundaries is disclosed in U.S. Pat. No. 6,313,791 to Klanke. However, such rectangular boundaries may potentially be cumbersome to properly define and program.

SUMMARY OF THE INVENTION

In view of the foregoing background, it is therefore an object of the present invention to provide a vehicle tracking unit which may be relatively easily programmed and used for determining whether a vehicle has been removed from a predetermined area.

This and other objects, features, and advantages in accordance with the present invention are provided by a tracking unit for a vehicle which may include a vehicle position determining device, a wireless communications device, and a controller cooperating with the wireless communications device and the vehicle position determining device to determine and send vehicle position information to a monitoring station. The controller may store a user selected reference location and send the vehicle position information based upon the vehicle moving beyond a radial threshold distance from the user selected reference location.

More particularly, the vehicle position information may be sent a threshold time after the vehicle moves beyond the radial threshold distance from the user selected reference location if the vehicle has not moved back within the radial threshold distance. By so doing, the area defined by the user selected reference location and the radial threshold distance may be made smaller than with prior art approaches while still reducing unwanted false alarms, such as from test drives at a dealership during which the vehicle travels briefly outside of the bounded area.

The vehicle tracking unit may further include at least one input device to be positioned within the vehicle for setting the user selected reference location. The at least one input device may also permit user setting of the threshold time. By way of example, the at least one input device may include

at least one of a switch, a keyboard, and a keypad. The at least one input device may also cooperate with the vehicle position determining device and the controller to set a current vehicle position as the user selected reference location. Accordingly, a user may advantageously set the user selected reference location (and/or the threshold time) to correspond to any desired position of the vehicle.

Moreover, the threshold time may also be set by the monitoring station. Further, the controller may set the user selected reference location based upon at least one signal provided by the monitoring station. For example, the controller may also cooperate with the vehicle position determining device to set a current vehicle position as the user selected reference location based upon the at least one signal provided by the monitoring station. In addition, the at least one signal may include the user selected reference location.

By way of example, the radial threshold distance may be less than about five miles, and the threshold time may be less than about thirty minutes, although other values may also be used. Additionally, the controller may include at least one memory for storing the user selected reference location and vehicle position information therein, and the vehicle position determining device may be a Global Positioning System (GPS) device, for example.

A method aspect of the invention is for tracking a vehicle using a vehicle tracking unit, such as the one briefly described above, to be carried by the vehicle. The method may include storing a user selected reference location for the vehicle tracking unit and determining vehicle position information using the vehicle tracking unit. Furthermore, vehicle position information may be sent from the vehicle tracking unit to a monitoring station based upon the vehicle moving beyond a radial threshold distance from the user selected reference location.

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 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. **5**A–**5**C 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 flowchart illustrating operation of the vehicle tracking unit as shown in FIG. **1** for direction deviation tracking.

FIG. **11** is a flowchart illustrating the direction deviation tracking operation of FIG. **10** in further detail.

FIG. **12** is a schematic block diagram illustrating a pair of switchable polarity output terminals, as generally illustrated in FIG. **2**, connected to a dual-motor vehicle device operable based upon output polarity.

FIGS. **13** and **14** are schematic block diagrams similar to FIG. **12** and both illustrating alternate connection arrangements in which the vehicle device is connected to a vehicle battery.

FIG. **15** is a schematic diagram illustrating the pair of switchable polarity output terminals of FIG. **12** in greater detail.

FIGS. **16** and **17** are flowcharts illustrating yet another aspect of the present invention for varying a frequency at which the vehicle tracking unit of FIG. **1** sends vehicle position information to the monitoring station.

FIGS. **18**A and **18**B are flowcharts illustrating yet another aspect of the invention for using the vehicle tracking unit as shown in FIG. **1** to determine and send vehicle position information based upon the vehicle moving outside a radial threshold distance from a user selected reference location.

FIG. **19** is a schematic block diagram illustrating the vehicle tracking unit of FIG. **1** including a user input device for setting the user selected reference location and/or a threshold time.

FIG. **20** is a schematic diagram illustrating the user selected radial threshold and a radial threshold distance therefrom.

FIG. **21** is a flowchart illustrating another aspect of the invention for using the vehicle tracking unit of FIG. **1** to provide an alarm indication for locating a vehicle and cease providing the alarm indication based upon a user input.

FIGS. **22** and **23** are flowcharts illustrating yet another aspect of the invention for sending alarm indication alerts based upon vehicle sensor activation.

FIGS. **24** and **25** are flowcharts illustrating a further aspect of the invention for selectively sending alert messages to a user.

FIG. **26** is a schematic block diagram of the vehicle tracking circuit of FIG. **1** further including a security device detection circuit.

FIGS. **27** and **28** are flowcharts illustrating another aspect of the invention for bypassing sending security signals while performing certain vehicle functions.

FIG. **29** is a schematic block diagram of the vehicle tracking unit of FIG. **1** also including the security device detection circuit and a battery sensing circuit.

FIGS. **30** and **31** are flowcharts illustrating a still further aspect of the invention for reducing excessive power drain on the vehicle battery and/or the back-up battery.

FIG. **32** is a perspective view of the vehicle tracking unit of FIG. **1** and further including a housing with an upgrade connector for an upgrade device.

FIG. **33** is a schematic block diagram of the vehicle tracking unit of FIG. **32**.

FIGS. **34** and **35** are flowcharts illustrating missed activation signal retrieval features of the present invention.

FIG. **36** is a schematic block diagram of an alternate embodiment of the vehicle as shown in FIG. **2** including a vehicle data bus.

FIG. **37** is a flowchart illustrating a method for controlling operable vehicle devices using the vehicle tracking unit and vehicle data bus shown in FIG. **36**.

FIGS. **38** and **39** are flowcharts illustrating a method according to the invention for sending alert indications based upon learning uniquely coded transmitters.

FIGS. **40** and **41** are flowcharts illustrating a related method according to the invention for sending alert indications based upon learning unique biometric characteristics.

FIGS. **42** and **43** are flowcharts illustrating another aspect according to the present invention for determining fault conditions of the vehicle tracking unit of FIG. **1**.

FIGS. **44** and **45** are flowcharts illustrating still another advantageous aspect of the invention for providing theft alerts based upon vehicle alarm indicator activation and a drop in vehicle battery voltage.

FIGS. **46** and **47** are flowcharts illustrating a further aspect of the invention for testing output drivers of the vehicle tracking unit of FIG. **1**.

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.

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 illustrated 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 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 sys-

tem **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. Accordingly, 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 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:

1. 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.

2. 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.

3. 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.

4. 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 WEB site. 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.

5. 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.

6. 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.

7. 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.

8. 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 it's 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 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:

1. 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.
2. The black wire is connected to ground.
3. 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

4. The gray wire is for input and output, and can be connected to an alarm siren or horn positive terminal. In addition:

a. 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 "B" alarm activation is given.

b. 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.

c. 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.

d. The gray wire bypass operates as follows:

i. After alert warning "B" bypass all future alert "B" signals until system is disarmed.

ii. After alert warning "C" bypass all future Alert "C" signals until system is armed.

iii. 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.

e. 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.

i. Non-stop activation from Command "**4**")

ii. 30-second activation from (Command "**5**")

f. Turn off the above alert "A" from (Command "**1**").

5. The orange wire is for the starter interrupt and arm/disarm system, and operates as follows:

a. If first DIP switch is in the:

i. 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**"

ii. 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.

b. Command **4** activates Orange wire to have 500 ma. negative until Command **1** is received.

c. 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:

1. 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 web site 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.

2. Alert Warning "B" (FIGS. **5**A–**5**C): 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.

3. 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**.

4. 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**.

5. 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) Web site to indicate present location and past events in memory.

14. Omega is entitled to compensatory damages and injunctive relief for CalAmp's infringing activities.

15. Omega put CalAmp on notice of one or more of these patents at least as early as June 2010.

16. Upon information and belief, CalAmp lacks justifiable belief that there is no infringement or that the infringed claims are invalid or has acted with objective and subjective recklessness in its infringing activity. CalAmp's infringement is therefore willful, and Omega is entitled to an award of exemplary damages, attorneys' fees, and costs in bringing this action.

Wherefore, Plaintiff Omega prays this Honorable Court enter such preliminary and final orders and judgments as are necessary to provide Omega with the following requested relief:

A. A preliminary and then permanent injunction enjoining CalAmp from infringing each of the Patents-in-Suit;

B. An award of damages against CalAmp under 35 U.S.C. §284 in an amount adequate to compensate Omega for CalAmp's infringement, but in no event less than a reasonable royalty for the use made by CalAmp of the inventions set forth in the Patents-in-Suit;

C. An award against CalAmp for exemplary damages, attorneys' fees, and costs under 35 U.S.C. § 285; and

D. Such other and further relief as this Court deems just and proper.

Command **4**: (Hijack or Stolen) monitoring station Command to vehicle system to activate:

a. Gray wire to pulse 1 sec on/1 sec off with 1 amp positive output and which continues until receive command #**1**.

b. 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:

1. 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:
   a. Once instantly.
   b. Once in 1 hour if at the same location.
   c. Once in 6 hours if at the same location.
   d. Once in 12 hours if at the same location.
   e. Once every 24 hours if at the same location.
   f. 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 contains 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:

1. The user's vehicle has issued a stolen alert:
   a. 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 Web site 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.
   b. 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.
2. 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.
3. 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 transmission 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 **30**, 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 **30** 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 **30**, 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 transmitting 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 **30**, and ultimately to the vehicle user when away from the vehicle **21**. If the vehicle is being serviced and the battery **61** 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 **30**. 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 ever 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 **30** 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 **30**, 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 "wildcard" 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 **30** 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.

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 **30** 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 **30** 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**:

(1) Code **1**—Tracker will turn off feature of upstream code caused by vehicle alert being detected.

(2) Code **2**—Tracker will turn on feature of upstream code caused by vehicle alert being detected.

(3) 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.

(4) Code **4**—Turn on audio buzzer feature that will sound once each 10 minutes. The monitoring station **30** need only send the command to activate the feature, as the tracker will time the period and drive the buzzer thereafter. The monitoring station **30** 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.

(5) Code **5**—Turn off the audio buzzer. This is to be sent by the monitoring station **30** after a user has successfully activated his account.

(6) 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.

(7) Code **7**—Turn off the 80 mph speed limit reporting.

(8) Code **8**—Increase speed limit 5 mph and increase the time 5 minutes.

(9) 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 so because if the second code is sent from the monitoring station **30**, 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 vehicles 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.

Turning now additionally to FIG. **10**, operation of the vehicle tracking unit **25** for providing direction deviation tracking will now generally be described. More particularly, beginning at Block **100**, when the vehicle tracking unit **25** is placed in an armed or tracking mode (Block **101**) to provide constant tracking, the vehicle tracking unit may determine

and send the vehicle position information at predetermined intervals, for example, as described above. For example, the vehicle tracking unit **25** may be placed in the armed mode when the vehicle **21** is stolen to allow the police and/or a user to maintain current vehicle position information, such as by overlaying the vehicle position information on a map using a mapping program.

Yet, one difficulty which may be encountered with prior art tracking approaches which transmit vehicle position information based solely upon a predetermined schedule is that it may take a relatively long time for direction changes of the vehicle **21** to be determined. That is, if a car thief turned at a stop light shortly after vehicle position information was sent, the change in direction would not be discovered until then next time vehicle position information was sent. If the intervals between sendings of vehicle position information are relatively long, the police may pursue the vehicle **25** in the wrong direction.

Thus, in accordance with the present invention, the controller **40** may cooperate with the vehicle position determining device **42** to determine vehicle position information based upon the vehicle **21** changing a direction of travel by greater than a threshold, at Blocks **102** and **103**. This may preferably be done in addition to sending vehicle position information at predetermined intervals, for example, as will be described further below. Of course, in some embodiments the vehicle position information may simply be determined and stored for later retrieval by the user based upon the direction changes, for example, or this may be done in addition to sending the vehicle position information to the monitoring station **30**.

The threshold may advantageously used to distinguish slight deviations in direction (e.g., from small bends in the road) from significant directional changes (e.g., turning at an intersection) which will actually be important to the police and/or user. By way of example, the threshold may be greater than about 45 degrees, although other thresholds may also be used.

Thus, in addition to regularly updating the vehicle position information at predetermined intervals, the police and/or user are also updated when the vehicle **25** changes direction. That is, the controller **40** may also cooperate with the wireless communications device **44** to send the vehicle position information to the monitoring station **30** based upon each occurrence of the vehicle **21** changing the direction of travel by greater than the threshold, at Block **104**. It will be appreciated by those of skill in the art that the vehicle position information may include direction or heading information in some embodiments, although in other embodiments basic GPS coordinate information (i.e., latitude and longitude coordinates) could be sent and the heading information determined at the monitoring station **30**.

Of course, in some embodiments the controller **40** may advantageously not send the vehicle position information to the monitoring station **30** unless the vehicle **25** changes the direction of travel by greater than the threshold. That is, vehicle position information will not be sent at predetermined intervals, but only when the direction of the vehicle **21** changes.

As a result, wireless communications charges (e.g., cellular phone charges) may be held to a minimum in those applications where continuous vehicle position updates are not required. By way of example, when tracking trucks, busses, etc. traveling on interstates, it may only be necessary to know when and where drivers get off of the interstate. As such, a significant amount of cellular phone charges may be saved by not continuously updating vehicle position information while such vehicles are traveling along a known route, (i.e., an interstate).

Referring more particularly to FIG. **11**, further details of the direction deviation tracking operation according to the invention will now be described. The controller **40** may determine the vehicle position information based not only upon the vehicle **21** changing the direction of travel by greater than the threshold (Block **102**), but this determination may also optionally be based upon the vehicle then continuing in the changed direction for greater than a predetermined period, at Block **110**. By way of example, the predetermined period may be greater than about five seconds and, more preferably, between about five and seven seconds, although other periods may also be used, as will be appreciated by those of skill in the art.

Similarly, the controller **40** may, in addition to determining the vehicle position information based upon the vehicle **21** changing the direction of travel by greater than the threshold, also optionally base this determination upon the vehicle then continuing in the changed direction at greater than a predetermined speed, at Block **111**. Preferably, the predetermined speed may be greater than about five miles per hour (MPH), but other speeds may also be used.

As a result of the steps illustrated at Blocks **110**, **111**, unwanted downloading of vehicle position information may advantageously be avoided. For example, when a vehicle makes only a temporary change in direction, such as to stop briefly at a gas station or go around something in the road, the above conditions may be used to limit the determination of vehicle position information. Again, this may result in further wireless communications charge savings.

In accordance with another advantageous aspect of the invention, the controller **40** may also determine a value of deviation in direction, at Block **112**. For example, this value of deviation may be an angular speed, such as in degrees per second. As such, the controller **40** may advantageously determine the vehicle position information based upon the value of deviation, at Block **103**.

Thus, yet another option is provided for determining whether a directional deviation is significant and requires vehicle position information to be determined or not. For example, determining angular speed may help discriminate between the vehicle **21** taking a curved on-ramp to a highway and simply turning slowly into a gas station for a brief stop. Of course, those of skill in the art will appreciate that any one or all of the steps illustrated at Blocks **110–112** may be used, or combinations thereof, to adjust the frequency with which the vehicle position information may be determined and sent for different applications.

As noted above, the controller **40** may include the memory **52** which may store the vehicle position information therein (Block **113**). The controller **40** may download the vehicle position information from the memory **52** to the monitoring station **30** based upon at least one of a predetermined schedule, a predetermined event, and the memory reaching a predetermined capacity, as noted above, at Blocks **114** and **115**.

Turning now additionally to FIG. **12**, the multiple polarity outputs **53**, which were generally illustrated in FIG. **2**, will now be described in further detail. More particularly, the controller **40** may include one or more pairs **53***a*, **53***b* of switchable polarity output terminals which may be used for controlling various vehicle devices. By way of example, such vehicle devices may include an actuator **121**, such as the door lock actuator **62** or a window actuator, for example, which may be used for performing at least one of door locking and unlocking functions or at least one of a roll up

and a roll down function, respectively. In particular, the vehicle device may include one or more pairs of input terminals, each pair being connected to a respective pair of output terminals **53***a*, **53***b*. In certain embodiments the controller **40** may advantageously include a learning mode in which it detects respective operating polarities of the input terminals of the vehicle device, as will be appreciated by those of skill in the art. Accordingly, the controller **40** may switch the pair of output terminals **53***a*, **53***b* based upon the detected operating polarities of the pair of input terminals. This learning mode may therefore save installers valuable time which might otherwise be required to manually match the polarities of the outputs **53***a*, **53***b* with vehicle device inputs.

The controller **30**, and more particularly the CPU **50**, may switch the pair of switchable polarity output terminals **53***a*, **53***b* based upon a command received by the remote transmitter **60** or by the wireless communications device **44**, for example. That is, the CPU **50** provides respective activation signals to a first output stage **122***a* of the output terminal **53***a* and a second output stage **122***b* of the output terminal **53***b* In particular, the CPU **50** may provide the activation signals substantially simultaneously, with the two activation signals having opposite polarities.

The CPU **50** may preferably activate the pair of output terminals **53***a*, **53***b* for a predetermined period, such as a few seconds to roll a window up or down, for example. On the other hand, the activation signals need only be a few seconds in duration to allow the door lock actuator **62** to perform a door locking/unlocking function. Of course, those of skill in the art will appreciate that any predetermined period may be used in accordance with the present invention.

Upon applying the activation signals to the output stages **122***a*, **122***b*, the activation signals are then passed to respective negative and positive switches **123***a*, **124***a*, and **123***b*, **124***b* of the output terminals **53***a*, **53***b*. Accordingly, only one of the switches **123***a*, **124***a* which corresponds in polarity to the activation signal applied to the output terminal **53***a* will provide an output. The same is also true with the switches **123***b*, **124***b*.

Thus, for example, if positive and negative activation signals are provided to the first and second output stages **122***a*, **122***b*, the positive output switch **124***a* will provide an output on a first output connector **125***a*, and the negative output switch **123***b* will provide an output on a second output connector **125***b*. In the embodiment illustrated in FIG. **12**, the window actuator **121** includes a first motor **126***a* for rolling a window down, and a second motor **126***b* for rolling the window up, both of which are activated based upon the polarity of signals provided thereto. Of course, in some embodiments an actuator **121** with a single motor could be used, as will be appreciated by those of skill in the art.

Accordingly, using the above example, the first motor **126***a* would receive a negative polarity signal from the first output connector **125***a* at its negative polarity terminal, and a positive polarity signal from the second output connector **125***b* at its positive polarity terminal. The first motor **126***a* will therefore be actuated, and the window will be rolled down. To the contrary, the second motor **126***b* will receive the negative polarity signal from the first output connector **125***a* at its positive polarity terminal and the positive polarity signal from the second output connector **125***b* at its negative polarity terminal, and it will therefore not be actuated.

Referring additionally to FIG. **13**, an alternate configuration is illustratively shown in which the first and second motors **126***a*', **126***b*' are connected to the positive terminal of the vehicle battery **61**' so that they are both activated by a negative polarity signal. As previously described above, if opposite polarity activation signals are provided by the CPU **50** to the first and second output stages **122***a*', **122***b*', then only one of the first and second output connectors **125***a*', **125***b*' will provide a negative polarity signal at a time. Thus, only one or the other of the first and second motors **126***a*', **126***b*' will be actuated at a time. The case in which the first and second motors **126***a*" and **126***b*" are connected to the battery **61**" to be actuated by positive polarity signals is illustratively shown in FIG. **14**.

A more detailed schematic diagram illustrating the pair of output terminals **53***a*, **53***b* is shown in the schematic diagram of FIG. **15**. The output stages **122***a* and **122***b* may each include a resistor, and the switches **123***a*, **124***a*, **123***b*, and **124***b* may all be transistors (e.g., bi-polar transistors). The output terminals may also include resistors **150–153**, and diodes **154–157**, as illustratively shown. In the illustrated embodiment, a three-pin connector is used which includes the connectors **125***a*, **125***b*, and an additional connector **125***c* which may be used to provide power, for example, as will be appreciated by those of skill in the art. By way of example, the resistors **122***a*, **122***b*, **150**, and **152** may be 4.7 KΩ resistors, and the resistors **151**, **153** may be 47 KΩ resistors though other values may also be used.

Accordingly, it will also be appreciated that the vehicle tracking unit **25** of the present invention may advantageously require less output terminal circuitry than in prior art vehicle tracking units, since a separate positive and negative terminal does not have to be provided for each motor, etc. Further, installation of the vehicle tracking unit **25** of the present invention may be simplified since the amount of wires that have to be connected to various vehicle devices is reduced.

Another advantageous aspect of the invention will now be described with reference to the flowchart shown in FIG. **16**. Beginning at Block **160**, as noted above, the vehicle tracking unit **25** may periodically determine (Block **161**) and send (Block **162**) vehicle position information to the monitoring station **30**. Again, this may be the case when the controller **40** is in the armed or tracking mode and such information has been requested or a predetermined event has occurred, as described above. The controller **40** may detect whether a triggering event has occurred, at Block **163**, and, if so, vary a period between successive sendings of vehicle position information based upon the triggering event (Block **164**).

By using a triggering event to increase the period between successive sendings of the vehicle position information, wireless (e.g., cellular) communications charges may advantageously be reduced by sending the vehicle position information less frequently. This may also result in significantly less drain on the vehicle battery **61** and/or back-up battery **54**. On the other hand, the period between successive sendings may also be decreased based upon a triggering event, which may be particularly beneficial when police are tracking the vehicle **25** after it has been stolen, for example.

Turning more particularly to FIG. **17**, the step of determining the triggering event (Block **163** in FIG. **16**) will now be described in further detail. By way of example, the triggering event may include a vehicle speed exceeding a threshold (Block **163***a*), receiving a period change signal from the monitoring station **30** (Block **163***b*), the passing of time (Block **163***c*), and/or the memory **52** reaching a predetermined capacity (Block **163***d*).

With respect to the passage of time, a message may be sent from the monitoring station **30** to the vehicle tracking

unit to prompt the sending of vehicle position information, as previously described above. By way of example, the initial period between sendings of vehicle position information may be about two minutes. After an hour, the period between sendings may be decreased to every fifteen minutes, and after six hours the period decreased to every hour. Further, after twenty four hours have passed, the controller **40** may then increase the period between sendings to once a day. Of course, the above periods and triggering events are merely exemplary, and others may be used as well, as will be appreciated by those skilled in the art.

It should be noted here that in some embodiments the visual indicator(s) **43** may advantageously cooperate with the vehicle position determining device **42** (e.g., a GPS device) for indicating a number of GPS satellites currently accessible. Similarly, the visual indicator(s) **45** may cooperate with the wireless (e.g., cellular) telephone communications device **44** for indicating communications with a cellular base station, for example.

Turning now additionally to FIGS. **18–20**, another aspect of the present invention for using the vehicle tracking unit **25** to notify a user when the vehicle **21** has been removed from a predetermined area (i.e., a G.O. fence) will now be described. Beginning at Block **160**, the controller **40** may store a user selected reference location **180**, at Block **161**, and determine vehicle position information (Block **162**) as previously described above. For example, the user selected reference location **180** may be stored in the memory **52** (FIG. **2**).

The user selected reference location **180** may advantageously be set in several ways according to the present invention. For example, the vehicle tracking unit **25** may include one or more input devices **170** to be positioned within the vehicle **21** for setting the user selected reference location **180**. By way of example, the input device **170** may be a switch, a keyboard, a keypad, or other suitable input device known to those skilled in the art.

If a keyboard or keypad is used, for example, the user could enter desired coordinates (e.g., in latitude and longitude) of the user selected reference location **180**. The input device **170** may also cooperate with the vehicle position determining device **42** and the controller **40** to set a current vehicle position as the user selected reference location. Accordingly, a user may advantageously set the user selected reference location **180** to correspond to any desired position of the vehicle **21** simply by driving the vehicle to that position and using the input device **170**.

This may be particularly advantageous when the user allows someone to use the vehicle **21** within a limited area (e.g., as with valet parking), but wants to be notified if the vehicle **21** is removed from this area. In such situations, the user will not want to be notified of any movement of the vehicle, as these may occur frequently if the vehicle **21** is moved around, such as in a valet parking lot. Thus, the user may use the input device **170** to set the user selectable reference location **180** at the position where possession of the vehicle **21** is transferred, e.g., at the valet parking drop-off location. The user may then advantageously only be notified if the vehicle moves beyond a radial threshold distance **181** from the user selectable reference location, if desired, as will be described further below.

The controller **40** may also set the user selected reference location **180** based upon one or more signals provided by the monitoring station **30**. For example, the controller **40** may also cooperate with the vehicle position determining device **42** to set a current vehicle position as the user selected reference location **180** based upon the signal(s) provided by the monitoring station **30**. In addition, the at least one signal may simply include the user selected reference location **180**.

As illustratively shown at Block **163**, based upon the vehicle position information determined as noted above with reference to Block **162**, the controller **40** determines whether the vehicle **21** has moved beyond a radial threshold distance **181** from the user selected reference location **180**. If this is the case, the controller **40** may then cause the vehicle position information to be sent to indicate to the user that the vehicle **21** has moved beyond the radial threshold distance **181**.

In some embodiments, the vehicle position information may be sent a threshold time after (Block **164**) the vehicle **21** moves beyond the radial threshold distance **181** from the user selected reference location **180** if the vehicle has not moved back within the radial threshold distance. By so doing, a bounded area **182** defined by the user selected reference location **180** and the radial threshold distance **181** may be made smaller than with prior art approaches while still reducing unwanted false alarms. This feature may be particularly useful in the case of car dealerships, where vehicles may occasionally be driven beyond the radial threshold distance **181** for test drives, but will return to the dealership (i.e., within the bounded area **182**) within a short time.

In accordance with the invention, the input device **170** may also permit user setting of the threshold time, or this may be done by the monitoring station **30**. The radial threshold distance **181** may also be set via the input device **170** and/or the monitoring station **30**. By way of example, the radial threshold distance **181** may be less than about five miles, and the threshold time may be less than about thirty minutes, although other values may also be used in accordance with the present invention.

Another particularly useful aspect of the present invention will now be described with reference to FIG. **21**. As noted above, the vehicle **21** may include the vehicle alarm indicator **67**, which may include one or more of a vehicle horn, a vehicle siren, a vehicle parking light, a vehicle headlight, a vehicle turning direction indicator, a vehicle hazard light, and a strobe light, for example. In accordance with this aspect of the invention, beginning at Block **190**, if a user is unable to find the vehicle **21**, such as when the vehicle is parked in a crowded parking lot, the user (or monitoring station **30**) may send a vehicle finder activation signal to the vehicle tracking unit **25**, as previously described above.

Similar to some prior art vehicle tracking systems, the controller **40** may then cause the vehicle alarm indicator **67** to provide an alarm indication lasting for a predetermined time (e.g., about 60 seconds or less), at Block **193**, based upon the wireless communications device **44** receiving the vehicle finder activation signal. As such, the vehicle tracking unit **25** may therefore be used to provide an alarm indication when the vehicle security controller **28** is otherwise out of range for the uniquely coded remote transmitter **60**.

Yet, one problem which may arise with prior art tracking systems is that once the user locates the vehicle **21**, there may still be a significant amount of time left before alert indication ceases. This may be particularly true where the predetermined time is set to be relatively large. Thus, if a user finds the vehicle **21** quickly, she may have to listen to the horn sounding for a relatively long period, or start driving away with a strobe light flashing, for example.

In accordance with the present invention, the controller **40** may also determine not only whether the predetermined time has expired before ceasing providing the alarm indication, but it may also determine whether a user input has been

received, at Block **194**. Thus, the controller **40** may advantageously cause the vehicle alarm indicator **67** to cease providing the alarm indication, at Block **195**, prior to expiration of the predetermined time based upon the user input.

As noted above, the controller **40** may be switchable between armed and disarmed modes, and the user input may include switching the controller from the armed mode to the disarmed mode. By way of example, this may be done based upon the ignition switch **65**, the remote transmitter **60**, a signal received from the monitoring station **30**, and/or the security controller **28**. Alternately, the controller **40** may switch the alarm indication off based upon the ignition switch **65**, etc., irrespective of the current operating mode of the controller.

As discussed above with reference to FIG. **5**A, the controller **40** may cooperate with the wireless communications device **44** to send an alarm indication alert to the monitoring station **30** based upon at least one vehicle sensor. More particularly, referring now to FIG. **22**, beginning at Block **200** the controller **40** may determine if the vehicle sensor has been activated, for example, at Block **201**. By way of example, the sensor may include at least one of the alarm indicator **67** (i.e., vehicle horn, vehicle siren, etc.), a vehicle parking light, a vehicle headlight, a vehicle turning direction indicator, a vehicle hazard light, a vehicle door switch, and a vehicle dome light. Of course, other sensors may also be used as will be appreciated by those of skill in the art.

Once the alarm indication alert has been sent, at Block **202**, the controller **203** may then determine whether a predetermined number of alarm indication alerts have already been sent, at Block **203**. If so, the controller **40** may stop the sending of further alarm indication alerts, at Block **204**. By so doing, if the vehicle sensor has been falsely activated (e.g., the alarm indicator **67** is repeatedly activated by thunder), the user need not receive numerous alarm indication alerts and may save the wireless communications charges associated therewith. By way of example, the predetermined number of alarm indication alerts may be in a range of one to five, although other numbers may also be used.

Another flowchart illustrating yet further details in accordance with this aspect of the present invention is shown in FIG. **23**. In addition to the above described steps, after determining that the predetermined number of alarm indication alerts have been sent, the controller **40** may then determine whether the predetermined number thereof occurred within a predetermined time, at Block **210**. If so, the controller **40** may stop sending further alarm indications until the controller is reset, at Block **211**.

More particularly, the controller **40** may be switchable between armed and disarmed modes, as discussed above, and the controller **40** may be reset upon being switched between armed and disarmed modes. By way of example, the controller **40** may be switchable between armed and disarmed modes based upon the ignition switch **65**, based upon the vehicle sensor being controlled by the remote transmitter **60**, and/or based upon a signal from the monitoring station **30**. Of course, other suitable ways of switching the controller **40** between armed and disarmed modes may also be used, as will be appreciated by those of skill in the art.

Referring now to FIGS. **24** and **25**, according to another related aspect of the present invention, beginning at Block **240** the controller **40** may cooperate with the vehicle position determining device **42** and the wireless communications device **44** to send an alert message to the monitoring station **30** based upon at least one vehicle sensor, at Blocks **244**, as discussed previously above. More particularly, the at least one vehicle sensor may include the ignition switch **65**, the uniquely coded remote transmitter **60**, or other suitable vehicle sensors noted above, for example, which may be used for switching the controller **40** between armed and disarmed modes.

Thus, during normal operation, the controller **40** may cause the alert message to be sent when the vehicle tracking unit **25** (i.e., the controller **40**) is in the active mode (e.g., the ignition switch **65** is in the off position) and a triggering event occurs (e.g., the vehicle **21** is moved), at Blocks **252–254**. The normal operation is illustratively shown as concluding at Block **255** for clarity of illustration, but those of skill in the art will appreciate that additional alert messages may be sent in some embodiments. It should also be noted that in some embodiments the alert message may also be sent when the controller **40** is in the disarmed mode (as opposed to the armed mode).

By way of example, if the vehicle **21** was broken down on the side of the road and the user had to leave the vehicle until a tow truck arrived, the user could accordingly place the controller **40** in the armed mode so he will be alerted if the vehicle is moved. Yet, the user would not want to receive alert messages resulting from the tow truck moving the vehicle **21**, which may not only be an inconvenience but may also result in significant wireless (e.g., cellular) communications charges for the user.

In accordance with this aspect of the invention, the vehicle tracking unit **25** (i.e., controller **40**) may also be switchable to an override mode, at Block **242**, to prevent sending of the alert message, as illustratively shown by the conclusion step at Block **245**, based upon receiving an alert override message from the monitoring station **30**. This switching may be performed irrespective of whether the controller **40** is in the armed mode or the disarmed mode. Using the above example, the user may therefore cause the controller **40** to be switched to the override mode once the tow truck has picked up the vehicle **21** so that he will no longer receive the alert indication.

Of course, the override mode may be disengaged, at Block **256**, once the user wants to start receiving alert messages again. By way of example, the controller **40** may disengage the override mode based upon the vehicle ignition switch **65** being switched between on and off positions, and more particularly from the off to the on position (i.e., the next time the user starts the vehicle **21**). Additionally, an override disengage message may also be sent from the monitoring station **30** to the vehicle tracking unit **25**, and the controller **40** may cooperate with the wireless communications device **44** to receive the override disengage message and disengage the override mode based thereon.

Also, the controller **40** may disengage the override mode based upon an operable vehicle device being controlled by the remote transmitter **60**, as discussed previously above. Again, the operable vehicle device may include at least one of a vehicle alarm device (e.g., the security controller **28**), a keyless entry device and/or the door lock actuator **62**, the engine starter interrupt device **66**, and the remote starter device **63**, for example. If the override mode is not disengaged, no further alert messages may be sent (Block **257**), but if it is then normal operation may resume as described above.

As previously noted, the monitoring station **30** may include a user interface for accepting at least one command from a user and sending at least one alert to the user, such as the Internet interface **34** and/or the telephone network

interface **33**, for example (FIG. **3**). Of course, in some embodiments the monitoring station **30** may also be a user's computer, telephone, personal data assistant (PDA), or other suitable device which may send/receive signals directly to/from the vehicle tracking unit **25** via a wireless communications network, for example.

Referring now to FIGS. **26–28**, in accordance with yet another aspect of the present invention the vehicle tracking unit **25** may further include a security device detection circuit **260** for at least one vehicle security device, such as the alarm indicator **67**, for example. As illustrative shown, the security device detection circuit **260** may be connected to the controller **40**, and the controller may cooperate with the wireless communications device **44** and the security device detection circuit for sending security signals to the monitoring station **30** based upon the security device detection circuit, at Block **271**.

By way of example, the controller **40** may cause the security signals to be sent to the monitoring station **30** based upon the security device detection circuit **260** detecting that the alarm indicator **67** has been activated. It should be noted that although the security device detection circuit **260** is illustratively shown as being separate from the controller **40** in FIG. **26**, this circuitry may well be included within the controller in some embodiments, or even implemented in software to be run on the CPU **50**, for example, as will be appreciated by those of skill in the art.

As previously noted above, the vehicle tracking unit **25** in accordance with the present invention may advantageously receive one or more command signals (Block **272**) (e.g., from the remote transmitter **60** and/or the monitoring station **30**) and perform corresponding vehicle functions based thereon. For example, the command signals may include car find command signals for causing the vehicle security controller **28** to activate the alarm indicator **67** and/or remote start command signals for causing the remote start device **63** to start the vehicle **21**.

Yet, one problem which may be encountered when the controller **40** causes such functions to be implemented is that by causing the alarm indicator **67** to be turned on so that the user can locate the vehicle **21**, the security device detection circuit **260** will detect the activation thereof. Thus, the controller **40** will be prompted to send a security signal to the user, even though the user was the one who sent the car find command signal. The same may also be the case with a remote start command signal, which may otherwise cause the security controller **28** to determine that the vehicle **21** is being stolen and trigger the alarm indicator **67**.

As such, in accordance with this aspect of the present invention, the controller **40** may perform the at least one predetermined vehicle function while bypassing sending the security signals, i.e., bypassing the security device detection circuit **260**, at Block **273**. Once the function has been performed, at Block **274**, then the normal sending of security signals may resume. Accordingly, even though performing the at least one vehicle function may otherwise activate the alarm indicator **67**, for example, the vehicle tracking unit **25** may advantageously avoid sending unwanted security signals to the user, which may result in a significant savings in wireless communications costs.

Once again, the controller **40** may be switchable between armed and disarmed modes, and the controller may perform the at least one predetermined vehicle function based upon receiving the corresponding command signal via the wireless communications device while in the armed mode, at Block **280**. The controller **40** may also cease bypassing the security device detection circuit **260** based upon a predetermined input, or after a predetermined period, at Block **281**. More particularly, the predetermined period could be measured from the time when the corresponding command signal is received, or from the time the corresponding vehicle function is completed, for example.

By way of example, the predetermined input may include switching the ignition switch **65** between on and off positions, or a deactivation of the at least one security device (i.e., the alarm indicator **67**). Use of the predetermined period may be particularly advantageous in the case of remote starting the vehicle **21**, in which case the function of starting the vehicle may last a relatively short time but the alarm indicator **67**, if activated, could continue to provide an alert for much longer. Accordingly, the predetermined period could be set to be slightly longer than the time which the security controller **28** is programmed to activate the alarm indicator **67**.

Turning now additionally to FIGS. **29–31**, another aspect of the invention for a battery power saving mode will now be described. By way of example, the power saving mode may be particularly applicable when the vehicle tracking unit **25** is switched to the armed mode based upon the ignition switch **65** being switched off, as previously discussed above.

As will be appreciated by those of skill in the art, the wireless communications device **44** may include a receiver **291**, and a transmitter **292** for communicating with the monitoring station **30**. As noted above, the vehicle tracking unit **25** may include the security device detection circuit **260**, and it may also include a battery sensing circuit **290** for sensing a voltage of at least one of the back-up battery **54** and the vehicle battery **61**.

Beginning at Block **300**, the controller **40** may cooperate with the battery sensing circuit **290** to determine whether a voltage of the battery supplying power to the vehicle tracing unit **25** (which could be either the vehicle battery **61** or the back-up battery **54**, for example) has fallen below a threshold, at Block **301**. In the case of the vehicle battery **61**, the threshold may advantageously be set to a voltage level required to start the vehicle (e.g., greater than about 11.5 Volts). For the back-up battery **54**, the threshold may correspond to a voltage level sufficient to allow the transmitter **292** to continue sending security and/or position signals.

If the sensed battery voltage is below the threshold, the controller **40** may then disable operation of the receiver **291**, at Block **303**. In some embodiments, the controller **40** may wait a predetermined period before disabling the operation of the receiver **291**. The controller **40** may preferably enable operation of the transmitter **292** irrespective of the sensed battery voltage (i.e., even when the sensed voltage falls below the threshold), at Block **304**, thus concluding the power saving mode (Block **305**).

As such, the controller **40** may advantageously allow the receiver **291**, which may consume a significant amount of battery power, to remain on as long as possible while preserving enough battery power to allow the vehicle **21** to be started (i.e., when the vehicle battery **61** is supplying power) and/or to allow other components of the vehicle tracking unit **25** to function properly. Accordingly, the controller **40** may still cooperate with the wireless communications device **44** to send security and/or position signals to the monitoring station **30**.

In particular, the controller **40** may enable operation of the receiver **291** based upon the sensed battery voltage being above the threshold for a predetermined duration, at Block **312**. Accordingly, if the sensed voltage only momentarily falls below the threshold, the receiver **291** will not unnec-

essarily be disabled and incoming signals potentially missed. To this end, the receiver **291** when enabled may operate substantially continuously, and the transmitter **292** when enabled may operate substantially intermittently based upon the security device detector circuit **260** to send security signals, as previously discussed above.

To provide even further power savings, the controller **40** may also enable operation of the vehicle position determining device **42** based upon the sensed battery voltage being above the threshold, at Block **313**, and disable operation of the vehicle position determining device **42** based upon the sensed battery voltage being below the threshold, at Block **310**. Again, the controller **40** may enable operation of the vehicle position determining device based upon the sensed battery voltage being above the threshold for the predetermined duration (Block **312**).

Of course, those of skill in the art will appreciate that while a single duration has been illustrative shown in FIG. **31** for clarity of illustration, separate durations (or even separate voltage thresholds) could be used for enabling the receiver **291** and the vehicle position determining device **42**. Moreover, if the vehicle tracking unit **25** includes additional components (e.g., an upgrade device, as will be discussed further below), such components may also be similarly disabled to further conserve power, as will be appreciated by those of skill in the art. It should be noted that the controller **40** may also advantageously cooperate with the wireless communications device **44** in some embodiments to send a low power message to the monitoring station **30** based upon the sensed battery voltage being below the threshold, at Block **311**. Here again, the controller **40** may delay a predetermined time before so doing in some embodiments.

Referring now to FIGS. **32** and **33**, the vehicle tracking unit **25** may also include a housing **320** for carrying the various components thereof (i.e., the vehicle position determining device **42**, the wireless communications device **44**, the controller **40**, etc.). Additionally, an upgrade connector **321** may be carried by the housing **320** and coupled to the controller **40**. As such, in accordance with another advantageous aspect of the invention, an upgrade device **322** may be removably coupled to the upgrade connector **321**, as illustratively shown in FIG. **32**, for causing the controller **40** to perform at least one vehicle function.

More particularly, the vehicle tracking unit **25** may further include one or more remote transmitters **60** to be carried by a user, and the upgrade device **322** may include a receiver **330** for causing the controller **40** to perform the at least one vehicle function based upon signals from the remote transmitter. The remote transmitter **60** may generate pseudorandomly coded signals, for example, to provide enhanced security, as will be appreciated by those of skill in the art.

Numerous vehicle functions may be performed based upon the type of upgrade device **322** that is used. By way of example, such vehicle functions may include either locking or unlocking vehicle doors via the door lock actuator **62**, remote starting the vehicle's engine via the remote start device **63**, and/or activating the alarm indicator **67**. Other vehicle functions may also be performed, as will be appreciated by those of skill in the art. Moreover, a given upgrade device **322** may provide one or more of such functions. Accordingly, a user may install the vehicle tracking unit **25** and at a later time relatively easily upgrade the vehicle tracking unit to provide such additional functionality. Furthermore, the upgrade device **322** may utilize some of the control circuitry already provided in the controller **40**, so both space and cost savings may potentially be realized.

The upgrade device **322** may be powered by the vehicle battery **61** via the upgrade connector **321**. More particularly, the vehicle tracking unit **25** may further include a voltage regulator **331** carried by the housing **320** and coupled to the vehicle battery **61**, and the upgrade device **322** may be powered by the voltage regulator via the upgrade connector **321**. More particularly, the voltage regulator **331** may provide a voltage to the upgrade device **322** that is lower than a voltage of the vehicle battery **61**.

By way of example, the vehicle battery **61** may provide about twelve Volts, while the upgrade device **322** may preferably operate off about five Volts. Of course, other voltages may also be used. Further, the back-up battery **54** may also be carried by the housing **320**, as illustratively shown in FIG. **33**, and the upgrade device **322** may be selectively powered by the back-up battery **54** via the upgrade connector **321**.

A serial communications link **332** may be used to connect the controller **40** and the upgrade device **322** via the upgrade connector **321**. In some embodiments, the upgrade device **322** may also include one or more connectors **323** to be connected to at least one vehicle device. Thus, instead of controlling the various vehicle devices via the controller **40**, the upgrade device may directly control vehicle devices via the connector **323**.

By way of example, for an alarm/keyless entry upgrade device embodiment, connectors **323** may be included for a valet switch, an LED light (or lights), shock sensors, door and hood trigger wires, and for flashing vehicle lights, as will be appreciated by those of skill in the art. In another embodiment for a remote start upgrade device, connectors **323** may be included for the car starter relays to be connected thereto, for example. Of course, other connector types known to those of skill in the art may also be used.

Another advantageous aspect of the invention will now be described with reference to FIGS. **34** and **35**. As noted above, the controller **40** may cooperate with the vehicle position determining device **42** and the wireless communications device **44** to send vehicle position information to the monitoring station **30** based upon receiving an activation signal via a communications network.

In accordance with this aspect of the invention, beginning at Block **340** the controller **40** may selectively cause the vehicle tracking unit **25** to be in a low power mode, at Block **341**, to conserve power, as discussed previously above. The controller **40** may also cooperate with the wireless communications device **44** to intermittently awaken the vehicle tracking unit **25** from the low power mode to poll the communications network (Block **342**) to thereby determine whether the activation signal has been directed to the vehicle tracking unit, at Block **343**. The polling may advantageously be relatively short (e.g., less than a minute) to reduce both power consumption and wireless communications charges.

The vehicle position information may then be sent to the monitoring station **30** one or more times, at Block **344**, as previously described above, concluding this aspect (Block **345**). As such, the monitoring station **30** need not be synchronized with the vehicle tracking unit **25** because the user does not have to send the activation during a brief window when the unit is active, as is the case with some prior art vehicle tracking units.

In particular, the controller **40** may selectively cause the vehicle tracking unit **25** to be in the low power mode based upon the vehicle's engine being off. Moreover, the controller **40** may detect the engine being off based upon the vehicle ignition switch **65** being switched to an off position. Also, the controller **40** may selectively cause the vehicle tracking unit **25** to be in the low power mode responsive to the passage of a predetermined time since the engine was turned

JURY TRIAL REQUEST

Omega requests a trial by jury as to all matters so triable.

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off, and/or responsive to a voltage of the vehicle battery **61** dropping below a threshold.

The communications network may be a cellular communications network, for example. The cellular communications network may store indications of missed calls, and the activation signal may be stored as at least one missed call by the cellular communications network, as will be appreciated by those skilled in the art. Alternately, the cellular communications network may store voice mail messages, and the activation signal may be stored as a voice mail message by the cellular communications network. Further, the cellular communications network may transmit data packets and/or voice data, as will also be appreciated by those skilled in the art.

The controller **40** may also cooperate with the wireless communications device **44** for determining when the communications network is out of range, at Block **350**, and for determining when the communications network is back in range after being out of range, at Block **351**. The communications network may then be polled as discussed above when back in range of the vehicle tracking unit **25** to determine whether the activation signal has been directed to the vehicle tracking unit while the communications network was out of range. Thus, both missed activation signals sent while the vehicle tracking unit **25** is in the low power mode and/or out of range may still be received. It should be noted that either one or both of these options may be used in various embodiments.

The communications network may also provide a notification to the monitoring station **30** upon being polled by the wireless communications device, at Block **352**. The controller **40** may also wait a predetermined time after receiving the activation signal before selectively causing the vehicle tracking unit **25** to return to the low power mode. For example, the predetermined time may be on the order of a few minutes. In addition, the wireless communications device may include a receiver **291**, as noted above, and the controller **40** may cause the receiver to be turned off when the vehicle tracking unit **25** is in the low power mode. Intervals of awakening the vehicle tracking unit **25** from the low power mode may be in a range of about 12 to 48 hours, for example, though other intervals may also be used.

In an alternate embodiment of the invention illustratively shown in FIG. **36**, the vehicle **21** may include a vehicle data bus **360** extending throughout the vehicle and which is connected to one or more operable vehicle devices. As illustratively shown, such operable vehicle devices may include the vehicle alarm indicator **67** (e.g., horn, siren, etc.), a keyless entry device, the engine starter interrupt device **66**, the remote start device **63**, the door lock actuator **62**, and the vehicle security controller **28**, although others may also be included as will be appreciated by those of skill in the art. Furthermore, other devices to be monitored, such as the ignition switch **65**, may also be connected to the vehicle data bus **360**, for example.

Furthermore, one or more of the operable vehicle devices may be responsive to at least one data bus code received on the vehicle data bus **360**. More particularly, each of the above listed operable vehicle devices may have one or more unique data bus codes assigned thereto which, when received, cause a respective operable vehicle device to perform a particular function, as will be understood by those skilled in the art.

As such, a method according to the present invention is illustratively shown in FIG. **37** in which, beginning at Block **370**, the controller **40** generates at least one data bus code on the vehicle data bus **360** to control at least one operable vehicle device based upon a command signal received by the wireless communications device **44**, at Blocks **371** and **372**. Accordingly, the user may not only use the vehicle tracking unit **25** to control numerous vehicle devices, but separate connections between such devices and the controller **40** need not be made. Instead, each of the operable vehicle devices may conveniently be connected to the vehicle data bus **360**, which may make the installation thereof easier.

In some embodiments, the command signal received by the wireless communications device **44** may include the at least one data bus code. Alternately, the command signal may relate to the at least one data bus code, and the controller **40** may process the command signal to generate the at least one data bus code on the vehicle data bus **360**, as will be understood by those skilled in the art.

Further, the command signal may be provided by the monitoring station **30**, and the controller **40** may optionally cooperate with the wireless communications device **44** to send a response message to the monitoring station based upon receiving the command signal, at Block **373**, thus ending the method (Block **374**). By way of example, the wireless communications device **44** may receive the vehicle data bus device code via a wireless pager network, although other suitable communications formats may also be used.

Another advantageous aspect of the invention if for a vehicle control system including the vehicle tracking unit **25** and a function controller, which may cooperate to alert a user that uniquely coded transmitters have been learned by the vehicle function unit, will now be described with reference to FIGS. **38** and **39**. By way of example, the function unit may be the vehicle security system **27**, and the functions performed thereby may include security and/or door locking/unlocking functions, as previously described above.

Of course, in some embodiments the function unit may be the door lock actuator **62** itself responsive to a remote transmitter **60** for performing door lock/unlock functions. Another example of a function unit is the remote start device **63** for starting the vehicle's engine, also described above. Of course, other function units may also be used, as will be appreciated by those of skill in the art. It should be noted that while the various function units noted above are illustratively shown as being separate devices from the vehicle tracking unit **25**, in some embodiments these units may be included within a single device, as will be understood by those of skill in the art. In particular, as described above, a remote start device and/or security controller may be embodied in an upgrade device **322** to be connected or plugged into the upgrade connector **321**, for example.

Using the example of the vehicle security system **27** as the function unit, as illustratively shown in FIG. **36**, the function unit may include one (or more) uniquely coded transmitter **60** to be carried by a user, and a receiver **29** at the vehicle **21** for receiving signals from the uniquely coded transmitter, at Blocks **380–381**. The function unit **27** may also include a function controller (the vehicle security controller **28** in the present example) at the vehicle **21** and connected to the receiver **29**. The function controller **28** cooperates with the receiver **29** to learn the uniquely coded transmitter **60** to permit control of one or more vehicle functions (here, security and/or door locking/unlocking functions) by the user, at Block **382**.

In accordance with this aspect of the invention, the function controller **28** may advantageously cooperate with the wireless communications device **44** of the vehicle tracking unit **25** for sending an alert indication of whether one or more new uniquely coded transmitters have been learned, at Block **383**, thus concluding the method (Block **384**).

Accordingly, if the uniquely coded transmitter **60** learned by the function controller **28** is an unauthorized transmitter, such as one a would-be thief may use to attempt to gain access to the vehicle **21**, the user will advantageously be notified of this fact and may alert the proper authorities.

The vehicle control system may further include a local indicator (a vehicle security system indicator **361** in the illustrated example of FIG. **36**) connected to the function controller **28** for providing a local indication of whether one or more uniquely coded transmitters **60** have been learned. Thus, if the user for some reason does not receive the alert indication to this effect, he will still be notified of this fact upon returning to the vehicle **21**.

In addition, the function controller **28** may be switchable to a learning mode to permit learning of the at least one uniquely coded transmitter, at Block **390**, and the function controller may cooperate with the wireless communications device **44** for sending the alert indication when the learning mode has been entered, for example, as may be seen in FIG. **39**. Moreover, the function controller **28** may cooperate with the wireless communications device **44** for sending the alert indication when the learning mode has last been entered.

Additionally, the function controller **28** may cooperate with the wireless communications device **44** for sending the alert indication for a passage of time since the learning mode has last been entered, at Block **391**. Similarly, the function controller **28** may cooperate with the wireless communications device **44** for sending the alert indication for a number of learned uniquely coded transmitters, as well as for sending the alert indication for a change in a number of learned uniquely coded transmitters **60**, and/or for sending the alert indication for a change in a code of at least one learned uniquely coded transmitter. The uniquely coded transmitter (s) **60** may be at least one of a uniquely coded remote transmitter and a uniquely coded transponder transmitter, for example, as will be appreciated by those skilled in the art.

In accordance with a similar aspect of the invention, the function unit **28** may instead of, or in addition to, the uniquely coded transmitter **60** also include a biometric characteristic sensor **362** for sensing a unique biometric characteristic of a user, at Block **401**. In this embodiment, the function controller **28** may similarly learn the unique biometric characteristic, at Block **402**, to permit control of a vehicle function by the user.

Again, the function controller **28** may cooperate with the wireless communications device **44** for sending (Block **403**) an alert indication of whether at least one new unique biometric characteristic has been learned, thus concluding the method (Block **404**). Of course, the learning mode, time-delayed sending, and location indication steps described above may similarly be performed with respect to learning biometric characteristics, as illustratively shown at Blocks **410–412**, respectively.

Turning now to FIGS. **42** and **43**, another advantageous aspect of the invention for determining fault conditions of the vehicle tracking unit **25** will now be described. More particularly, beginning at Block **420**, the controller **40** may monitor operation of the vehicle **21** and determine a fault condition of at least one of the vehicle position determining device **42** and the wireless communications device **44** based upon a failure thereof over a predetermined pattern of vehicle operation, at Blocks **422–423**. By way of example, the fault condition may be based upon a received signal strength, although other faults may also be indicated.

Moreover, the controller **40** may also store the fault condition, at Block **424**, and permit retrieval of the stored fault condition, at Block **425**, thus concluding the fault sensing operation (Block **426**). In particular, the controller **40** may monitor the operation of the vehicle **21** by monitoring the vehicle's ignition (e.g., via the ignition switch **65**), for example, to determine whether the ignition has been operational for greater than a time threshold (e.g., fifteen minutes), at Block **430**. Thus, occurrences of determining momentary operational errors (e.g., failure of the wireless communications device **44** to communicate with a communications network due to interference) as significant fault conditions may be reduced.

The predetermined pattern of vehicle operation may include a series of successive operations of the ignition. That is, a predetermined number of faults (e.g., two) will need to occur, at Block **428**, before the local fault indication is provided (Block **431**). Here again, this also helps to increase the likelihood that only a true fault condition will result in a fault indication being provided.

Further, if, at any time after the fault condition has been determined but before the fault indication is provided, the fault condition is corrected (e.g., the wireless communications device **44** comes back in range of a communications network after being out of range for an extended period), at Block **427**, the controller **40** may determine that the device in question is in fact working. In such event, the fault count may be reset, at Block **429**, and the fault monitoring process may begin again.

The controller **40** may permit user retrieval of the stored fault condition based upon selective operation of the ignition switch and/or remotely by the monitoring station **30** upon request. Regarding the former, an indicator **363** (FIG. **36**) may also be connected to the controller **40** to provide a local fault indication based upon retrieval of the stored fault condition. By way of example, the indicator **363** may include at least one of an audible and a visual indicator, such as a tone generator or an LED. Of course, one or more of the other indicators noted above may also be used for this purpose.

It should be noted that the controller **40** may determine and store fault conditions of one or both the vehicle position determining device **42** and the wireless communications device **44** in various embodiments. Similarly, the local fault indication may correspond to either the vehicle position determining device **42**, the wireless communications device **44**, or both.

In accordance with another aspect of the invention described now with reference to FIGS. **44** and **45**, beginning at Block **440** the controller **40** may also monitor the vehicle alarm indicator **67** to determine triggering thereof, at Block **441**, and monitor at least one power supply to determine a change therein, at Block **442**. More particularly, the at least one power supply may be the vehicle battery **61** or the back-up battery **54**. By way of example, the controller may monitor the vehicle battery **61**/back-up battery **54** via the battery sensing circuit **290** (FIG. **29**), which may be connected to one or both of these batteries. Further, the controller **40** in cooperation with the wireless communications device **44** may cause at least one alert to be sent to the monitoring station **30** based upon both triggering of the vehicle alarm indicator **67** and a change in the at least one power supply, at Block **443**, to conclude notification to the user (Block **444**).

More particularly, the at least one alert may include a first alert (Block **451**) based upon the alarm indicator **67** being triggered, and a second alert (Block **452**) based upon the voltage of the at least one power supply (e.g., the vehicle battery **61**) being below a threshold, as illustratively shown in FIG. **45**. By way of example, the threshold may be less

than about 4 Volts, although other thresholds may also be used. To this end, the vehicle tracking unit **25** in such embodiments will preferably include the back-up battery **54** for providing back-up power to the controller **40** and the wireless communications device **44** upon such a drop in voltage of the vehicle battery **61**.

Accordingly, the vehicle tracking unit **25** of the present invention will advantageously send the second alert even if the first alert is not sent. For example, in some embodiments the controller **40** may monitor the vehicle alarm indicator **67** to determine triggering thereof continuously for greater than a predetermined time (e.g., a few seconds), at Block **450**, before sending the first alert, at Block **451**. This may be done to allow a user time to deactivate an errantly generated alarm condition before the first alert is sent and wireless communications charges unnecessarily incurred.

Yet, because of this delay period, a would-be thief could potentially cut the battery cable quickly enough to prevent the first alert from ever being sent. Nonetheless, by so doing, in accordance with the present invention the second alert will still be sent, and the user will therefore still be notified of the attempted theft of the vehicle **21**. It should be noted that the controller **40** may also monitor the vehicle alarm indicator **67** to determine triggering in a repetitive pattern (Block **450**), either in addition to or instead of monitoring for continuous triggering for a predetermined time, before sending the first alert. Further, instead of monitoring the vehicle battery **61** for a drop in voltage provided thereby to determine that the battery cables have been cut, this could also be done based upon detecting a sudden power drain on the back-up battery **54**, which would also provide an indication that the cables to the vehicle battery had be severed.

Turning now to FIGS. **46** and **47**, an additional aspect of the invention will now be described for performing diagnostics of output driver circuits (i.e., the outputs **53** described above) for various vehicle devices and, correspondingly, whether the CPU **50** is providing correct output signals thereto. In accordance with this aspect of the invention, beginning at Block **461** the controller **40** may be switchable to a diagnostic mode, at Block **461**, wherein at least one output driver circuit **53** is tested, at Block **462**. Results of the testing may be indicated by one or more local diagnostic indicators, at Block **463**, such as the previously noted indicators **363**, **43**, **45**, for example, concluding the diagnostic operations (Block **464**).

More particularly, the input device **170** (e.g., a switch) and/or a diagnostic signal received from the monitoring station **30** via the controller **40** and the wireless communications device **44** may be used for switching the controller to the diagnostic mode, at Block **470**. In some embodiments, the controller **40** when in the diagnostic mode may determine whether each driver circuit **53** is connected to respective vehicle devices, at Block **471**, to define one or more respective connected output driver circuits **53**. Thus, the controller **40**, when in the diagnostic mode, may advantageously test only the output driver circuit or circuits **53** which are connected, if desired. Of course, this need not be the case, and it will be appreciated by those skilled in the art that the output driver circuits **53** may advantageously be tested without being connected, so that the vehicle tracking unit **25** of the present invention can be tested prior to installation, for example.

By way of example, the controller **40** when in the diagnostic mode may sequentially test a plurality (or all) of the output driver circuits **53** (Block **472**). Thus, by knowing which output driver circuits **53** will be tested in the diagnostic mode (e.g., which ones are connected to vehicle devices), the user may relatively easily determine which of the output driver circuits, if any, are not functioning correctly when a corresponding indication is not provided in the sequence of indications, as will be understood by those of skill in the art.

As illustratively shown in FIGS. **46** and **47**, the controller **40** may cooperate with the diagnostic indicator(s) **363**, for example, so that it is only operable when the controller is in the diagnostic mode. This feature may be particularly beneficial when an output driver circuit **53** is connected to a particular vehicle device, as the local diagnostic indicator **363** may otherwise provide an unwanted indication each time the vehicle device is activated during normal use, as will be appreciated by those of skill in the art.

As noted above, the local diagnostic indicator **363** may include an audible indicator and/or a visual indicator. In some embodiments, a respective diagnostic indicator **363** may be included for each output driver circuit **53**, although this is not required. The controller **40** may also cooperate with the wireless communications device **44** to send test result indications to the monitoring station **30**, at Block **473**. As such, the user and/or a monitoring service may remotely determine whether the vehicle tracking unit **25** is functioning correctly.

Other features relating to vehicle tracking units and systems are disclosed in co-pending patent applications entitled VEHICLE TRACKER CONSERVING CODES AND RELATED METHODS, application Ser. No. 09/859,673; VEHICLE TRACKER WITH POWER SAVING FEATURES AND RELATED METHODS, application Ser. No. 09/859,728; VEHICLE TRACKER COOPERATING WITH A STARTER INTERRUPT AND RELATED METHODS, application Ser. No. 09/859,973; VEHICLE TRACKER WITH USER NOTIFICATIONS AND ASSOCIATED METHODS, application Ser. No. 09/859,733; VEHICLE TRACKER WITH USER REGISTRATION REMINDER AND RELATED METHODS, application Ser. No. 09/859,971; VEHICLE TRACKER INCLUDING INPUT/OUTPUT FEATURES AND RELATED METHODS, application Ser. No. 09/859,972; and VEHICLE TRACKER WITH TEST FEATURES AND RELATED METHODS, application Ser. No. 09/859,729; VEHICLE TRACKING UNIT PROVIDING DIRECTION DEVIATION TRACKING AND RELATED METHODS, attorney docket no. 58113; VEHICLE TRACKER HAVING SWITCAHABLE POLARITY OUTPUT TERMINALS AND RELATED METHODS, attorney docket no. 58114; VEHICLE TRACKING OUT PROVIDING VARIABLE FREQUENCY TRANSMISSION AND RELATED METHODS, attorney docket no. 58115; VEHICLE TRACKER HAVING FIND ALERT FEATURES AND RELATED METHODS, attorney docket no. 58116; VEHICLE TRACKER PROVIDING VEHICLE ALARM ALERT FEATURES AND RELATED METHODS, attorney docket no. 58117; VEHICLE TRACKER INCLUDING OVERRIDE FEATURE AND RELATED METHODS, attorney docket no. 58118; VEHICLE TRACKER INCLUDING SECURITY DEVICE MONITORING BYPASS FEATURE AND RELATED METHODS, attorney docket no. 58119; VEHICLE TRACKER INCLUDING BATTERY MONITORING FEATURE AND RELATED METHODS, attorney docket no. 58120; VEHICLE TRACKER INCLUDING A CONNECTOR FOR AN UPGRADE DEVICE AND RELATED METHODS, attorney docket no. 58125; VEHICLE TRACKER INCLUDING MISSED CALL FEATURE AND RELATED METHODS, attorney docket no. 58126; VEHICLE TRACKING UNIT

FOR CONTROLING OPERABLE VEHICLE DEVICES USING A VEHICLE DATA BUS AND RELATED METHODS, attorney docket no. 58127; VEHICLE CONTROL SYSTEM FOR CONTROLLING A VEHICLE FUNCTION INCLUDING A VEHICLE TRACKING UNIT AND RELATED METHODS, attorney docket no. 58135; VEHICLE TRACKING UNIT WITH FAULT CONDITION DIAGNOSIS AND RELATED METHODS, attorney docket no. 58138; VEHICLE TRACKING UNIT PROVIDING THEFT ALERT NOTIFICATIONS AND RELATED METHODS, attorney docket no. 58139; and VEHICLE TRACKING UNIT HAVING A SELF DIAGNOSTIC MODE AND RELATED METHODS, attorney docket no. 58140, the entire disclosures of which are hereby 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. Therefore, it is understood that the invention is not to be limited to the specific embodiments disclosed, and that modifications and embodiments are intended to be included within the scope of the appended claims.

That which is claimed is:

1. A tracking unit for a vehicle comprising:

a vehicle position determining device;

a wireless communications device;

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, said controller storing a user selected reference location; and

at least one input device to be positioned within the vehicle for setting the user selected reference location;

said controller sending the vehicle position information based upon the vehicle moving beyond a radial threshold distance from the user selected reference location.

2. The vehicle tracking unit according to claim **1** wherein the radial threshold distance is less than about five miles.

3. The vehicle tracking unit according to claim **1** wherein the vehicle position information is sent a threshold time after the vehicle moves beyond the radial threshold distance from the user selected reference location if the vehicle has not moved back within the radial threshold distance; and wherein said at least one input device also permits user setting of the threshold time, and the threshold time is set by at least one of said monitoring station and said at least one input device.

4. The vehicle tracking unit according to claim **3** wherein the threshold time is less than about thirty minutes.

5. The vehicle tracking unit according to claim **1** wherein said at least one input device comprises at least one of a switch, a keyboard, and a keypad.

6. The vehicle tracking unit according to claim **1** wherein said controller comprises at least one memory for storing the user selected reference location and vehicle position information therein.

7. The vehicle tracking unit according to claim **1** wherein said at least one input device cooperates with said vehicle position determining device and said controller to set a current vehicle position as the user selected reference location.

8. The vehicle tracking unit according to claim **1** wherein said controller also sets the user selected reference location based upon at least one signal provided by the monitoring station.

9. The vehicle tracking unit according to claim **8** wherein said controller cooperates with said vehicle position determining device to set a current vehicle position as the user selected reference location based upon the at least one signal provided by the monitoring station.

10. The vehicle tracking unit according to claim **8** wherein the at least one signal includes the user selected reference location.

11. The vehicle tracking unit according to claim **1** wherein said vehicle position determining device comprises a Global Positioning System (GPS) device.

12. A tracking unit for a vehicle comprising:

a vehicle position determining device, a wireless communications 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;

said controller storing a user selected reference location;

said controller also sending the vehicle position information a threshold time after the vehicle moves beyond a radial threshold distance from the user selected reference location if the vehicle has not moved back within the radial threshold distance.

13. The vehicle tracking unit according to claim **12** wherein the radial threshold distance is less than about five miles.

14. The vehicle tracking unit according to claim **12** wherein the threshold time is less than about thirty minutes.

15. The vehicle tracking unit according to claim **12** wherein the vehicle tracking unit further comprises at least one input device to be positioned within the vehicle for permitting user setting of the threshold time.

16. The vehicle tracking unit according to claim **15** wherein said at least one input device comprises at least one of a switch, a keyboard, and a keypad.

17. The vehicle tracking unit according to claim **12** wherein the threshold time is set by the monitoring station.

18. The vehicle tracking unit according to claim **12** wherein said controller comprises at least one memory for storing the user selected reference location and vehicle position information therein.

19. The vehicle tracking unit according to claim **12** wherein said controller sets the user selected reference location based upon at least one signal provided by the monitoring station.

20. The vehicle tracking unit according to claim **19** wherein said controller cooperates with said vehicle position determining device to set a current vehicle position as the user selected reference location based upon the at least one signal provided by the monitoring station.

21. The vehicle tracking unit according to claim **19** wherein the at least one signal includes the user selected reference location.

22. The vehicle tracking unit according to claim **12** wherein said vehicle position determining device comprises a Global Positioning System (GPS) device.

23. A tracking unit for a vehicle comprising:

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;

said 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.

24. The vehicle tracking unit according to claim **23** wherein the radial threshold distance is less than about five miles.

25. The vehicle tracking unit according to claim **23** wherein the vehicle position information is sent a threshold time after the vehicle moves beyond the radial threshold distance from the user selected reference location if the vehicle has not moved back within the radial threshold distance; and further comprising at least one input device to be positioned within the vehicle for setting the user selected reference location.

26. The vehicle tracking unit according to claim **25** wherein the threshold time is less than about thirty minutes.

27. The vehicle tracking unit according to claim **25** wherein said at least one input device also permits user setting of the threshold time.

28. The vehicle tracking unit according to claim **25** wherein said at least one input device comprises at least one of a switch, a keyboard, and a keypad.

29. The vehicle tracking unit according to claim **25** wherein the threshold time is set by the monitoring station.

30. The vehicle tracking unit according to claim **25** wherein said at least one input device cooperates with said vehicle position determining device and said controller to set a current vehicle position as the user selected reference location.

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.

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.

33. The vehicle tracking unit according to claim **32** wherein said controller cooperates with said vehicle position determining device to set a current vehicle position as the user selected reference location based upon the at least one signal provided by the monitoring station.

34. The vehicle tracking unit according to claim **32** wherein the at least one signal includes 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.

36. A method for tracking a vehicle using a vehicle tracking unit to be carried by the vehicle, the method comprising:

storing a user selected reference location for the vehicle tracking unit;

determining vehicle position information using the vehicle tracking unit; and

sending vehicle position information from the vehicle tracking unit to a monitoring station based upon the vehicle moving beyond a radial threshold distance from the user selected reference location.

37. The method according to claim **36** wherein the radial threshold distance is less than about five miles.

38. The method according to claim **36** wherein sending comprises sending vehicle position information a threshold time after the vehicle moves beyond the radial threshold distance from the user selected reference location if the vehicle has not moved back within the radial threshold distance.

39. The method according to claim **38** wherein the threshold time is less than about thirty minutes.

40. The method according to claim **38** further comprising setting the threshold time using at least one input device positioned within the vehicle.

41. The method according to claim **40** wherein the at least one input device comprises at least one of a switch, a keyboard, and a keypad.

42. The method according to claim **38** further comprising receiving a signal from the monitoring station and setting the threshold time based thereon.

43. The method according to claim **36** further comprising setting the user selected reference location based upon at least one input device positioned within the vehicle.

44. The method according to claim **43** wherein setting further comprises setting a current vehicle position as the user selected reference location based upon the at least one input device.

45. The method according to claim **44** wherein the at least one input device comprises at least one of a switch, a keyboard, and a keypad.

46. The method according to claim **36** further comprising setting the user selected reference location based upon at least one signal provided by the monitoring station.

47. The method according to claim **46** wherein setting further comprises setting a current vehicle position as the user selected reference location based upon the at least one signal provided by the monitoring station.

48. The method according to claim **46** wherein the at least one signal includes the user selected reference location.

* * * * *

EXHIBIT D

US006756885B1

(12) **United States Patent**
Flick

(10) **Patent No.: US 6,756,885 B1**
(45) **Date of Patent: Jun. 29, 2004**

(54) **MULTI-VEHICLE COMPATIBLE CONTROL SYSTEM FOR READING FROM A DATA BUS AND ASSOCIATED METHODS**

(75) Inventor: **Kenneth E. Flick**, Douglasville, GA (US)

(73) Assignee: **Omega Patents, L.L.C.**, Douglasville, GA (US)

(*) Notice: Subject to any disclaimer, the term of this patent is extended or adjusted under 35 U.S.C. 154(b) bydays.days.

(21) Appl. No.: **09/583,257**

(22) Filed: **May 31, 2000**

Related U.S. Application Data

(63) Continuation-in-part of application No. 09/382,245, filed on Aug. 25, 1999, now Pat. No. 6,275,147, which is a continuation of application No. 09/023,838, filed on Feb. 13, 1998, now Pat. No. 6,011,460, which is a continuation-in-part of application No. 08/701,356, filed on Aug. 22, 1996, now Pat. No. 5,719,551.

(51) **Int. Cl.**[7] **B60R 25/10**

(52) **U.S. Cl.** **340/426.1**; 340/426.13; 340/426.14; 340/426.17; 307/10.3; 307/10.6; 180/287

(58) **Field of Search** 340/426.1, 425.5, 340/439, 825.36, 825.37, 825.69, 426.13, 426.14, 426.16, 426.17; 307/10.2, 10.3, 10.4, 10.5, 10.6; 180/167, 287

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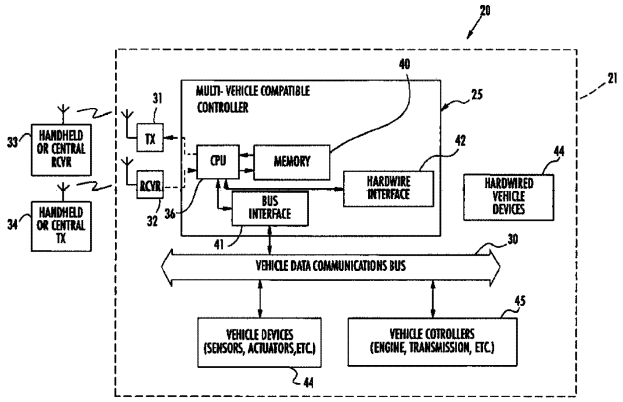
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Primary Examiner—Toan N. Pham
(74) *Attorney, Agent, or Firm*—Allen, Dyer, Doppelt, Milbrath & Gilchrist, P.A.

(57) **ABSTRACT**

A control system includes a transmitter, a receiver for receiving signals from the transmitter, and a multi-vehicle compatible controller cooperating with the transmitter and receiver. 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 a 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. Such an arrangement provides for a relatively simple and straightforward approach to interface with a vehicle having a data communications bus. The multi-vehicle compatible controller may include a memory for the stored device codes, and a processor cooperating with the memory for determining the match between the read device code and the stored device codes. The approach is useful for a number of vehicle remote control functions including vehicle security, remote keyless entry and remote starting. The multi-vehicle compatibility concept is also extended to an adaptor device which can be used in combination with a conventional remote function controller.

44 Claims, 8 Drawing Sheets



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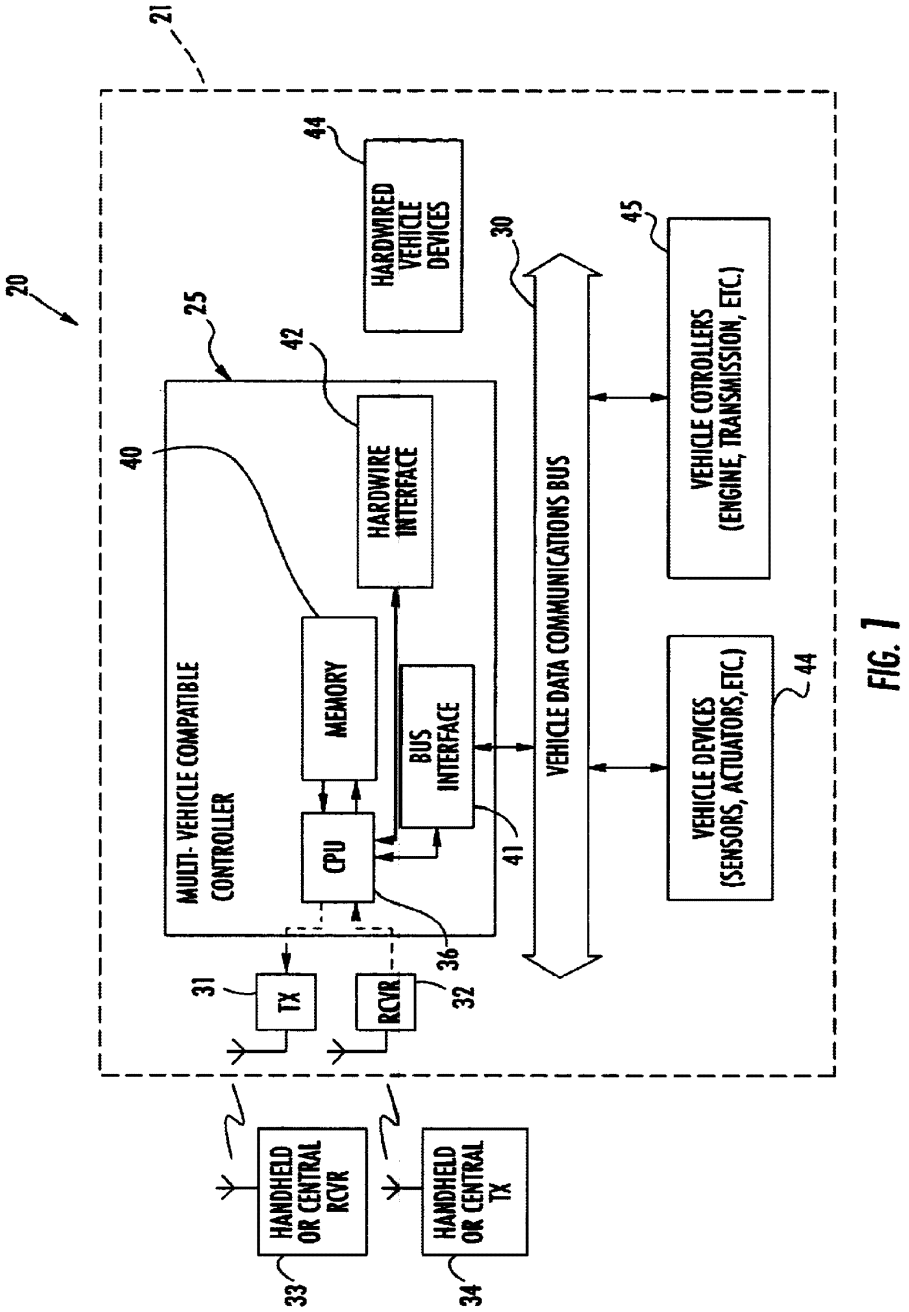


FIG. 1

Ex. 1002 - Page 165

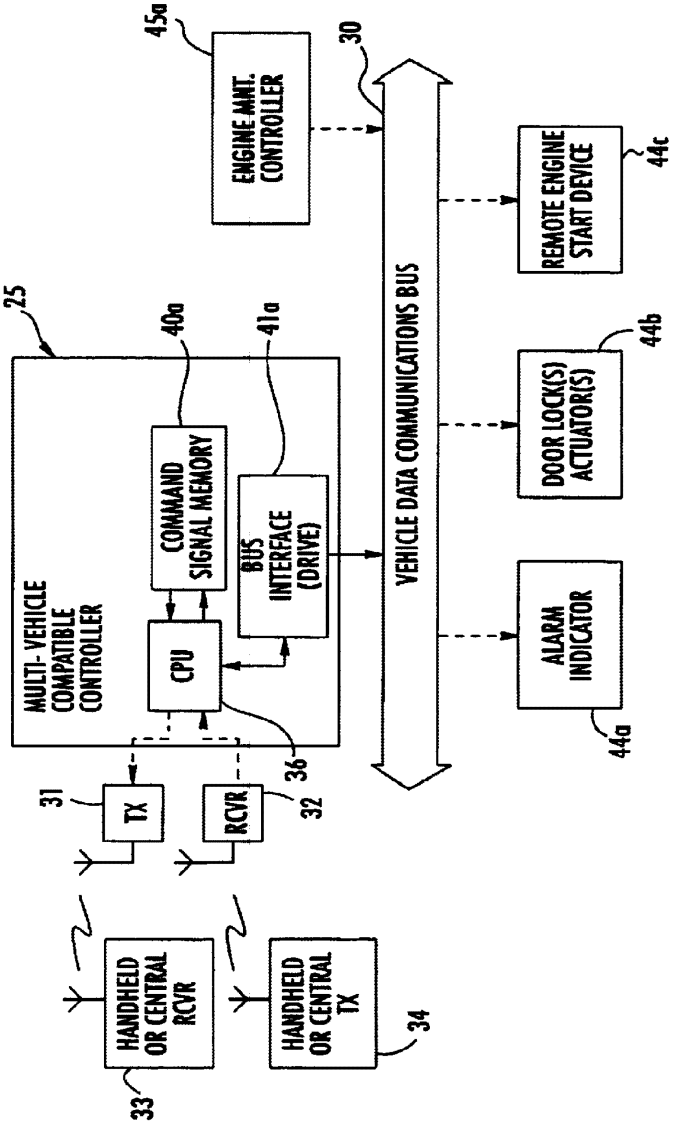


FIG. 2

Ex. 1002 - Page 166

AO 120 (Rev. 08/10)

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DOCKET NO.	DATE FILED	U.S. DISTRICT COURT
1:13-cv-646-TWT	2/28/2013	Northern District of Georgia

PLAINTIFF	DEFENDANT
Omega Patents, LLC	Enfora, Inc.

	PATENT OR TRADEMARK NO.	DATE OF PATENT OR TRADEMARK	HOLDER OF PATENT OR TRADEMARK
1	US 6,346,876 B1	2/12/2002	Kenneth E. Flick
2	US 7,671,727 B2	3/2/2010	Omega Patents, LLC
3	US 8,032,278 B2	10/4/2011	Omega Patents, LLC
4	US 8,362,886 B2	1/29/2013	Omega Patents, LLC
5			

In the above—entitled case, the following patent(s)/ trademark(s) have been included:

DATE INCLUDED	INCLUDED BY ☐ Amendment ☐ Answer ☐ Cross Bill ☐ Other Pleading	
PATENT OR TRADEMARK NO.	DATE OF PATENT OR TRADEMARK	HOLDER OF PATENT OR TRADEMARK
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DECISION/JUDGEMENT
Notice of Voluntary Dismissal Without Prejudice

CLERK	(BY) DEPUTY CLERK	DATE
James N. Hatten	s/D.Richardson	6/20/2013

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APPLICATION NO.	ISSUE DATE	PATENT NO.	ATTORNEY DOCKET NO.	CONFIRMATION NO.
11/773,272	10/04/2011	8032278	58106CIP1	1046

7590 09/14/2011

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Orlando, FL 32802-3791

ISSUE NOTIFICATION

The projected patent number and issue date are specified above.

Determination of Patent Term Adjustment under 35 U.S.C. 154 (b)
(application filed on or after May 29, 2000)

The Patent Term Adjustment is 840 day(s). Any patent to issue from the above-identified application will include an indication of the adjustment on the front page.

If a Continued Prosecution Application (CPA) was filed in the above-identified application, the filing date that determines Patent Term Adjustment is the filing date of the most recent CPA.

Applicant will be able to obtain more detailed information by accessing the Patent Application Information Retrieval (PAIR) WEB site (http://pair.uspto.gov).

Any questions regarding the Patent Term Extension or Adjustment determination should be directed to the Office of Patent Legal Administration at (571)-272-7702. Questions relating to issue and publication fee payments should be directed to the Application Assistance Unit (AAU) of the Office of Data Management (ODM) at (571)-272-4200.

APPLICANT(s) (Please see PAIR WEB site http://pair.uspto.gov for additional applicants):

Kenneth E. Flick, Douglasville, GA;

SUBSTITUTE FORM PTO-1449A LIST OF PATENTS AND APPLICANT'S INFORMATION DISCLOSURE STATEMENT	Atty Docket:	58106CIP1
	Serial No.:	Not Yet Assigned
	Applicant:	FLICK
	Filing Date:	Herewith
	Group:	

U.S. PATENT DOCUMENTS

Examiner Initials		Document Number	Date	Name	Class	Sub Class	Filing Date
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EXAMINER: /Cuong Nguyen/ (12/21/2009)	DATE CONSIDERED:

*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.

PART B - FEE(S) TRANSMITTAL

Complete and send this form, together with applicable fee(s), to: Mail **Mail Stop ISSUE FEE**
Commissioner for Patents
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INSTRUCTIONS: This form should be used for transmitting the ISSUE FEE and PUBLICATION FEE (if required). Blocks 1 through 5 should be completed where appropriate. All further correspondence including the Patent, advance orders and notification of maintenance fees will be mailed to the current correspondence address as indicated unless corrected below or directed otherwise in Block 1, by (a) specifying a new correspondence address; and/or (b) indicating a separate "FEE ADDRESS" for maintenance fee notifications.

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7590 06/28/2011
CHRISTOPHER F. REGAN, ESQUIRE
ALLEN, DYER, DOPPELT, MILBRATH & GILCHRIST, P.A.
P.O. Box 3791
Orlando, FL 32802-3791

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(Depositor's name)
EFILED (Signature)
(Date)

APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
11/773,272	07/03/2007	Kenneth E. Flick	58106CIP1	1046

TITLE OF INVENTION: VEHICLE TRACKING UNIT WITH DOWNLOADABLE CODES AND ASSOCIATED METHODS

APPLN. TYPE	SMALL ENTITY	ISSUE FEE DUE	PUBLICATION FEE DUE	PREV. PAID ISSUE FEE	TOTAL FEE(S) DUE	DATE DUE
nonprovisional	NO	$1510	$300	$0	$1810	09/28/2011

EXAMINER	ART UNIT	CLASS-SUBCLASS
NGUYEN, CUONG H	3661	701-036000

1. Change of correspondence address or indication of "Fee Address" (37 CFR 1.363).
- ☐ Change of correspondence address (or Change of Correspondence Address form PTO/SB/122) attached.
- ☐ "Fee Address" indication (or "Fee Address" Indication form PTO/SB/47; Rev 03-02 or more recent) attached. **Use of a Customer Number is required.**

2. For printing on the patent front page, list
(1) the names of up to 3 registered patent attorneys or agents OR, alternatively,
(2) the name of a single firm (having as a member a registered attorney or agent) and the names of up to 2 registered patent attorneys or agents. If no name is listed, no name will be printed.

1 ALLEN, DYER, DOPPELT, MILBRATH & GILCHRIST, P.A.
2 Attorneys at Law 255 S. Orange Ave., Ste.1401
3 PO Box 3791 Orlando, FL 32802-3791

3. ASSIGNEE NAME AND RESIDENCE DATA TO BE PRINTED ON THE PATENT (print or type)

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(A) NAME OF ASSIGNEE: OMEGA PATENTS, L.L.C.
(B) RESIDENCE: (CITY and STATE OR COUNTRY): DOUGLASVILLE, GEORGIA

Please check the appropriate assignee category or categories (will not be printed on the patent) : ☐ Individual ☒ Corporation or other private group entity ☐ Government

4a. The following fee(s) are submitted:
- ☒ Issue Fee
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5. **Change in Entity Status** (from status indicated above)
- ☐ a. Applicant claims SMALL ENTITY status. See 37 CFR 1.27.
- ☐ b. Applicant is no longer claiming SMALL ENTITY status. See 37 CFR 1.27(g)(2).

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Authorized Signature /CHRISTOPHER F. REGAN/ Date August 31, 2011

Typed or printed name Christopher F. Regan Registration No. 34,906

This collection of information is required by 37 CFR 1.311. 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 12 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, Virginia 22313-1450. DO NOT SEND FEES OR COMPLETED FORMS TO THIS ADDRESS. SEND TO: Commissioner for Patents, P.O. Box 1450, Alexandria, Virginia 22313-1450.

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Electronic Patent Application Fee Transmittal

Application Number:	11773272
Filing Date:	03-Jul-2007
Title of Invention:	VEHICLE TRACKING UNIT WITH DOWNLOADABLE CODES AND ASSOCIATED METHODS
First Named Inventor/Applicant Name:	Kenneth E. Flick
Filer:	Christopher F. Regan/joellen murphy
Attorney Docket Number:	58106CIP1

Filed as Large Entity

Utility under 35 USC 111(a) Filing Fees

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:				
Utility Appl issue fee	1501	1	1510	1510
Publ. Fee- early, voluntary, or normal	1504	1	300	300

Description	Fee Code	Quantity	Amount	Sub-Total in USD($)
Extension-of-Time:				
Miscellaneous:				
		Total in USD ($)		**1810**

Electronic Acknowledgement Receipt	
EFS ID:	10849827
Application Number:	11773272
International Application Number:	
Confirmation Number:	1046
Title of Invention:	VEHICLE TRACKING UNIT WITH DOWNLOADABLE CODES AND ASSOCIATED METHODS
First Named Inventor/Applicant Name:	Kenneth E. Flick
Correspondence Address:	CHRISTOPHER F. REGAN, ESQUIRE ALLEN, DYER, DOPPELT, MILBRATH & GILCHRIST, P.A. P.O. Box 3791 - Orlando FL 32802-3791 US 4078412330 -
Filer:	Christopher F. Regan/joellen murphy
Filer Authorized By:	Christopher F. Regan
Attorney Docket Number:	58106CIP1
Receipt Date:	31-AUG-2011
Filing Date:	03-JUL-2007
Time Stamp:	11:06:50
Application Type:	Utility under 35 USC 111(a)

Payment information:

Submitted with Payment	yes
Payment Type	Credit Card
Payment was successfully received in RAM	$1810

RAM confirmation Number	9160
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Authorized User	REGAN,CHRISTOPHER F.

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File Listing:

Document Number	Document Description	File Name	File Size(Bytes)/ Message Digest	Multi Part /.zip	Pages (if appl.)
1	Issue Fee Payment (PTO-85B)	58106CIP1_IF.pdf	112434 a28f435129f21d8da1a60598b8518c758679323e	no	1
Warnings:					
Information:					
2	Fee Worksheet (SB06)	fee-info.pdf	32337 f5dc4543f3f7d6a6b9097dccb6d3a352b812bc24	no	2
Warnings:					
Information:					
		Total Files Size (in bytes):	144771		

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<u>National Stage of an International Application under 35 U.S.C. 371</u>
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.

<u>New International Application Filed with the USPTO as a Receiving Office</u>
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IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

In re Patent Application of: **FLICK**	)	Atty. Docket No. **58106CIP1**
Serial No. **11/773,272**	)	
Filing Date: **07/03/2007**	)	Art Unit: **3661**
Confirmation No. **1046**	)	Examiner: **CUONG H. NGUYEN**
For: **VEHICLE TRACKING UNIT WITH DOWNLOADABLE CODES AND ASSOCIATED METHODS**	)	

TRANSMITTAL OF REPLACEMENT DRAWINGS

EFILED
Commissioner of Patents

Sir:

Per the Examiner's request submitted with the Notice of Allowance mailed on June 28, 2011, attached are thirteen (13) sheets of replacement drawings previously filed in the above-identified patent application on August 10, 2007.

Respectfully submitted,

/CHRISTOPHER F. REGAN/
CHRISTOPHER F. REGAN
Reg. No. 34,906

Customer No.: 27975

Telephone: (407) 841-2330 DATE: July 27, 2011

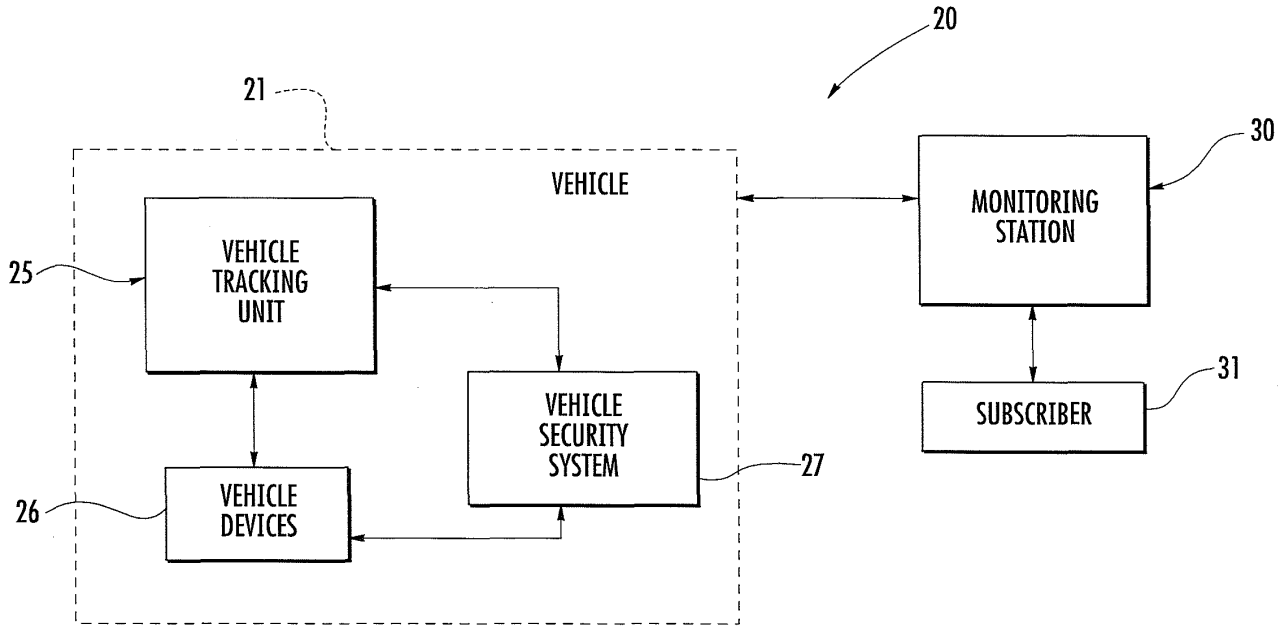


FIG. 1

REPLACEMENT SHEET

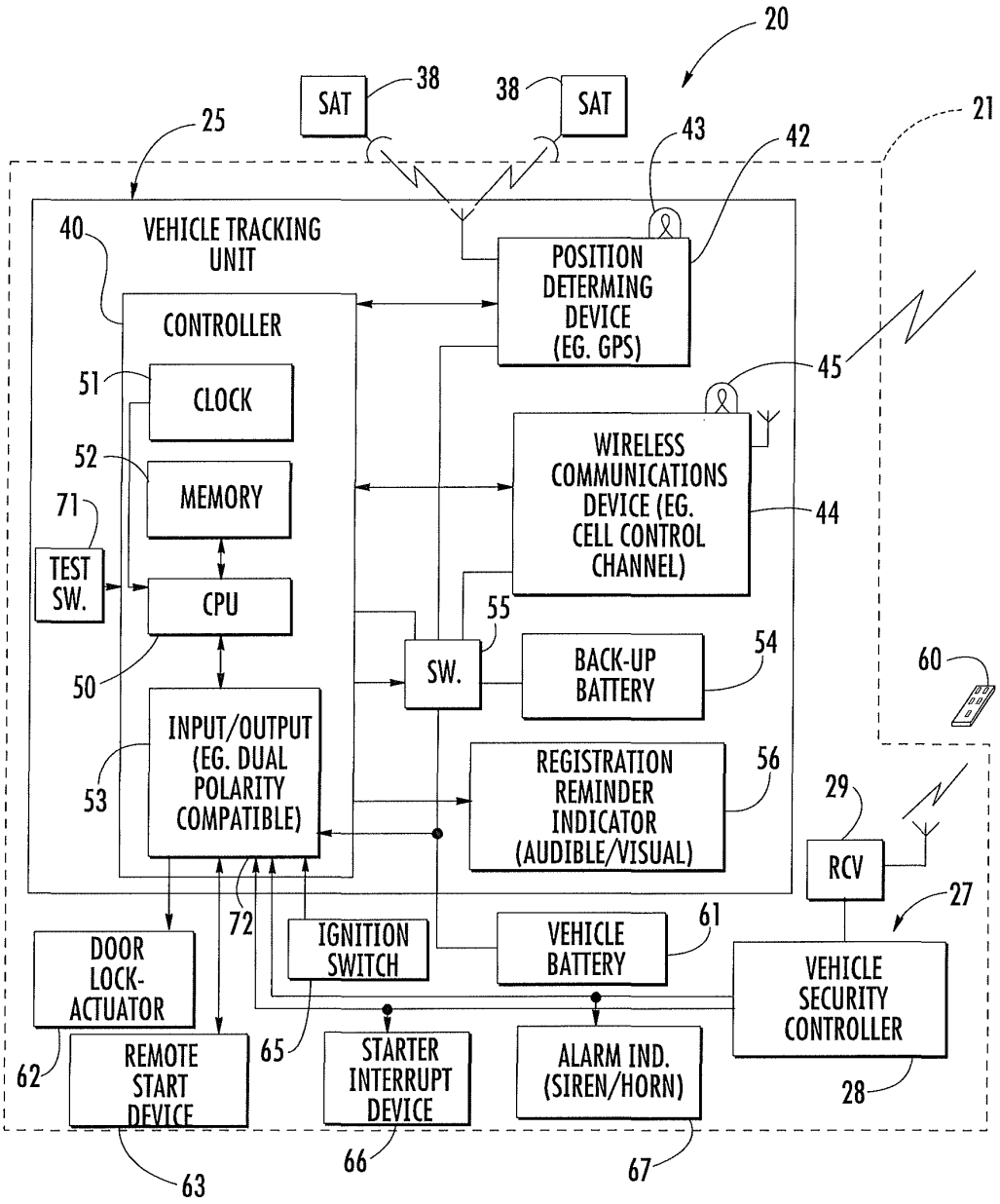

20
SAT
38
38
SAT
25
21
43
42
40
VEHICLE TRACKING UNIT
POSITION DETERMING DEVICE (EG. GPS)
CONTROLLER
45
51
CLOCK
52
MEMORY
WIRELESS COMMUNICATIONS DEVICE (EG. CELL CONTROL CHANNEL)
44
71
TEST SW.
CPU
55
SW.
BACK-UP BATTERY
54
60
50
INPUT/OUTPUT (EG. DUAL POLARITY COMPATIBLE)
53
REGISTRATION REMINDER 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

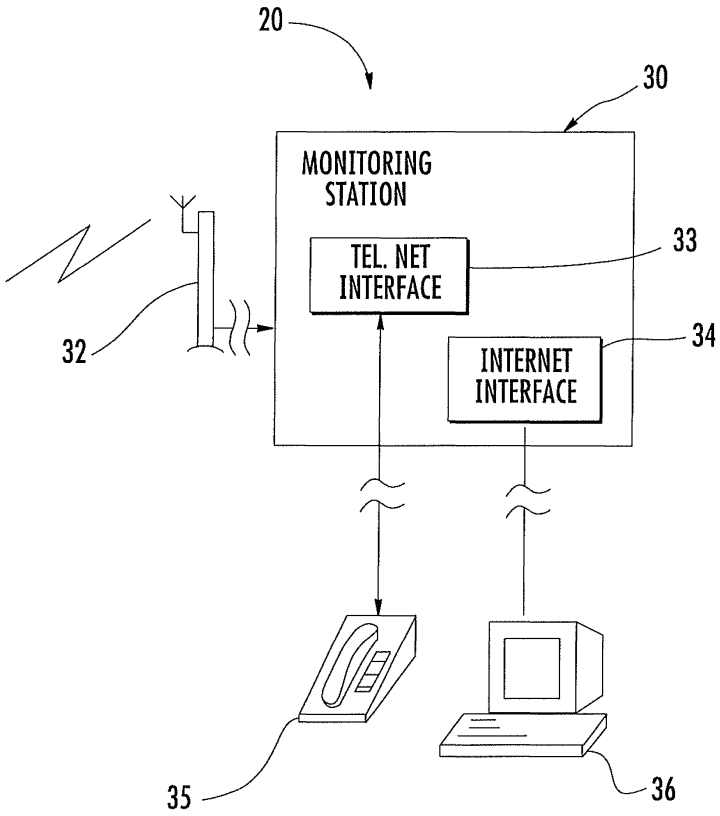

20
30
MONITORING STATION
TEL. NET INTERFACE
33
INTERNET INTERFACE
34
32
35
36

FIG. 3

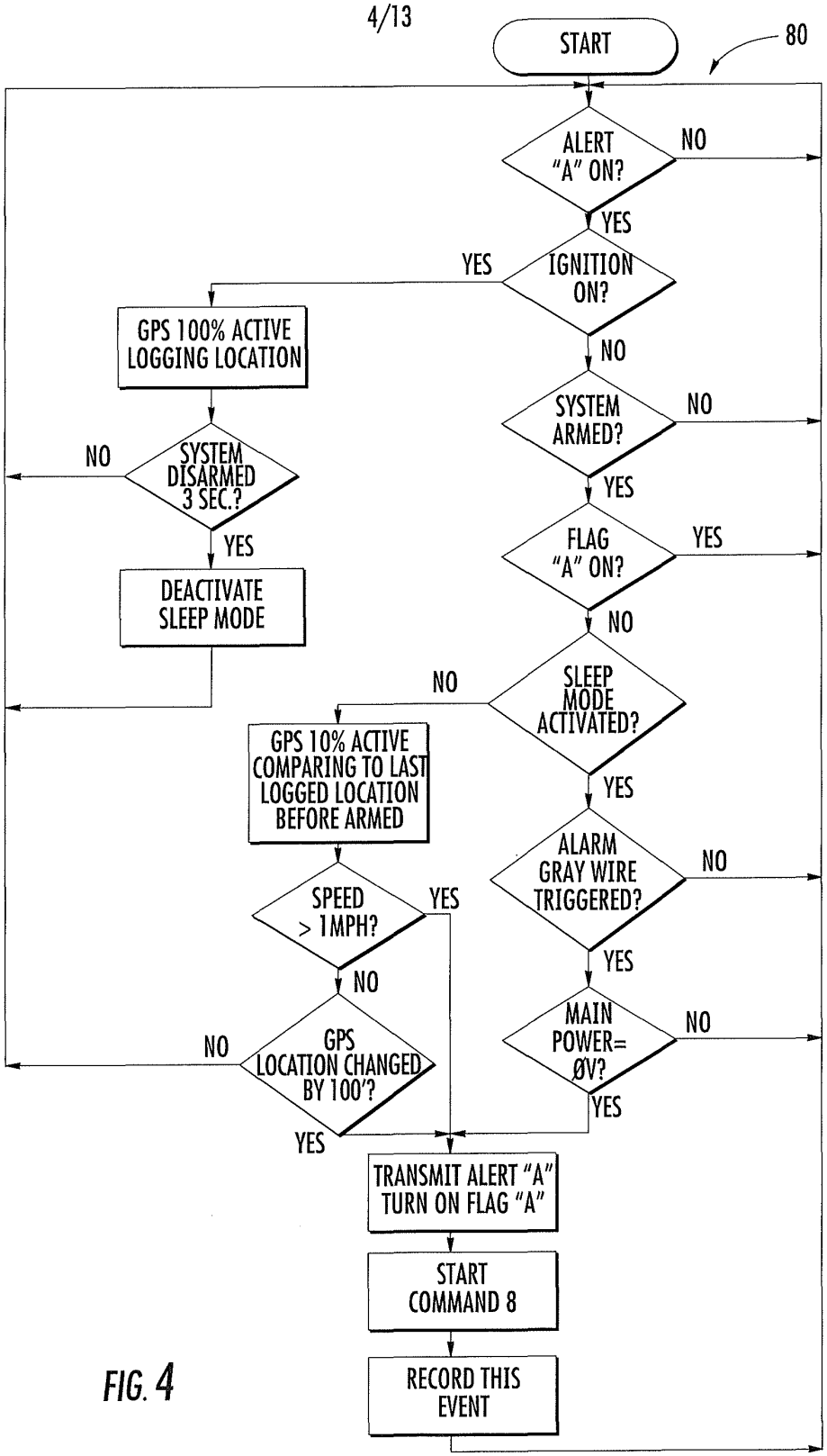

START
80
ALERT "A" ON?
NO
YES
IGNITION ON?
YES
GPS 100% ACTIVE LOGGING LOCATION
NO
SYSTEM ARMED?
NO
YES
SYSTEM DISARMED 3 SEC.?
NO
YES
FLAG "A" ON?
YES
DEACTIVATE SLEEP MODE
NO
SLEEP MODE ACTIVATED?
NO
GPS 10% ACTIVE COMPARING TO LAST LOGGED LOCATION BEFORE ARMED
YES
ALARM GRAY WIRE TRIGGERED?
NO
SPEED > 1MPH?
YES
YES
NO
MAIN POWER= ØV?
NO
NO
GPS LOCATION CHANGED BY 100'?
YES
YES
TRANSMIT ALERT "A" TURN ON FLAG "A"
START COMMAND 8
RECORD THIS EVENT

FIG. 4

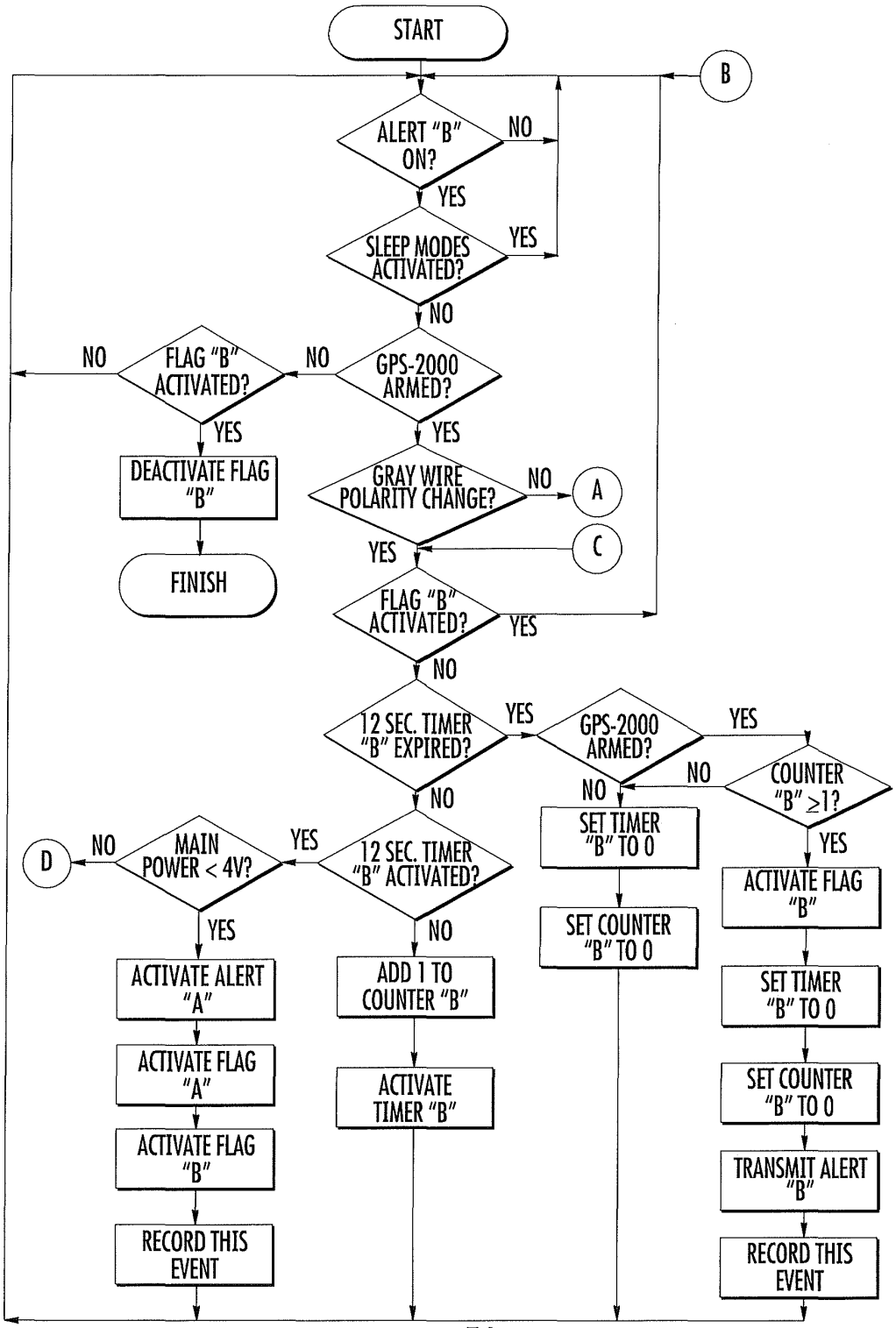

START
B
ALERT "B" ON?
NO
YES
SLEEP MODES ACTIVATED?
YES
NO
NO
FLAG "B" ACTIVATED?
NO
GPS-2000 ARMED?
YES
YES
DEACTIVATE FLAG "B"
GRAY WIRE POLARITY CHANGE?
NO
A
C
YES
FINISH
FLAG "B" ACTIVATED?
YES
NO
12 SEC. TIMER "B" EXPIRED?
YES
GPS-2000 ARMED?
YES
NO
NO
COUNTER "B" ≥1?
NO
SET TIMER "B" TO 0
YES
D
NO
MAIN POWER < 4V?
YES
12 SEC. TIMER "B" ACTIVATED?
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

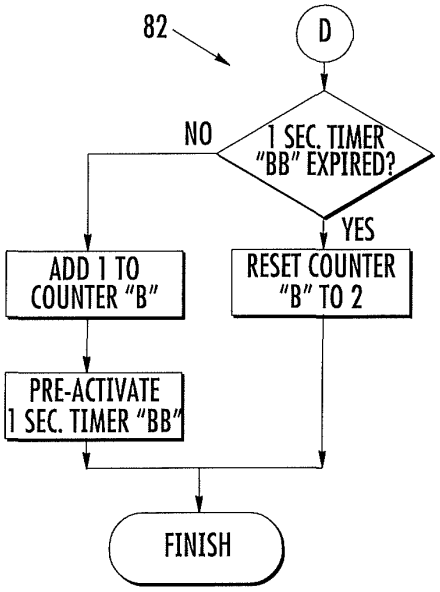

82
D
1 SEC. TIMER "BB" EXPIRED?
NO
YES
ADD 1 TO COUNTER "B"
RESET COUNTER "B" TO 2
PRE-ACTIVATE 1 SEC. TIMER "BB"
FINISH

FIG. 5B

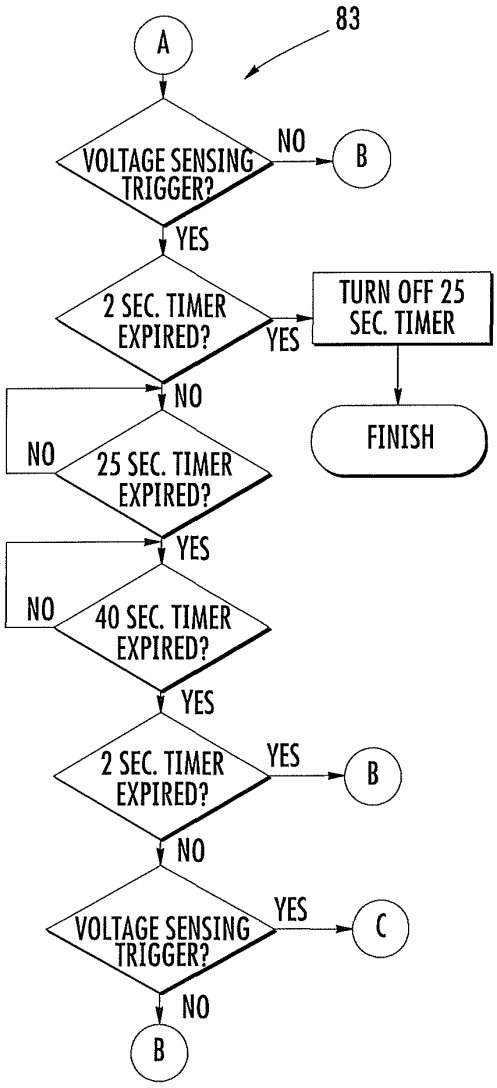

83
A
VOLTAGE SENSING TRIGGER?
NO
B
YES
2 SEC. TIMER EXPIRED?
YES
TURN OFF 25 SEC. TIMER
FINISH
NO
NO
25 SEC. TIMER EXPIRED?
YES
NO
40 SEC. TIMER EXPIRED?
YES
2 SEC. TIMER EXPIRED?
YES
B
NO
VOLTAGE SENSING TRIGGER?
YES
C
NO
B

FIG. 5C

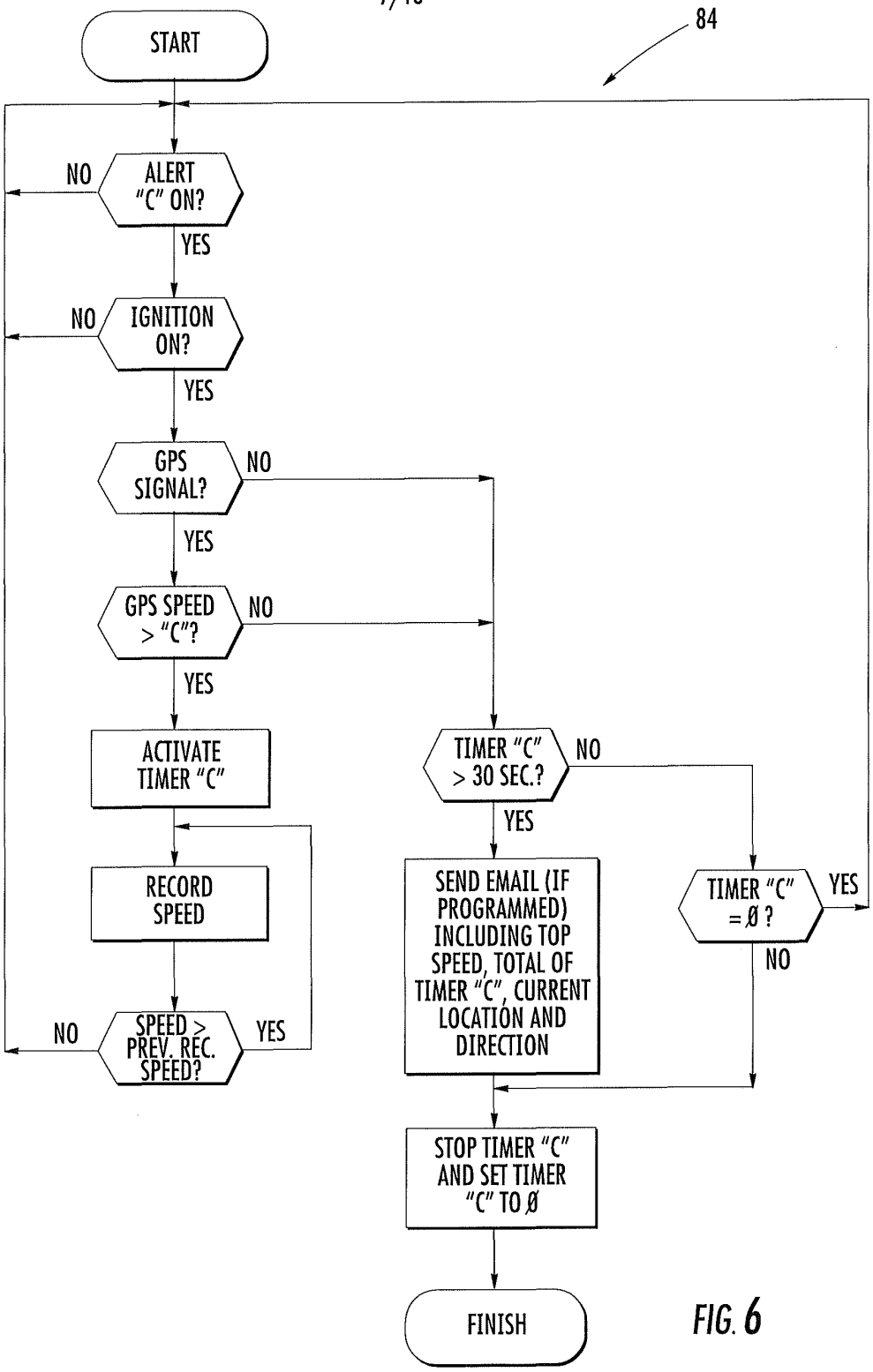

84
START
ALERT "C" ON?
NO
YES
IGNITION ON?
NO
YES
GPS SIGNAL?
NO
YES
GPS SPEED > "C"?
NO
YES
ACTIVATE TIMER "C"
RECORD SPEED
SPEED > PREV. REC. SPEED?
NO
YES
TIMER "C" > 30 SEC.?
NO
YES
SEND EMAIL (IF PROGRAMMED) INCLUDING TOP SPEED, TOTAL OF TIMER "C", CURRENT LOCATION AND DIRECTION
TIMER "C" = Ø ?
YES
NO
STOP TIMER "C" AND SET TIMER "C" TO Ø
FINISH

FIG. 6

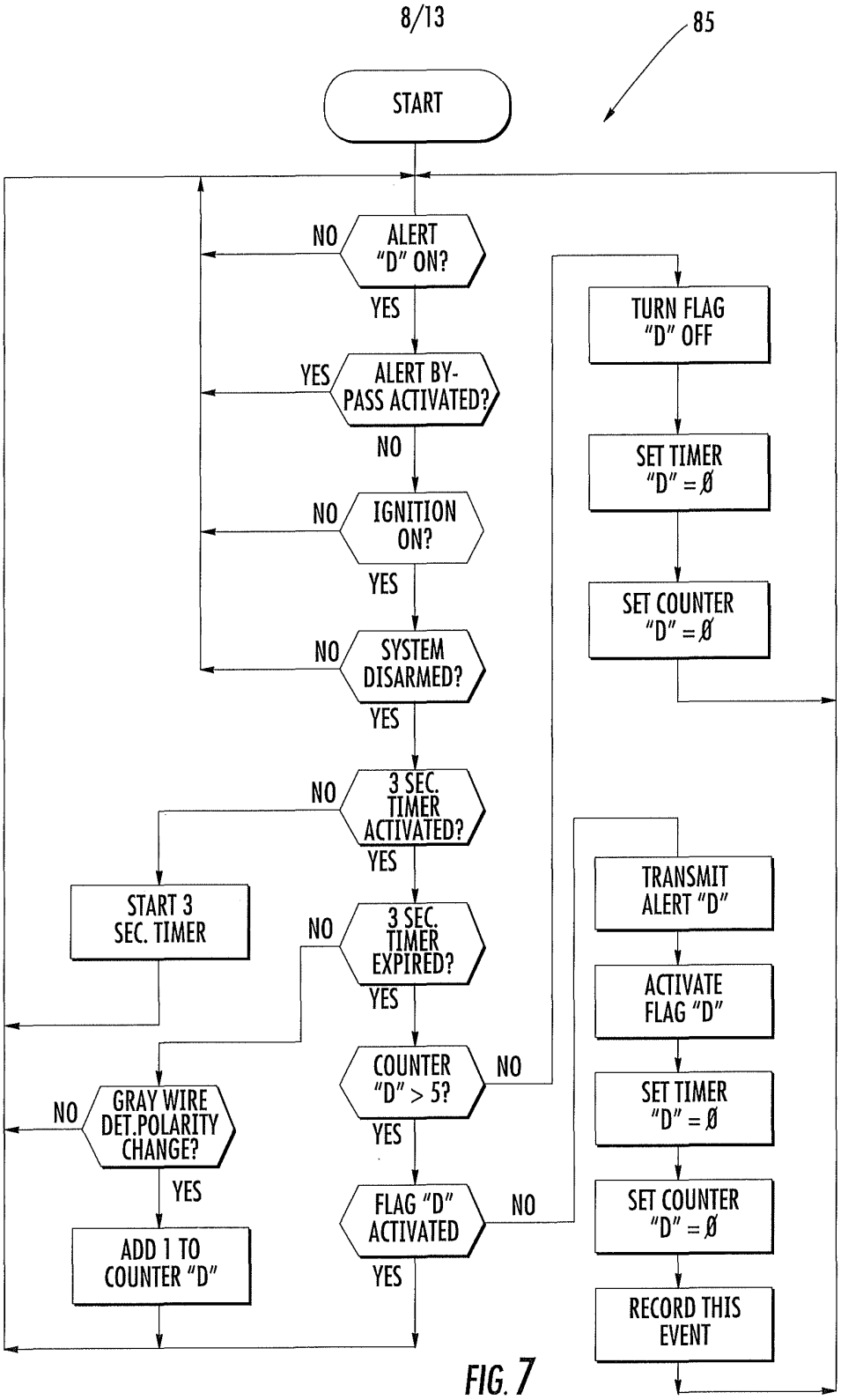

85
START
NO
ALERT "D" ON?
YES
YES
ALERT BY-PASS ACTIVATED?
NO
NO
IGNITION ON?
YES
NO
SYSTEM DISARMED?
YES
NO
3 SEC. TIMER ACTIVATED?
YES
START 3 SEC. TIMER
NO
3 SEC. TIMER EXPIRED?
YES
COUNTER "D" > 5?
NO
YES
NO
GRAY WIRE DET.POLARITY CHANGE?
YES
ADD 1 TO COUNTER "D"
FLAG "D" ACTIVATED
NO
YES
TURN FLAG "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

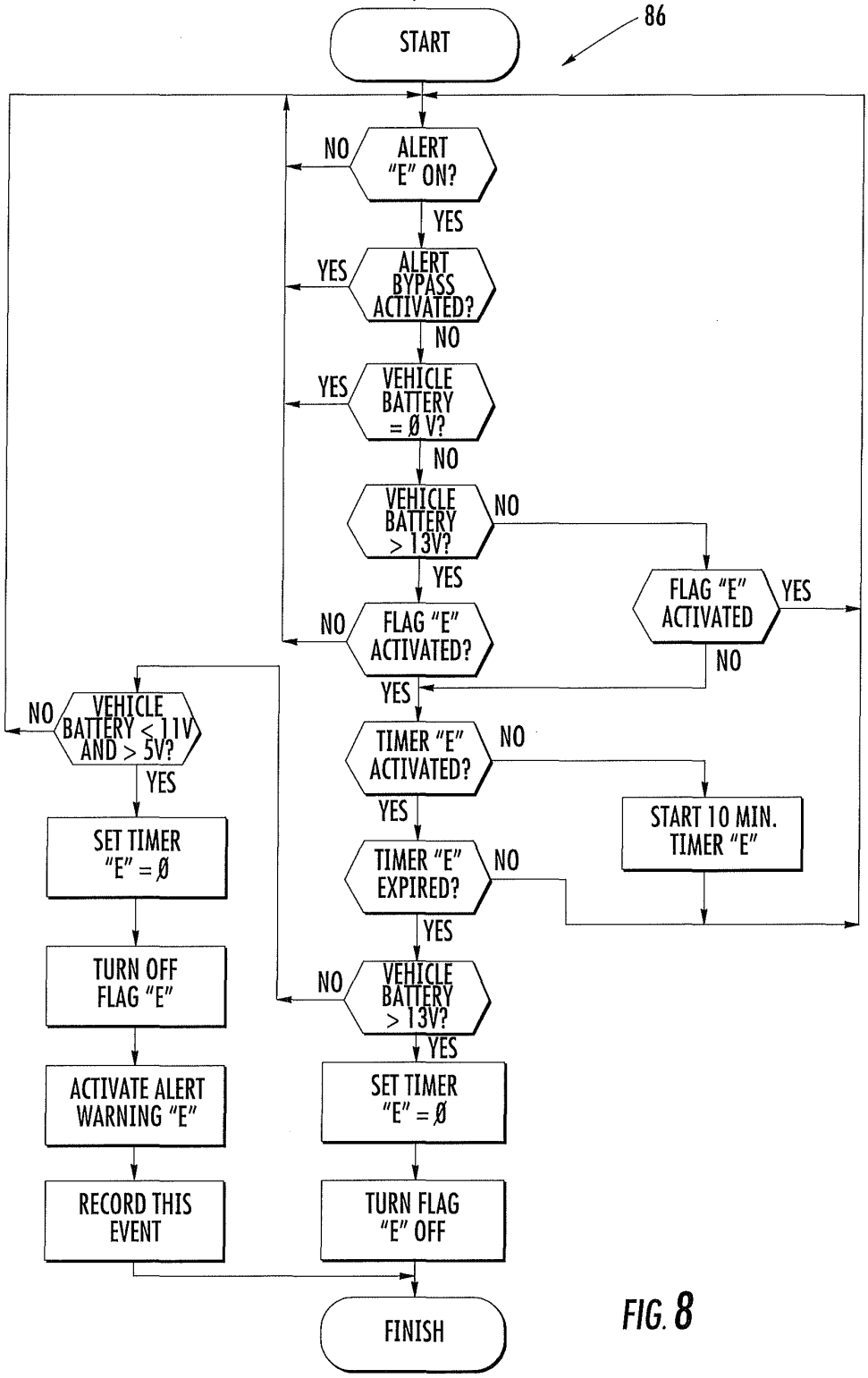

86
START
ALERT "E" ON?
NO
YES
ALERT BYPASS ACTIVATED?
YES
NO
VEHICLE BATTERY = Ø V?
YES
NO
VEHICLE BATTERY > 13V?
NO
YES
FLAG "E" ACTIVATED
YES
NO
FLAG "E" ACTIVATED?
NO
YES
VEHICLE BATTERY < 11V AND > 5V?
NO
YES
TIMER "E" ACTIVATED?
NO
YES
START 10 MIN. TIMER "E"
SET TIMER "E" = Ø
TIMER "E" EXPIRED?
NO
YES
TURN OFF FLAG "E"
VEHICLE BATTERY > 13V?
NO
YES
ACTIVATE ALERT WARNING "E"
SET TIMER "E" = Ø
RECORD THIS EVENT
TURN FLAG "E" OFF
FINISH

FIG. 8

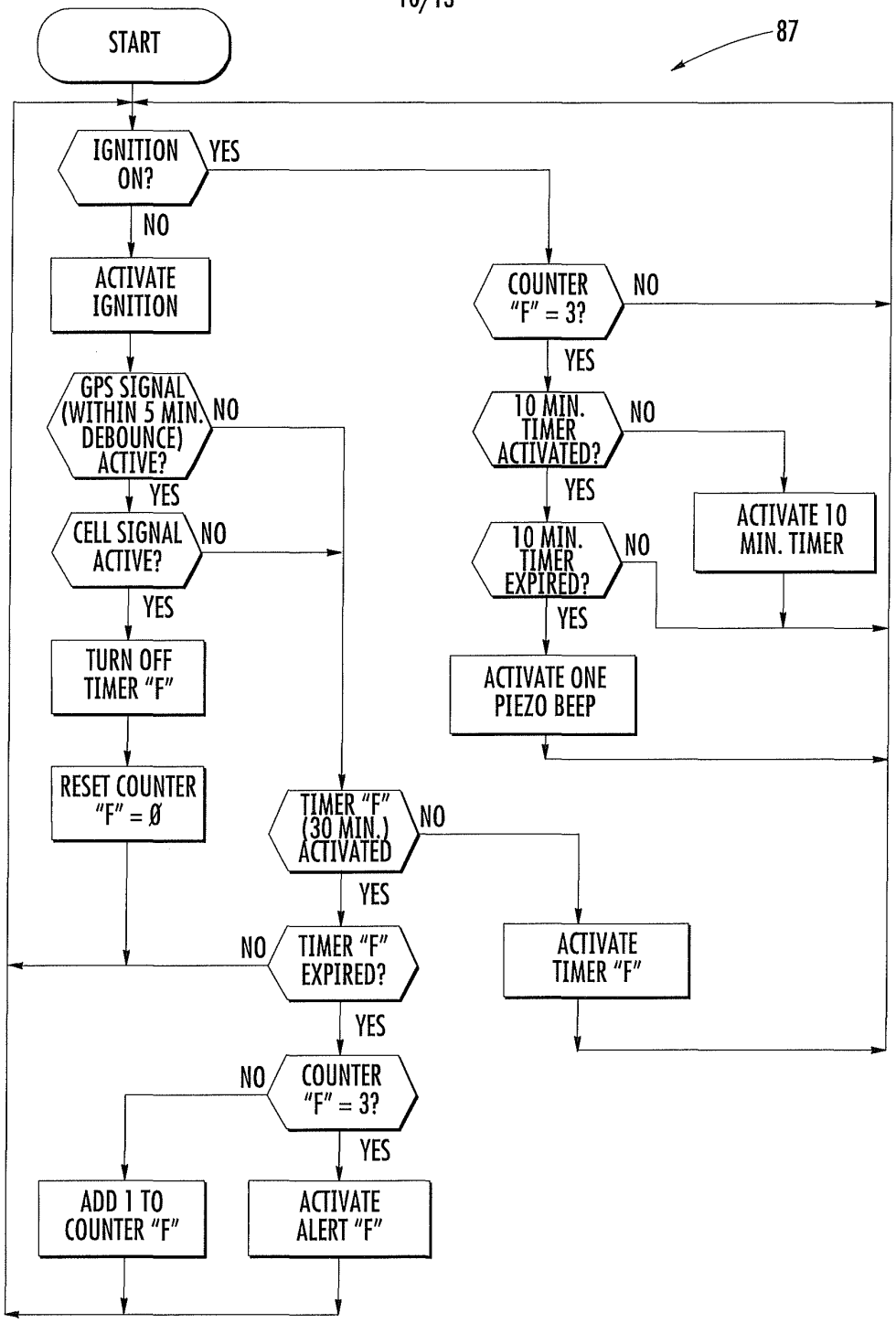

START
87
IGNITION ON?
YES
NO
ACTIVATE IGNITION
GPS SIGNAL (WITHIN 5 MIN. DEBOUNCE) ACTIVE?
NO
YES
CELL SIGNAL ACTIVE?
NO
YES
TURN OFF TIMER "F"
RESET COUNTER "F" = Ø
TIMER "F" (30 MIN.) ACTIVATED
NO
YES
TIMER "F" EXPIRED?
NO
YES
COUNTER "F" = 3?
NO
YES
ADD 1 TO COUNTER "F"
ACTIVATE ALERT "F"
COUNTER "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

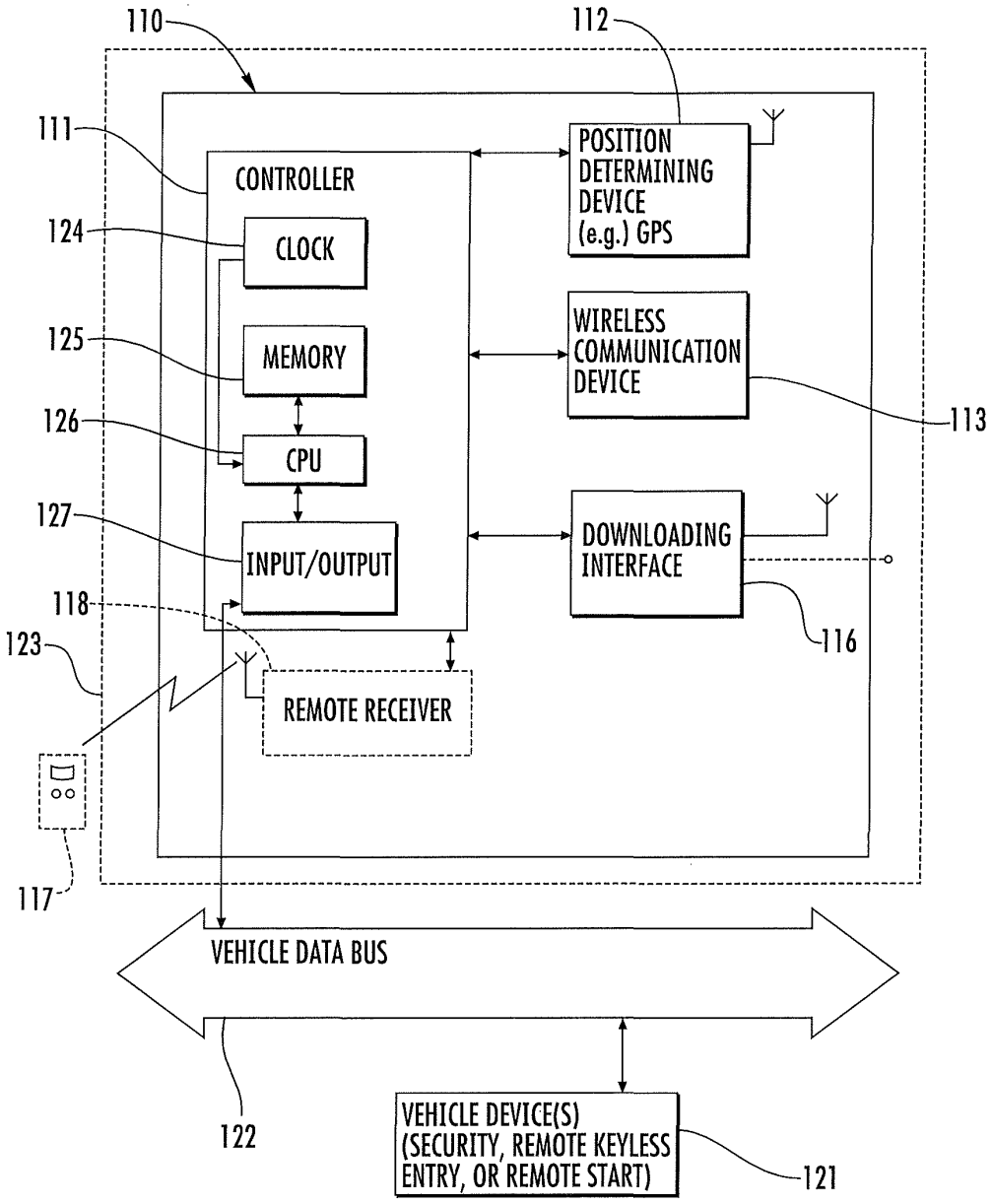

110
112
111
CONTROLLER
POSITION DETERMINING DEVICE (e.g.) GPS
124
CLOCK
125
MEMORY
WIRELESS COMMUNICATION DEVICE
113
126
CPU
127
INPUT/OUTPUT
DOWNLOADING INTERFACE
118
116
123
REMOTE RECEIVER
117
VEHICLE DATA BUS
122
VEHICLE DEVICE(S) (SECURITY, REMOTE KEYLESS ENTRY, OR REMOTE START)
121

FIG. 10

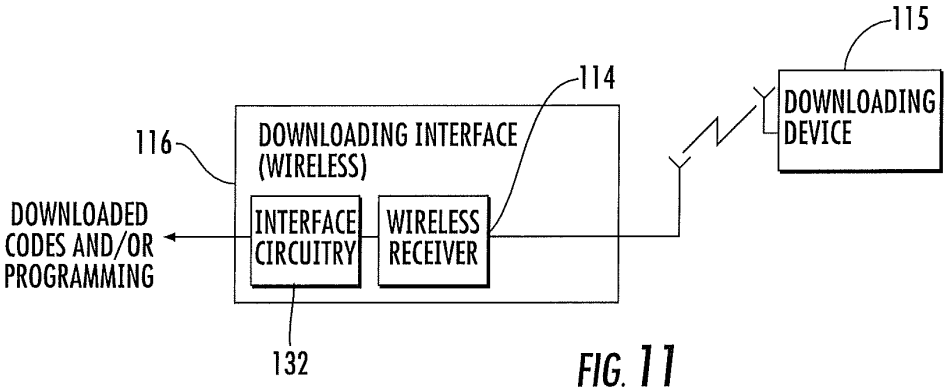


FIG. 11

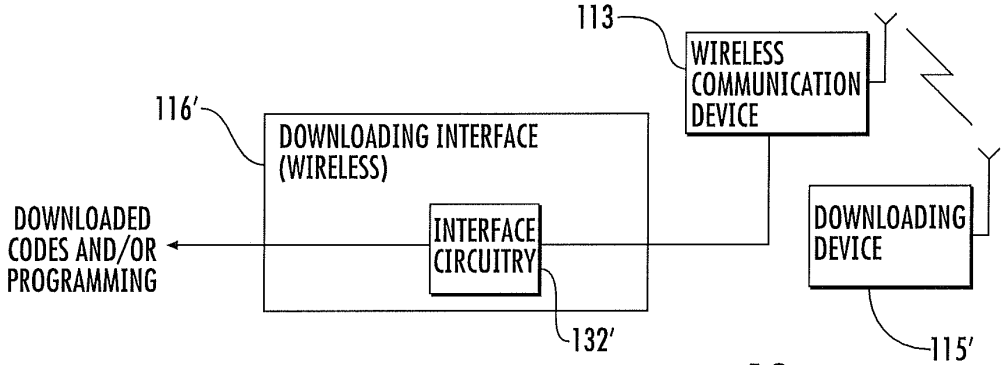


FIG. 12

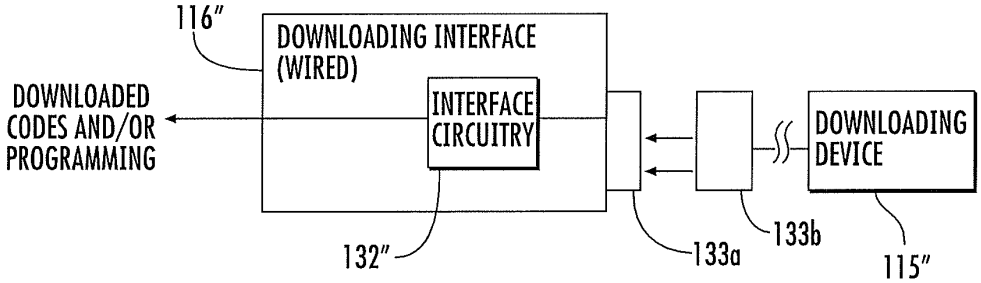


FIG. 13

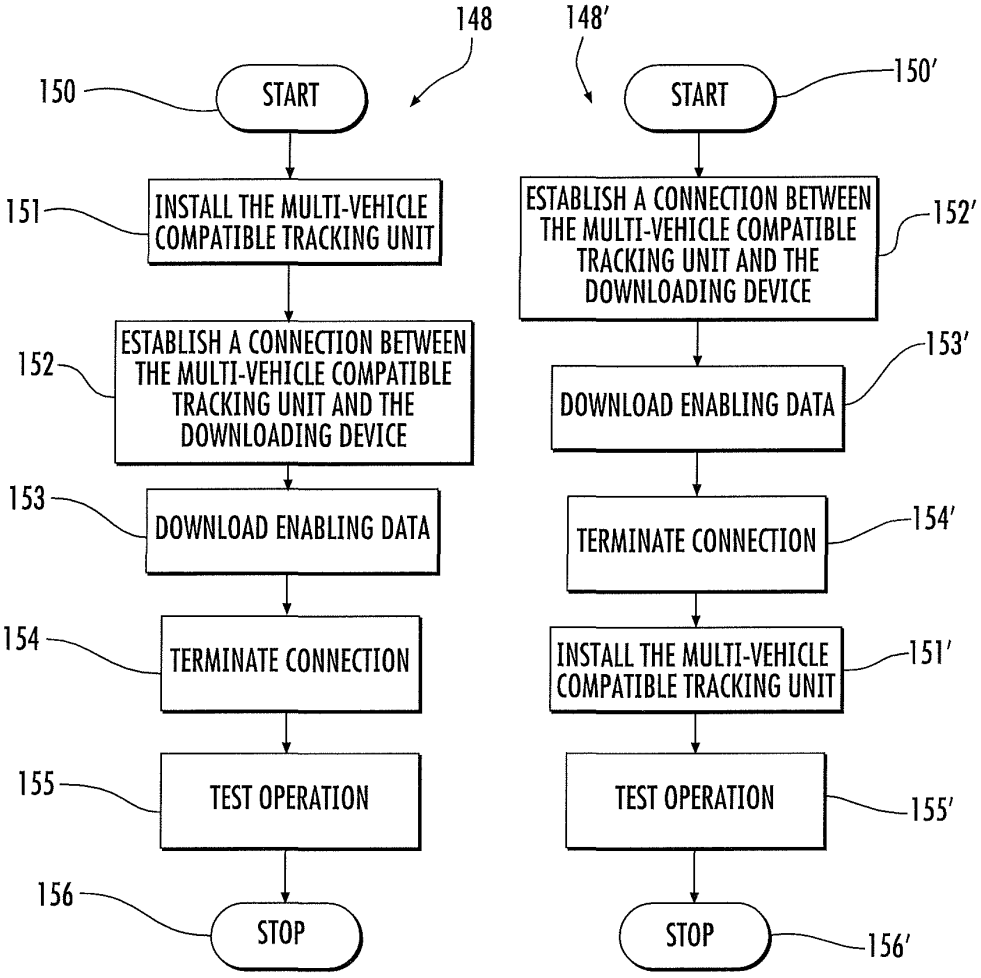

148
150
START
151
INSTALL THE MULTI-VEHICLE COMPATIBLE TRACKING UNIT
152
ESTABLISH A CONNECTION BETWEEN THE MULTI-VEHICLE COMPATIBLE TRACKING UNIT AND THE DOWNLOADING DEVICE
153
DOWNLOAD ENABLING DATA
154
TERMINATE CONNECTION
155
TEST OPERATION
156
STOP
148'
START
150'
ESTABLISH A CONNECTION BETWEEN THE MULTI-VEHICLE COMPATIBLE TRACKING UNIT AND THE DOWNLOADING DEVICE
152'
DOWNLOAD ENABLING DATA
153'
TERMINATE CONNECTION
154'
INSTALL THE MULTI-VEHICLE COMPATIBLE TRACKING UNIT
151'
TEST OPERATION
155'
STOP
156'

FIG. 14

FIG. 15

Electronic Acknowledgement Receipt	
EFS ID:	10637681
Application Number:	11773272
International Application Number:	
Confirmation Number:	1046
Title of Invention:	VEHICLE TRACKING UNIT WITH DOWNLOADABLE CODES AND ASSOCIATED METHODS
First Named Inventor/Applicant Name:	Kenneth E. Flick
Correspondence Address:	CHRISTOPHER F. REGAN, ESQUIRE ALLEN, DYER, DOPPELT, MILBRATH & GILCHRIST, P.A. P.O. Box 3791 - Orlando FL 32802-3791 US 4078412330 -
Filer:	Christopher F. Regan/joellen murphy
Filer Authorized By:	Christopher F. Regan
Attorney Docket Number:	58106CIP1
Receipt Date:	01-AUG-2011
Filing Date:	03-JUL-2007
Time Stamp:	13:35:20
Application Type:	Utility under 35 USC 111(a)

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		58106cip1replacedwgsnoa.pdf	909367 b7fbc125d251d53314e495aab78aa0929bf14da3	yes	14

Multipart Description/PDF files in .zip description		
Document Description	**Start**	**End**
Post Allowance Communication - Incoming	1	1
Drawings-only black and white line drawings	2	14

Warnings:	
Information:	
Total Files Size (in bytes):	909367

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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NOTICE OF ALLOWANCE AND FEE(S) DUE

7590 06/28/2011

CHRISTOPHER F. REGAN, ESQUIRE
ALLEN, DYER, DOPPELT, MILBRATH & GILCHRIST, P.A.
P.O. Box 3791
Orlando, FL 32802-3791

EXAMINER	
NGUYEN, CUONG H	
ART UNIT	PAPER NUMBER
3661	

DATE MAILED: 06/28/2011

APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
11/773,272	07/03/2007	Kenneth E. Flick	58106CIP1	1046

TITLE OF INVENTION: VEHICLE TRACKING UNIT WITH DOWNLOADABLE CODES AND ASSOCIATED METHODS

APPLN. TYPE	SMALL ENTITY	ISSUE FEE DUE	PUBLICATION FEE DUE	PREV. PAID ISSUE FEE	TOTAL FEE(S) DUE	DATE DUE
nonprovisional	NO	$1510	$300	$0	$1810	09/28/2011

THE APPLICATION IDENTIFIED ABOVE HAS BEEN EXAMINED AND IS ALLOWED FOR ISSUANCE AS A PATENT. PROSECUTION ON THE MERITS IS CLOSED. THIS NOTICE OF ALLOWANCE IS NOT A GRANT OF PATENT RIGHTS. THIS APPLICATION IS SUBJECT TO WITHDRAWAL FROM ISSUE AT THE INITIATIVE OF THE OFFICE OR UPON PETITION BY THE APPLICANT. SEE 37 CFR 1.313 AND MPEP 1308.

THE ISSUE FEE AND PUBLICATION FEE (IF REQUIRED) MUST BE PAID WITHIN THREE MONTHS FROM THE MAILING DATE OF THIS NOTICE OR THIS APPLICATION SHALL BE REGARDED AS ABANDONED. THIS STATUTORY PERIOD CANNOT BE EXTENDED. SEE 35 U.S.C. 151. THE ISSUE FEE DUE INDICATED ABOVE DOES NOT REFLECT A CREDIT FOR ANY PREVIOUSLY PAID ISSUE FEE IN THIS APPLICATION. IF AN ISSUE FEE HAS PREVIOUSLY BEEN PAID IN THIS APPLICATION (AS SHOWN ABOVE), THE RETURN OF PART B OF THIS FORM WILL BE CONSIDERED A REQUEST TO REAPPLY THE PREVIOUSLY PAID ISSUE FEE TOWARD THE ISSUE FEE NOW DUE.

HOW TO REPLY TO THIS NOTICE:

I. Review the SMALL ENTITY status shown above.

If the SMALL ENTITY is shown as YES, verify your current SMALL ENTITY status:

A. If the status is the same, pay the TOTAL FEE(S) DUE shown above.

B. If the status above is to be removed, check box 5b on Part B - Fee(s) Transmittal and pay the PUBLICATION FEE (if required) and twice the amount of the ISSUE FEE shown above, or

If the SMALL ENTITY is shown as NO:

A. Pay TOTAL FEE(S) DUE shown above, or

B. If applicant claimed SMALL ENTITY status before, or is now claiming SMALL ENTITY status, check box 5a on Part B - Fee(s) Transmittal and pay the PUBLICATION FEE (if required) and 1/2 the ISSUE FEE shown above.

II. PART B - FEE(S) TRANSMITTAL, or its equivalent, must be completed and returned to the United States Patent and Trademark Office (USPTO) with your ISSUE FEE and PUBLICATION FEE (if required). If you are charging the fee(s) to your deposit account, section "4b" of Part B - Fee(s) Transmittal should be completed and an extra copy of the form should be submitted. If an equivalent of Part B is filed, a request to reapply a previously paid issue fee must be clearly made, and delays in processing may occur due to the difficulty in recognizing the paper as an equivalent of Part B.

III. All communications regarding this application must give the application number. Please direct all communications prior to issuance to Mail Stop ISSUE FEE unless advised to the contrary.

IMPORTANT REMINDER: Utility patents issuing on applications filed on or after Dec. 12, 1980 may require payment of maintenance fees. It is patentee's responsibility to ensure timely payment of maintenance fees when due.

PTOL-85 (Rev. 02/11)

PART B - FEE(S) TRANSMITTAL

Complete and send this form, together with applicable fee(s), to: Mail **Mail Stop ISSUE FEE**
Commissioner for Patents
P.O. Box 1450
Alexandria, Virginia 22313-1450
or Fax (571)-273-2885

INSTRUCTIONS: This form should be used for transmitting the ISSUE FEE and PUBLICATION FEE (if required). Blocks 1 through 5 should be completed where appropriate. All further correspondence including the Patent, advance orders and notification of maintenance fees will be mailed to the current correspondence address as indicated unless corrected below or directed otherwise in Block 1, by (a) specifying a new correspondence address; and/or (b) indicating a separate "FEE ADDRESS" for maintenance fee notifications.

CURRENT CORRESPONDENCE ADDRESS (Note: Use Block 1 for any change of address)

7590 06/28/2011

CHRISTOPHER F. REGAN, ESQUIRE
ALLEN, DYER, DOPPELT, MILBRATH & GILCHRIST, P.A.
P.O. Box 3791
Orlando, FL 32802-3791

Note: A certificate of mailing can only be used for domestic mailings of the Fee(s) Transmittal. This certificate cannot be used for any other accompanying papers. Each additional paper, such as an assignment or formal drawing, must have its own certificate of mailing or transmission.

Certificate of Mailing or Transmission

I hereby certify that this Fee(s) Transmittal is being deposited with the United States Postal Service with sufficient postage for first class mail in an envelope addressed to the Mail Stop ISSUE FEE address above, or being facsimile transmitted to the USPTO (571) 273-2885, on the date indicated below.

(Depositor's name)
(Signature)
(Date)

APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
11/773,272	07/03/2007	Kenneth E. Flick	58106CIP1	1046

TITLE OF INVENTION: VEHICLE TRACKING UNIT WITH DOWNLOADABLE CODES AND ASSOCIATED METHODS

APPLN. TYPE	SMALL ENTITY	ISSUE FEE DUE	PUBLICATION FEE DUE	PREV. PAID ISSUE FEE	TOTAL FEE(S) DUE	DATE DUE
nonprovisional	NO	$1510	$300	$0	$1810	09/28/2011

EXAMINER	ART UNIT	CLASS-SUBCLASS
NGUYEN, CUONG H	3661	701-036000

1. Change of correspondence address or indication of "Fee Address" (37 CFR 1.363).

❑ Change of correspondence address (or Change of Correspondence Address form PTO/SB/122) attached.

❑ "Fee Address" indication (or "Fee Address" Indication form PTO/SB/47; Rev 03-02 or more recent) attached. **Use of a Customer Number is required.**

2. For printing on the patent front page, list

(1) the names of up to 3 registered patent attorneys or agents OR, alternatively,

(2) the name of a single firm (having as a member a registered attorney or agent) and the names of up to 2 registered patent attorneys or agents. If no name is listed, no name will be printed.

1 _____

2 _____

3 _____

3. ASSIGNEE NAME AND RESIDENCE DATA TO BE PRINTED ON THE PATENT (print or type)

PLEASE NOTE: Unless an assignee is identified below, no assignee data will appear on the patent. If an assignee is identified below, the document has been filed for recordation as set forth in 37 CFR 3.11. Completion of this form is NOT a substitute for filing an assignment.

(A) NAME OF ASSIGNEE (B) RESIDENCE: (CITY and STATE OR COUNTRY)

Please check the appropriate assignee category or categories (will not be printed on the patent) : ❑ Individual ❑ Corporation or other private group entity ❑ Government

4a. The following fee(s) are submitted:

❑ Issue Fee

❑ Publication Fee (No small entity discount permitted)

❑ Advance Order - # of Copies _____

4b. Payment of Fee(s): (**Please first reapply any previously paid issue fee shown above**)

❑ A check is enclosed.

❑ Payment by credit card. Form PTO-2038 is attached.

❑ The Director is hereby authorized to charge the required fee(s), any deficiency, or credit any overpayment, to Deposit Account Number _____ (enclose an extra copy of this form).

5. **Change in Entity Status** (from status indicated above)

❑ a. Applicant claims SMALL ENTITY status. See 37 CFR 1.27.

❑ b. Applicant is no longer claiming SMALL ENTITY status. See 37 CFR 1.27(g)(2).

NOTE: The Issue Fee and Publication Fee (if required) will not be accepted from anyone other than the applicant; a registered attorney or agent; or the assignee or other party in interest as shown by the records of the United States Patent and Trademark Office.

Authorized Signature _____ Date _____

Typed or printed name _____ Registration No. _____

This collection of information is required by 37 CFR 1.311. 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 12 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, Virginia 22313-1450. DO NOT SEND FEES OR COMPLETED FORMS TO THIS ADDRESS. SEND TO: Commissioner for Patents, P.O. Box 1450, Alexandria, Virginia 22313-1450.

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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
11/773,272	07/03/2007	Kenneth E. Flick	58106CIP1	1046

7590 06/28/2011

CHRISTOPHER F. REGAN, ESQUIRE
ALLEN, DYER, DOPPELT, MILBRATH & GILCHRIST, P.A.
P.O. Box 3791
Orlando, FL 32802-3791

EXAMINER	
NGUYEN, CUONG H	
ART UNIT	PAPER NUMBER
3661	

DATE MAILED: 06/28/2011

Determination of Patent Term Adjustment under 35 U.S.C. 154 (b)
(application filed on or after May 29, 2000)

The Patent Term Adjustment to date is 447 day(s). If the issue fee is paid on the date that is three months after the mailing date of this notice and the patent issues on the Tuesday before the date that is 28 weeks (six and a half months) after the mailing date of this notice, the Patent Term Adjustment will be 447 day(s).

If a Continued Prosecution Application (CPA) was filed in the above-identified application, the filing date that determines Patent Term Adjustment is the filing date of the most recent CPA.

Applicant will be able to obtain more detailed information by accessing the Patent Application Information Retrieval (PAIR) WEB site (http://pair.uspto.gov).

Any questions regarding the Patent Term Extension or Adjustment determination should be directed to the Office of Patent Legal Administration at (571)-272-7702. Questions relating to issue and publication fee payments should be directed to the Customer Service Center of the Office of Patent Publication at 1-(888)-786-0101 or (571)-272-4200.

Privacy Act Statement

The Privacy Act of 1974 (P.L. 93-579) requires that you be given certain information in connection with your submission of the attached form related to a patent application or patent. Accordingly, pursuant to the requirements of the Act, please be advised that: (1) the general authority for the collection of this information is 35 U.S.C. 2(b)(2); (2) furnishing of the information solicited is voluntary; and (3) the principal purpose for which the information is used by the U.S. Patent and Trademark Office is to process and/or examine your submission related to a patent application or patent. If you do not furnish the requested information, the U.S. Patent and Trademark Office may not be able to process and/or examine your submission, which may result in termination of proceedings or abandonment of the application or expiration of the patent.

The information provided by you in this form will be subject to the following routine uses:

1. The information on this form will be treated confidentially to the extent allowed under the Freedom of Information Act (5 U.S.C. 552) and the Privacy Act (5 U.S.C 552a). Records from this system of records may be disclosed to the Department of Justice to determine whether disclosure of these records is required by the Freedom of Information Act.
2. A record from this system of records may be disclosed, as a routine use, in the course of presenting evidence to a court, magistrate, or administrative tribunal, including disclosures to opposing counsel in the course of settlement negotiations.
3. A record in this system of records may be disclosed, as a routine use, to a Member of Congress submitting a request involving an individual, to whom the record pertains, when the individual has requested assistance from the Member with respect to the subject matter of the record.
4. A record in this system of records may be disclosed, as a routine use, to a contractor of the Agency having need for the information in order to perform a contract. Recipients of information shall be required to comply with the requirements of the Privacy Act of 1974, as amended, pursuant to 5 U.S.C. 552a(m).
5. A record related to an International Application filed under the Patent Cooperation Treaty in this system of records may be disclosed, as a routine use, to the International Bureau of the World Intellectual Property Organization, pursuant to the Patent Cooperation Treaty.
6. A record in this system of records may be disclosed, as a routine use, to another federal agency for purposes of National Security review (35 U.S.C. 181) and for review pursuant to the Atomic Energy Act (42 U.S.C. 218(c)).
7. A record from this system of records may be disclosed, as a routine use, to the Administrator, General Services, or his/her designee, during an inspection of records conducted by GSA as part of that agency's responsibility to recommend improvements in records management practices and programs, under authority of 44 U.S.C. 2904 and 2906. Such disclosure shall be made in accordance with the GSA regulations governing inspection of records for this purpose, and any other relevant (i.e., GSA or Commerce) directive. Such disclosure shall not be used to make determinations about individuals.
8. A record from this system of records may be disclosed, as a routine use, to the public after either publication of the application pursuant to 35 U.S.C. 122(b) or issuance of a patent pursuant to 35 U.S.C. 151. Further, a record may be disclosed, subject to the limitations of 37 CFR 1.14, as a routine use, to the public if the record was filed in an application which became abandoned or in which the proceedings were terminated and which application is referenced by either a published application, an application open to public inspection or an issued patent.
9. A record from this system of records may be disclosed, as a routine use, to a Federal, State, or local law enforcement agency, if the USPTO becomes aware of a violation or potential violation of law or regulation.

Notice of Allowability	Application No.	Applicant(s)	
	11/773,272	FLICK, KENNETH E.	
	Examiner	Art Unit	
	CUONG H. NGUYEN	3661	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address--

All claims being allowable, PROSECUTION ON THE MERITS IS (OR REMAINS) CLOSED in this application. If not included herewith (or previously mailed), a Notice of Allowance (PTOL-85) or other appropriate communication will be mailed in due course. **THIS NOTICE OF ALLOWABILITY IS NOT A GRANT OF PATENT RIGHTS.** This application is subject to withdrawal from issue at the initiative of the Office or upon petition by the applicant. See 37 CFR 1.313 and MPEP 1308.

1. ☒ This communication is responsive to *4/05/2011*.

2. ☒ The allowed claim(s) is/are *1-22*.

3. ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
   a) ☐ All b) ☐ Some* c) ☐ None of the:
      1. ☐ Certified copies of the priority documents have been received.
      2. ☐ Certified copies of the priority documents have been received in Application No. _____ .
      3. ☐ Copies of the certified copies of the priority documents have been received in this national stage application from the International Bureau (PCT Rule 17.2(a)).

   * Certified copies not received: _____.

Applicant has THREE MONTHS FROM THE "MAILING DATE" of this communication to file a reply complying with the requirements noted below. Failure to timely comply will result in ABANDONMENT of this application.
THIS THREE-MONTH PERIOD IS NOT EXTENDABLE.

4. ☐ A SUBSTITUTE OATH OR DECLARATION must be submitted. Note the attached EXAMINER'S AMENDMENT or NOTICE OF INFORMAL PATENT APPLICATION (PTO-152) which gives reason(s) why the oath or declaration is deficient.

5. ☒ CORRECTED DRAWINGS (as "replacement sheets") must be submitted.
   (a) ☐ including changes required by the Notice of Draftsperson's Patent Drawing Review (PTO-948) attached
      1) ☐ hereto or 2) ☐ to Paper No./Mail Date _____.
   (b) ☒ including changes required by the attached Examiner's Amendment / Comment or in the Office action of Paper No./Mail Date _____.

   Identifying indicia such as the application number (see 37 CFR 1.84(c)) should be written on the drawings in the front (not the back) of each sheet. Replacement sheet(s) should be labeled as such in the header according to 37 CFR 1.121(d).

6. ☐ DEPOSIT OF and/or INFORMATION about the deposit of BIOLOGICAL MATERIAL must be submitted. Note the attached Examiner's comment regarding REQUIREMENT FOR THE DEPOSIT OF BIOLOGICAL MATERIAL.

Attachment(s)

1. ☒ Notice of References Cited (PTO-892)
2. ☐ Notice of Draftperson's Patent Drawing Review (PTO-948)
3. ☐ Information Disclosure Statements (PTO/SB/08), Paper No./Mail Date _____
4. ☐ Examiner's Comment Regarding Requirement for Deposit of Biological Material
5. ☐ Notice of Informal Patent Application
6. ☐ Interview Summary (PTO-413), Paper No./Mail Date _____ .
7. ☐ Examiner's Amendment/Comment
8. ☒ Examiner's Statement of Reasons for Allowance
9. ☐ Other _____.

/CUONG H NGUYEN/
Primary Examiner
Art Unit: 3661

1. This Office Action is an answer to a communication filed on 4/05/2011.

2. Claims 1-22 are pending.

Drawing Objection

3. Figs. 10-15 are informal drawings. Formal drawings are required.

Allowable subject matter

4. 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.

Conclusion

5. Claims 1-22 are allowed.

6. Any inquiry concerning this communication or earlier communications from the examiner should be directed to CUONG H. NGUYEN whose telephone number is 571-272-6759 (email address: cuong.nguyen@uspto.gov). The examiner can normally be reached on 9:30 am - 5:30 pm.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, THOMAS G. BLACK can be reached on 571-272-6956. The Rightfax number for the organization where this application is assigned is 571-273-6956.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see http://pair-direct.uspto.gov. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).

/CUONG H. NGUYEN/
Primary Examiner
Art Unit 3661

Notice of References Cited	Application/Control No. 11/773,272	Applicant(s)/Patent Under Reexamination FLICK, KENNETH E.	
	Examiner CUONG H. NGUYEN	Art Unit 3661	Page 1 of 1

U.S. PATENT DOCUMENTS

*		Document Number Country Code-Number-Kind Code	Date MM-YYYY	Name	Classification
*	A	US-5,635,693	06-1997	Benson et al.	340/10.33
*	B	US-2011/0029196	02-2011	Escott, Alex	701/36
*	C	US-2010/0222963	09-2010	Schofield et al.	701/36
*	D	US-2010/0010706	01-2010	Gormley, Joseph	701/33
*	E	US-2009/0240397	09-2009	Schofield et al.	701/36
*	F	US-2008/0221752	09-2008	Jager et al.	701/35
*	G	US-2008/0051957	02-2008	Breed et al.	701/036
*	H	US-2006/0173601	08-2006	Bassiere et al.	701/053
*	I	US-7,873,593	01-2011	Schofield et al.	701/1
*	J	US-7,734,392	06-2010	Schofield et al.	701/36
*	K	US-7,526,367	04-2009	Schofield et al.	701/1
*	L	US-7,308,341	12-2007	Schofield et al.	701/1
*	M	US-7,725,253	05-2010	Foxlin, Eric	701/207

FOREIGN PATENT DOCUMENTS

*		Document Number Country Code-Number-Kind Code	Date MM-YYYY	Country	Name	Classification
*	N	DE 19607017 A1	08-1997	Germany	HOFFMANN D et al.	
*	O	DE 19607017 C2	06-2000	Germany	SCHWEGLER G et al.	
*	P	EP 725377 A2	08-1996	European Patent	VON G R J et al.	
*	Q	JP 3019952 B2	06-2003	Japan	COFINO T A et al.	
*	R	TW 275683A	05-1996	Taiwan	BENSON S J et al.	
	S					
	T					

NON-PATENT DOCUMENTS

*		Include as applicable: Author, Title Date, Publisher, Edition or Volume, Pertinent Pages)
*	U	Omega Research and Development, Inc., "GPS 2000", distributed at Consumer Electronics Show in Las Vegas, NV, Jan. 2001, pp. 1-4.
*	V	Security Challenges of Location-Aware Mobile Business; Tatly, E.I.; Stegemann, D.; Lucks, S.; Mobile Commerce and Services, 2005. WMCS '05. The Second IEEE International Workshop on; 19-19 Jul. 2005 pp. 84-95; Digital Object Identifier 10.1109/WMCS.2005.23.
*	W	Motion tracking: no silver bullet, but a respectable arsenal; Welch, G.; Foxlin, E.; Computer Graphics and Applications, IEEE vol. 22, Issue 6, Nov.-Dec. 2002 pp. 24-38; Digital Object Identifier 10.1109/MCG.2002.1046626.
*	X	Localization of ahead vehicles with on-board stereo cameras; Zanin, M.; Image Analysis and Processing, 2007. ICIAP 2007. 14th International Conference on; Sep. 10-14, 2007 pp. 111-116; Digital Object Identifier 10.1109/ICIAP.2007.4362766.

*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.

UNITED STATES PATENT AND TRADEMARK OFFICE

UNITED STATES DEPARTMENT OF COMMERCE
United States Patent and Trademark Office
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BIB DATA SHEET

CONFIRMATION NO. 1046

SERIAL NUMBER	FILING or 371(c) DATE	CLASS	GROUP ART UNIT	ATTORNEY DOCKET NO.
11/773,272	07/03/2007 RULE	701	3661	58106CIP1

APPLICANTS

Kenneth E. Flick, Douglasville, GA;

**** CONTINUING DATA **************************

This application is a CIP of 11/076,259 03/09/2005 PAT 7,720,597
which is a CON of 10/383,496 03/07/2003 PAT 7,149,623
which is a CON of 09/859,972 05/17/2001 PAT 6,606,561
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 ****

07/30/2007

Foreign Priority claimed ❑ Yes ☑ No 35 USC 119(a-d) conditions met ❑ Yes ☑ No Verified and Acknowledged /CUONG H NGUYEN/ Examiner's Signature	❑ Met after Allowance Initials	STATE OR COUNTRY	SHEETS DRAWINGS	TOTAL CLAIMS	INDEPENDENT CLAIMS
		GA	13	~~30~~ 22	~~4~~ 3

ADDRESS

CHRISTOPHER F. REGAN, ESQUIRE
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		
1700	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 _____ ❑ Credit

BIB (Rev. 05/07).

Refine Search

Search Results

Terms	Documents
L40 and (vehicle$ with (data or "CAN") adj bus)	5

Database: US Pre-Grant Publication Full-Text Database; US Patents Full-Text Database; US Patents OCR Backfile; EPO Abstracts Database; JPO Abstracts Database; Derwent World Patents Index; IBM Technical Disclosure Bulletin Database

Search Type: (•) Prior Art ( ) Interference

Search:

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L41 and (((id or code$) with vehicl$)
same(control$ with (multi$ or many or
different$) adj2 (vehicle$ or
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Refine Search | Recall Text | Clear | Interrupt

Search History

DATE: Thursday, June 16, 2011 Purge Queries | Printable Copy | Create Case

Set Name Side by Side	Query	Hit Count	Set Name Result Set	Set Name Grid
Prior Art Searches				
	DB=PGPB,USPT,USOC,EPAB,JPAB,DWPI,TDBD; THES=ASSIGNEE; PLUR=YES; OP=OR			
L41	L40 and (vehicle$ with (data or "CAN") adj bus)	5	L41	L41
L40	l36 or l38 or l39	223	L40	L40
	DB=USPT; THES=ASSIGNEE; PLUR=YES; OP=OR			
L39	(6009356 | 5206643 | 4786907 | 5686904 | 5142278 | 5528086 | 5317309 | 4075632 | 5798458 | 4809268 | 5055659 | 4897642 | 5231273 | 4739328 | 5661804 | 6112085 | 4924221 | 5159344 | 6185430 | 4988992)![PN]	20	L39	L39
	DB=USPT,DWPI; THES=ASSIGNEE; PLUR=YES; OP=OR			
L38	("6253064" | "5635693" | "5940007" | "EP 725377 A2" | "DE 19607017 A1" | "US 6253064 B1")[ABPN1,NRPN,PN]	6	L38	L38
	DB=PGPB,USPT,USOC,EPAB,JPAB,DWPI,TDBD; THES=ASSIGNEE; PLUR=YES; OP=OR			
L37	l35	6	L37	L37
	DB=USPT; THES=ASSIGNEE; PLUR=YES; OP=OR			
	("6253064" | "5635693" | "5940007" | "EP / 725377 A2" | "DE / 19607017			

L36	A1" | "US / 6253064 B1" | "EP 725377 A2" | "DE 19607017 A1" | "US 6253064 B1")[URPN]	197	L36	L36
DB=PGPB,USPT,USOC,EPAB,JPAB,DWPI,TDBD; THES=ASSIGNEE; PLUR=YES; OP=OR				
L35	5635693.pn. or 6253064.pn. or 5940007.pn.	6	L35	L35
DB=PGPB,USPT; THES=ASSIGNEE; PLUR=YES; OP=OR				
L34	L33 and (vehicle$ with (data or "CAN") adj bus)	0	L34	L34
L33	L6 and (((id or code$) with vehicl$) same(control$ with (multi$ or many or different$) adj2 (vehicle$ or automobil$ or car$)))	3	L33	L33
L32	l30 not l31	1	L32	L32
L31	L30 and (remot$ with control$)	1	L31	L31
L30	L29 and gps$	2	L30	L30
L29	L6 and (((id or code$) with vehicl$) same((multi$ or many or different$) adj2 (vehicle$ or automobil$ or car$)))	7	L29	L29
L28	L6 and ((vehicl$ with data adj bus$) same ((id or code$) with vehicl$) same((multi$ or many or different$) adj2 (vehicle$ or automobil$ or car$)))	0	L28	L28
DB=USPT; THES=ASSIGNEE; PLUR=YES; OP=OR				
L27	L26 and down$	1	L27	L27
L26	6253064.pn.	1	L26	L26
L25	L21 and (can adj2 bus)	0	L25	L25
L24	L21 and (can adj bus)	0	L24	L24
L23	L22 and (can$ with bus$)	1	L23	L23
L22	6611755.pn.	1	L22	L22
DB=PGPB,USPT; THES=ASSIGNEE; PLUR=YES; OP=OR				
L21	L6 and (can$ with bus$)	36	L21	L21
L20	L19 and (can$ with bus$)	2	L20	L20
L19	20020152053 or 6275773.pn.	2	L19	L19
L18	L17 and (can$ with bus$)	21	L18	L18
L17	20020152053 or 6275773	146	L17	L17
L16	L15 and (can$ with bus$)	2	L16	L16
L15	6236365.pn. or 6298306.pn.	2	L15	L15
L14	L7 and (can$ with bus$)	7	L14	L14
DB=USPT; THES=ASSIGNEE; PLUR=YES; OP=OR				
L13	L7 and (can adj bus)	0	L13	L13
L12	L8 and bus$	0	L12	L12
L11	L8 and ((monitor$ or track$) with (multi$ or many) with ((vehicle$ or car$ or automobile$)))	1	L11	L11
L10	L8 and (can with bus)	0	L10	L10
L9	L8 and (can adj2 bus)	0	L9	L9
L8	6253064.pn.	1	L8	L8
DB=PGPB,USPT,USOC,EPAB,JPAB,DWPI,TDBD; THES=ASSIGNEE; PLUR=YES; OP=OR				
L7	L6 and monitor$ and securit$ and gps$	31	L7	L7

L6	L5 or L4	662	L6	L6
L5	@pd<=20000517 and (track$ with "vehicles") and (track$ with (multi$ or many) with ((vehicle$ or car$ or automobile$))) and ((can adj bus) or (code or id$))	542	L5	L5
L4	@ad<=20000517 and (track$ with "vehicles") and (track$ with (multi$ or many) with ((vehicle$ or car$ or automobile$))) and ((can adj bus) or (code or id$))	518	L4	L4
L3	L2 and ((can adj bus) or (code or id$))	8482908	L3	L3
L2	@ad<=20000517 and (track$ with "vehicles") and (track$ with (multi$ or many) with ((vehicle$ or car$ or automobile$))) and (can adj bus) or (code or id$)	8482908	L2	L2
L1	@ad<=20000517 and (track$ with (multi$ or many) with ((vehicle$ or car$ or automobile$))) and (can adj bus) and (code or id$)	0	L1	L1

END OF SEARCH HISTORY

Search Notes	Application/Control No.	Applicant(s)/Patent under Reexamination	
	11/773,272	FLICK, KENNETH E.	
	Examiner	Art Unit	
	CUONG H. NGUYEN	3661	

SEARCHED			
Class	Subclass	Date	Examiner

INTERFERENCE SEARCHED			
Class	Subclass	Date	Examiner
701	**36,33**	**6/19/2011**	**CHN**
382	104	6/19/2011	CHN
455	575.9	6/19/2011	CHN
G01C 21/00		6/19/2011	CHN

SEARCH NOTES (INCLUDING SEARCH STRATEGY)		
	DATE	EXMR
WEST/DERWENT frwrd/bkwrd searches on an allowable subject matter and closest cited references	6/19/2011	CHN
PG PUBS	6/19/2011	CHN
Inventor's name	6/19/2011	CHN
IEEE Xplore	6/19/2011	CHN

Issue Classification	Application/Control No.	Applicant(s)/Patent under Reexamination	
	11/773,272	FLICK, KENNETH E.	
	Examiner	Art Unit	
	CUONG H. NGUYEN	3661	

ISSUE CLASSIFICATION

ORIGINAL		CROSS REFERENCE(S)							
CLASS	SUBCLASS	CLASS	SUBCLASS (ONE SUBCLASS PER BLOCK)						
701	36	701	33						
INTERNATIONAL CLASSIFICATION		382	104	988					
G 0 1 C	21/00	455	575.9						
	/								
	/								
	/								
	/								

(Assistant Examiner) (Date)	/CUONG H NGUYEN/ 6/19/2011	Total Claims Allowed: 22	
(Legal Instruments Examiner) (Date)	(Primary Examiner) (Date)	O.G. Print Claim(s): 13	O.G. Print Fig.: 2

☐ Claims renumbered in the same order as presented by applicant ☐ CPA ☐ T.D. ☐ R.1.47

Final	Original	Final	Original	Final	Original	Final	Original	Final	Original	Final	Original	Final	Original
1	1		31		61		91		121		151		181
2	2		32		62		92		122		152		182
3	3		33		63		93		123		153		183
4	4		34		64		94		124		154		184
5	5		35		65		95		125		155		185
6	6		36		66		96		126		156		186
7	7		37		67		97		127		157		187
8	8		38		68		98		128		158		188
9	9		39		69		99		129		159		189
10	10		40		70		100		130		160		190
11	11		41		71		101		131		161		191
12	12		42		72		102		132		162		192
13	13		43		73		103		133		163		193
14	14		44		74		104		134		164		194
15	15		45		75		105		135		165		195
16	16		46		76		106		136		166		196
17	17		47		77		107		137		167		197
18	18		48		78		108		138		168		198
19	19		49		79		109		139		169		199
20	20		50		80		110		140		170		200
21	21		51		81		111		141		171		201
22	22		52		82		112		142		172		202
	23		53		83		113		143		173		203
	24		54		84		114		144		174		204
	25		55		85		115		145		175		205
	26		56		86		116		146		176		206
	27		57		87		117		147		177		207
	28		58		88		118		148		178		208
	29		59		89		119		149		179		209
	30		60		90		120		150		180		210

IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

In re Patent Application of: **FLICK**	)	
Serial No. **11/773,272**	)	
Filing Date: **July 3, 2007**	)	
Confirmation No. **1046**	)	Examiner: **C. NGUYEN**
For: **VEHICLE TRACKING UNIT WITH DOWNLOADABLE CODES AND ASSOCIATED METHODS**	)	Attorney Docket No: **58106_CIP1**

AMENDMENT

Mail Stop Amendment
Commissioner for Patents
P.O. Box 1450
Alexandria, VA 22313-1450

Sir:

Responsive to the Official Action of January 5, 2011, 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. (Original) 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. (Original) The multi-vehicle compatible tracking unit according to Claim 1 wherein said downloading interface comprises a wired signal downloading interface.

3. (Original) 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. (Original) The multi-vehicle compatible tracking unit according to Claim 1 wherein said downloading interface comprises a wireless signal downloading interface.

5. (Original) 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. (Original) 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. (Original) 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. (Original) 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. (Original) 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. (Original) 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. (Original) The multi-vehicle compatible tracking unit according to Claim 1 wherein said wireless position determining device comprises a Global Positioning System (GPS) receiver.

12. (Original) 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. (Previously presented) 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. (Original) 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. (Original) 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. (Original) 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. (Original) 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. (Previously presented) 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. (Original) 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. (Original) 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. (Original) 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. (Original) 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.

Claims 23-30 (Canceled).

REMARKS

Applicant thanks the Examiner for the careful and thorough examination of the present application, and for correctly withdrawing the previous rejections of the claims.

Applicant submits that all claims are patentable, presents arguments herein supporting such patentability, and respectfully requests that the Examiner withdraw all pending rejections and allow all claims.

I. The Claimed Invention

Independent Claim 1 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 may comprise 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. The multi-vehicle compatible tracking unit may comprise 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 multi-vehicle compatible tracking units similar to that of Claim 1, but further recite the downloading interface comprising a

connector for temporary connection to a downloading device and a wireless receiver for temporary connection to a downloading device, respectively.

II. The Claims Are Patentable

The Examiner has rejected all of the claims over Monroe in view of Brinkmeyer et al. Monroe discloses a system for tracking aircraft as they taxi in and out of an airport terminal. The system includes a receiver, and a plurality of transceivers on the respective tracked aircraft for communicating with the receiver. The transceivers in the tracked aircraft transmit GPS data for the aircraft to the receiver. The system also includes a plurality of cameras, which also are in communication with the receiver, for visual monitoring of tracked aircraft. As shown in Figures 4a and 4b, each aircraft includes a camera, and a WLAN for coupling together the camera to the aircraft transceiver.

Brinkmeyer et al. discloses a wireless key fob that can learn the codes to operate other devices, such as garage doors, vehicle convenience functions, and automated home door locks. (Col. 4, lines 1-7). The wireless key fob learns new codes in the typical fashion, i.e. the user executes the needed command on an existing remote while the wireless key fob is in a learning mode. While in the learning mode, the wireless key fob listens for the wireless code to be learned. Once learned, the wireless key fob can operate the learned function. (Col. 6, line 65 through Col. 7, line 37).

The wireless key fob can control certain devices within the car, such as an auxiliary heater, by communicating

with a separate wireless transceiver of the car. Of course, the wireless key fob must first learn the codes for this function. The wireless transceiver of the car communicates with the device using a data communications bus. (Col. 4, lines 53-66).

Applicant respectfully notes that 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. Although Brinkmeyer et al. discloses the wireless key fob that can learn wireless codes for controlling certain feature of a vehicle, the wireless key fob is unrelated to the data communications bus of the vehicle. Indeed, as noted above, the wireless key fob must first communicate with the vehicle wireless transceiver, which then communicates with the data communications bus. Moreover, Monroe does not appear to make up for this deficiency of Brinkmeyer et al.

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.

Accordingly, it is submitted that independent Claims 1, 13, and 18 are patentable over the prior art. Their respective dependent claims, which recite yet further distinguishing features, are also patentable over the prior art and require no further discussion herein.

CONCLUSIONS

In view of the claims and the arguments presented above, it is submitted that all of the claims are patentable. Accordingly, a Notice of Allowance 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.

Respectfully submitted,

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Attorney for Applicant

Electronic Acknowledgement Receipt	
EFS ID:	9809841
Application Number:	11773272
International Application Number:	
Confirmation Number:	1046
Title of Invention:	VEHICLE TRACKING UNIT WITH DOWNLOADABLE CODES AND ASSOCIATED METHODS
First Named Inventor/Applicant Name:	Kenneth E. Flick
Correspondence Address:	CHRISTOPHER F. REGAN, ESQUIRE ALLEN, DYER, DOPPELT, MILBRATH & GILCHRIST, P.A. P.O. Box 3791 - Orlando FL 32802-3791 US 4078412330 -
Filer:	Christopher F. Regan/Sherry Leonard
Filer Authorized By:	Christopher F. Regan
Attorney Docket Number:	58106CIP1
Receipt Date:	05-APR-2011
Filing Date:	03-JUL-2007
Time Stamp:	11:49:20
Application Type:	Utility under 35 USC 111(a)

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		58106_CIP1_Amendment_4_5_11.pdf	366071 5456220740db06e81768934a410ab023417ed822	yes	13

Multipart Description/PDF files in .zip description		
Document Description	**Start**	**End**
Miscellaneous Incoming Letter	1	1
Amendment/Req. Reconsideration-After Non-Final Reject	2	2
Claims	3	8
Applicant Arguments/Remarks Made in an Amendment	9	13

Warnings:	
Information:	
Total Files Size (in bytes):	366071

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.

Case No. 58106 CIP1

Commissioner For Patents
P.O. Box 1450
Alexandria, VA 22313-1450

In re Application of: **FLICK**

Serial No.: **11/773,272**

Filed: **July 3, 2007**

For: **VEHICLE TRACKING UNIT WITH DOWNLOADABLE CODES AND ASSOCIATED METHODS**

Sir:

Transmitted herewith is an amendment in the above-identified application.

[ ] Applicant qualifies as a small entity under 37 CFR § 1.27.

[X] No additional fee is required.

[X] The Commissioner is hereby authorized to charge or credit any discrepancies in fee amounts to Deposit Account No. 01-0484.

[X] **PLEASE ADDRESS ALL CORRESPONDENCE TO ATTORNEY OF RECORD: CHRISTOPHER F. REGAN**

[X] This application is associated with Customer No. **27975**.

April 5, 2011
DATE

JACK GEORGE ABID
Reg. No. 58,237

PTO/SB/06 (07-06)
Approved for use through 1/31/2007. OMB 0651-0032
U.S. Patent and Trademark Office; U.S. DEPARTMENT OF COMMERCE
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PATENT APPLICATION FEE DETERMINATION RECORD

Substitute for Form PTO-875

Application or Docket Number	Filing Date	☐ To be Mailed
11/773,272	07/03/2007	

APPLICATION AS FILED – PART I

	(Column 1)	(Column 2)	SMALL ENTITY ☐		OR	OTHER THAN SMALL ENTITY	
FOR	NUMBER FILED	NUMBER EXTRA	RATE ($)	FEE ($)		RATE ($)	FEE ($)
☐ BASIC FEE (37 CFR 1.16(a), (b), or (c))	N/A	N/A	N/A			N/A	
☐ SEARCH FEE (37 CFR 1.16(k), (i), or (m))	N/A	N/A	N/A			N/A	
☐ EXAMINATION FEE (37 CFR 1.16(o), (p), or (q))	N/A	N/A	N/A			N/A	
TOTAL CLAIMS (37 CFR 1.16(i))	minus 20 =	*	X $ =		OR	X $ =	
INDEPENDENT CLAIMS (37 CFR 1.16(h))	minus 3 =	*	X $ =			X $ =	
☐ APPLICATION SIZE FEE (37 CFR 1.16(s))	If the specification and drawings exceed 100 sheets of paper, the application size fee due is $250 ($125 for small entity) for each additional 50 sheets or fraction thereof. See 35 U.S.C. 41(a)(1)(G) and 37 CFR 1.16(s).						
☐ MULTIPLE DEPENDENT CLAIM PRESENT (37 CFR 1.16(j))							
* If the difference in column 1 is less than zero, enter "0" in column 2.			TOTAL			TOTAL	

APPLICATION AS AMENDED – PART II

AMENDMENT 04/05/2011	(Column 1) CLAIMS REMAINING AFTER AMENDMENT		(Column 2) HIGHEST NUMBER PREVIOUSLY PAID FOR	(Column 3) PRESENT EXTRA	SMALL ENTITY RATE ($)	ADDITIONAL FEE ($)	OR	OTHER THAN SMALL ENTITY RATE ($)	ADDITIONAL FEE ($)
Total (37 CFR 1.16(i))	* 22	Minus	** 30	= 0	X $ =		OR	X $52=	0
Independent (37 CFR 1.16(h))	* 3	Minus	***4	= 0	X $ =		OR	X $220=	0
☐ Application Size Fee (37 CFR 1.16(s))									
☐ FIRST PRESENTATION OF MULTIPLE DEPENDENT CLAIM (37 CFR 1.16(j))							OR		
					TOTAL ADD'L FEE		OR	TOTAL ADD'L FEE	0

AMENDMENT	(Column 1) CLAIMS REMAINING AFTER AMENDMENT		(Column 2) HIGHEST NUMBER PREVIOUSLY PAID FOR	(Column 3) PRESENT EXTRA	RATE ($)	ADDITIONAL FEE ($)	OR	RATE ($)	ADDITIONAL FEE ($)
Total (37 CFR 1.16(i))	*	Minus	**	=	X $ =		OR	X $ =	
Independent (37 CFR 1.16(h))	*	Minus	***	=	X $ =		OR	X $ =	
☐ Application Size Fee (37 CFR 1.16(s))									
☐ FIRST PRESENTATION OF MULTIPLE DEPENDENT CLAIM (37 CFR 1.16(j))							OR		
					TOTAL ADD'L FEE		OR	TOTAL ADD'L FEE	

* If the entry in column 1 is less than the entry in column 2, write "0" in column 3.

** If the "Highest Number Previously Paid For" IN THIS SPACE is less than 20, enter "20".

*** If the "Highest Number Previously Paid For" IN THIS SPACE is less than 3, enter "3".

The "Highest Number Previously Paid For" (Total or Independent) is the highest number found in the appropriate box in column 1.

Legal Instrument Examiner:
/BURNELL L. ROSS/

This collection of information is required by 37 CFR 1.16. 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 12 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: 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.

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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
11/773,272	07/03/2007	Kenneth E. Flick	58106CIP1	1046

7590 01/05/2011

CHRISTOPHER F. REGAN, ESQUIRE
ALLEN, DYER, DOPPELT, MILBRATH & GILCHRIST, P.A.
P.O. Box 3791
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EXAMINER	
NGUYEN, CUONG H	
ART UNIT	PAPER NUMBER
3661	

MAIL DATE	DELIVERY MODE
01/05/2011	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.

Office Action Summary	Application No.	Applicant(s)	
	11/773,272	FLICK, KENNETH E.	
	Examiner	Art Unit	
	CUONG H. NGUYEN	3661	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1)☒ Responsive to communication(s) filed on *22 October 2010*.

2a)☐ This action is **FINAL**. 2b)☒ This action is non-final.

3)☐ Since this application is in condition for allowance 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.

Disposition of Claims

4)☒ Claim(s) *1-22* is/are pending in the application.

4a) Of the above claim(s) _____ is/are withdrawn from consideration.

5)☐ Claim(s) _____ is/are allowed.

6)☒ Claim(s) *1-22* is/are rejected.

7)☐ Claim(s) _____ is/are objected to.

8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

9)☐ The specification is objected to by the Examiner.

10)☒ The drawing(s) filed on _____ is/are: a)☒ accepted or b)☐ objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).

11)☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

12)☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

a)☐ All b)☐ Some * c)☐ None of:

1.☐ Certified copies of the priority documents have been received.

2.☐ Certified copies of the priority documents have been received in Application No. _____.

3.☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

1) ☒ Notice of References Cited (PTO-892)
2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
3) ☐ Information Disclosure Statement(s) (PTO/SB/08) Paper No(s)/Mail Date _____.
4) ☐ Interview Summary (PTO-413) Paper No(s)/Mail Date. _____ .
5) ☐ Notice of Informal Patent Application
6) ☐ Other: _____.

1. This Office Action is the answer to a communication received on 10/22/2010.

2. Claims 1-22 are pending.

Response

3. Previous objections and rejections are withdrawn. New grounds of obvious rejections are submitted herein.

Claim Rejections - 35 USC § 103

The following is a quotation of 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.

4. Claims 1-21, are rejected under 35 U.S.C. 103(a) as being unpatentable over Monroe (US Pat. 6,253,064 B1), in view of Brinkmeyer et al. (US Pat. 5,940,007).

A. As to independent claims 1, 4-10, 14-16, and 18-21: Monroe suggests a system to tracking and monitoring different kinds of vehicles (see Monroe, Fig. 1, refs. 10, 10a, and 10b).

Brinkmeyer et al., also teach a vehicle control system comprising:

- a tracking unit and a function unit cooperating therewith, said tracking unit comprising a vehicle position determining device (see Monroe, Fig. 4a-4b; see also Brinkmeyer et al, col. 5, lines 6-16) "..vehicle is equipped with an antitheft system having a car telephone *and a locating system, such as the Global Positioning System").*

- a wireless communications device, and a tracking controller configured cooperate with said vehicle position determining device and said wireless communications device (see

Monroe, Fig. 4a-4b; see Brinkmeyer et al., Fig. 1); said function unit comprising at least one uniquely coded transmitter to be carried by a user (see Monroe, Fig. 4a-4b "wireless transceiver"; this is also taught in this prior art since remote controlling a car requires a uniquely coded command in order for that command to be received and executed).

Monroe and Brinkmeyer et al., teach that a device can read/write/program/download from/to another device by remotely using proper codes/instructions/ID (see Monroe, Fig. 4a-4b with "transceivers"' capabilities; as in pending claims 6-9 and 19-22, see Brinkmeyer et al, Fig.1).

Brinkmeyer et al., (col. 4, lines 22-39, and lines 52-65) clearly disclose: "The transmitter/receiver 4a in the vehicle 4 is connected with the other components of the electric system of the vehicle, via a data bus system ", and "the vehicle-side transmitter/receiver 4a transmits the corresponding control commands via the data bus system to the respective vehicle target component "; i.e. a vehicle data bus has been taught by Brinkmeyer et al.

Brinkmeyer et al., do not disclose that a receiver at the vehicle for receiving signals from said a uniquely coded transmitter, and a function controller at the vehicle and connected to said receiver for learning (i.e., pending claim is about signal transmitting/receiving between vehicles).

However, similar functions as claimed are taught by Monroe, and Brinkmeyer et al., with a wireless receiver I/F - (not necessary disclosing that a receiver and a transmitter must be from different vehicles).

Since the pending claims are physical structures/units, Monroe and Brinkmeyer et al., system obviously performs claimed devices/components.

As for accepting a command – a particular definition for "learning" a uniquely coded transmitter to permit control of a vehicle function by the user (see Brinkmeyer et al., Figs. 4A, 4C, col. 2 lines 23-42, "... *activating a* learn mode, in which they can receive the new authorization code from the newly programmed remote control unit by way of a special antenna, if the remote control unit is brought into the direct vicinity and is caused to send the new authorization code.. ".

Brinkmeyer et al., also do not disclose that an alert function would acknowledge a user for accepting a new unique code in "said function controller configured to cooperate with said wireless communications device of said tracking unit to send an alert indication *of whether at least one new uniquely coded transmitter has been learned".*

However, this action is obvious for a remote device to acknowledge a user/operator wirelessly that it starts to accept a new unique code (e.g., from a control tower) – also this is a clear example of wirelessly programming a garage door to accept a specific code (as taught by Brinkmeyer et al).

It would have been obvious to one of ordinary in the art at the time this invention was made to combine both Monroe and Brinkmeyer et al.'s systems by clearly disclosing that a communication between related vehicles, an extra feature to alert/drawing attentions of a user (by available voice/sound/image/text generator) that a new unique code would be effective from now on as a reminder to that user.

B. As per claims 2-3, and 13: The rationales and reference for a rejection of claim 1 are incorporated.

It is submitted that downloading/(sending signals) by using a (temporary) directed wire (connecting directly to an I/F) has been quite well-known.

C. As per claim 10: The rationales and reference for a rejection of claim 1 are incorporated.

It is submitted that Brinkmeyer et al., taught about a garage door opener (e.g., a claimed "remote keyless entry function").

D. As per claim 11: The rationales and reference for a rejection of claim 1 are incorporated.

It is submitted that Monroe Figs. 4a-4b, and Brinkmeyer et al., taught about using a GPS receiver (see Brinkmeyer et al., col. 5 line 9).

E. As per claim 12: The rationales and reference for a rejection of claim 1 are incorporated.

It is submitted that Monroe and Brinkmeyer et al., taught about a housing to contain a GPS, a wireless communication device, a controller, and communication I/F (see Brinkmeyer et al., Figs. 1-2).

F. As per claim 17: The rationales and reference for a rejection of claim 1 are incorporated.

It is submitted that Monroe and Brinkmeyer et al., taught about wireless communication devices: a remote transmitter, and communication I/F to remotely control a device/component (see Brinkmeyer et al., Fig. 3 "the garage door opener").

Conclusion

5. Pending claims are rejected.

6. Any inquiry concerning this communication or earlier communications from the examiner should be directed to CUONG H. NGUYEN whose telephone number is 571-272-6759. (email address is cuong.nguyen@uspto.gov). The examiner can normally be

reached on 9:30 am – 5:30 pm.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, THOMAS G. BLACK can be reached on 571-272-6956. The Rightfax number for the organization where this application is assigned is 571-273-6956.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see http://pair-direct.uspto.gov. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).

Please provide support, with page and line numbers, for any amended or new claim in an effort to help advance prosecution; otherwise any new claim language that is introduced in an amended or new claim may be considered as new matter, especially if the Application is a Jumbo Application.

/CUONG H. NGUYEN/
Primary Examiner
Art Unit 3661

Notice of References Cited	Application/Control No. 11/773,272	Applicant(s)/Patent Under Reexamination FLICK, KENNETH E.	
	Examiner CUONG H. NGUYEN	Art Unit 3661	Page 1 of 1

U.S. PATENT DOCUMENTS

*		Document Number Country Code-Number-Kind Code	Date MM-YYYY	Name	Classification
*	A	US-2006/0187026	08-2006	Kochis, Gary	340/539.13
*	B	US-7,196,621	03-2007	Kochis, Gary	340/539.13
*	C	US-7,366,892	04-2008	Spaur et al.	713/151
*	D	US-7,085,775	08-2006	Short et al.	1/1
*	E	US-2002/0188702	12-2002	Short et al.	709/220
*	F	US-6,611,755	08-2003	Coffee et al.	701/213
*	G	US-6,657,587	12-2003	Mohan, Paul L.	342/357.75
*	H	US-6,859,831	02-2005	Gelvin et al.	709/224
*	I	US-2004/0073440	04-2004	Garbers et al.	705/001
*	J	US-2004/0066330	04-2004	Knockeart et al.	342/357.07
*	K	US-6,628,233	09-2003	Knockeart et al.	342/357.31
*	L	US-6,253,064	06-2001	Monroe, David A.	455/66.1
*	M	US-2002/0152053	10-2002	Roy et al.	702/185

FOREIGN PATENT DOCUMENTS

*		Document Number Country Code-Number-Kind Code	Date MM-YYYY	Country	Name	Classification
	N					
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	R					
	S					
	T					

NON-PATENT DOCUMENTS

*		Include as applicable: Author, Title Date, Publisher, Edition or Volume, Pertinent Pages)
	U	
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	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	
11773272	11/773,272	FLICK, KENNETH E.	
	Examiner	Art Unit	
	CUONG H. NGUYEN	3661	

SEARCHED			
Class	Subclass	Date	Examiner

INTERFERENCE SEARCHED			
Class	Subclass	Date	Examiner

SEARCH NOTES (INCLUDING SEARCH STRATEGY)		
	DATE	EXMR
Updated west/derwent	1/2/2010	CHN

Index of Claims	Application/Control No.	Applicant(s)/Patent under Reexamination
11773272	11/773,272	FLICK, KENNETH E.
	Examiner: CUONG H. NGUYEN	Art Unit: 3661

√	Rejected	–	(Through numeral) Cancelled	N	Non-Elected	A	Appeal
=	Allowed	÷	Restricted	I	Interference	O	Objected

Claim		Date
Final	Original	1/2/10
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Refine Search

Search Results

Terms	Documents
L4 and (databus or "can bus" or "data bus")	3

Database: US Pre-Grant Publication Full-Text Database; US Patents Full-Text Database; US Patents OCR Backfile; EPO Abstracts Database; JPO Abstracts Database; Derwent World Patents Index; IBM Technical Disclosure Bulletin Database

Search Type: (•) Prior Art ( ) Interference

Search: L7

Refine Search | Recall Text | Clear | Interrupt

Search History

DATE: Sunday, January 02, 2011 Purge Queries | Printable Copy | Create Case

Set Name Side by Side	Query	Hit Count	Set Name Result Set	Set Name Grid
Prior Art Searches				
DB=PGPB,USPT,USOC,EPAB,JPAB,DWPI,TDBD; THES=ASSIGNEE; PLUR=YES; OP=OR				
L7	L4 and (databus or "can bus" or "data bus")	3	L7	L7
L6	L5 and l4	5	L6	L6
L5	L3 and (vehicles with controller with (multi$ or many))	24	L5	L5
L4	L3 and (download$ with (code$ or id$))	12	L4	L4
L3	L2 or l1	113	L3	L3
L2	@pd<=20050309 and (track$ with (multi$ or many$) with "vehicles") and ("can" with "bus") and (id$ or code)	66	L2	L2
L1	@ad<=20050309 and (track$ with (multi$ or many$) with "vehicles") and ("can" with "bus") and (id$ or code)	110	L1	L1

END OF SEARCH HISTORY

IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

In re Patent Application of: **FLICK**	)	
Serial No. **11/773,272**	)	
Filing Date: **July 3, 2007**	)	
Confirmation No. **1046**	)	Examiner: **NGUYEN, CUONG**
For: **VEHICLE TRACKING UNIT WITH DOWNLOADABLE CODES AND ASSOCIATED METHODS**	)	Attorney Docket No: **58106_CIP1**

AMENDMENT

Mail Stop Amendment
Commissioner for Patents
P.O. Box 1450
Alexandria, VA 22313-1450

Sir:

Responsive to the Official Action of June 22, 2010, 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. (Original) 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. (Original) The multi-vehicle compatible tracking unit according to Claim 1 wherein said downloading interface comprises a wired signal downloading interface.

3. (Original) 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. (Original) The multi-vehicle compatible tracking unit according to Claim 1 wherein said downloading interface comprises a wireless signal downloading interface.

5. (Original) 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. (Original) 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. (Original) 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. (Original) 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. (Original) 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. (Original) 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. (Original) The multi-vehicle compatible tracking unit according to Claim 1 wherein said wireless position determining device comprises a Global Positioning System (GPS) receiver.

12. (Original) 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. (Previously presented) 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. (Original) 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. (Original) 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. (Original) 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. (Original) 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. (Previously presented) 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. (Original) 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. (Original) 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. (Original) 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. (Original) 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.

Claims 23-30 (Canceled).

REMARKS

Applicant thanks the Examiner for extending all courtesies to Applicant's Attorney during the Telephonic Interview of October 12, 2010. During the Telephonic Interview, the Examiner agreed to issue a new Official Action to correct defects in the Official Action of June 22, 2010.

The Examiner rejected all of the claims over Brickmeyer et al. Brickmeyer et al. discloses a wireless key fob that can learn the codes to operate garage doors. The wireless key fob learns new codes in the typical fashion, i.e. the user executes the needed command on an existing remote while the wireless key fob is in a learning mode. While in the learning mode, the wireless key fob listens for the wireless code to be learned. Once learned, the wireless key fob can operate the learned function.

Applicant submits that Brickmeyer et al. fails 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, for example.

Accordingly, because of such deficiency, Applicant submits that independent Claim 1 is patentable over the prior art. Applicant submits that companion independent Claims 13 and 18 are similar to Claim 1 and are patentable for similar reasoning. Their respective dependent claims, which recite yet further distinguishing features, are also patentable over the prior art and require no further discussion herein.

CONCLUSIONS

Applicant respectfully submits that the claims are patentable since the applied prior art fails to disclose or fairly suggest each and every feature of the claimed invention. Accordingly, a Notice of Allowance 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.

Respectfully submitted,

/JACK GEORGE ABID/

JACK GEORGE ABID
Reg. No. 58,237
Allen, Dyer, Doppelt, Milbrath
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255 S. Orange Avenue, Suite 1401
Post Office Box 3791
Orlando, Florida 32802
407-841-2330
407-841-2343 fax
Attorney for Applicant

Electronic Patent Application Fee Transmittal

Application Number:	11773272
Filing Date:	03-Jul-2007
Title of Invention:	VEHICLE TRACKING UNIT WITH DOWNLOADABLE CODES AND ASSOCIATED METHODS
First Named Inventor/Applicant Name:	Kenneth E. Flick
Filer:	Christopher F. Regan/Michelle Holmes
Attorney Docket Number:	58106CIP1

Filed as Large Entity

Utility under 35 USC 111(a) Filing Fees

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:				
Extension - 1 month with $0 paid	1251	1	130	130

Description	Fee Code	Quantity	Amount	Sub-Total in USD($)
Miscellaneous:				
			Total in USD ($)	**130**

Electronic Acknowledgement Receipt	
EFS ID:	8681082
Application Number:	11773272
International Application Number:	
Confirmation Number:	1046
Title of Invention:	VEHICLE TRACKING UNIT WITH DOWNLOADABLE CODES AND ASSOCIATED METHODS
First Named Inventor/Applicant Name:	Kenneth E. Flick
Correspondence Address:	CHRISTOPHER F. REGAN, ESQUIRE ALLEN, DYER, DOPPELT, MILBRATH & GILCHRIST, P.A. P.O. Box 3791 - Orlando FL 32802-3791 US 4078412330 -
Filer:	Christopher F. Regan/Michelle Holmes
Filer Authorized By:	Christopher F. Regan
Attorney Docket Number:	58106CIP1
Receipt Date:	22-OCT-2010
Filing Date:	03-JUL-2007
Time Stamp:	12:06:36
Application Type:	Utility under 35 USC 111(a)

Payment information:

Submitted with Payment	yes
Payment Type	Credit Card
Payment was successfully received in RAM	$130

RAM confirmation Number	9853
Deposit Account	
Authorized User	

File Listing:

Document Number	Document Description	File Name	File Size(Bytes)/ Message Digest	Multi Part /.zip	Pages (if appl.)
1		58106_CIP1_EOT_Amendment.pdf	443186 a9880dc978ad7652c728ad3d1174a4a3019fff73	yes	10

Multipart Description/PDF files in .zip description

Document Description	Start	End
Extension of Time	1	1
Amendment/Req. Reconsideration-After Non-Final Reject	2	2
Claims	3	8
Applicant Arguments/Remarks Made in an Amendment	9	10

Warnings:

Information:

2	Fee Worksheet (PTO-875)	fee-info.pdf	30643 a75a8474e3d0392b5fdca6f308284ecb524b67da	no	2

Warnings:

Information:

Total Files Size (in bytes):	473829

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 Application of: **FLICK**	)	
Serial No. **11/773,272**	)	
Filing Date: **July 3, 2007**	)	
Confirmation No. **1046**	)	Examiner: **NGUYEN, CUONG**
For: **VEHICLE TRACKING UNIT WITH DOWNLOADABLE CODES AND ASSOCIATED METHODS**	)	Attorney Docket No: **58106_CIP1**

REQUEST FOR EXTENSION OF TIME

Commissioner for Patents
P.O. Box 1450
Alexandria, VA 22313-1450

Sir:

The Applicant in the above-referenced application respectfully requests a one-month time extension for filing the response to the Office Action mailed June 22, 2010. The extension of time fee in the amount of $130.00 is being paid by credit card on EFS-Web. The Commissioner is authorized to charge or credit any discrepancies in fee amounts to Deposit Account **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 Applicant

PTO/SB/06 (07-06)
Approved for use through 1/31/2007. OMB 0651-0032
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 displays a valid OMB control number.

PATENT APPLICATION FEE DETERMINATION RECORD

Substitute for Form PTO-875

Application or Docket Number	Filing Date	☐ To be Mailed
11/773,272	07/03/2007	

APPLICATION AS FILED – PART I

	(Column 1)	(Column 2)	SMALL ENTITY ☐		OR	OTHER THAN SMALL ENTITY	
FOR	NUMBER FILED	NUMBER EXTRA	RATE ($)	FEE ($)		RATE ($)	FEE ($)
☐ BASIC FEE (37 CFR 1.16(a), (b), or (c))	N/A	N/A	N/A			N/A	
☐ SEARCH FEE (37 CFR 1.16(k), (i), or (m))	N/A	N/A	N/A			N/A	
☐ EXAMINATION FEE (37 CFR 1.16(o), (p), or (q))	N/A	N/A	N/A			N/A	
TOTAL CLAIMS (37 CFR 1.16(i))	minus 20 =	*	X $ =		OR	X $ =	
INDEPENDENT CLAIMS (37 CFR 1.16(h))	minus 3 =	*	X $ =			X $ =	
☐ APPLICATION SIZE FEE (37 CFR 1.16(s))	If the specification and drawings exceed 100 sheets of paper, the application size fee due is $250 ($125 for small entity) for each additional 50 sheets or fraction thereof. See 35 U.S.C. 41(a)(1)(G) and 37 CFR 1.16(s).						
☐ MULTIPLE DEPENDENT CLAIM PRESENT (37 CFR 1.16(j))							
* If the difference in column 1 is less than zero, enter "0" in column 2.			TOTAL			TOTAL	

APPLICATION AS AMENDED – PART II

AMENDMENT	10/22/2010	(Column 1) CLAIMS REMAINING AFTER AMENDMENT		(Column 2) HIGHEST NUMBER PREVIOUSLY PAID FOR	(Column 3) PRESENT EXTRA	SMALL ENTITY RATE ($)	ADDITIONAL FEE ($)	OR	OTHER THAN SMALL ENTITY RATE ($)	ADDITIONAL FEE ($)
	Total (37 CFR 1.16(i))	* 22	Minus	** 30	= 0	X $ =		OR	X $52=	0
	Independent (37 CFR 1.16(h))	* 3	Minus	***4	= 0	X $ =		OR	X $220=	0
	☐ Application Size Fee (37 CFR 1.16(s))									
	☐ FIRST PRESENTATION OF MULTIPLE DEPENDENT CLAIM (37 CFR 1.16(j))							OR		
						TOTAL ADD'L FEE		OR	TOTAL ADD'L FEE	0

AMENDMENT		(Column 1) CLAIMS REMAINING AFTER AMENDMENT		(Column 2) HIGHEST NUMBER PREVIOUSLY PAID FOR	(Column 3) PRESENT EXTRA	RATE ($)	ADDITIONAL FEE ($)		RATE ($)	ADDITIONAL FEE ($)
	Total (37 CFR 1.16(i))	*	Minus	**	=	X $ =		OR	X $ =	
	Independent (37 CFR 1.16(h))	*	Minus	***	=	X $ =		OR	X $ =	
	☐ Application Size Fee (37 CFR 1.16(s))									
	☐ FIRST PRESENTATION OF MULTIPLE DEPENDENT CLAIM (37 CFR 1.16(j))							OR		
						TOTAL ADD'L FEE		OR	TOTAL ADD'L FEE	

* If the entry in column 1 is less than the entry in column 2, write "0" in column 3.

** If the "Highest Number Previously Paid For" IN THIS SPACE is less than 20, enter "20".

*** If the "Highest Number Previously Paid For" IN THIS SPACE is less than 3, enter "3".

The "Highest Number Previously Paid For" (Total or Independent) is the highest number found in the appropriate box in column 1.

Legal Instrument Examiner:
/TERRY MALLOY ROSS/

This collection of information is required by 37 CFR 1.16. 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 12 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: 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.

RECEIVED
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OCT 12 2010

IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

In re Patent Application of: FLICK	
Serial No. 11/773,272	
Filing Date: July 3, 2007	
Confirmation No. 1046	Examiner: NGUYEN, CUONG
For: VEHICLE TRACKING UNIT WITH DOWNLOADABLE CODES AND ASSOCIATED METHODS	Attorney Docket No: 58106_CIP1

SUMMARY OF TELEPHONIC INTERVIEW OF OCTOBER 12, 2010

Applicant thanks the Examiner for extending all courtesies to Applicant's Attorney during the Telephonic Interview of October 12, 2010. During the Telephonic Interview, the Examiner agreed to issue a new Official Action to correct defects in the Official Action of June 22, 2010.

Respectfully submitted,

JACK GEORGE ABID
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Attorney for Applicant

PAGE 2/2 * RCVD AT 10/12/2010 2:58:36 PM [Eastern Daylight Time] * SVR:USPTO-EFXRF-5/31 * DNIS:2738300 * CSID:407 796 5046 * DURATION (mm-ss):00-36

Allen, Dyer, Doppelt,
Milbrath & Gilchrist, P.A.
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FACSIMILE COVER SHEET

TO: Examiner Cuong Ngyuen - United States Patent and Trademark Office; Art Unit – 3661

CLIENT NAME/NUMBER: 58106_CIP1

TELEPHONE: 571-272-6759 **FAX NO:** 571-273-8300

FROM: Jack G. Abid **DATE:** October 12, 2010

NUMBER OF PAGES (INCLUDING COVER SHEET): 2

COMMENTS/INSTRUCTIONS:

Please see attached Interview Summary for U.S. Patent Application Serial No. 11/773,272.

NOTE: The information in this facsimile transmission is intended only for the personal and confidential use of the designated recipient(s) named above. This message may be an attorney-client communication and as such is privileged.

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UNITED STATES DEPARTMENT OF COMMERCE
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Alexandria, Virginia 22313-1450
www.uspto.gov

APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
11/773,272	07/03/2007	Kenneth E. Flick	58106CIP1	1046

7590 06/22/2010

CHRISTOPHER F. REGAN, ESQUIRE
ALLEN, DYER, DOPPELT, MILBRATH & GILCHRIST, P.A.
P.O. Box 3791
Orlando, FL 32802-3791

EXAMINER	
NGUYEN, CUONG H	
ART UNIT	PAPER NUMBER
3661	

MAIL DATE	DELIVERY MODE
06/22/2010	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.

Office Action Summary	Application No.	Applicant(s)	
	11/773,272	FLICK, KENNETH E.	
	Examiner	Art Unit	
	CUONG H. NGUYEN	3661	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1)☒ Responsive to communication(s) filed on *24 February 2010*.

2a)☐ This action is **FINAL**. 2b)☒ This action is non-final.

3)☐ Since this application is in condition for allowance 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.

Disposition of Claims

4)☒ Claim(s) *1-30* is/are pending in the application.

4a) Of the above claim(s) *23-30* is/are withdrawn from consideration.

5)☐ Claim(s) _____ is/are allowed.

6)☒ Claim(s) *1-22* is/are rejected.

7)☐ Claim(s) _____ is/are objected to.

8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

9)☐ The specification is objected to by the Examiner.

10)☐ The drawing(s) filed on _____ is/are: a)☐ accepted or b)☐ objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).

11)☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

12)☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

a)☐ All b)☐ Some * c)☐ None of:

1.☐ Certified copies of the priority documents have been received.

2.☐ Certified copies of the priority documents have been received in Application No. _____.

3.☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

1) ☒ Notice of References Cited (PTO-892)
2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
3) ☒ Information Disclosure Statement(s) (PTO/SB/08) Paper No(s)/Mail Date _____.
4) ☐ Interview Summary (PTO-413) Paper No(s)/Mail Date. _____ .
5) ☐ Notice of Informal Patent Application
6) ☐ Other: _____.

1. This Office Action is the answer to a communication received on 2/24/2010.

2. Claims 1-30 are pending; claims 23-30 are withdrawn on 2/24/2010.

Claim Objections

3. Claims 1-22 are objected because they recite confused/unclear language:

- As per claim 1: it is directed to a multi-vehicle compatible tracking unit for a vehicle, comprising a multi-vehicle compatible controller.

- As per claim 13: it is directed to a multi-vehicle compatible tracking unit for a vehicle, comprising a multi-vehicle compatible controller.

- As per claim 18: it is directed to a multi-vehicle compatible tracking unit for a vehicle, comprising a multi-vehicle compatible controller.

As best interpretation from this invention's disclosure: it is claimed about using a data bus to remote control functions: i.e., data downloading, a vehicle security function, a remote keyless entry function, and a remote engine starting function (see pending claim 10) – the disclosure does not disclose about "multi-vehicle …tracking unit" or "multi-vehicle …controller" – this kind of language is not proper, and not being used in prior art (for a search purpose) – it may receive info./signal(s) from different source(s). Corrections are required.

Claim Rejections - 35 USC § 103

The following is a quotation of 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.

4. *Claims 1-21, are rejected under 35 U.S.C. 103(a) as being unpatentable over Brinkmeyer et al. (US Pat. 5,940,007).*

A. As to independent claims 1, 4-10, 14-16, and 18-21: Brinkmeyer et al., teach a vehicle control system comprising:

- a tracking unit and a function unit cooperating therewith, said tracking unit comprising a vehicle position determining device (see Brinkmeyer et al, col. 5, lines 6-16) "*.. vehicle is equipped with an antitheft system having a car telephone and a locating system, such as the Global Positioning System").*

- a wireless communications device, and a tracking controller configured cooperate with said vehicle position determining device and said wireless communications device (see Brinkmeyer et al., Fig. 1); said function unit comprising at least one uniquely coded transmitter to be carried by a user (*this is also taught in this prior art since remote controlling a car requires a uniquely coded command in order for that command to be received and executed*).

Brinkmeyer et al., teach that a device can read/write/program/download from/to another device by remotely using proper codes/instructions (as in pending claims 6-9 and 19-22, see Brinkmeyer et al, Fig.1).

Brinkmeyer et al., US Pat. 5,940,007, (col. 4, lines 22-39, and lines 52-65) disclose: "The transmitter/receiver 4a in the vehicle 4 is connected with the other components of the electric system of the vehicle, via a data bus system ", and "the vehicle-side transmitter/receiver 4a transmits the corresponding control commands via the data bus system to the respective vehicle target component "; i.e. a vehicle data bus has been taught by Brinkmeyer et al.

Brinkmeyer et al., do not disclose that a receiver at the vehicle for receiving signals

from said a uniquely coded transmitter, and a function controller at the vehicle and connected to said receiver for learning (i.e., pending claim is about signal transmitting/receiving between vehicles).

However, similar functions as claimed are taught by Brinkmeyer et al., with a wireless receiver I/F - (not necessary disclosing that a receiver and a transmitter must be from different vehicles).

Since the pending claims are physical structures/units, Brinkmeyer et al., system obviously performs claimed devices/components.

As for accepting a command – a particular definition for "learning" a uniquely coded transmitter to permit control of a vehicle function by the user (see Brinkmeyer et al., Figs. 4A, 4C, col. 2 lines 23-42, "... *activating a learn mode, in which they can receive the new authorization code from the newly programmed remote control unit by way of a special antenna, if the remote control unit is brought into the direct vicinity and is caused to send the new authorization code..".*

Brinkmeyer et al., also do not disclose that an alert function would acknowledge a user for accepting a new unique code in "said function controller configured to cooperate with said wireless communications device of said tracking unit *to send an alert indication of whether at least one new uniquely coded transmitter has been learned".*

However, this action is obvious for a remote device to acknowledge a user/operator wirelessly that it starts to accept a new unique code – a clear example of wirelessly programming a garage door to accept a specific code (as taught by Brinkmeyer et al).

It would have been obvious to one of ordinary in the art at the time this invention was made to implement Brinkmeyer et al.'s system by clearly disclosing that a communication between related vehicles, an extra feature to alert/drawing attentions of a user (by available voice/sound/image/text generator) that a new unique code would be effective from now on as a reminder to that user.

B. As per claims 2-3, and 13: The rationales and reference for a rejection of claim 1 are incorporated.

It is submitted that downloading/(sending signals) by using a (temporary) directed wire (connecting directly to an I/F) has been quite well-known.

C. As per claim 10: The rationales and reference for a rejection of claim 1 are incorporated.

It is submitted that Brinkmeyer et al., taught about a garage door opener (e.g., a claimed "remote keyless entry function").

D. As per claim 11: The rationales and reference for a rejection of claim 1 are incorporated.

It is submitted that Brinkmeyer et al., taught about using a GPS receiver (see Brinkmeyer et al., col. 5 line 9).

E. As per claim 12: The rationales and reference for a rejection of claim 1 are incorporated.

It is submitted that Brinkmeyer et al., taught about a housing to contain a GPS, a wireless communication device, a controller, and communication I/F (see Brinkmeyer et al., Figs. 1-2).

F. As per claim 17: The rationales and reference for a rejection of claim 1 are incorporated.

It is submitted that Brinkmeyer et al., taught about wireless communication devices: a remote transmitter, and communication I/F to remotely control a device/component (see Brinkmeyer et al., Fig. 3 "the garage door opener").

Conclusion

5. Pending claims are rejected.

6. Any inquiry concerning this communication or earlier communications from the examiner should be directed to CUONG H. NGUYEN whose telephone number is 571-272-6759. (email address is cuong.nguyen@uspto.gov). The examiner can normally be reached on 9:30 am – 5:30 pm.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, THOMAS G. BLACK can be reached on 571-272-6956. The Rightfax number for the organization where this application is assigned is 571-273-6956.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see http://pair-direct.uspto.gov. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).

Please provide support, with page and line numbers, for any amended or new claim in an effort to help advance prosecution; otherwise any new claim language that is introduced in an amended or new claim may be considered as new matter, especially if the Application is a Jumbo Application.

/CUONG H. NGUYEN/
Primary Examiner
Art Unit 3661

Notice of References Cited	Application/Control No. 11/773,272	Applicant(s)/Patent Under Reexamination FLICK, KENNETH E.	
	Examiner CUONG H. NGUYEN	Art Unit 3661	Page 1 of 1

U.S. PATENT DOCUMENTS

*		Document Number Country Code-Number-Kind Code	Date MM-YYYY	Name	Classification
*	A	US-5,940,007	08-1999	Brinkmeyer et al.	340/825.69
	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	Classification
	N					
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	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.

Index of Claims

Application/Control No.	Applicant(s)/Patent under Reexamination
11/773,272	FLICK, KENNETH E.
Examiner	**Art Unit**
CUONG H. NGUYEN	3661

√	Rejected	–	(Through numeral) Cancelled	N	Non-Elected	A	Appeal
=	Allowed	÷	Restricted	I	Interference	O	Objected

Claim		Date
Final	Original	6/6/10
	1	V
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Search Notes	Application/Control No.	Applicant(s)/Patent under Reexamination	
	11/773,272	FLICK, KENNETH E.	
	Examiner	Art Unit	
	CUONG H. NGUYEN	3661	

SEARCHED			
Class	Subclass	Date	Examiner
701	36,207	6/6/2010	CHN

INTERFERENCE SEARCHED			
Class	Subclass	Date	Examiner

SEARCH NOTES (INCLUDING SEARCH STRATEGY)		
	DATE	EXMR
Updated WEST/DERWENT	6/6/2010	CHN

SUBSTITUTE FORM PTO-1449A LIST OF PATENTS AND APPLICANT'S INFORMATION DISCLOSURE STATEMENT	Atty Docket:	58106CIP1
	Serial No.:	Not Yet Assigned
	Applicant:	FLICK
	Filing Date:	Herewith
	Group:	

U.S. PATENT DOCUMENTS

Examiner Initials		Document Number	Date	Name	Class	Sub Class	Filing Date
/CHN/	AA	6,756,885	6/29/04	Flick	340	426.1	
/CHN/	AB	6,011,460	1/4/00	Flick	340	426	
/CHN/	AC	5,719,551	2/17/98	Flick	340	426	
/CHN/	AD	5,654,688	8/5/97	Flick	340	426	
/CHN/	AE	5,515,043	5/7/96	Flick	340	988	
/CHN/	AF	5,223,844	6/29/93	Flick	342	357	
	AG						
	AH						
	AI						
	AJ						
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	AL						

FOREIGN PATENT DOCUMENTS

		Document Number	Date	Country	Class	Sub Class	Translation
	AM						
	AN						
	AO						
	AP						

OTHER ART (Including Author, Title, Date, Pertinent Pages, etc.)

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EXAMINER: /Cuong Nguyen/ (12/21/2009)	DATE CONSIDERED:

*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.

IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

In re Patent Application of: **FLICK**	)	
Serial No. **11/773,272**	)	
Filing Date: **July 3, 2007**	)	
Confirmation No. **1046**	)	Examiner: **NGUYEN, CUONG**
For: **VEHICLE TRACKING UNIT WITH DOWNLOADABLE CODES AND ASSOCIATED METHODS**	)	Attorney Docket No: **58106_CIP1**

AMENDMENT

Mail Stop Amendment
Commissioner for Patents
P.O. Box 1450
Alexandria, VA 22313-1450

Sir:

Responsive to the Official Action of December 24, 2009, please enter and consider the amendments and remarks set out below.

In the Claims:

This listing of claims replaces all prior versions and listings of claims in the application.

1. (Original) 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. (Original) The multi-vehicle compatible tracking unit according to Claim 1 wherein said downloading interface comprises a wired signal downloading interface.

3. (Original) 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. (Original) The multi-vehicle compatible tracking unit according to Claim 1 wherein said downloading interface comprises a wireless signal downloading interface.

5. (Original) 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. (Original) 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. (Original) 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. (Original) 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. (Original) 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. (Original) 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. (Original) The multi-vehicle compatible tracking unit according to Claim 1 wherein said wireless position determining device comprises a Global Positioning System (GPS) receiver.

12. (Original) 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. (Currently amended) 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. (Original) 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. (Original) 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. (Original) 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. (Original) 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. (Currently amended) 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. (Original) 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. (Original) 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. (Original) 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. (Original) 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.

23. (Withdrawn) A method 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 comprising 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 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 of thereof for different vehicles, the method comprising:

downloading enabling data related to at least one corresponding vehicle device code for use by the multi-vehicle compatible controller via a downloading interface.

24. (Withdrawn) The method according to Claim 23 wherein the downloading interface comprises a wired signal downloading interface.

25. (Withdrawn) The method according to Claim 24 wherein the wired signal downloading interface comprises a connector for temporary connection to a downloading device.

26. (Withdrawn) The method according to Claim 23 wherein the downloading interface comprises a wireless signal downloading interface.

27. (Withdrawn) The method according to Claim 26 wherein the wireless signal downloading interface comprises a wireless receiver for temporary connection to a downloading device.

28. (Withdrawn) The method according to Claim 23 wherein the corresponding at least one vehicle code is for reading from the at least one vehicle device.

29. (Withdrawn) The method according to Claim 23 wherein the corresponding at least one vehicle code is for writing to the at least one vehicle device.

30. (Withdrawn) The method according to Claim 23 further comprising downloading at least one programming instruction for the multi-vehicle compatible controller via the downloading interface.

REMARKS

Applicant thanks the Examiner for the careful and thorough examination of the present application, and for helpfully pointing out the informalities in Claims 13 and 18. Applicant has amended independent Claims 13 and 18 as helpfully suggested by the Examiner.

In the Official Action of December 24, 2009, the Examiner issued a Restriction Requirement, contending that Claims 1-22 and 23-30 were drawn to separate inventions. Under 37 C.F.R. §1.143, Applicant hereby provisionally elects Group I, Claims 1-22 and withdraws Claims 23-30.

Nonetheless, Applicant respectfully requests that the Examiner use his discretion under 35 U.S.C. §121 and withdraw the Restriction Requirement since search and examination of the entire application can be made without serious burden.

CONCLUSIONS

In view of the arguments presented above, it is submitted that all of the claims are patentable. Accordingly, a Notice of Allowance 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.

Respectfully submitted,

JACK GEORGE ABID
Reg. No. 58,237
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Electronic Acknowledgement Receipt	
EFS ID:	7075341
Application Number:	11773272
International Application Number:	
Confirmation Number:	1046
Title of Invention:	VEHICLE TRACKING UNIT WITH DOWNLOADABLE CODES AND ASSOCIATED METHODS
First Named Inventor/Applicant Name:	Kenneth E. Flick
Correspondence Address:	CHRISTOPHER F. REGAN, ESQUIRE ALLEN, DYER, DOPPELT, MILBRATH & GILCHRIST, P.A. P.O. Box 3791 - Orlando FL 32802-3791 US 4078412330 -
Filer:	Christopher F. Regan/Lisa Norberg
Filer Authorized By:	Christopher F. Regan
Attorney Docket Number:	58106CIP1
Receipt Date:	24-FEB-2010
Filing Date:	03-JUL-2007
Time Stamp:	12:14:53
Application Type:	Utility under 35 USC 111(a)

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		58106_CIP1_Amendment.pdf	280615 7b36376bbee6661adf1061b4771d49cf9e85209e	yes	11

Multipart Description/PDF files in .zip description		
Document Description	**Start**	**End**
Amendment/Req. Reconsideration-After Non-Final Reject	1	1
Claims	2	9
Applicant Arguments/Remarks Made in an Amendment	10	11

Warnings:	
Information:	
Total Files Size (in bytes):	280615

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.

PTO/SB/06 (07-06)
Approved for use through 1/31/2007. OMB 0651-0032
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 displays a valid OMB control number.

PATENT APPLICATION FEE DETERMINATION RECORD

Substitute for Form PTO-875

Application or Docket Number	Filing Date	☐ To be Mailed
11/773,272	07/03/2007	

APPLICATION AS FILED – PART I

	(Column 1)	(Column 2)	SMALL ENTITY ☐		OR	OTHER THAN SMALL ENTITY	
FOR	NUMBER FILED	NUMBER EXTRA	RATE ($)	FEE ($)		RATE ($)	FEE ($)
☐ BASIC FEE (37 CFR 1.16(a), (b), or (c))	N/A	N/A	N/A			N/A	
☐ SEARCH FEE (37 CFR 1.16(k), (i), or (m))	N/A	N/A	N/A			N/A	
☐ EXAMINATION FEE (37 CFR 1.16(o), (p), or (q))	N/A	N/A	N/A			N/A	
TOTAL CLAIMS (37 CFR 1.16(i))	minus 20 =	*	X $ =		OR	X $ =	
INDEPENDENT CLAIMS (37 CFR 1.16(h))	minus 3 =	*	X $ =			X $ =	
☐ APPLICATION SIZE FEE (37 CFR 1.16(s))	If the specification and drawings exceed 100 sheets of paper, the application size fee due is $250 ($125 for small entity) for each additional 50 sheets or fraction thereof. See 35 U.S.C. 41(a)(1)(G) and 37 CFR 1.16(s).						
☐ MULTIPLE DEPENDENT CLAIM PRESENT (37 CFR 1.16(j))							
* If the difference in column 1 is less than zero, enter "0" in column 2.			TOTAL			TOTAL	

APPLICATION AS AMENDED – PART II

AMENDMENT	02/24/2010	(Column 1) CLAIMS REMAINING AFTER AMENDMENT		(Column 2) HIGHEST NUMBER PREVIOUSLY PAID FOR	(Column 3) PRESENT EXTRA	SMALL ENTITY RATE ($)	ADDITIONAL FEE ($)	OR	OTHER THAN SMALL ENTITY RATE ($)	ADDITIONAL FEE ($)
	Total (37 CFR 1.16(i))	* 30	Minus	** 30	= 0	X $ =		OR	X $52=	0
	Independent (37 CFR 1.16(h))	* 4	Minus	***4	= 0	X $ =		OR	X $220=	0
	☐ Application Size Fee (37 CFR 1.16(s))									
	☐ FIRST PRESENTATION OF MULTIPLE DEPENDENT CLAIM (37 CFR 1.16(j))							OR		
						TOTAL ADD'L FEE		OR	TOTAL ADD'L FEE	0

AMENDMENT		(Column 1) CLAIMS REMAINING AFTER AMENDMENT		(Column 2) HIGHEST NUMBER PREVIOUSLY PAID FOR	(Column 3) PRESENT EXTRA	RATE ($)	ADDITIONAL FEE ($)		RATE ($)	ADDITIONAL FEE ($)
	Total (37 CFR 1.16(i))	*	Minus	**	=	X $ =		OR	X $ =	
	Independent (37 CFR 1.16(h))	*	Minus	***	=	X $ =		OR	X $ =	
	☐ Application Size Fee (37 CFR 1.16(s))									
	☐ FIRST PRESENTATION OF MULTIPLE DEPENDENT CLAIM (37 CFR 1.16(j))							OR		
						TOTAL ADD'L FEE		OR	TOTAL ADD'L FEE	

* If the entry in column 1 is less than the entry in column 2, write "0" in column 3.

** If the "Highest Number Previously Paid For" IN THIS SPACE is less than 20, enter "20".

*** If the "Highest Number Previously Paid For" IN THIS SPACE is less than 3, enter "3".

The "Highest Number Previously Paid For" (Total or Independent) is the highest number found in the appropriate box in column 1.

Legal Instrument Examiner:
/MARGARET BYARS/

This collection of information is required by 37 CFR 1.16. 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 12 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: 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.

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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
11/773,272	07/03/2007	Kenneth E. Flick	58106CIP1	1046

7590 12/24/2009

CHRISTOPHER F. REGAN, ESQUIRE
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P.O. Box 3791
Orlando, FL 32802-3791

EXAMINER	
NGUYEN, CUONG H	
ART UNIT	PAPER NUMBER
3661	

MAIL DATE	DELIVERY MODE
12/24/2009	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.

Office Action Summary	Application No.	Applicant(s)	
	11/773,272	FLICK, KENNETH E.	
	Examiner	Art Unit	
	CUONG H. NGUYEN	3661	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1)☒ Responsive to communication(s) filed on *8/13/07 (new drawings)*.

2a)☐ This action is **FINAL**. 2b)☒ This action is non-final.

3)☐ Since this application is in condition for allowance 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.

Disposition of Claims

4)☒ Claim(s) *1-30* is/are pending in the application.

4a) Of the above claim(s) _____ is/are withdrawn from consideration.

5)☐ Claim(s) _____ is/are allowed.

6)☐ Claim(s) _____ is/are rejected.

7)☒ Claim(s) *13,18 and 24-27* is/are objected to.

8)☒ Claim(s) *1-30* are subject to restriction and/or election requirement.

Application Papers

9)☐ The specification is objected to by the Examiner.

10)☒ The drawing(s) filed on *8/13/07* is/are: a)☒ accepted or b)☐ objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).

11)☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

12)☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

a)☐ All b)☐ Some * c)☐ None of:

1.☐ Certified copies of the priority documents have been received.

2.☐ Certified copies of the priority documents have been received in Application No. _____.

3.☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

1) ☒ Notice of References Cited (PTO-892)
2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
3) ☒ Information Disclosure Statement(s) (PTO/SB/08) Paper No(s)/Mail Date _____.
4) ☐ Interview Summary (PTO-413) Paper No(s)/Mail Date. _____ .
5) ☐ Notice of Informal Patent Application
6) ☐ Other: _____.

1. This Office Action is the answer to the communication received on 8/13/2007.

2. Claims 1-30 are pending in this application.

Drawings

3. This application has been filed with 4 sheets of formal drawings which are acceptable for examining purposes.

Claim Objections

4. Claims 24-27 are objected since these claims' lack limitations (there are only further descriptions – not clearly containing all required limitations for steps of a method.).

As to Claims 13, and 18. "A multi-vehicle compatible tracking unit for a vehicle comprising a vehicle data bus extending throughout the vehicle, the multi-vehicle vehicle tracking unit comprising:" ; the "compatible" should be inserted (in 2nd underlined terms) because it repeats the first-underlined terms.

The examiner also respectfully submits that there is a restriction, as shown below:

Election/Restrictions

5. Restriction to one of the following inventions is required under 35 U.S.C. 121:

I. Claims 1-22, drawn to a multi-vehicle tracking device/unit, classified in class 701, subclasses 207-209.

II. Claims 23-30, drawn to a method comprising steps of using above multi-vehicle tracking device (*comprising only one step: downloading enabling data related to a vehicle device code for use by a multi- vehicle compatible controller*), classified in class 340, subclasses 531, 533-534.

The inventions are distinct, each from the other because of the following reasons:

Inventions I and II are related as a product, and a method of use that product however, group I is essentially directed to physical components of a unit, not specifically providing steps of use that unit as required in group II that do not need to use exactly same physical components/device to perform claimed steps; in addition, these two groups have different US classifications.

Applicants are advised that the reply to this requirement to be complete must include an election of the invention to be examined even though the requirement be traversed (37 CFR 1.143).

Applicants are reminded that upon the cancellation of claims to a non-elected invention, the inventorship must be amended in compliance with 37 CFR 1.48(b) if one or more of the currently named inventors is no longer an inventor of at least one claim remaining in the application. Any amendment of inventorship must be accompanied by a request under 37 CFR 1.48(b) and by the fee required under 37 CFR 1.17(i).

6. Remark: Pending claims 1-22 are about a physical unit; therefore, those physical components must be distinguished from the prior art in terms of structure rather than function, In re Danly 263 F.2d 844, 847, 120 USPQ 582, 531 (CCPA 1959).

A claim containing a "recitation with respect to the manner in which a claimed apparatus is intended to be employed does not differentiate the claimed apparatus from a prior art apparatus" if the prior art apparatus teaches all the structural limitations of the claim. Ex parte Masham, 2 USPQ2d 1657 (bd Pat. App. & Inter. 1987). In order to be given a patentable weight, a functional recitation MUST BE EXPRESSED as a "means" for performing the specified function, as set forth in 35 USC 112, 6th paragraph, and must be supported by recitation in the

claim of sufficient structure to warrant the presence of the functional language (see In re Fuller, 1929 C.D. 172, 388 O.G. 279).

7. Any inquiry concerning this communication or earlier communications from the examiner should be directed to CUONG H. NGUYEN whose telephone number is 571-272-6759. (email address is cuong.nguyen@uspto.gov). The examiner can normally be reached on 9:30 am - 5:30 pm.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, THOMAS G. BLACK can be reached on 571-272-6956. The Rightfax number for the organization where this application is assigned is 571-273-6956.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see http://pair-direct.uspto.gov. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).

Please provide support, with page and line numbers, for any amended or new claim in an effort to help advance prosecution; otherwise any new claim language that is introduced in an amended or new claim may be considered as new matter, especially if the Application is a Jumbo Application.

/CUONG H. NGUYEN/
Primary Examiner
Art Unit 3661

Notice of References Cited	Application/Control No. 11/773,272	Applicant(s)/Patent Under Reexamination FLICK, KENNETH E.	
	Examiner CUONG H. NGUYEN	Art Unit 3661	Page 1 of 1

U.S. PATENT DOCUMENTS

*		Document Number Country Code-Number-Kind Code	Date MM-YYYY	Name	Classification
*	A	US-7,502,687	03-2009	Flick, Kenneth E.	701/213
*	B	US-7,343,244	03-2008	Flick, Kenneth E.	701/207
*	C	US-7,305,293	12-2007	Flick, Kenneth E.	701/45
*	D	US-7,149,623	12-2006	Flick, Kenneth E.	701/207
*	E	US-7,015,830	03-2006	Flick, Kenneth E.	340/989
*	F	US-6,888,495	05-2005	Flick, Kenneth E.	342/357.07
	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	Classification
	N					
	O					
	P					
	Q					
	R					
	S					
	T					

NON-PATENT DOCUMENTS

*		Include as applicable: Author, Title Date, Publisher, Edition or Volume, Pertinent Pages)
*	U	Intelligent Object-Tracking using Sensor Networks; Sridhar, P.; Madni, A.M.; Jamshidi, M.; Sensors Applications Symposium, 2007. SAS '07. IEEE; Feb. 6-8, 2007 pp. 1-5; Digital Object Identifier 10.1109/SAS.2007.374384.
*	V	Energy efficient sleep scheduling based on moving directions in target tracking sensor network; Bo Jiang; Kai Han; Ravindran, B.; Hyeonjoong Cho; Parallel and Distributed Processing, 2008. IPDPS 2008. IEEE International Symposium on; Apr. 14-18, 2008 pp. 1-10; Digital Object Identifier 10.1109/IPDPS.2008.4536330.
*	W	A self-organizing hybrid sensor system with distributed data fusion for intruder tracking and surveillance; Palaniappan, R.; Clarke, T.; Wahid, P.; Behdad, N.; Kincaid, P.; Antennas and Propagation Society International Symposium, 2008. AP-S 2008. IEEE; Jul. 5-11, 2008 pp. 1-4; Digital Object Identifier 10.1109/APS.2008.4619564.
*	X	SVATS: A Sensor-Network-Based Vehicle Anti-Theft System; Hui Song; Sencun Zhu; Guohong Cao; INFOCOM 2008. The 27th Conference on Computer Communications. IEEE; Apr. 13-18, 2008 pp. 2128-2136; Digital Object Identifier 10.1109/INFOCOM.2008.279.

*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.

Index of Claims

Application/Control No.	Applicant(s)/Patent under Reexamination
11/773,272	FLICK, KENNETH E.
Examiner	**Art Unit**
CUONG H. NGUYEN	3661

√	Rejected	–	(Through numeral) Cancelled	N	Non-Elected	A	Appeal
=	Allowed	÷	Restricted	I	Interference	O	Objected

Claim		Date
Final	Original	12/20/09
	1	÷
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Claim		Date
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Claim		Date
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Search Notes	Application/Control No.	Applicant(s)/Patent under Reexamination	
	11/773,272	FLICK, KENNETH E.	
	Examiner	Art Unit	
	CUONG H. NGUYEN	3661	

SEARCHED			
Class	Subclass	Date	Examiner
701	36,207-209		
340	500,506		
340	515,531		
340	533-534		

INTERFERENCE SEARCHED			
Class	Subclass	Date	Examiner

SEARCH NOTES (INCLUDING SEARCH STRATEGY)		
	DATE	EXMR
WEST/DERWENT		
Inventor's name		
IEEE Xplore		

The Contents of Case 11076259d

Qnum	Query	Type	DB Name	Thesaurus	Operator	Plural
Q1	6139496.pn. (method with display$).clm. and position$.clm. and image$.clm. and occupant$.clm.	p	USPT	ASSIGNEE	OR	YES
Q2	Q2 and (chang$ with orientation$)	p	USPT	ASSIGNEE	OR	YES
Q3	bio$ and recogni$ and (control$ with (vehicle or car or automobile)) and @pd<=20000517 and (learn$ with (new$ or another$ or differen$) with code$) and (alert$ or alarm$ or warn$) and (vehicle or car or automobile)	p	PGPB,USPT,USOC,EPAB,JPAB,DWPI,TDBD	ASSIGNEE	OR	YES
Q4	bio$ and recogni$ and (control$ with (vehicle or car or automobile)) and @ad<=20000517 and (learn$ with (new$ or another$ or differen$) with code$) and (alert$ or alarm$ or warn$) and (vehicle or car or automobile)	p	PGPB,USPT	ASSIGNEE	OR	YES
Q5	Q5 and gps$	p	PGPB,USPT	ASSIGNEE	OR	YES
Q6	Q5 and (remot$ with control$)	p	PGPB,USPT	ASSIGNEE	OR	YES
Q7	Q7 and position$	p	PGPB,USPT	ASSIGNEE	OR	YES
Q8	position$ and gps$ and recogni$ and (control$ with (vehicle or car or	p	PGPB,USPT	ASSIGNEE	OR	YES

Q9	automobile)) and @ad<=20000517 and (learn$ with (new$ or another$ or differen$) with code$) and (alert$ or alarm$ or warn$) and (vehicle or car or automobile) position$ and recogni$ and (control$ with (vehicle or car or automobile)) and @ad<=20000517 and (learn$ with (new$ or another$ or differen$) with code$) and (alert$ or alarm$ or warn$) and (vehicle or car or automobile)	p	PGPB,USPT	ASSIGNEE	OR	YES
Q10		p	PGPB,USPT	ASSIGNEE	OR	YES
Q11	Q10 not Q8	p	PGPB,USPT	ASSIGNEE	OR	YES
Q12	Q11 and track$	p	PGPB,USPT	ASSIGNEE	OR	YES
Q13	Q10 not Q12	p	PGPB,USPT	ASSIGNEE	OR	YES
Q14	Q13 and gps$	p	PGPB,USPT	ASSIGNEE	OR	YES
Q15	gps$ and recogni$ and (control$ with (vehicle or car or automobile)) and @ad<=20000517 and (learn$ with (new$ or another$ or differen$) with code$) and (alert$ or alarm$ or warn$) and (vehicle or car or automobile)	p	PGPB,USPT	ASSIGNEE	OR	YES
Q16	gps$ and (control$ with (vehicle$ or car$ or automobile$)) and @ad<=20000517 and (learn$ with (new$ or another$ or differen$) with code$) and	p	PGPB,USPT	ASSIGNEE	OR	YES

Q17	(alert$ or alarm$ or warn$) 5940007.pn.	p	USPT	ASSIGNEE	OR	YES
Q18	Q17 and ((ignit$ or start$) with engine$)	p	USPT	ASSIGNEE	OR	YES
Q19	Q17 and ((ignit$ or start$) same engine$)	p	USPT	ASSIGNEE	OR	YES
Q20	Q17 and ((ignit$ or start$) same remot$)	p	USPT	ASSIGNEE	OR	YES
Q21	Q17 and transpond$	p	USPT	ASSIGNEE	OR	YES
Q22	6411217.pn.	p	USPT	ASSIGNEE	OR	YES
Q23	Q22 and transpond$	p	USPT	ASSIGNEE	OR	YES
Q24	Q22 and bio$	p	USPT	ASSIGNEE	OR	YES
Q25	Q17 and bio$	p	USPT	ASSIGNEE	OR	YES
Q26	6140939.pn. or 6320514.pn. or 6144515.pn. or 6140938.pn.	p	USPT	ASSIGNEE	OR	YES
Q27	Q26 and (gps$ or track$).clm. and "unique code".clm. and learn$.clm.	p	USPT	ASSIGNEE	OR	YES
Q28	Q26 and (gps$ or track$).clm. and learn$.clm.	p	USPT	ASSIGNEE	OR	YES
Q29	Q26 and (gps$ or track$).clm. and learn$	p	USPT	ASSIGNEE	OR	YES
Q30	6140939.pn. or 6320514.pn. or 6144315.pn. or 6140938.pn.	p	USPT	ASSIGNEE	OR	YES
Q31	Q30 and (gps$ or track$).clm. and learn$.clm.	p	USPT	ASSIGNEE	OR	YES
Q32	Q30 and (gps$ or track$).clm. and learn$	p	USPT	ASSIGNEE	OR	YES
Q33	Q30 and (gps$ or track$ and learn$)	p	USPT	ASSIGNEE	OR	YES
Q34	Q30 and (gps$ or track$) and learn$	p	USPT	ASSIGNEE	OR	YES
Q35	Q30 and (gps$ or track$)	p	USPT	ASSIGNEE	OR	YES
Q36	6411217.pn. or 5940007.pn.	p	USPT	ASSIGNEE	OR	YES
Q37	Q36 and door$	p	USPT	ASSIGNEE	OR	YES

Case Operation
Run Case



Submit Cancel

IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

In re Patent Application of: **FLICK**	
Serial No. **NOT YET ASSIGNED**	Attorney Docket: 58106CIP1
Filing Date: **HEREWITH**	
For: **VEHICLE TRACKING UNIT WITH DOWNLOADABLE CODES AND ASSOCIATED METHODS**	

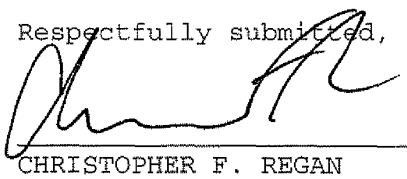
CITATION UNDER 37 CFR §1.97

Commissioner for Patents
P.O. Box 1450
Alexandria, VA 22313-1450

Sir:

Attached is Form PTO-1449 listing several references for consideration in the examination of the above-identified application. In accordance with current USPTO procedures published 05 AUG. 2003, in 1276 OG 55, copies of the U.S. patent documents cited in the form 1449A are not attached. The undersigned would be happy to provide copies of these references if requested. Copies of non-U.S. patent references, if any, are attached. It is requested that these references be considered by the Examiner and officially made of record in accordance with the provisions of 37 CFR §1.97 and Section 609 of the MPEP.

Respectfully submitted,



CHRISTOPHER F. REGAN
Reg. No. 34,906
Allen, Dyer, Doppelt, Milbrath
& Gilchrist, P.A.
Attorneys of Record

SUBSTITUTE FORM PTO-1449A LIST OF PATENTS AND APPLICANT'S INFORMATION DISCLOSURE STATEMENT	Atty Docket:	58106CIP1
	Serial No.:	Not Yet Assigned
	Applicant:	FLICK
	Filing Date:	Herewith
	Group:	

U.S. PATENT DOCUMENTS

Examiner Initials		Document Number	Date	Name	Class	Sub Class	Filing Date
/CHN/	AA	6,756,885	6/29/04	Flick	340	426.1	
/CHN/	AB	6,011,460	1/4/00	Flick	340	426	
/CHN/	AC	5,719,551	2/17/98	Flick	340	426	
/CHN/	AD	5,654,688	8/5/97	Flick	340	426	
/CHN/	AE	5,515,043	5/7/96	Flick	340	988	
/CHN/	AF	5,223,844	6/29/93	Flick	342	357	
	AG						
	AH						
	AI						
	AJ						
	AK						
	AL						

FOREIGN PATENT DOCUMENTS

		Document Number	Date	Country	Class	Sub Class	Translation
	AM						
	AN						
	AO						
	AP						

OTHER ART (Including Author, Title, Date, Pertinent Pages, etc.)

	AQ	
	AR	
	AS	

EXAMINER: /Cuong Nguyen/ (12/21/2009)	DATE CONSIDERED:

*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.

UNITED STATES PATENT AND TRADEMARK OFFICE

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APPLICATION NUMBER	FILING OR 371(c) DATE	FIRST NAMED APPLICANT	ATTY. DOCKET NO./TITLE
11/773,272	07/03/2007	Kenneth E. Flick	58106CIP1

CONFIRMATION NO. 1046

CHRISTOPHER F. REGAN, ESQUIRE
ALLEN, DYER, DOPPELT, MILBRATH & GILCHRIST, P.A.
P.O. Box 3791
Orlando, FL32802-3791

Title: VEHICLE TRACKING UNIT WITH DOWNLOADABLE CODES AND ASSOCIATED METHODS

Publication No. US-2007-0279283-A1
Publication Date: 12/06/2007

NOTICE OF PUBLICATION OF APPLICATION

The above-identified application will be electronically published as a patent application publication pursuant to 37 CFR 1.211, et seq. The patent application publication number and publication date are set forth above.

The publication may be accessed through the USPTO's publically available Searchable Databases via the Internet at www.uspto.gov. The direct link to access the publication is currently http://www.uspto.gov/patft/.

The publication process established by the Office does not provide for mailing a copy of the publication to applicant. A copy of the publication may be obtained from the Office upon payment of the appropriate fee set forth in 37 CFR 1.19(a)(1). Orders for copies of patent application publications are handled by the USPTO's Office of Public Records. The Office of Public Records can be reached by telephone at (703) 308-9726 or (800) 972-6382, by facsimile at (703) 305-8759, by mail addressed to the United States Patent and Trademark Office, Office of Public Records, Alexandria, VA 22313-1450 or via the Internet.

In addition, information on the status of the application, including the mailing date of Office actions and the dates of receipt of correspondence filed in the Office, may also be accessed via the Internet through the Patent Electronic Business Center at www.uspto.gov using the public side of the Patent Application Information and Retrieval (PAIR) system. The direct link to access this status information is currently http://pair.uspto.gov/. Prior to publication, such status information is confidential and may only be obtained by applicant using the private side of PAIR.

Further assistance in electronically accessing the publication, or about PAIR, is available by calling the Patent Electronic Business Center at 1-866-217-9197.

Pre-Grant Publication Division, 703-605-4283

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APPLICATION NUMBER	FILING or 371(c) DATE	GRP ART UNIT	FIL FEE REC'D	ATTY.DOCKET.NO	TOT CLAIMS	IND CLAIMS
11/773,272	07/03/2007	3661	1700	58106CIP1	30	4

CONFIRMATION NO. 1046

CHRISTOPHER F. REGAN, ESQUIRE
ALLEN, DYER, DOPPELT, MILBRATH & GILCHRIST, P.A.
P.O. Box 3791
Orlando, FL32802-3791

UPDATED FILING RECEIPT

Date Mailed: 08/24/2007

Receipt is acknowledged of this non-provisional patent application. The application will be taken up for examination in due course. Applicant will be notified as to the results of the examination. Any correspondence concerning the application must include the following identification information: the U.S. APPLICATION NUMBER, FILING DATE, NAME OF APPLICANT, and TITLE OF INVENTION. Fees transmitted by check or draft are subject to collection. Please verify the accuracy of the data presented on this receipt. **If an error is noted on this Filing Receipt, please write to the Office of Initial Patent Examination's Filing Receipt Corrections. Please provide a copy of this Filing Receipt with the changes noted thereon. If you received a "Notice to File Missing Parts" for this application, please submit any corrections to this Filing Receipt with your reply to the Notice. When the USPTO processes the reply to the Notice, the USPTO will generate another Filing Receipt incorporating the requested corrections**

Applicant(s)

Kenneth E. Flick, Douglasville, GA;

Assignment For Published Patent Application

Omega Patents, L.L.C., State of Incorporation: Georgia, Douglasville, GA

Power of Attorney: The patent practitioners associated with Customer Number 27975

Domestic Priority data as claimed by applicant

This application is a CIP of 11/076,259 03/09/2005
which is a CON of 10/383,496 03/07/2003 PAT 7,149,623
which is a CON of 09/859,972 05/17/2001 PAT 6,606,561
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: 07/30/2007

The country code and number of your priority application, to be used for filing abroad under the Paris Convention, is **US11/773,272**

Projected Publication Date: 12/06/2007

Non-Publication Request: No

Early Publication Request: No

Title

VEHICLE TRACKING UNIT WITH DOWNLOADABLE CODES AND ASSOCIATED METHODS

Preliminary Class

PROTECTING YOUR INVENTION OUTSIDE THE UNITED STATES

Since the rights granted by a U.S. patent extend only throughout the territory of the United States and have no effect in a foreign country, an inventor who wishes patent protection in another country must apply for a patent in a specific country or in regional patent offices. Applicants may wish to consider the filing of an international application under the Patent Cooperation Treaty (PCT). An international (PCT) application generally has the same effect as a regular national patent application in each PCT-member country. The PCT process **simplifies** the filing of patent applications on the same invention in member countries, but **does not result** in a grant of "an international patent" and does not eliminate the need of applicants to file additional documents and fees in countries where patent protection is desired.

Almost every country has its own patent law, and a person desiring a patent in a particular country must make an application for patent in that country in accordance with its particular laws. Since the laws of many countries differ in various respects from the patent law of the United States, applicants are advised to seek guidance from specific foreign countries to ensure that patent rights are not lost prematurely.

Applicants also are advised that in the case of inventions made in the United States, the Director of the USPTO must issue a license before applicants can apply for a patent in a foreign country. The filing of a U.S. patent application serves as a request for a foreign filing license. The application's filing receipt contains further information and guidance as to the status of applicant's license for foreign filing.

Applicants may wish to consult the USPTO booklet, "General Information Concerning Patents" (specifically, the section entitled "Treaties and Foreign Patents") for more information on timeframes and deadlines for filing foreign patent applications. The guide is available either by contacting the USPTO Contact Center at 800-786-9199, or it can be viewed on the USPTO website at http://www.uspto.gov/web/offices/pac/doc/general/index.html.

For information on preventing theft of your intellectual property (patents, trademarks and copyrights), you may wish to consult the U.S. Government website, http://www.stopfakes.gov. Part of a Department of Commerce initiative, this website includes self-help "toolkits" giving innovators guidance on how to protect intellectual property in specific countries such as China, Korea and Mexico. For questions regarding patent enforcement issues, applicants may call the U.S. Government hotline at 1-866-999-HALT (1-866-999-4158).

LICENSE FOR FOREIGN FILING UNDER

Title 35, United States Code, Section 184

Title 37, Code of Federal Regulations, 5.11 & 5.15

GRANTED

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IFW

IN THE UNITED STATES PATENT AND TRADEMARK OFFICE



In re Patent Application of:)
FLICK)
)
Serial No. **11/773,272**)
)
Confirmation No: **1046**)
)
Filing Date: **MARCH 3, 2007**)
)
For: **VEHICLE TRACKING UNIT WITH DOWNLOADABLE CODES AND ASSOCIATED METHODS**)
)

RESPONSE TO NOTICE TO FILE CORRECTED APPLICATION PAPERS

Commissioner for Patents
P.O. Box 1450
Alexandria, VA 22313-1450

Sir:

Responsive to the Notice to File Corrected Application Papers mailed July 31, 2007, Applicants enclose the following:

1) Transmittal of Formal Drawings

2) Thirteen (13) sheets of formal drawings

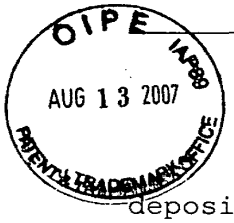
3) Copy of Notice to File Corrected Application Papers mailed July 31, 2007.

There is no fee required for this response, however, if any extension fee is required, or if any additional claim fee is required, authorization is give to charge Account No. 01-0484.

Respectfully submitted,

CHRISTOPHER F. REGAN
Reg. No. 34,906
Allen, Dyer, Doppelt,
Milbrath & Gilchrist, P.A.
255 S. Orange Avenue
Suite 1401
Post Office Box 3791
Orlando, Florida 32802
407/841-2330

In re Patent Application of:
FLICK
Serial No. **11/773,272**
Filing Date: **JULY 3, 2007**



CERTIFICATE OF MAILING

I hereby certify that this correspondence is being deposited with the United States Postal Service as First Class Mail in an envelope addressed to: COMMISSIONER FOR PATENTS, P.O. BOX 1450, ALEXANDRIA, VA 22313-1450, on this 10th day of August, 2007.

IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

In re Patent Application of:)
FLICK)
)
Serial No. **11/773,272**)
)
Confirmation No: **1046**)
)
Filing Date: **MARCH 3, 2007**)
)
For: **VEHICLE TRACKING UNIT WITH DOWNLOADABLE CODES AND ASSOCIATED METHODS**)
)

OIPE IAP89 AUG 13 2007 PATENT & TRADEMARK OFFICE

TRANSMITTAL OF FORMAL DRAWINGS

Commissioner for Patents
P.O. Box 1450
Alexandria, VA 22313-1450

Sir:

Enclosed are thirteen (13) sheets of formal drawings to be filed in the above-identified patent application.

Respectfully submitted,

CHRISTOPHER F. REGAN
Reg. No. 34,906
Allen, Dyer, Doppelt, Milbrath & Gilchrist, P.A.
255 S. Orange Ave., Suite 1401
P. O. Box 3791
Orlando, Florida 32802
(407) 841-2330

CERTIFICATE OF MAILING

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APPLICATION NUMBER	FILING OR 371 (c) DATE	FIRST NAMED APPLICANT	ATTORNEY DOCKET NUMBER
11/773,272	07/03/2007	Kenneth E. Flick	58106CIP1

CONFIRMATION NO. 1046

CHRISTOPHER F. REGAN, ESQUIRE
ALLEN, DYER, DOPPELT, MILBRATH & GILCHRIST, P.A.
P.O. Box 3791
Orlando, FL 32802-3791

FORMALITIES LETTER

Date Mailed: 07/31/2007

NOTICE TO FILE CORRECTED APPLICATION PAPERS

Filing Date Granted

An application number and filing date have been accorded to this application. The application is informal since it does not comply with the regulations for the reason(s) indicated below. Applicant is given TWO MONTHS from the date of this Notice within which to correct the informalities indicated below. Extensions of time may be obtained by filing a petition accompanied by the extension fee under the provisions of 37 CFR 1.136(a).

The required item(s) identified below must be timely submitted to avoid abandonment:

- Replacement drawings in compliance with 37 CFR 1.84 and 37 CFR 1.121(d) are required. The drawings submitted are not acceptable because:
    - The drawings have a line quality that is too light to be reproduced (weight of all lines and letters must be heavy enough to permit adequate reproduction) or text that is illegible (reference characters, sheet numbers, and view numbers must be plain and legible) see 37 CFR 1.84(l) and (p)(1)); See Figure(s) 10.

Applicant is cautioned that correction of the above items may cause the specification and drawings page count to exceed 100 pages. If the specification and drawings exceed 100 pages, applicant will need to submit the required application size fee.

Replies should be mailed to: Mail Stop Missing Parts
Commissioner for Patents
P.O. Box 1450
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Office of Initial Patent Examination (571) 272-4000, or 1-800-PTO-9199
PART 2 - COPY TO BE RETURNED WITH RESPONSE

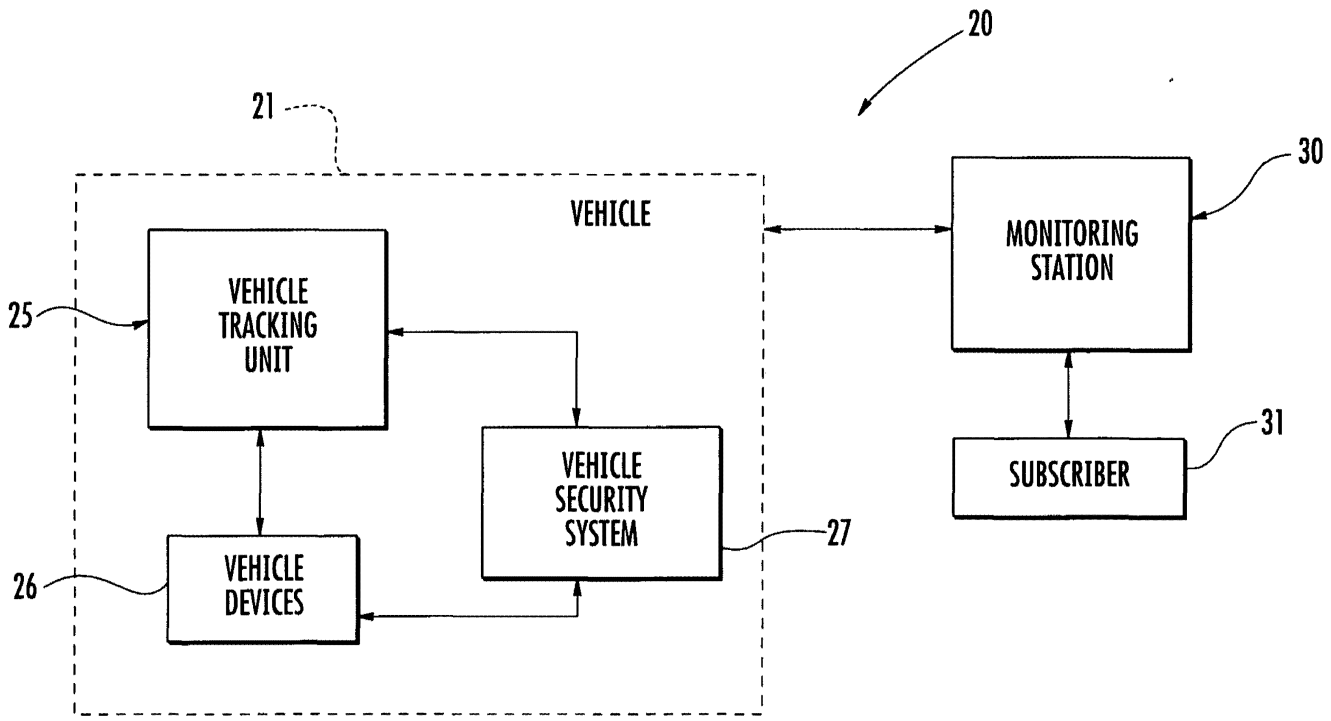


FIG. 1

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REPLACEMENT SHEET

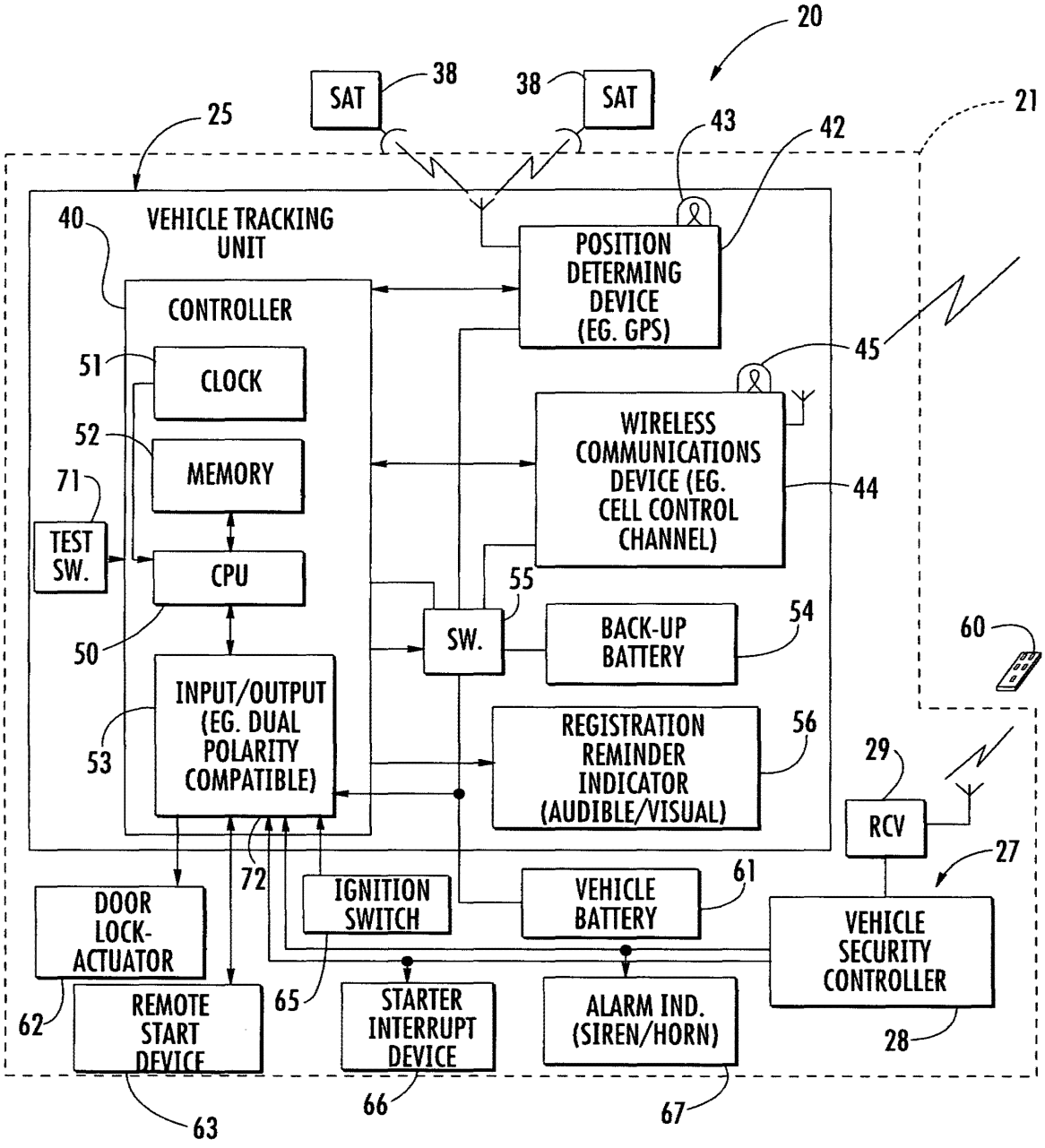

20
SAT
38
38
SAT
25
21
43
42
40
VEHICLE TRACKING UNIT
POSITION DETERMING DEVICE (EG. GPS)
CONTROLLER
45
51
CLOCK
52
MEMORY
WIRELESS COMMUNICATIONS DEVICE (EG. CELL CONTROL CHANNEL)
44
71
TEST SW.
CPU
55
SW.
BACK-UP BATTERY
54
60
50
INPUT/OUTPUT (EG. DUAL POLARITY COMPATIBLE)
53
REGISTRATION REMINDER INDICATOR (AUDIBLE/VISUAL)
56
29
RCV
27
72
IGNITION SWITCH
VEHICLE BATTERY
61
DOOR LOCK-ACTUATOR
VEHICLE SECURITY CONTROLLER
62
REMOTE START DEVICE
65
STARTER INTERRUPT DEVICE
ALARM IND. (SIREN/HORN)
28
63
66
67

FIG. 2

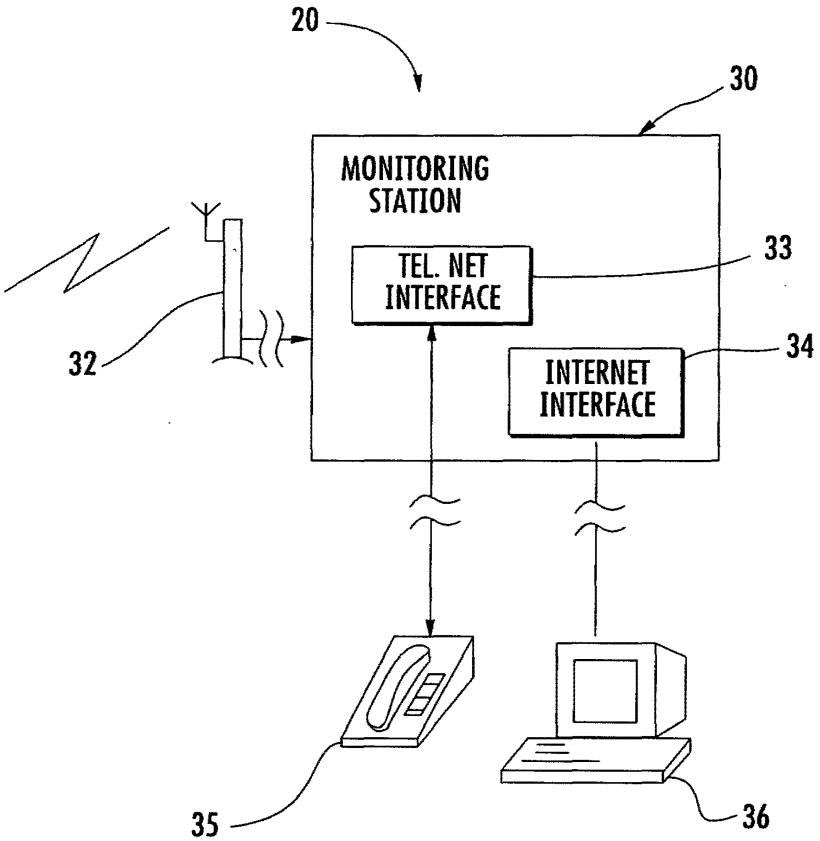

20
30
MONITORING STATION
TEL. NET INTERFACE
33
INTERNET INTERFACE
34
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35
36

FIG. 3

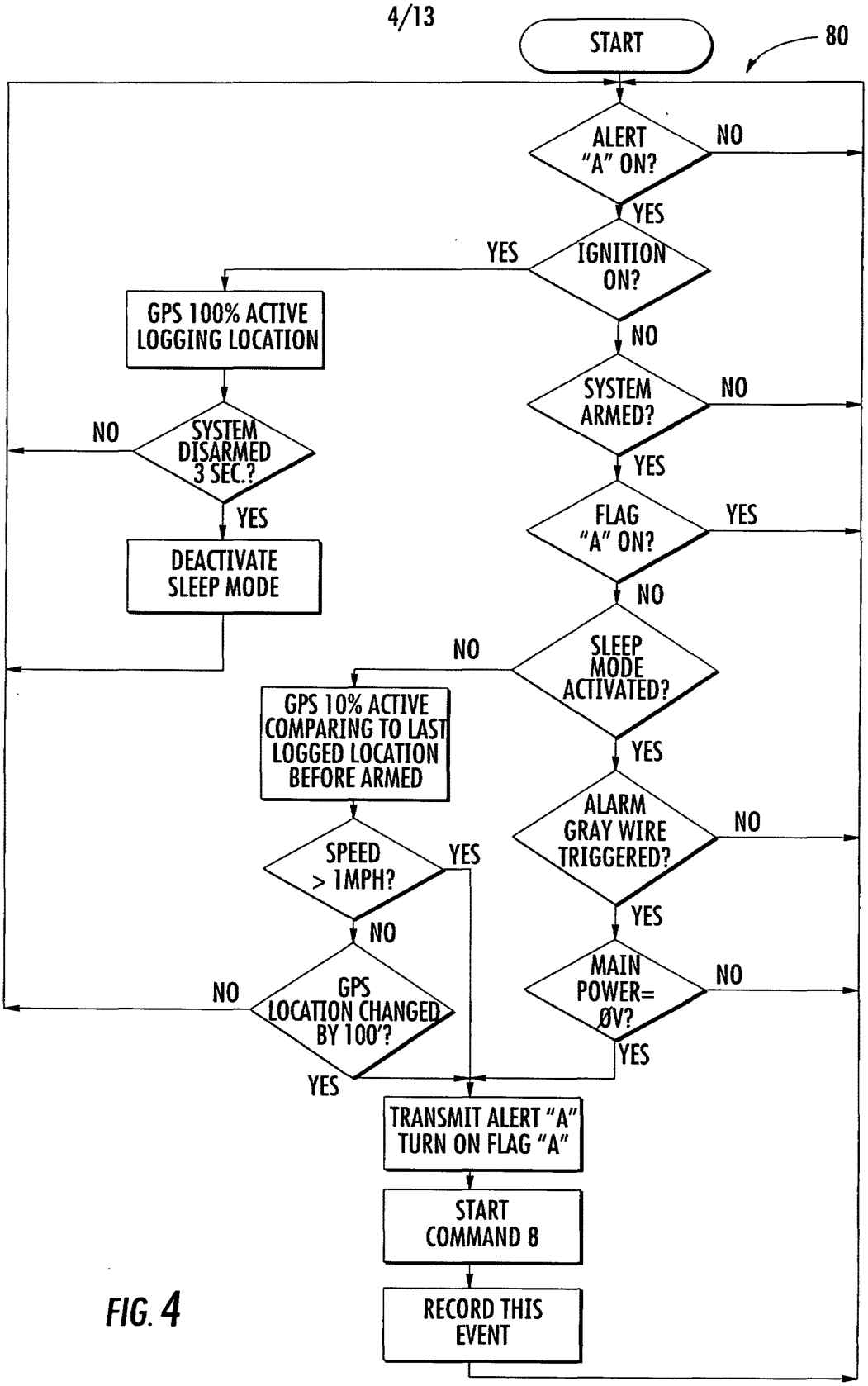

START
80
ALERT "A" ON?
NO
YES
IGNITION ON?
YES
GPS 100% ACTIVE LOGGING LOCATION
NO
SYSTEM ARMED?
NO
YES
SYSTEM DISARMED 3 SEC.?
NO
YES
DEACTIVATE SLEEP MODE
FLAG "A" ON?
YES
NO
SLEEP MODE ACTIVATED?
NO
GPS 10% ACTIVE COMPARING TO LAST LOGGED LOCATION BEFORE ARMED
YES
ALARM GRAY WIRE TRIGGERED?
NO
SPEED > 1MPH?
YES
YES
NO
MAIN POWER= ØV?
NO
GPS LOCATION CHANGED BY 100'?
NO
YES
YES
TRANSMIT ALERT "A" TURN ON FLAG "A"
START COMMAND 8
RECORD THIS EVENT

FIG. 4

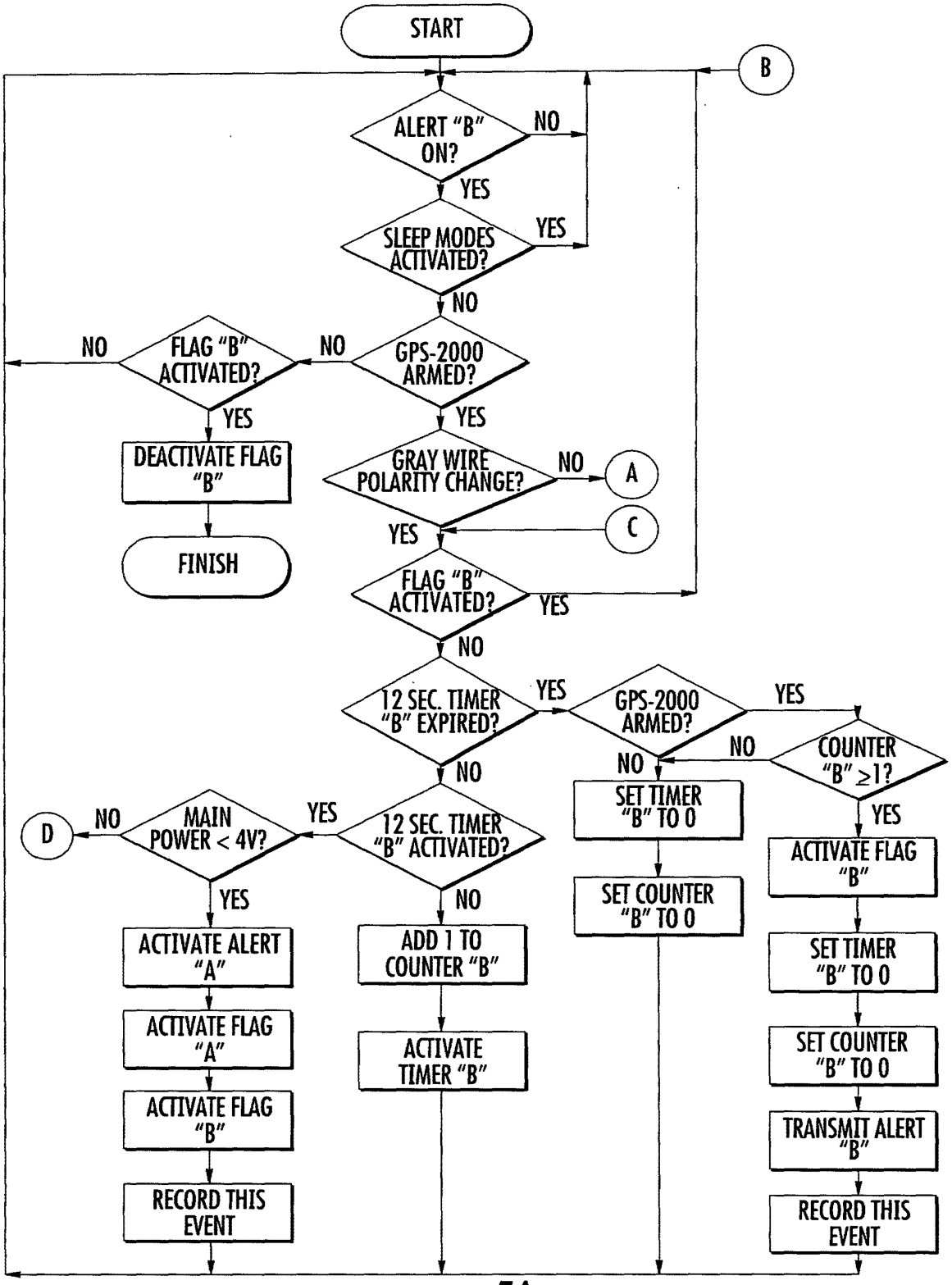

START
B
ALERT "B" ON?
NO
YES
SLEEP MODES ACTIVATED?
YES
NO
NO
FLAG "B" ACTIVATED?
NO
GPS-2000 ARMED?
YES
YES
DEACTIVATE FLAG "B"
GRAY WIRE POLARITY CHANGE?
NO
A
C
YES
FINISH
FLAG "B" ACTIVATED?
YES
NO
12 SEC. TIMER "B" EXPIRED?
YES
GPS-2000 ARMED?
YES
NO
NO
COUNTER "B" ≥1?
NO
SET TIMER "B" TO 0
YES
D
NO
MAIN POWER < 4V?
YES
12 SEC. TIMER "B" ACTIVATED?
ACTIVATE FLAG "B"
SET COUNTER "B" TO 0
YES
NO
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

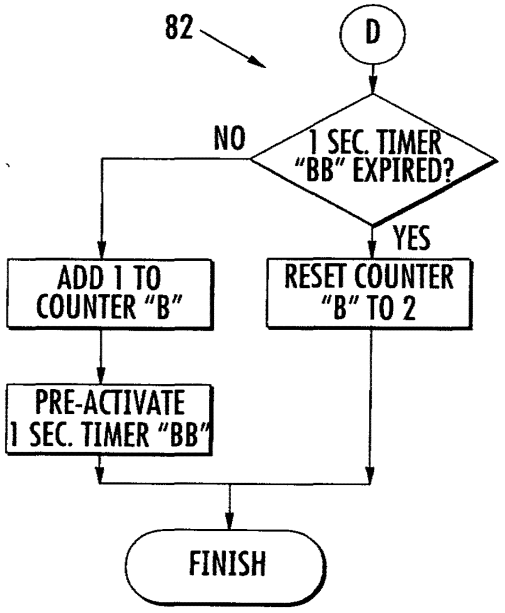

82
D
1 SEC. TIMER "BB" EXPIRED?
NO
YES
ADD 1 TO COUNTER "B"
RESET COUNTER "B" TO 2
PRE-ACTIVATE 1 SEC. TIMER "BB"
FINISH

FIG. 5B

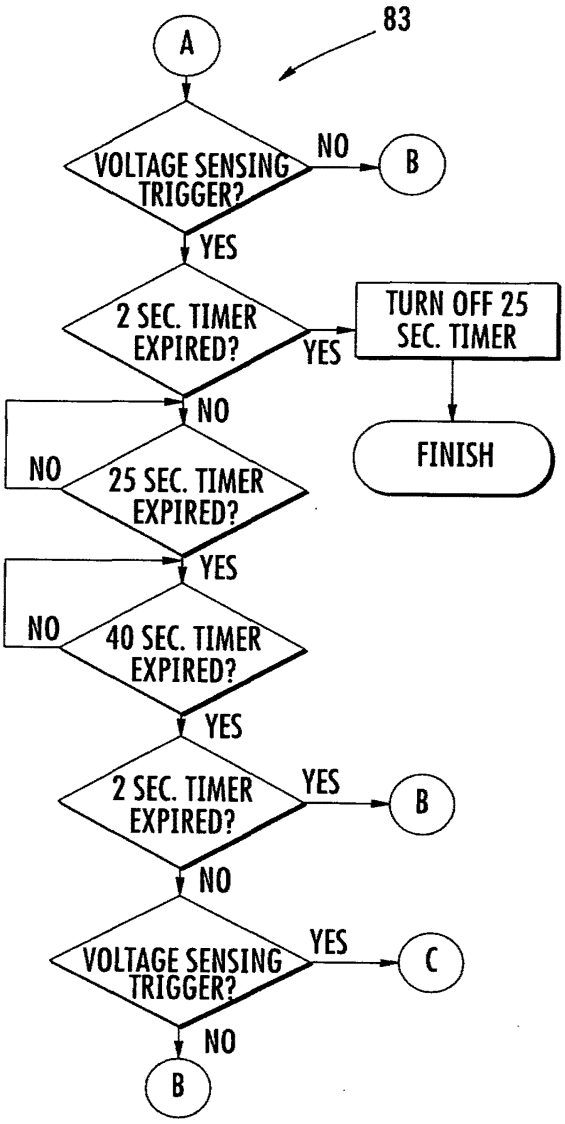

83
A
VOLTAGE SENSING TRIGGER?
NO
B
YES
2 SEC. TIMER EXPIRED?
YES
TURN OFF 25 SEC. TIMER
FINISH
NO
NO
25 SEC. TIMER EXPIRED?
YES
NO
40 SEC. TIMER EXPIRED?
YES
2 SEC. TIMER EXPIRED?
YES
B
NO
VOLTAGE SENSING TRIGGER?
YES
C
NO
B

FIG. 5C

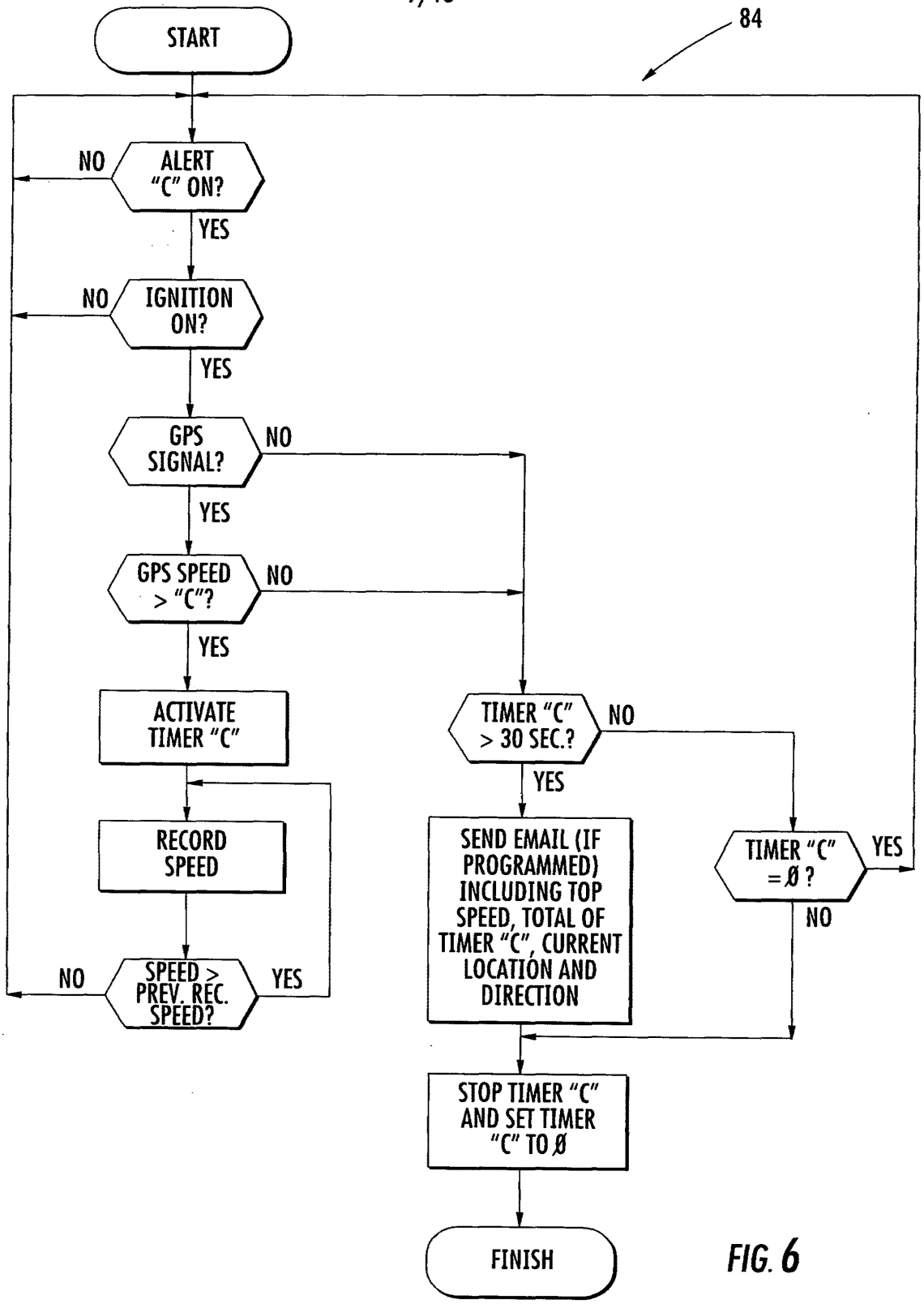

84
START
ALERT "C" ON?
NO
YES
IGNITION ON?
NO
YES
GPS SIGNAL?
NO
YES
GPS SPEED > "C"?
NO
YES
ACTIVATE TIMER "C"
RECORD SPEED
SPEED > PREV. REC. SPEED?
NO
YES
TIMER "C" > 30 SEC.?
NO
YES
SEND EMAIL (IF PROGRAMMED) INCLUDING TOP SPEED, TOTAL OF TIMER "C", CURRENT LOCATION AND DIRECTION
TIMER "C" = Ø ?
YES
NO
STOP TIMER "C" AND SET TIMER "C" TO Ø
FINISH

FIG. 6

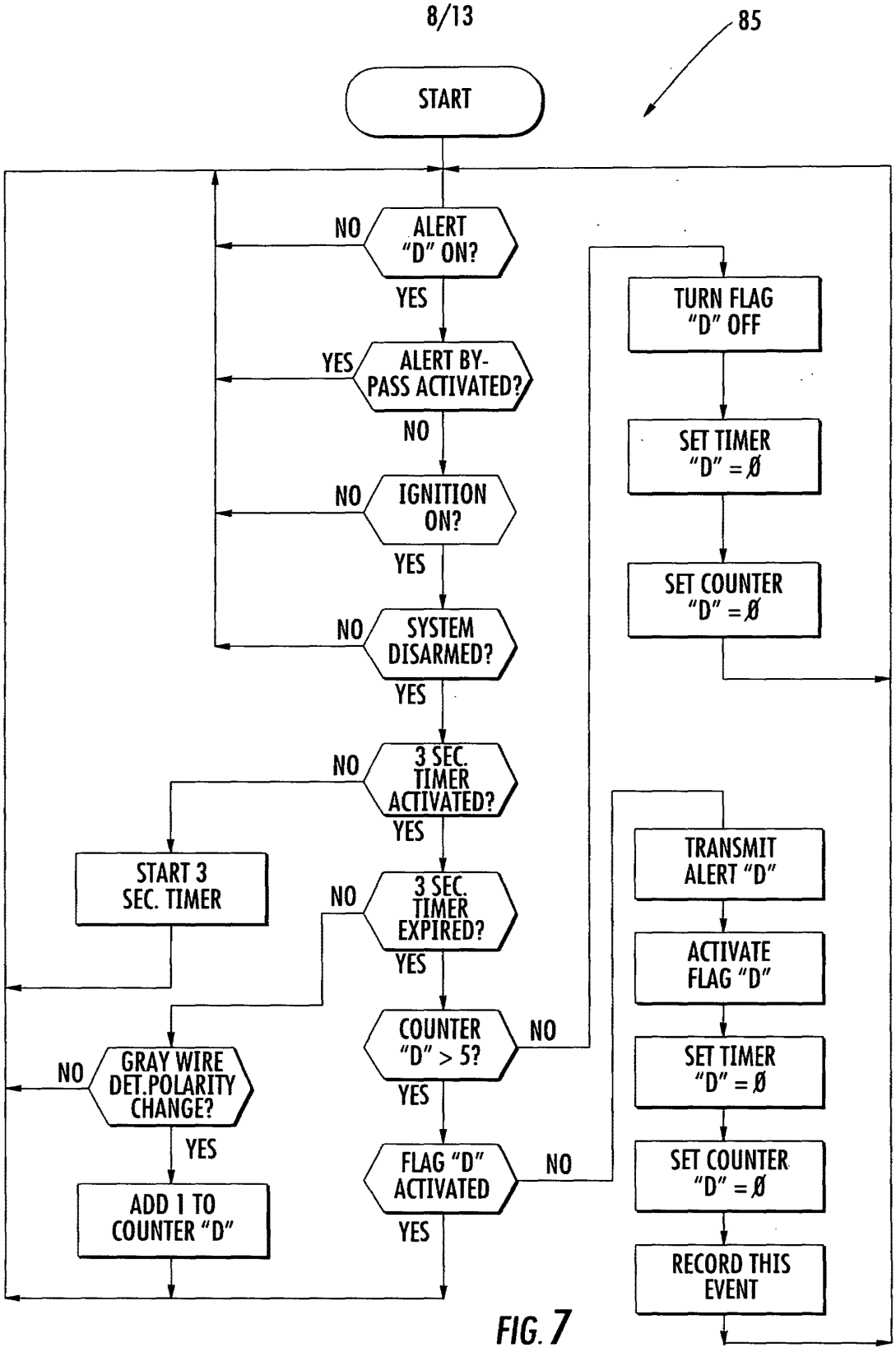

85
START
NO
ALERT "D" ON?
YES
YES
ALERT BY-PASS ACTIVATED?
NO
NO
IGNITION ON?
YES
NO
SYSTEM DISARMED?
YES
NO
3 SEC. TIMER ACTIVATED?
YES
START 3 SEC. TIMER
NO
3 SEC. TIMER EXPIRED?
YES
COUNTER "D" > 5?
NO
YES
NO
GRAY WIRE DET.POLARITY CHANGE?
YES
ADD 1 TO COUNTER "D"
FLAG "D" ACTIVATED
NO
YES
TURN FLAG "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

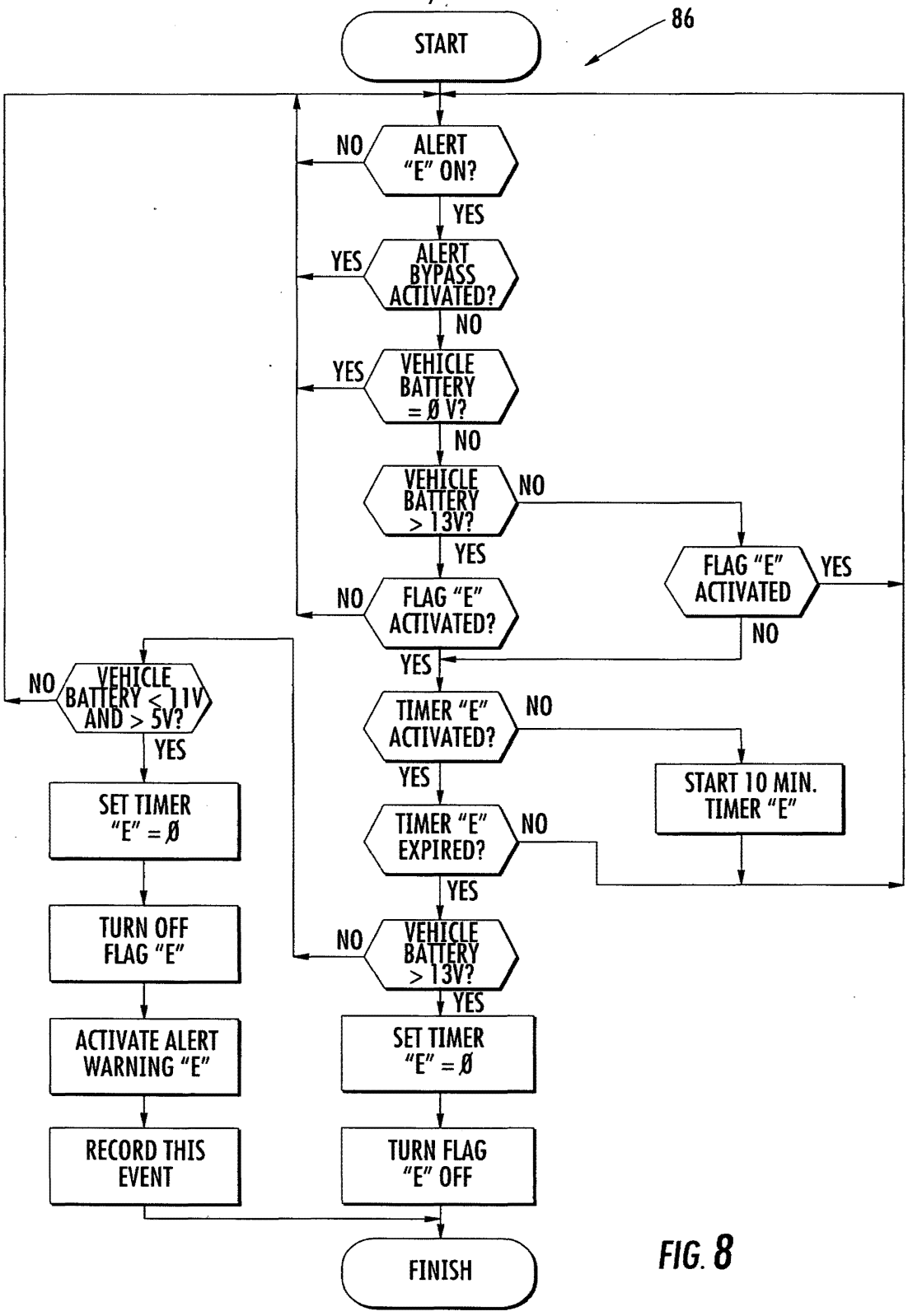

START
86
ALERT "E" ON?
NO
YES
ALERT BYPASS ACTIVATED?
YES
NO
VEHICLE BATTERY = Ø V?
YES
NO
VEHICLE BATTERY > 13V?
NO
YES
FLAG "E" ACTIVATED?
NO
YES
FLAG "E" ACTIVATED
YES
NO
VEHICLE BATTERY < 11V AND > 5V?
NO
YES
TIMER "E" ACTIVATED?
NO
YES
START 10 MIN. TIMER "E"
SET TIMER "E" = Ø
TIMER "E" EXPIRED?
NO
YES
TURN OFF FLAG "E"
VEHICLE BATTERY > 13V?
NO
YES
ACTIVATE ALERT WARNING "E"
SET TIMER "E" = Ø
RECORD THIS EVENT
TURN FLAG "E" OFF
FINISH

FIG. 8

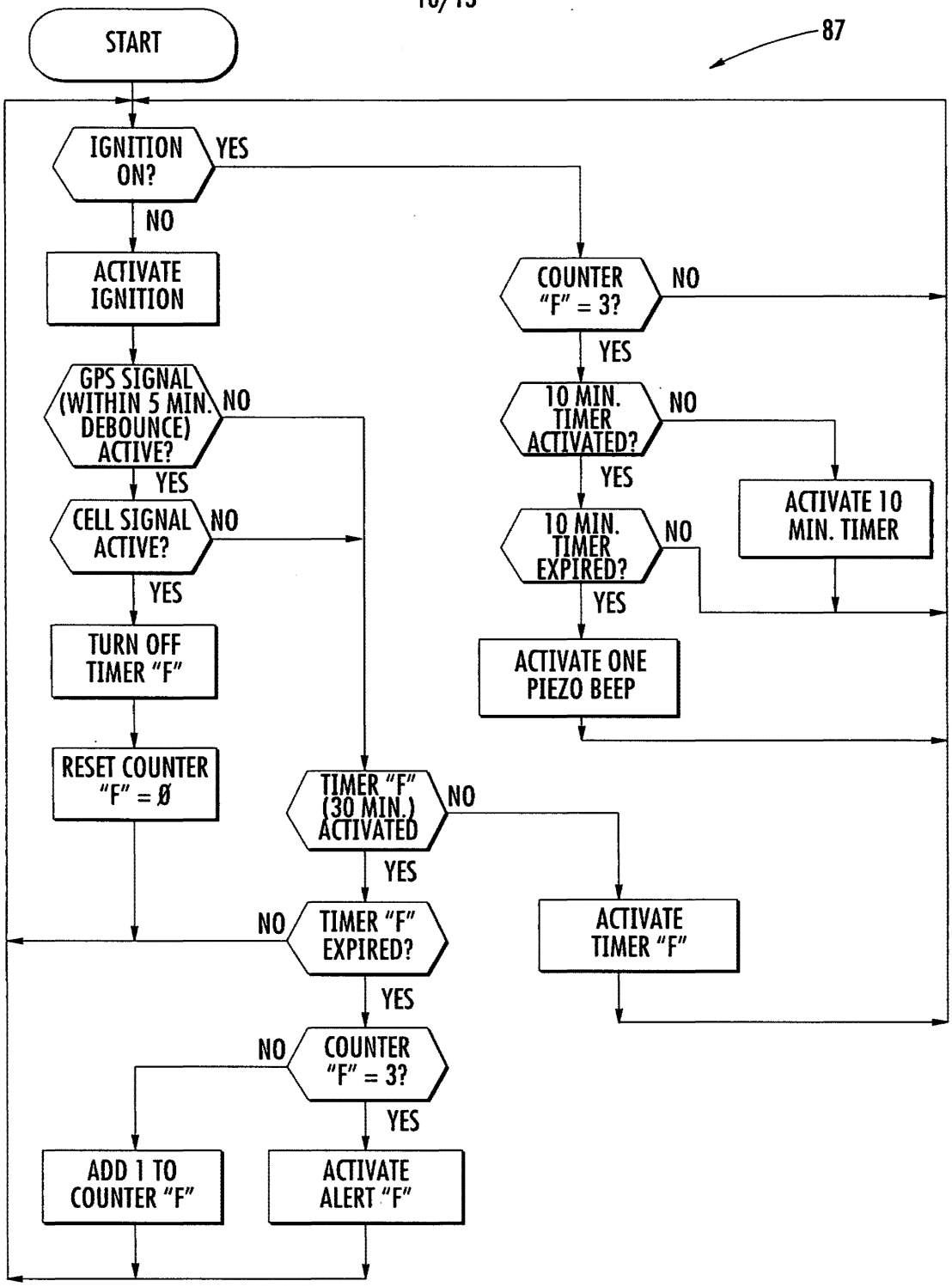

87
START
IGNITION ON?
YES
NO
ACTIVATE IGNITION
GPS SIGNAL (WITHIN 5 MIN. DEBOUNCE) ACTIVE?
NO
YES
CELL SIGNAL ACTIVE?
NO
YES
TURN OFF TIMER "F"
RESET COUNTER "F" = Ø
COUNTER "F" = 3?
NO
YES
10 MIN. TIMER ACTIVATED?
NO
YES
ACTIVATE 10 MIN. TIMER
10 MIN. TIMER EXPIRED?
NO
YES
ACTIVATE ONE PIEZO BEEP
TIMER "F" (30 MIN.) ACTIVATED
NO
YES
ACTIVATE TIMER "F"
NO
TIMER "F" EXPIRED?
YES
NO
COUNTER "F" = 3?
YES
ADD 1 TO COUNTER "F"
ACTIVATE ALERT "F"

FIG. 9

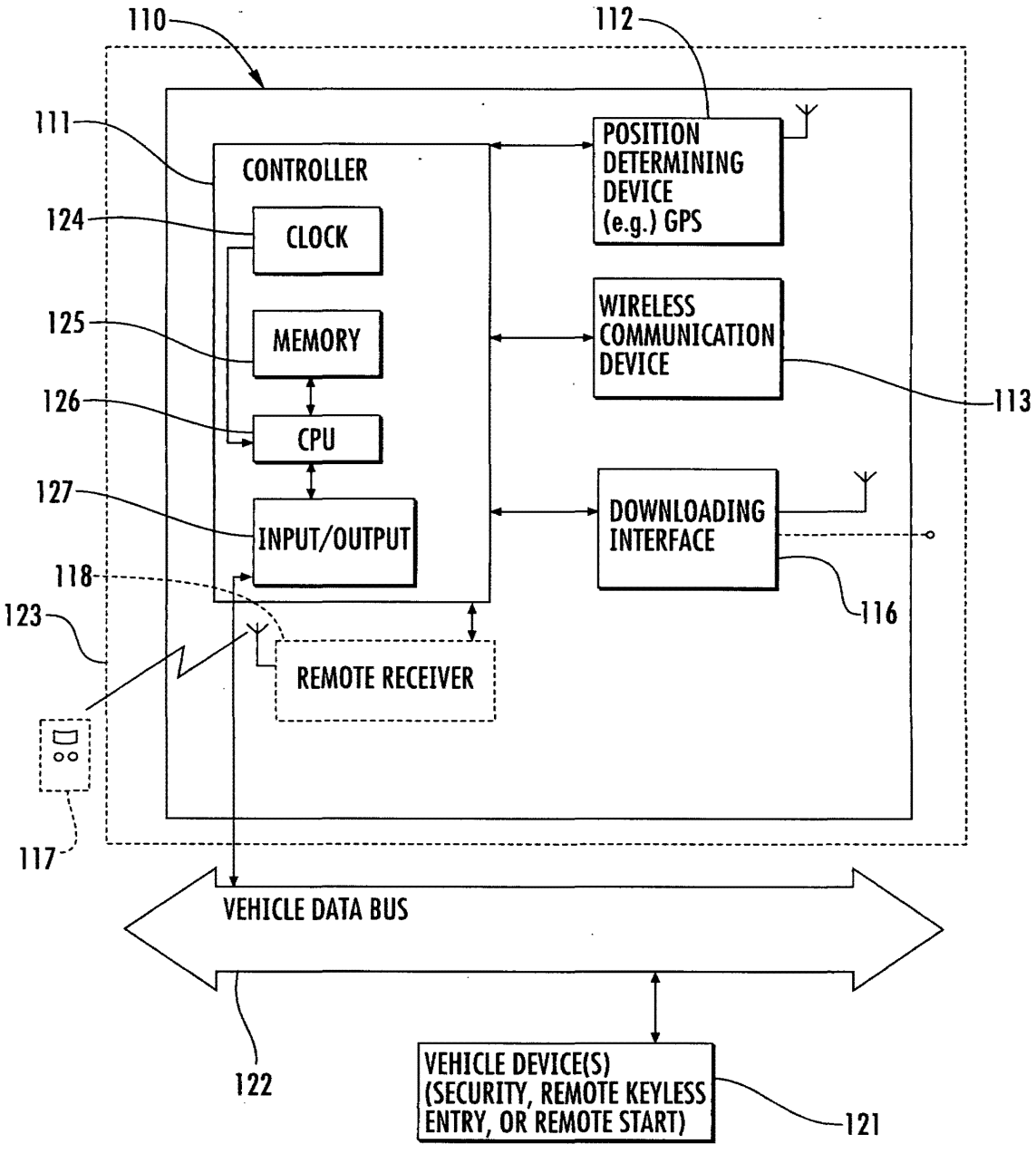

110
112
111
CONTROLLER
124
CLOCK
125
MEMORY
126
CPU
127
INPUT/OUTPUT
118
123
REMOTE RECEIVER
117
POSITION DETERMINING DEVICE (e.g.) GPS
WIRELESS COMMUNICATION DEVICE
113
DOWNLOADING INTERFACE
116
VEHICLE DATA BUS
122
VEHICLE DEVICE(S) (SECURITY, REMOTE KEYLESS ENTRY, OR REMOTE START)
121

FIG. 10

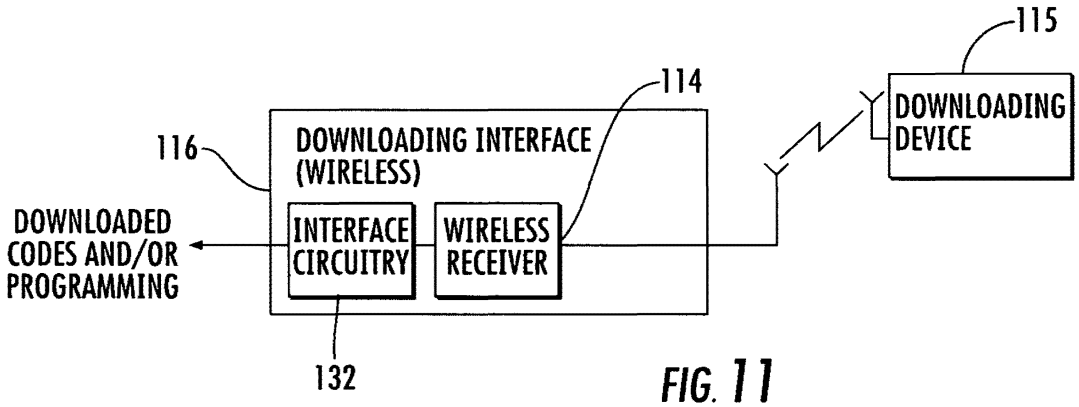


FIG. 11

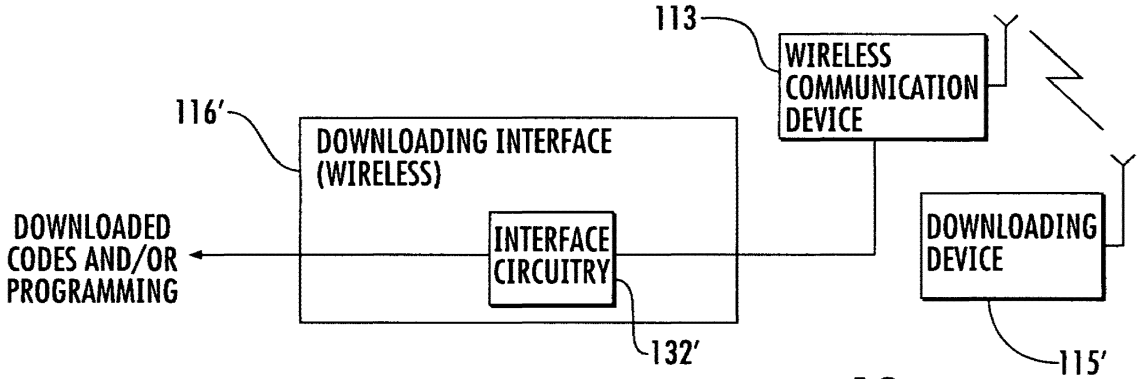


FIG. 12

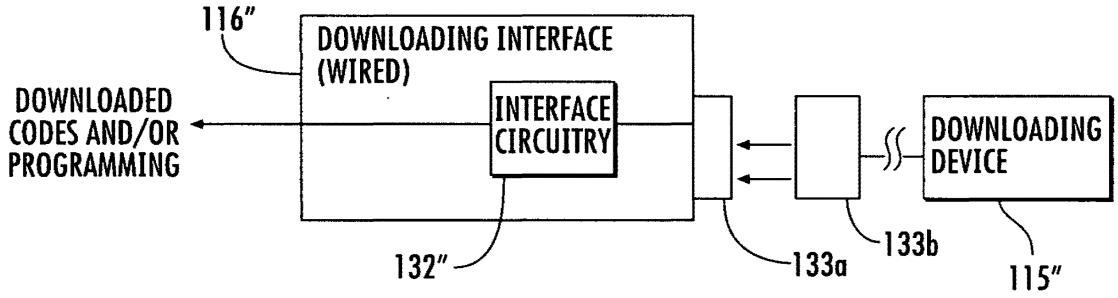


FIG. 13

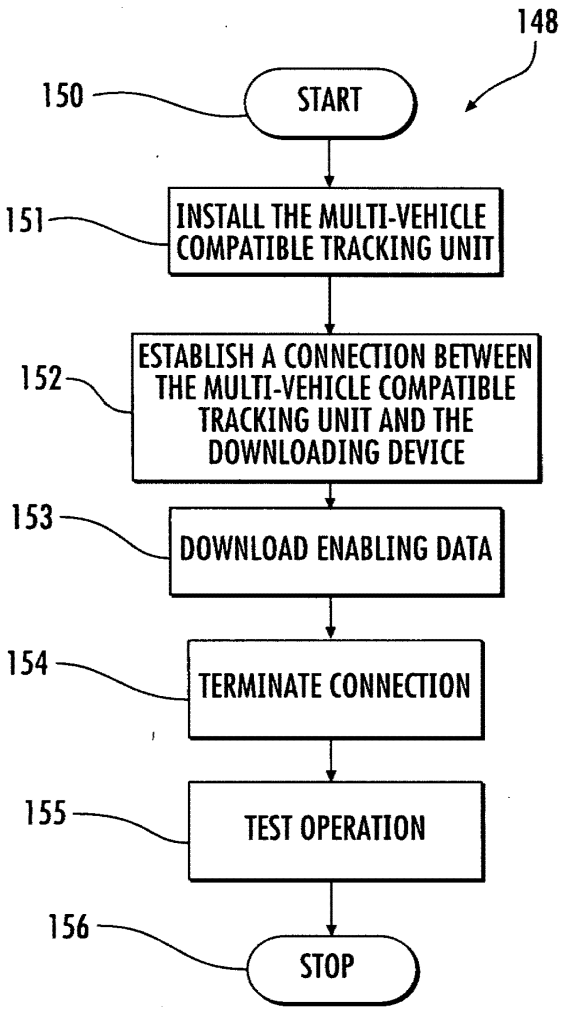

148
150
START
151
INSTALL THE MULTI-VEHICLE COMPATIBLE TRACKING UNIT
152
ESTABLISH A CONNECTION BETWEEN THE MULTI-VEHICLE COMPATIBLE TRACKING UNIT AND THE DOWNLOADING DEVICE
153
DOWNLOAD ENABLING DATA
154
TERMINATE CONNECTION
155
TEST OPERATION
156
STOP

FIG. 14

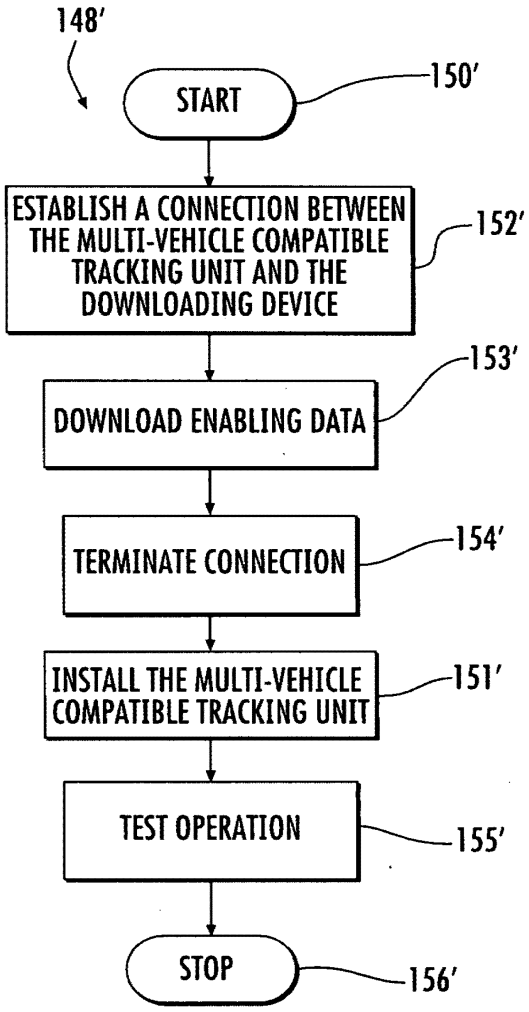

148'
150'
START
152'
ESTABLISH A CONNECTION BETWEEN THE MULTI-VEHICLE COMPATIBLE TRACKING UNIT AND THE DOWNLOADING DEVICE
153'
DOWNLOAD ENABLING DATA
154'
TERMINATE CONNECTION
151'
INSTALL THE MULTI-VEHICLE COMPATIBLE TRACKING UNIT
155'
TEST OPERATION
156'
STOP

FIG. 15

UNITED STATES PATENT AND TRADEMARK OFFICE

UNITED STATES DEPARTMENT OF COMMERCE
United States Patent and Trademark Office
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Alexandria, Virginia 22313-1450
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APPLICATION NUMBER	FILING or 371(c) DATE	GRP ART UNIT	FIL FEE REC'D	ATTY.DOCKET.NO	TOT CLAIMS	IND CLAIMS
11/773,272	07/03/2007		1700	58106CIP1	30	4

CONFIRMATION NO. 1046

CHRISTOPHER F. REGAN, ESQUIRE
ALLEN, DYER, DOPPELT, MILBRATH & GILCHRIST, P.A.
P.O. Box 3791
Orlando, FL32802-3791

FILING RECEIPT

Date Mailed: 07/31/2007

Receipt is acknowledged of this non-provisional patent application. The application will be taken up for examination in due course. Applicant will be notified as to the results of the examination. Any correspondence concerning the application must include the following identification information: the U.S. APPLICATION NUMBER, FILING DATE, NAME OF APPLICANT, and TITLE OF INVENTION. Fees transmitted by check or draft are subject to collection. Please verify the accuracy of the data presented on this receipt. **If an error is noted on this Filing Receipt, please write to the Office of Initial Patent Examination's Filing Receipt Corrections. Please provide a copy of this Filing Receipt with the changes noted thereon. If you received a "Notice to File Missing Parts" for this application, please submit any corrections to this Filing Receipt with your reply to the Notice. When the USPTO processes the reply to the Notice, the USPTO will generate another Filing Receipt incorporating the requested corrections**

Applicant(s)

Kenneth E. Flick, Douglasville, GA;

Assignment For Published Patent Application

Omega Patents, L.L.C., State of Incorporation: Georgia, Douglasville, GA

Power of Attorney: The patent practitioners associated with Customer Number 27975

Domestic Priority data as claimed by applicant

This application is a CIP of 11/076,259 03/09/2005
which is a CON of 10/383,496 03/07/2003 PAT 7,149,623
which is a CON of 09/859,972 05/17/2001 PAT 6,606,561
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: 07/30/2007

The country code and number of your priority application, to be used for filing abroad under the Paris Convention, is **US11/773,272**

Projected Publication Date: To Be Determined - pending completion of Corrected Papers

Non-Publication Request: No

Early Publication Request: No

Title

VEHICLE TRACKING UNIT WITH DOWNLOADABLE CODES AND ASSOCIATED METHODS

Preliminary Class

PROTECTING YOUR INVENTION OUTSIDE THE UNITED STATES

Since the rights granted by a U.S. patent extend only throughout the territory of the United States and have no effect in a foreign country, an inventor who wishes patent protection in another country must apply for a patent in a specific country or in regional patent offices. Applicants may wish to consider the filing of an international application under the Patent Cooperation Treaty (PCT). An international (PCT) application generally has the same effect as a regular national patent application in each PCT-member country. The PCT process **simplifies** the filing of patent applications on the same invention in member countries, but **does not result** in a grant of "an international patent" and does not eliminate the need of applicants to file additional documents and fees in countries where patent protection is desired.

Almost every country has its own patent law, and a person desiring a patent in a particular country must make an application for patent in that country in accordance with its particular laws. Since the laws of many countries differ in various respects from the patent law of the United States, applicants are advised to seek guidance from specific foreign countries to ensure that patent rights are not lost prematurely.

Applicants also are advised that in the case of inventions made in the United States, the Director of the USPTO must issue a license before applicants can apply for a patent in a foreign country. The filing of a U.S. patent application serves as a request for a foreign filing license. The application's filing receipt contains further information and guidance as to the status of applicant's license for foreign filing.

Applicants may wish to consult the USPTO booklet, "General Information Concerning Patents" (specifically, the section entitled "Treaties and Foreign Patents") for more information on timeframes and deadlines for filing foreign patent applications. The guide is available either by contacting the USPTO Contact Center at 800-786-9199, or it can be viewed on the USPTO website at http://www.uspto.gov/web/offices/pac/doc/general/index.html.

For information on preventing theft of your intellectual property (patents, trademarks and copyrights), you may wish to consult the U.S. Government website, http://www.stopfakes.gov. Part of a Department of Commerce initiative, this website includes self-help "toolkits" giving innovators guidance on how to protect intellectual property in specific countries such as China, Korea and Mexico. For questions regarding patent enforcement issues, applicants may call the U.S. Government hotline at 1-866-999-HALT (1-866-999-4158).

LICENSE FOR FOREIGN FILING UNDER

Title 35, United States Code, Section 184

Title 37, Code of Federal Regulations, 5.11 & 5.15

GRANTED

The applicant has been granted a license under 35 U.S.C. 184, if the phrase "IF REQUIRED, FOREIGN FILING LICENSE GRANTED" followed by a date appears on this form. Such licenses are issued in all applications where the conditions for issuance of a license have been met, regardless of whether or not a license may be required as set forth in 37 CFR 5.15. The scope and limitations of this license are set forth in

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This license is to be retained by the licensee and may be used at any time on or after the effective date thereof unless it is revoked. This license is automatically transferred to any related applications(s) filed under 37 CFR 1.53(d). This license is not retroactive.

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NOT GRANTED

No license under 35 U.S.C. 184 has been granted at this time, if the phrase "IF REQUIRED, FOREIGN FILING LICENSE GRANTED" DOES NOT appear on this form. Applicant may still petition for a license under 37 CFR 5.12, if a license is desired before the expiration of 6 months from the filing date of the application. If 6 months has lapsed from the filing date of this application and the licensee has not received any indication of a secrecy order under 35 U.S.C. 181, the licensee may foreign file the application pursuant to 37 CFR 5.15(b).

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www.uspto.gov

APPLICATION NUMBER	FILING OR 371 (c) DATE	FIRST NAMED APPLICANT	ATTORNEY DOCKET NUMBER
11/773,272	07/03/2007	Kenneth E. Flick	58106CIP1

CONFIRMATION NO. 1046

CHRISTOPHER F. REGAN, ESQUIRE
ALLEN, DYER, DOPPELT, MILBRATH & GILCHRIST, P.A.
P.O. Box 3791
Orlando, FL 32802-3791

FORMALITIES LETTER

Date Mailed: 07/31/2007

NOTICE TO FILE CORRECTED APPLICATION PAPERS

Filing Date Granted

An application number and filing date have been accorded to this application. The application is informal since it does not comply with the regulations for the reason(s) indicated below. Applicant is given TWO MONTHS from the date of this Notice within which to correct the informalities indicated below. Extensions of time may be obtained by filing a petition accompanied by the extension fee under the provisions of 37 CFR 1.136(a).

The required item(s) identified below must be timely submitted to avoid abandonment:

- Replacement drawings in compliance with 37 CFR 1.84 and 37 CFR 1.121(d) are required. The drawings submitted are not acceptable because:
    - The drawings have a line quality that is too light to be reproduced (weight of all lines and letters must be heavy enough to permit adequate reproduction) or text that is illegible (reference characters, sheet numbers, and view numbers must be plain and legible) see 37 CFR 1.84(l) and (p)(1)); See Figure(s) 10.

Applicant is cautioned that correction of the above items may cause the specification and drawings page count to exceed 100 pages. If the specification and drawings exceed 100 pages, applicant will need to submit the required application size fee.

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Commissioner for Patents
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Alexandria VA 22313-1450

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Office of Initial Patent Examination (571) 272-4000, or 1-800-PTO-9199
PART 3 - OFFICE COPY

Case No. 58106CIP1

COMMISSIONER FOR PATENTS
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Transmitted herewith for filing is the patent application of:

Inventor: Kenneth E. FLICK

For: VEHICLE TRACKING UNIT WITH DOWNLOADABLE CODES AND ASSOCIATED METHODS

Enclosed are:

[X] Patent Application: 65 pages, 30 claims.
[X] 13 sheets of drawings.
[X] The suggested drawing figure to be published is FIG. 10.
[X] A declaration and power of attorney.
[X] An assignment of the invention to *Omega Patents, L.L.C.*
[X] Assignee info:
Name: Omega Patents, L.L.C.
Address: 5326 Presley Place, Douglasville, GA 30135
State of Incorporation: Georgia

[X] Applicant claims priority benefit to the following U.S. applications:
The present application is a CIP of Serial No. 11/076,259 filed 3/9/05, which is a continuation of Serial No. 10/383,496 filed 3/7/03, which is a continuation of Serial No. 09/859,972 filed 5/17/01 now U.S. Patent 6,606,561 which, in turn, was based upon provisional patent Serial Nos. 60/264,811 filed 1/29/01; 60/258,005 filed 12/22/00; 60/251,552 filed 12/6/00; 60/252,125 filed 11/20/00; 60/236,890 filed 12/29/00; 60/246,463 filed 11/7/00; 60/222,777 filed 8/3/00; and 60/205,178, filed 5/17/00, the entire contents of each of which are incorporated herein by reference.

The filing fee has been calculated as shown below:

	(Col. 1)		(Col. 2)	SMALL ENTITY		LARGE ENTITY	
FOR:	# FILED		# EXTRA	RATE	FEE	RATE	FEE
BASIC FEE					$ 75		$ 300
SEARCH FEE					$ 250		$ 500
EXAMINATION FEE					$ 100		$ 200
TOTAL CLAIMS	30	-20	10	X 25	$	X 50	$ 500
INDEP CLAIMS	4	- 3	1	X 100	$	X 200	$ 200
TOTAL PAGES		- 100	0	X 125*	$	X 250*	$
* for each additional 50 sheets that exceeds 100 sheets				TOTAL	$	TOTAL	$ 1,700

[X] The filing fee in the amount of $ 1,700 is being paid by credit card on EFS-Web.
[X] The Commissioner is authorized to charge or credit any discrepancies in fee amounts to Deposit Account No. 01-0484.
[X] PLEASE ADDRESS CORRESPONDENCE TO ATTORNEY OF RECORD:
CHRISTOPHER F. REGAN
[X] Please associate this application with Customer No. 27975.

July 3, 2007
Date

CHRISTOPHER F. REGAN
Reg. No. 34,906

VEHICLE TRACKING UNIT WITH DOWNLOADABLE CODES AND ASSOCIATED METHODS

Related Applications

[0001] The present application is a continuation-in-part of U.S. Patent Application Serial No. 11/076,259 filed March 9, 2005, which is a continuation of U.S. Patent Application Serial No. 10/383,496 filed March 7, 2003, which is a continuation of U.S. Patent Application Serial No. 09/859,972 filed on May 17, 2001 now U.S. Patent 6,606,561 which, in turn, was based upon 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.

Field of the Invention

[0002] 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

[0003] 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.

[0004] 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.

[0005] 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.

[0006] A number of patents disclose various systems and approaches to tracking vehicles. For example, U.S. Patent 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.

[0007] U.S. Patent 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).

[0008] 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.

[0009] 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.

[0010] A number of patents disclose various security and control systems that address data bus interoperability. For example, U.S. Patent 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. Patent 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. Patent 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.

[0011] 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

[0012] 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.

[0013] 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 thereover with 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.

[0014] 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.

[0015] 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.

[0016] 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

[0017] FIG. 1 is a simplified block diagram of a vehicle tracking system in accordance with the present invention.

[0018] FIG. 2 is a more detailed block diagram of the vehicle tracking unit as shown in FIG. 1.

[0019] FIG. 3 is a more detailed block diagram of the monitoring station as shown in FIG. 1.

[0020] FIG. 4 is a flowchart for operation of the vehicle tracking system as shown in FIG. 1 illustrating a vehicle stolen alert.

[0021] FIGS. 5A-5C are a flowchart for operation of the vehicle tracking system as shown in FIG. 1 illustrating a vehicle alarm sounding alert.

[0022] FIG. 6 is a flowchart for operation of the vehicle tracking system as shown in FIG. 1 illustrating a vehicle speeding alert.

[0023] FIG. 7 is a flowchart for operation of the vehicle tracking system as shown in FIG. 1 illustrating an unauthorized transmitter learned alert.

[0024] FIG. 8 is a flowchart for operation of the vehicle tracking system as shown in FIG. 1 illustrating a low battery alert.

[0025] 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.

[0026] FIG. 10 is a simplified block diagram of a multi-vehicle compatible tracking unit in accordance with the invention.

[0027] FIG. 11 is a more detailed block diagram of an embodiment of the downloading interface as shown in FIG. 10.

[0028] FIG. 12 is a more detailed block diagram of another embodiment of a downloading interface as shown in FIG. 10.

[0029] FIG. 13 is a more detailed block diagram of yet another embodiment of the downloading interface as shown in FIG. 10.

[0030] FIG. 14 is a flowchart showing a method in accordance with the invention.

[0031] FIG. 15 is a flowchart showing another embodiment of a method in accordance with the invention.

Detailed Description of the Preferred Embodiments

[0032] 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.

[0033] 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.

[0034] 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**.

[0035] 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**.

[0036] 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.

[0037] 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.

[0038] 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.

[0039] 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.

[0040] 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.

[0041] 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.

[0042] 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**.

[0043] 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.

[0044] 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.

[0045] 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**.

[0046] 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**.

[0047] 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**.

[0048] 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.

[0049] 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.

[0050] 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.

[0051] 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. Accordingly, a number of codes or messages used by the system can be conserved. Various messages are described in greater detail below.

[0052] 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.

[0053] 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.

[0054] 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.

[0055] 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**.

[0056] 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.

[0057] 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.

[0058] 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.

[0059] 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.

[0060] 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.

[0061] 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.

[0062] 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.

[0063] 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**.

[0064] 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.

[0065] 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.

[0066] 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.

[0067] 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.

[0068] 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.

[0069] 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.

[0070] 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.

[0071] 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.

[0072] 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**.

[0073] 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.

[0074] 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.

[0075] 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.

[0076] 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.

[0077] 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.

[0078] 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.

[0079] 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**.

[0080] 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.

[0081] 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. Patent 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.

[0082] 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.

[0083] 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.

[0084] 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.

[0085] 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.

[0086] 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).

[0087] 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).

[0088] 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.

[0089] 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.

[0090] 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.

[0091] 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.

[0092] 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.

[0093] 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 "B" 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

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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.

[0092] 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 12v 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 250ma., negative 1 second pulse for remote Car Starter (Command "2").

[0093] 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.

[0094] 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.

[0095] The following are representative commands for use in the system:

[0096] 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.

[0097] Command 2: (Accessory activation) monitoring station Command to the system to activate Pink wire to pulse 250 ma negative for 1 second.

[0098] Command 3: (Vehicle Location) website to indicate present location and past events in memory.

[0099] 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.

[0100] 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.

[0101] Command 7: (Unlock Doors) monitoring station Command to system to activate Blue wire to pulse 1 second with 250 ma negative.

[0102] 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.

[0103] 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.

[0104] 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.

[0105] 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)

[0106] 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.

[0107] 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.

[0108] 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.

[0109] 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.

[0110] 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.

[0111] 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.

[0112] 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.

[0113] 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.

[0114] 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).

[0115] 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.

[0116] 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).

[0117] 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).

[0118] 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.

[0119] 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.

[0120] 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.

[0121] 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.

[0122] 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.

[0123] 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.

[0124] 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.

[0125] 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.

[0126] 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.

[0127] 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.

[0128] 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.

[0129] 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.

[0130] 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.

[0131] 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.

[0132] 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.

[0133] 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. Patent 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.

[0134] 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.

[0135] 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.

[0136] 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:

[0137] Code 1 -- Tracker will turn off feature of upstream code caused by vehicle alert being detected.

[0138] Code 2 -- Tracker will turn on feature of upstream code caused by vehicle alert being detected.

[0139] 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.

[0140] 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.

[0141] Code 5 -- Turn off the audio buzzer. This is to be sent by the monitoring station after a user has successfully activated his account.

[0142] 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.

[0143] Code 7 -- Turn off the 80 mph speed limit reporting.

[0144] Code 8 -- Increase speed limit 5 mph and increase the time 5 minutes.

[0145] 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.

[0146] 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.

[0147] 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.

[0148] 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.

[0149] 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.

[0150] 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.

[0151] 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.

[0152] 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. 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**.

[0153] 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.

[0154] 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.

[0155] 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.

[0156] 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 **133a** for temporary connection to a downloading device **115''** with a mating connector **133b**. 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 **133a** 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.

[0157] 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, implemented 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.

[0158] 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.

[0159] 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'**).

[0160] Other features relating to vehicle control systems are disclosed in copending patent applications entitled VEHICLE TRACKER INCLUDING STATIONARY TIME DETERMINATION AND ASSOCIATED METHODS, Serial No. 09/859,727 filed May 17, 2001, now U.S. Patent No. 6,512,465; VEHICLE TRACKER CONSERVING CODES AND RELATED METHODS, Serial No. 09/859,673 filed May 17, 2001, now U.S. Patent No. 6,522,267; VEHICLE TRACKER WITH POWER SAVING FEATURES AND RELATED METHODS, Serial No. 09/859,728 filed May 17, 2001, now U.S. Patent No. 6,512,466; VEHICLE TRACKER COOPERATING

WITH A STARTER INTERRUPT AND RELATED METHODS, Serial No. 09/859,973 filed May 17, 2001; VEHICLE TRACKER WITH USER NOTIFICATIONS AND ASSOCIATED METHODS, Serial No. 09/859,733 filed May 17, 2001, now U.S. Patent No. 6,509,868; VEHICLE TRACKER WITH USER REGISTRATION REMINDER AND RELATED METHODS, Serial No. 09/859,971 filed May 17, 2001, now U.S. Patent No. 6,507,786; VEHICLE TRACKER INCLUDING INPUT/OUTPUT FEATURES AND RELATED METHODS, Serial No. 09/859,972 filed May 17, 2001, now U.S. Patent No. 6,606,561; and VEHICLE TRACKER WITH TEST FEATURES AND RELATED METHODS, Serial No. 09/859,729 filed May 17, 2001, now U.S. Patent No. 6,809,659, the entire disclosures of which are incorporated herein by reference.

[0161] 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 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 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.

23. A method 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 comprising 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 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 of thereof for different vehicles, the method comprising:

downloading enabling data related to at least one corresponding vehicle device code for use by the multi-vehicle compatible controller via a downloading interface.

24. The method according to Claim 23 wherein the downloading interface comprises a wired signal downloading interface.

25. The method according to Claim 24 wherein the wired signal downloading interface comprises a connector for temporary connection to a downloading device.

26. The method according to Claim 23 wherein the downloading interface comprises a wireless signal downloading interface.

27. The method according to Claim 26 wherein the wireless signal downloading interface comprises a wireless receiver for temporary connection to a downloading device.

28. The method according to Claim 23 wherein the corresponding at least one vehicle code is for reading from the at least one vehicle device.

29. The method according to Claim 23 wherein the corresponding at least one vehicle code is for writing to the at least one vehicle device.

30. The method according to Claim 23 further comprising downloading at least one programming instruction for the multi-vehicle compatible controller via the downloading interface.

VEHICLE TRACKING UNIT WITH DOWNLOADABLE CODES AND ASSOCIATED METHODS

Abstract of the Disclosure

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.

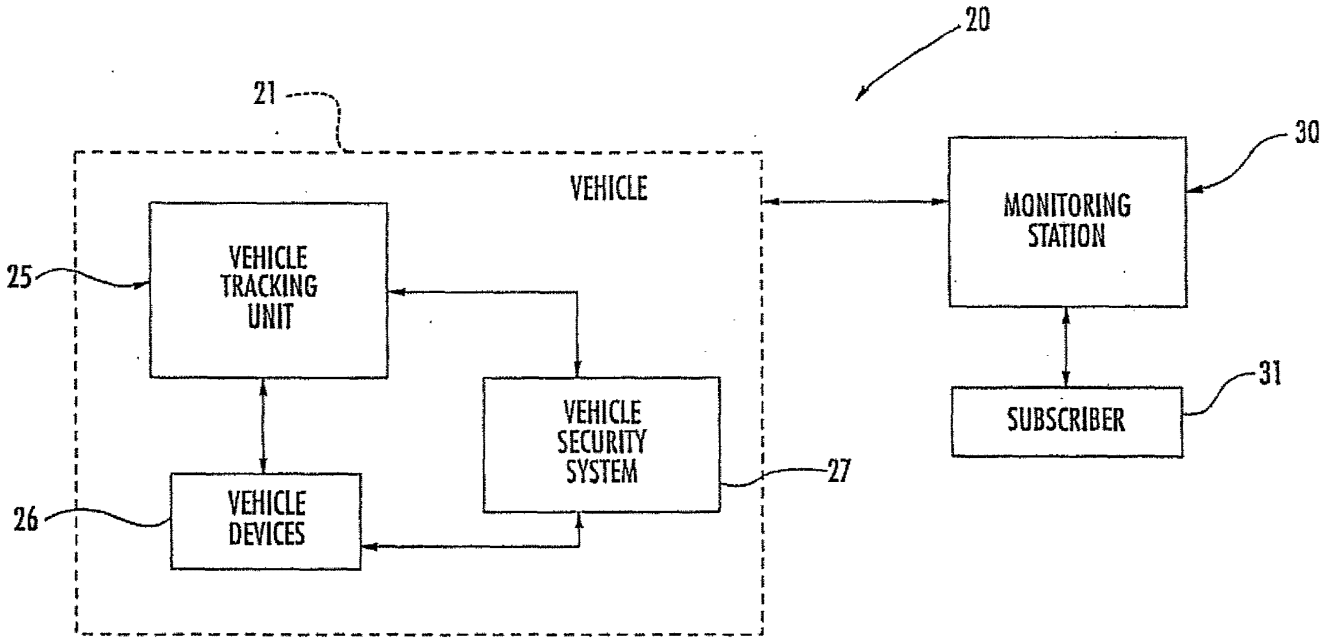

20
21
VEHICLE
VEHICLE TRACKING UNIT
25
VEHICLE SECURITY SYSTEM
27
VEHICLE DEVICES
26
MONITORING STATION
30
SUBSCRIBER
31

FIG. 1.

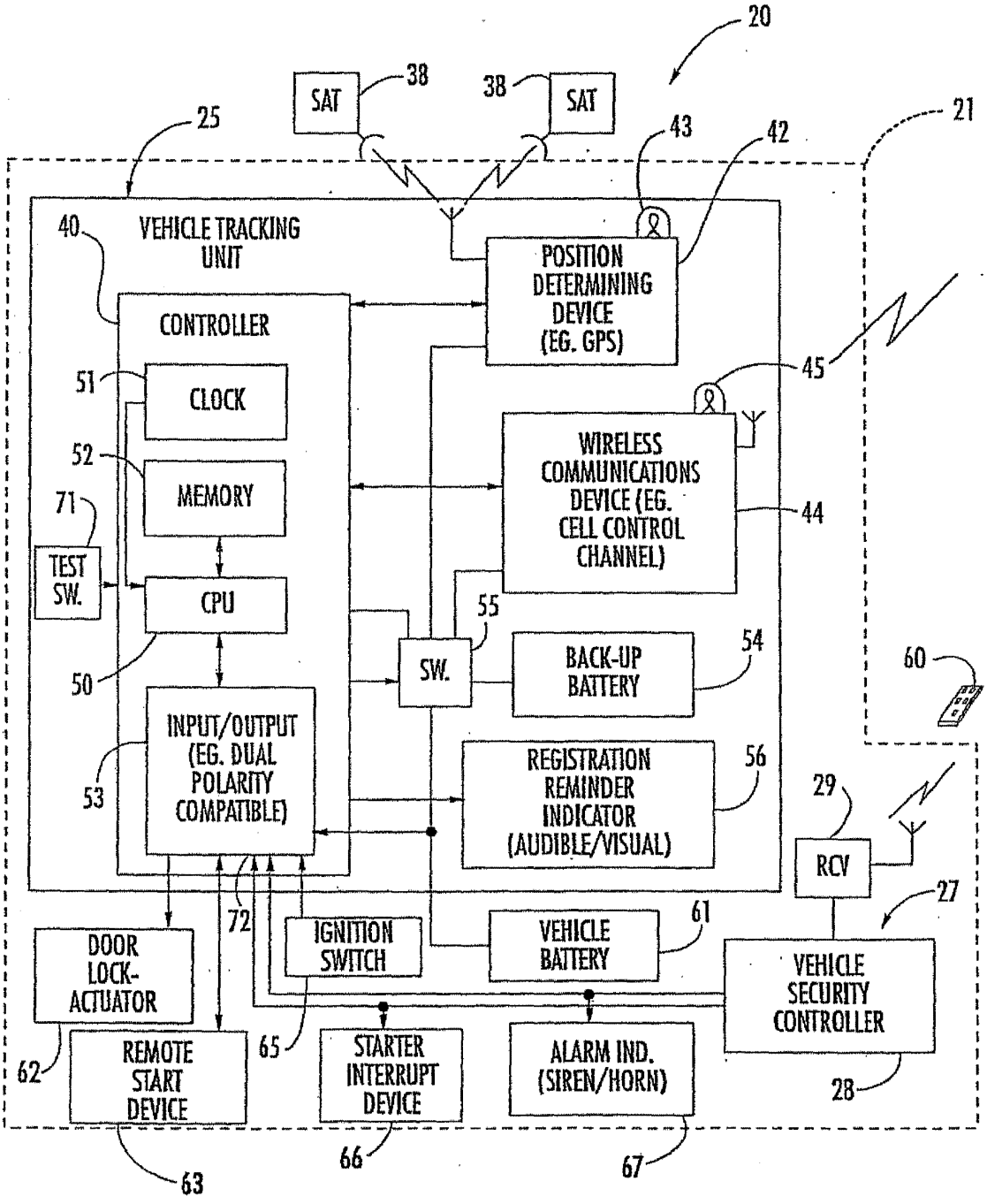

20
SAT
38
38
SAT
25
21
43
42
40
VEHICLE TRACKING UNIT
POSITION DETERMINING DEVICE (EG. GPS)
CONTROLLER
45
51
CLOCK
WIRELESS COMMUNICATIONS DEVICE (EG. CELL CONTROL CHANNEL)
52
MEMORY
44
71
TEST SW.
CPU
55
SW.
BACK-UP BATTERY
54
60
50
INPUT/OUTPUT (EG. DUAL POLARITY COMPATIBLE)
53
REGISTRATION REMINDER 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.

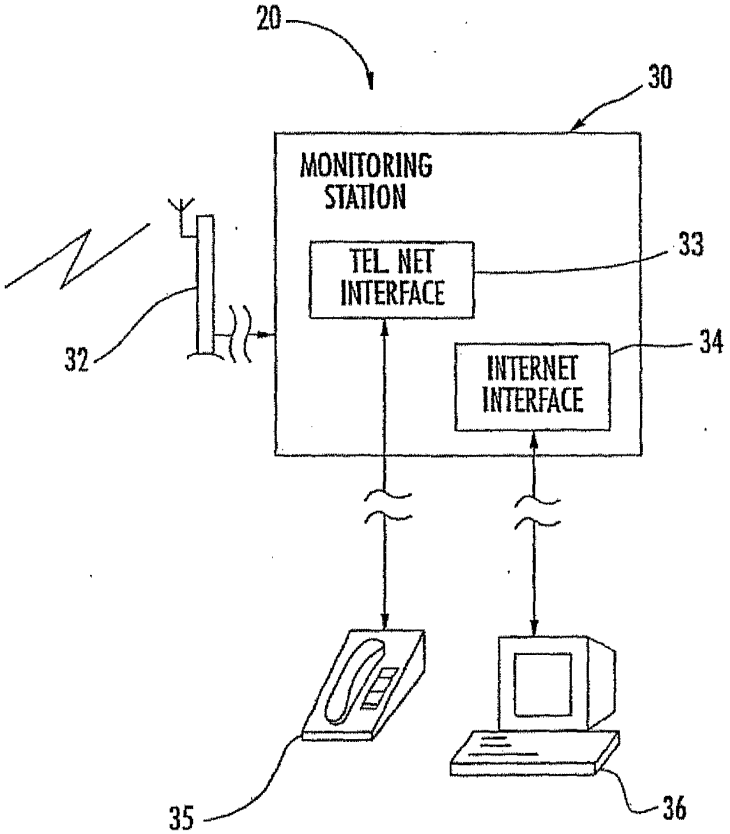

20
30
MONITORING STATION
TEL. NET INTERFACE
33
INTERNET INTERFACE
34
32
35
36

FIG. 3.

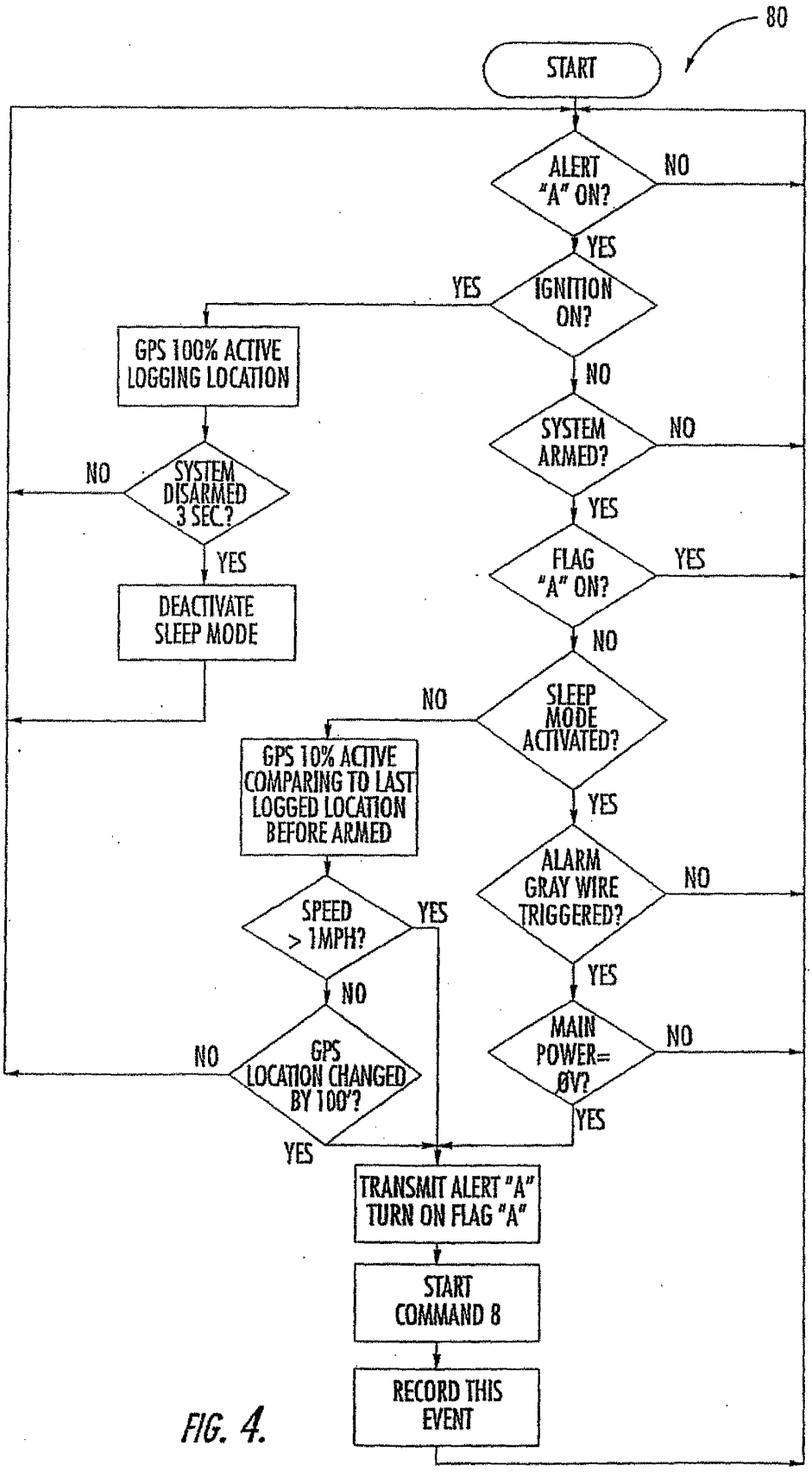

80
START
ALERT "A" ON?
NO
YES
IGNITION ON?
YES
GPS 100% ACTIVE LOGGING LOCATION
NO
SYSTEM ARMED?
NO
YES
NO
SYSTEM DISARMED 3 SEC.?
FLAG "A" ON?
YES
YES
DEACTIVATE SLEEP MODE
NO
NO
SLEEP MODE ACTIVATED?
GPS 10% ACTIVE COMPARING TO LAST LOGGED LOCATION BEFORE ARMED
YES
ALARM GRAY WIRE TRIGGERED?
NO
SPEED > 1MPH?
YES
YES
NO
MAIN POWER= 0V?
NO
NO
GPS LOCATION CHANGED BY 100'?
YES
YES
TRANSMIT ALERT "A" TURN ON FLAG "A"
START COMMAND 8
RECORD THIS EVENT

FIG. 4.

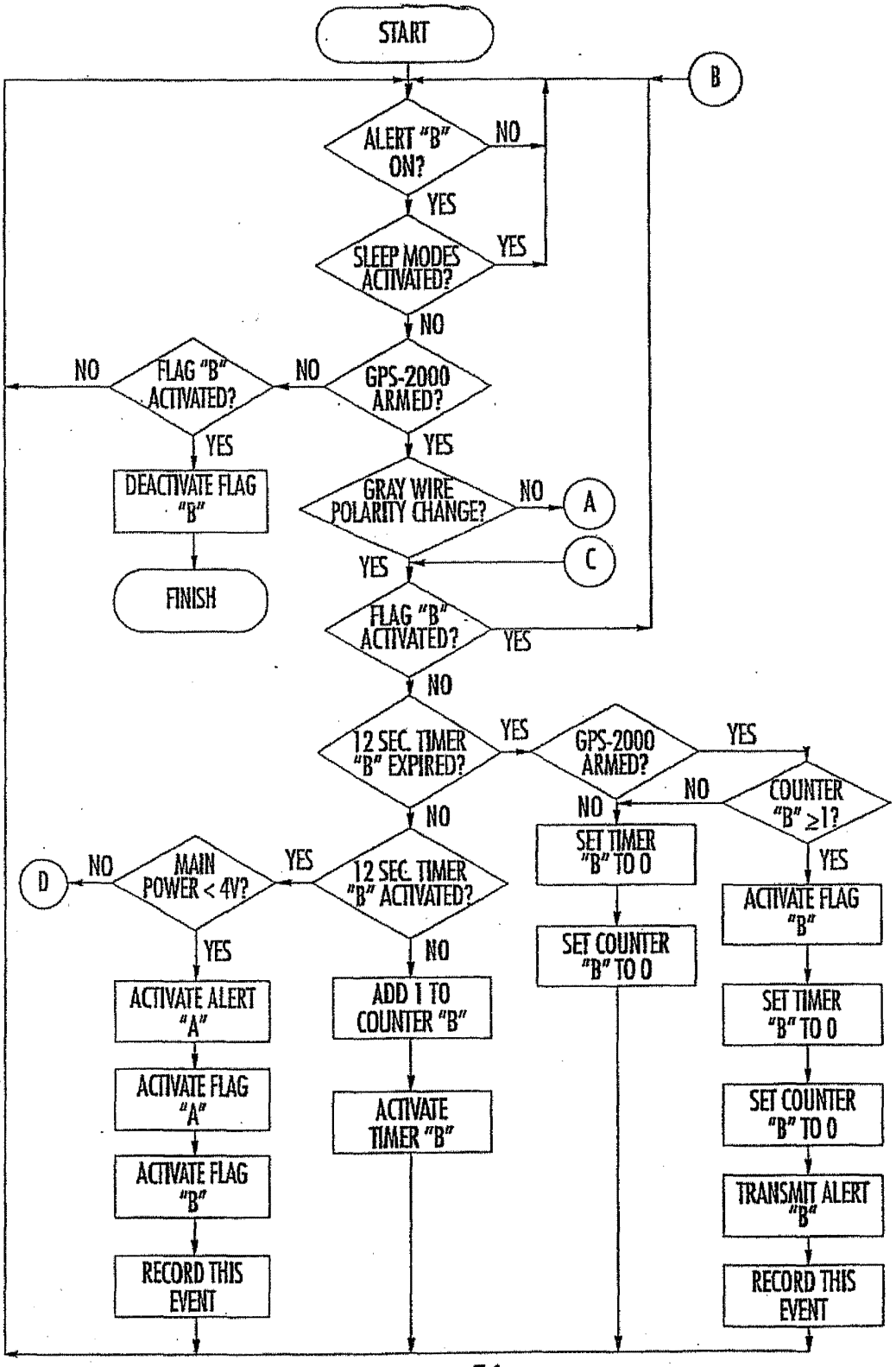

START
B
ALERT "B" ON?
NO
YES
SLEEP MODES ACTIVATED?
YES
NO
GPS-2000 ARMED?
NO
FLAG "B" ACTIVATED?
NO
YES
YES
DEACTIVATE FLAG "B"
GRAY WIRE POLARITY CHANGE?
NO
A
C
YES
FINISH
FLAG "B" ACTIVATED?
YES
NO
12 SEC. TIMER "B" EXPIRED?
YES
GPS-2000 ARMED?
YES
NO
NO
COUNTER "B" ≥1?
NO
YES
D
NO
MAIN POWER < 4V?
YES
12 SEC. TIMER "B" ACTIVATED?
YES
NO
SET TIMER "B" TO 0
ACTIVATE FLAG "B"
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.

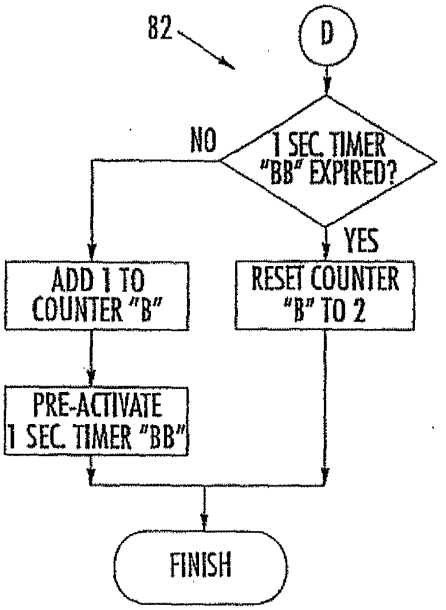

82
D
1 SEC. TIMER "BB" EXPIRED?
NO
YES
ADD 1 TO COUNTER "B"
RESET COUNTER "B" TO 2
PRE-ACTIVATE 1 SEC. TIMER "BB"
FINISH

FIG. 5B.

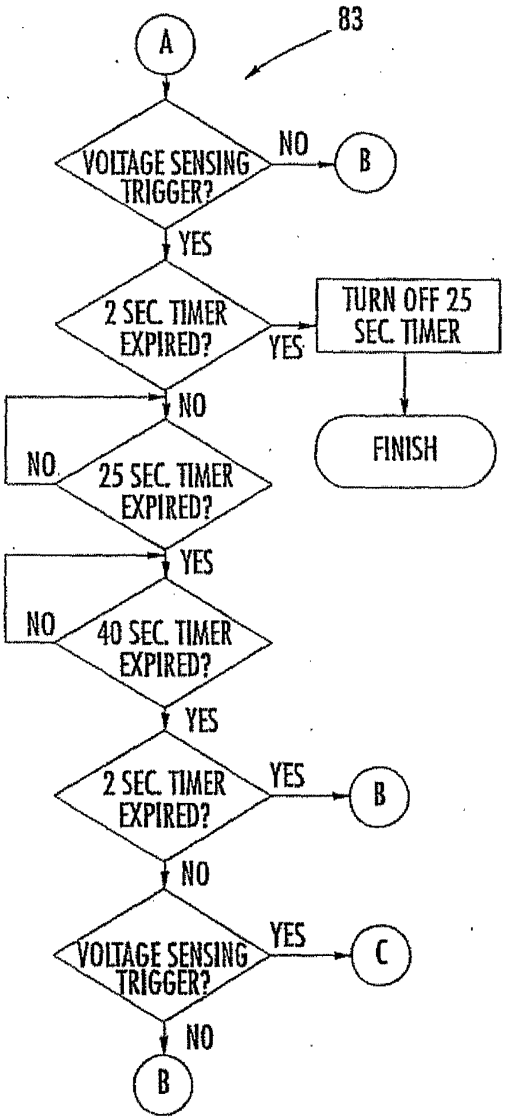

83
A
VOLTAGE SENSING TRIGGER?
NO
B
YES
2 SEC. TIMER EXPIRED?
YES
TURN OFF 25 SEC. TIMER
FINISH
NO
NO
25 SEC. TIMER EXPIRED?
YES
NO
40 SEC. TIMER EXPIRED?
YES
2 SEC. TIMER EXPIRED?
YES
B
NO
VOLTAGE SENSING TRIGGER?
YES
C
NO
B

FIG. 5C.

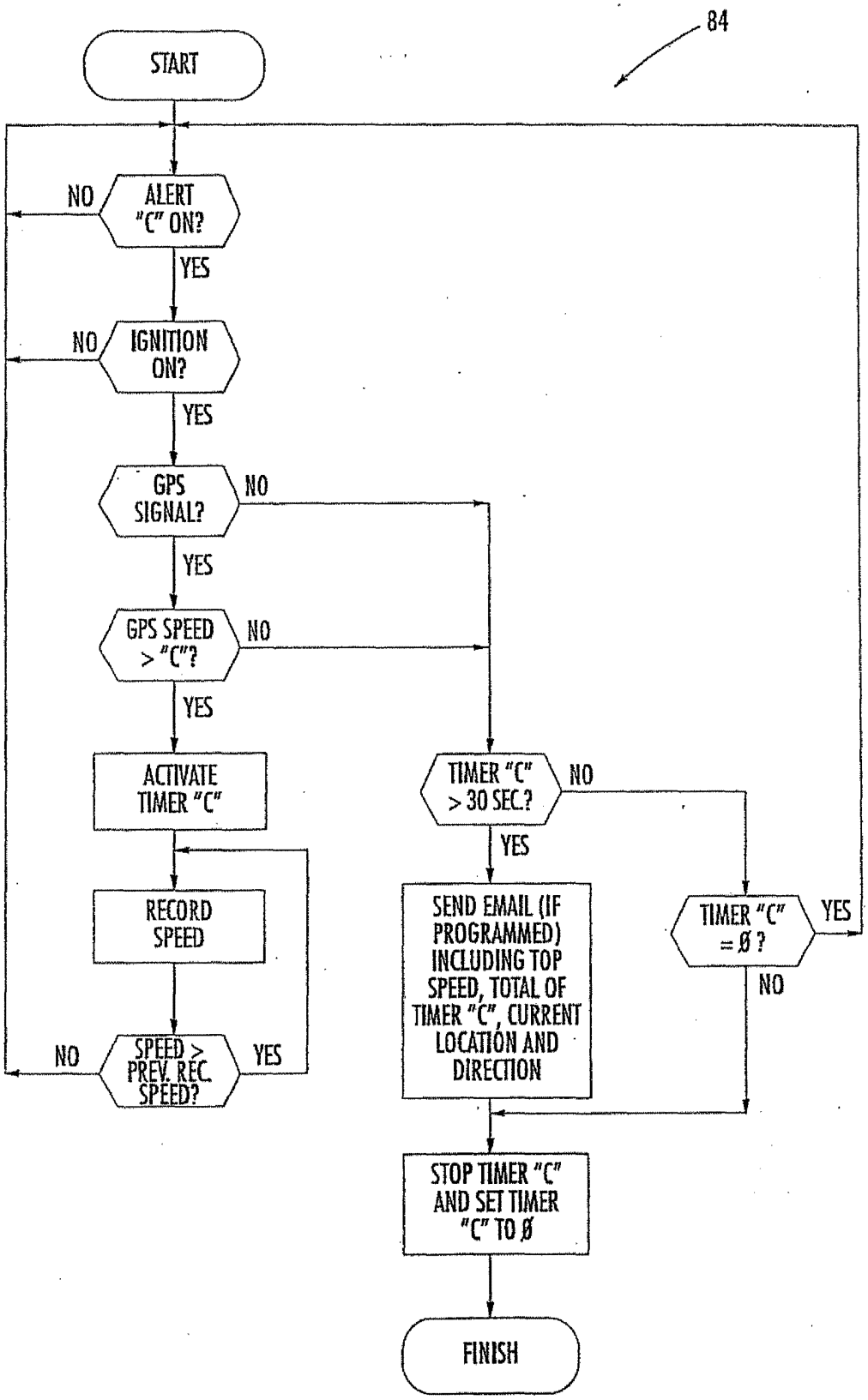

84
START
ALERT "C" ON?
NO
YES
IGNITION ON?
NO
YES
GPS SIGNAL?
NO
YES
GPS SPEED > "C"?
NO
YES
ACTIVATE TIMER "C"
RECORD SPEED
SPEED > PREV. REC. SPEED?
NO
YES
TIMER "C" > 30 SEC.?
NO
YES
SEND EMAIL (IF PROGRAMMED) INCLUDING TOP SPEED, TOTAL OF TIMER "C", CURRENT LOCATION AND DIRECTION
TIMER "C" = Ø ?
YES
NO
STOP TIMER "C" AND SET TIMER "C" TO Ø
FINISH

FIG. 6.

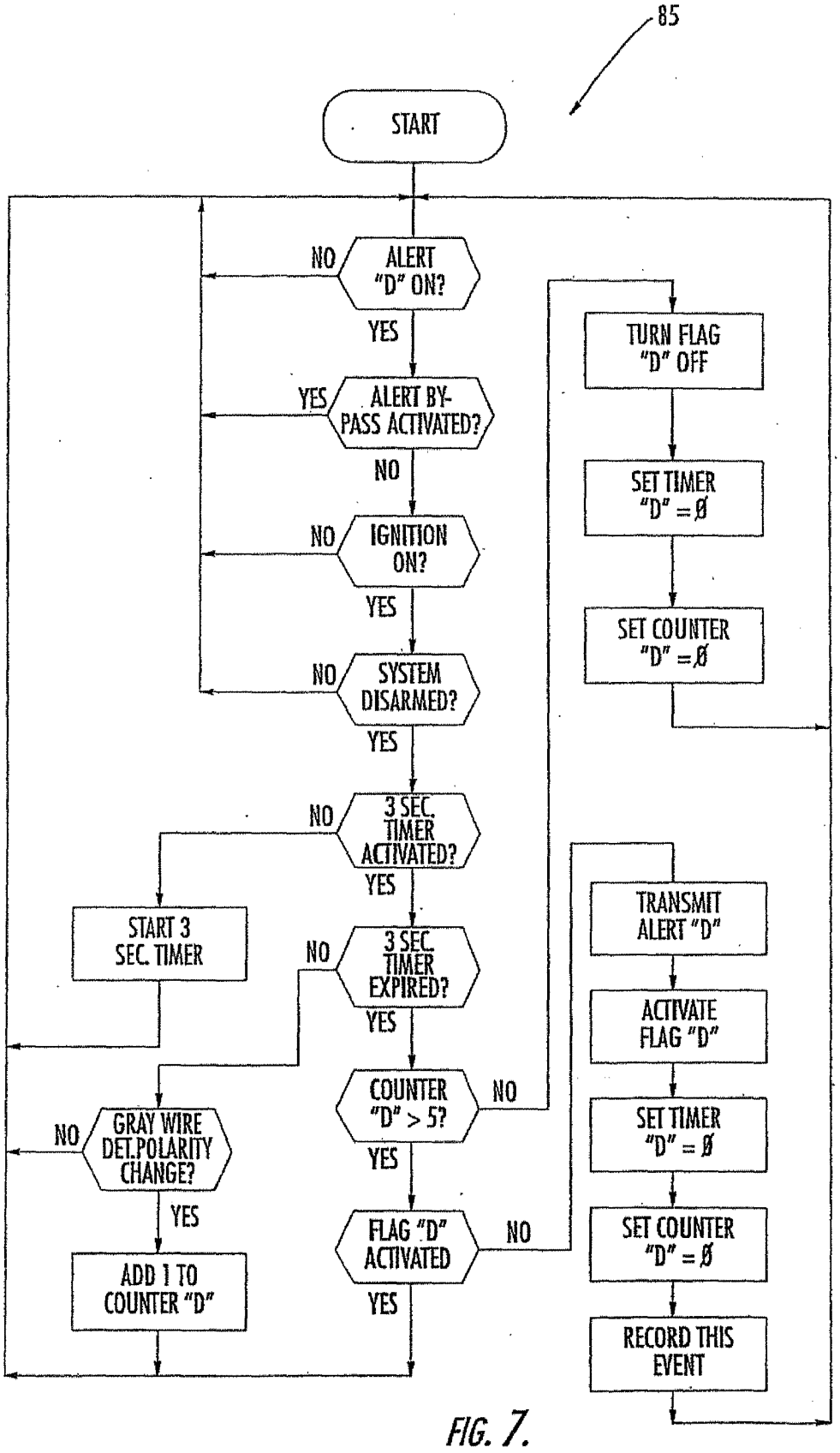

85
START
NO
ALERT "D" ON?
YES
YES
ALERT BY-PASS ACTIVATED?
NO
NO
IGNITION ON?
YES
NO
SYSTEM DISARMED?
YES
NO
3 SEC. TIMER ACTIVATED?
YES
START 3 SEC. TIMER
NO
3 SEC. TIMER EXPIRED?
YES
NO
GRAY WIRE DET.POLARITY CHANGE?
YES
ADD 1 TO COUNTER "D"
COUNTER "D" > 5?
NO
YES
FLAG "D" ACTIVATED
NO
YES
TURN FLAG "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.

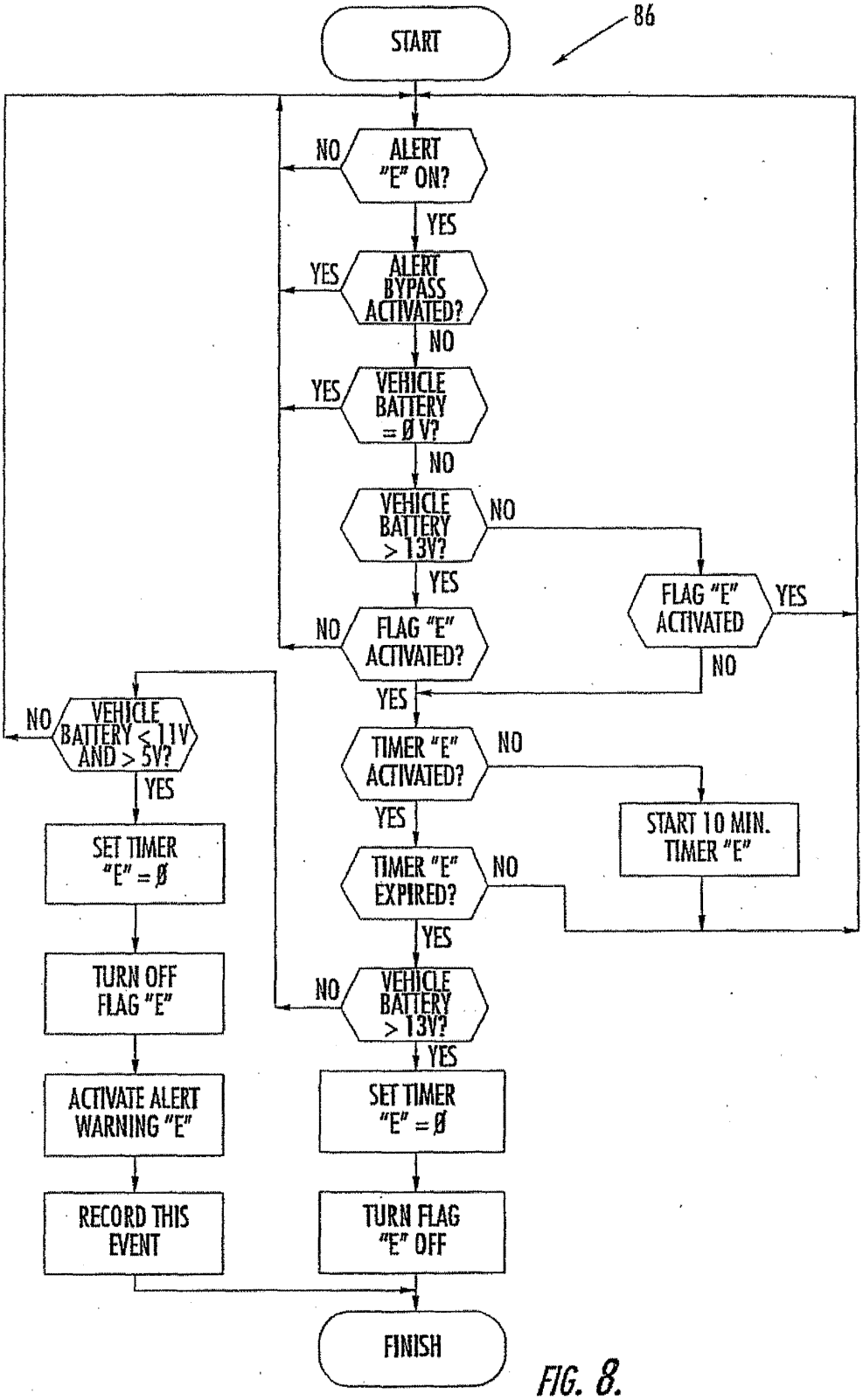

86
START
ALERT "E" ON?
NO
YES
ALERT BYPASS ACTIVATED?
YES
NO
VEHICLE BATTERY = Ø V?
YES
NO
VEHICLE BATTERY > 13V?
NO
YES
FLAG "E" ACTIVATED
YES
NO
FLAG "E" ACTIVATED?
NO
YES
VEHICLE BATTERY ≤ 11V AND > 5V?
NO
YES
TIMER "E" ACTIVATED?
NO
YES
START 10 MIN. TIMER "E"
SET TIMER "E" = Ø
TIMER "E" EXPIRED?
NO
YES
TURN OFF FLAG "E"
VEHICLE BATTERY > 13V?
NO
YES
ACTIVATE ALERT WARNING "E"
SET TIMER "E" = Ø
RECORD THIS EVENT
TURN FLAG "E" OFF
FINISH

FIG. 8.

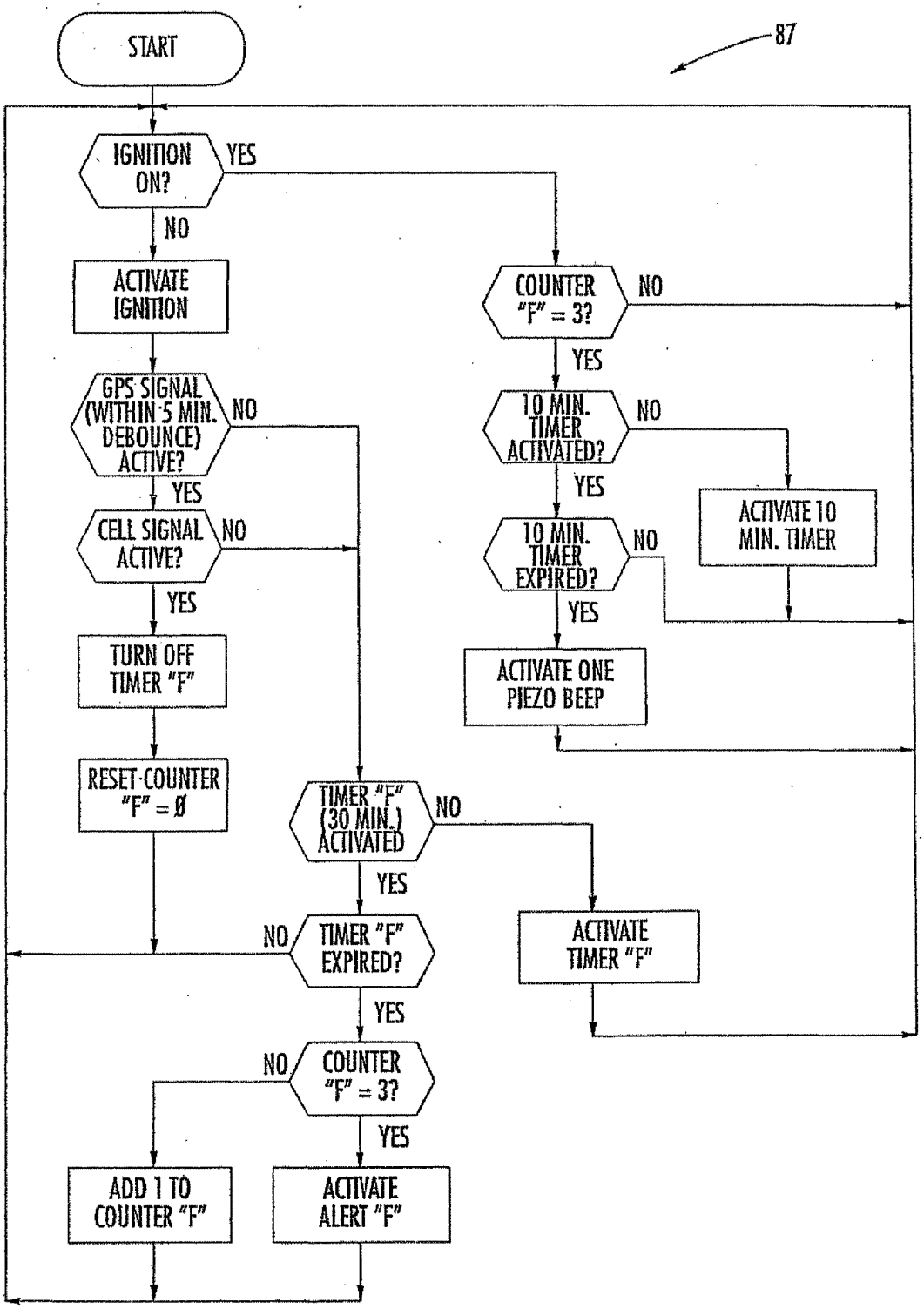

87
START
IGNITION ON?
YES
NO
ACTIVATE IGNITION
GPS SIGNAL (WITHIN 5 MIN. DEBOUNCE) ACTIVE?
NO
YES
CELL SIGNAL ACTIVE?
NO
YES
TURN OFF TIMER "F"
RESET COUNTER "F" = Ø
TIMER "F" (30 MIN.) ACTIVATED
NO
YES
TIMER "F" EXPIRED?
NO
YES
COUNTER "F" = 3?
NO
YES
ADD 1 TO COUNTER "F"
ACTIVATE ALERT "F"
COUNTER "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.

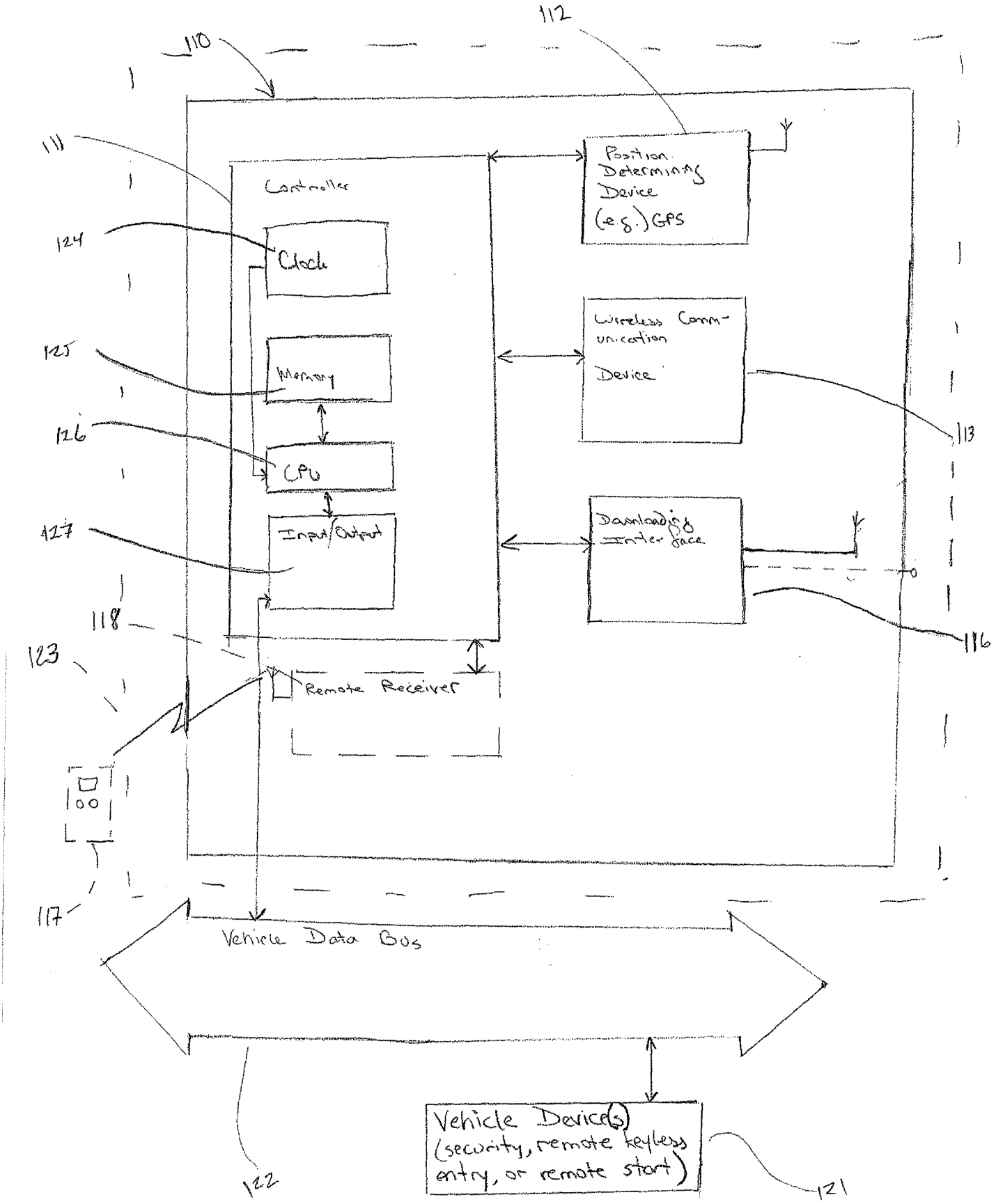

110
112
111
Controller
Position Determining Device (e.g.) GPS
124
Clock
Wireless Communication Device
125
Memory
113
126
CPU
Input/Output
Downloading Interface
127
118
116
123
Remote Receiver
117
Vehicle Data Bus
Vehicle Device(s) (security, remote keyless entry, or remote start)
122
121

Fig. 10

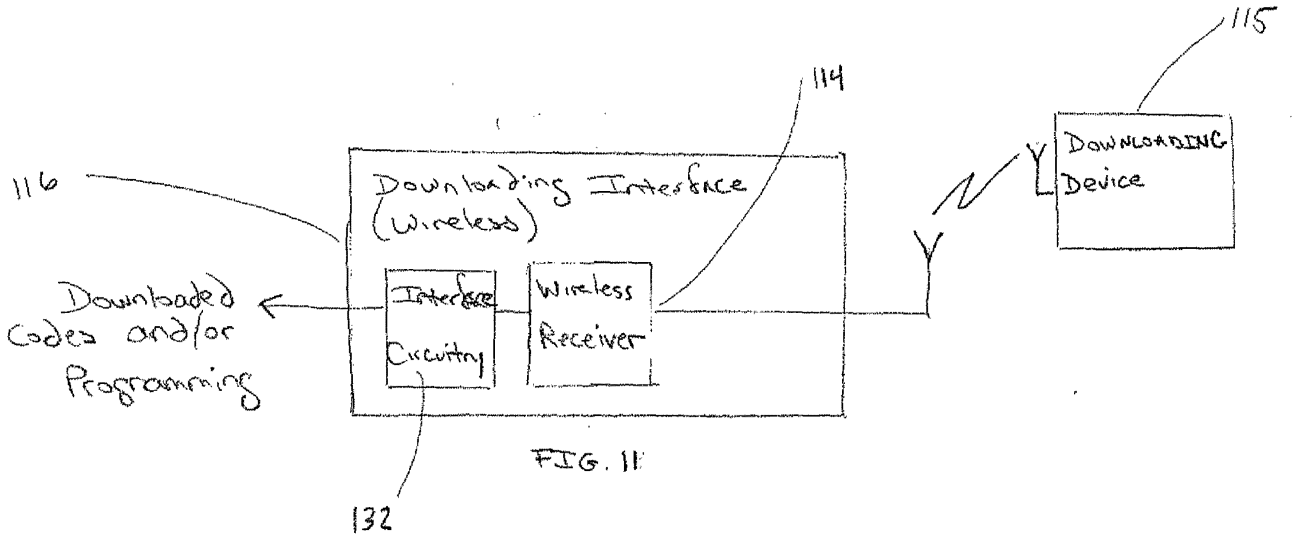


FIG. 11

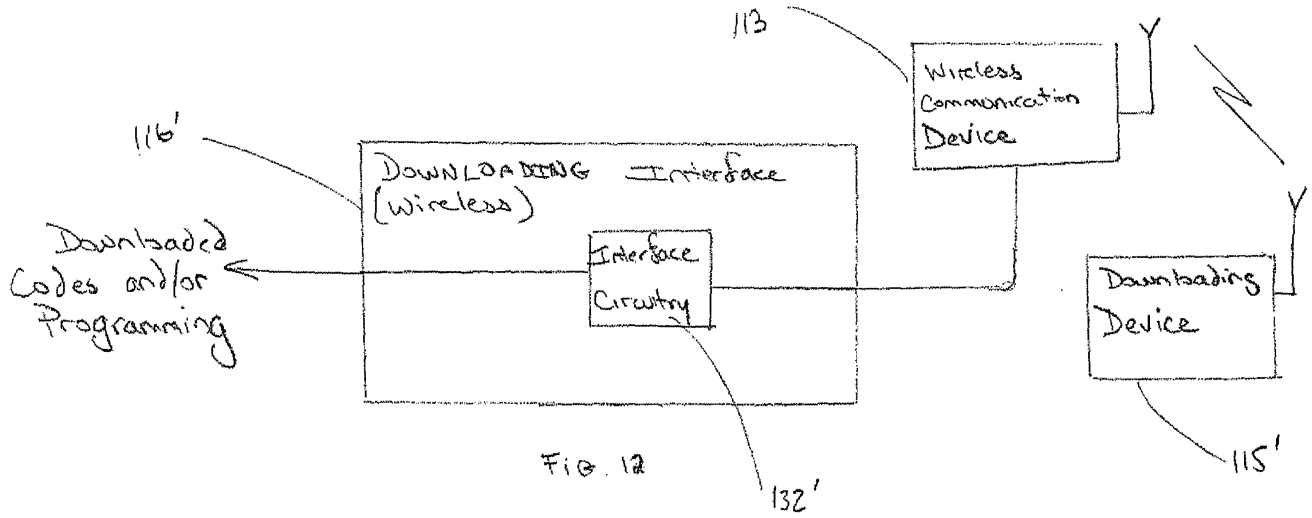


FIG. 12

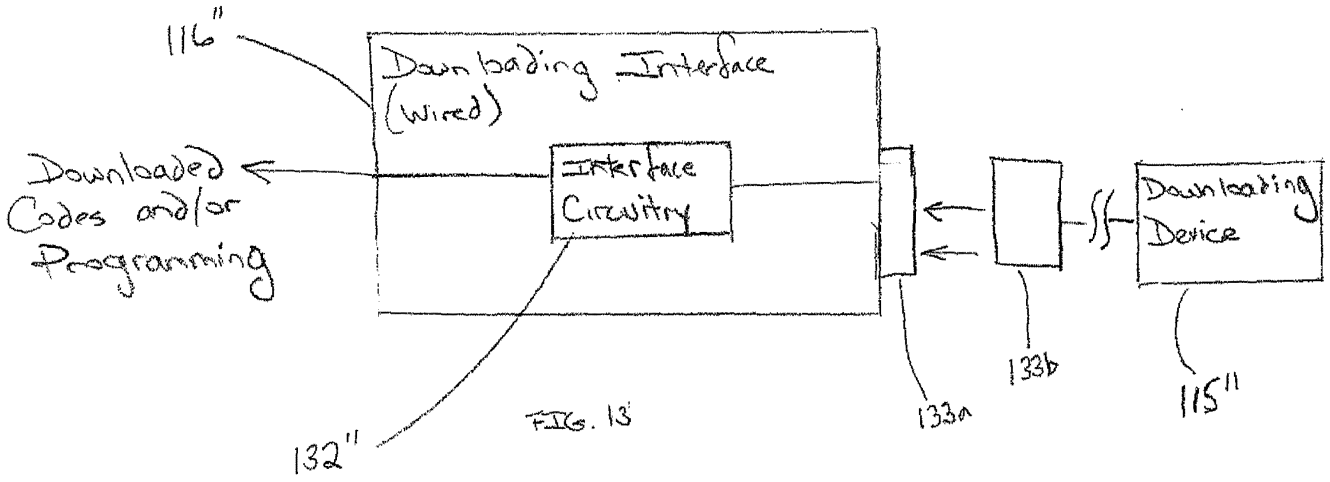


FIG. 13

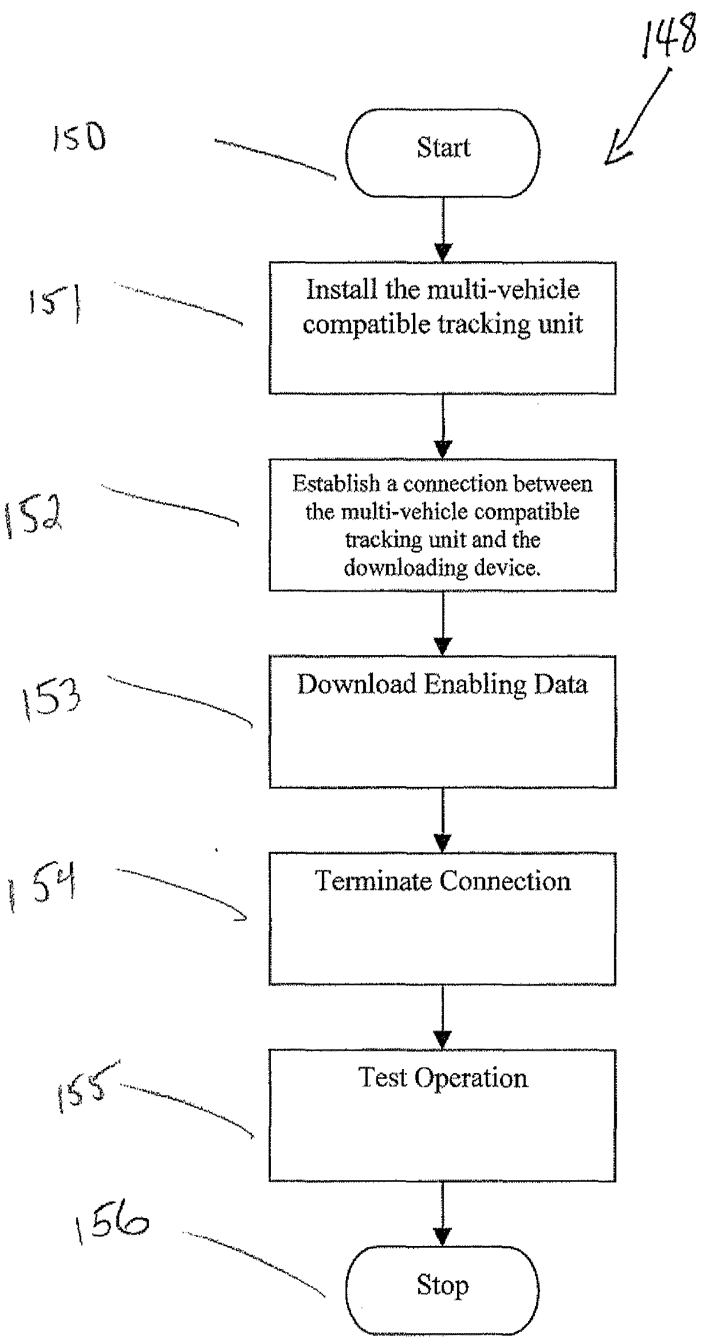

148
150
Start
151
Install the multi-vehicle compatible tracking unit
152
Establish a connection between the multi-vehicle compatible tracking unit and the downloading device.
153
Download Enabling Data
154
Terminate Connection
155
Test Operation
156
Stop

Fig. 14

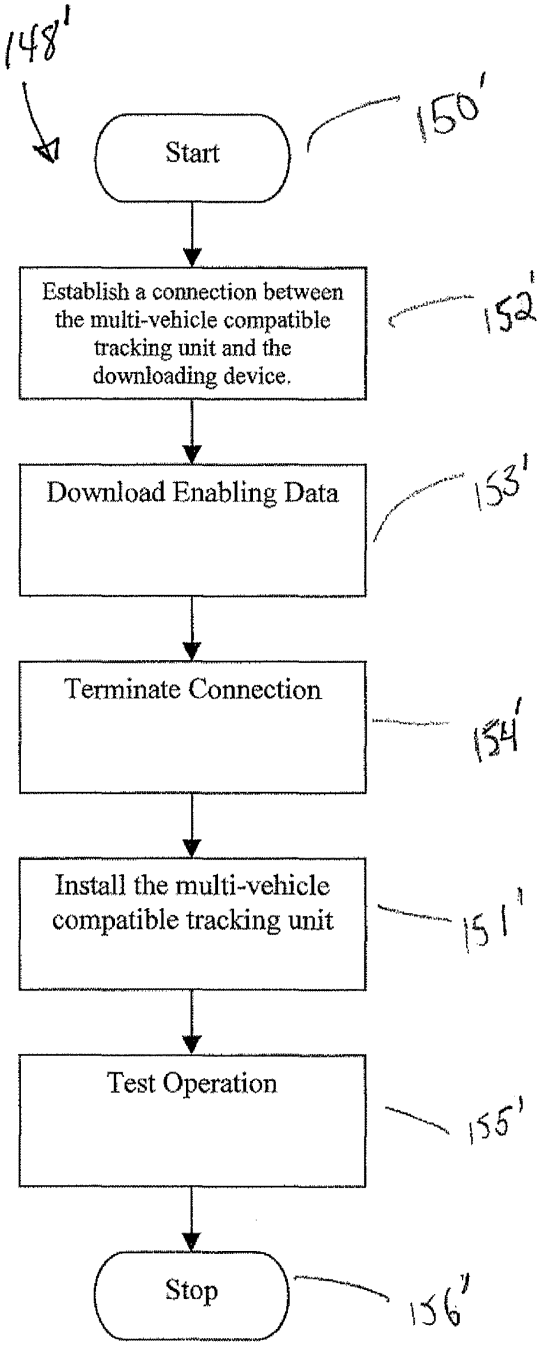

148'
150'
Start
152'
Establish a connection between the multi-vehicle compatible tracking unit and the downloading device.
153'
Download Enabling Data
154'
Terminate Connection
151'
Install the multi-vehicle compatible tracking unit
155'
Test Operation
156'
Stop

Fig. 15

DECLARATION AND POWER OF ATTORNEY FOR PATENT APPLICATION

Attorney Docket No.: **58106CIP1**

As a below named inventor, I hereby declare that:

My residence, post office address and citizenship are as stated below next to my name,

I believe I am the original, first and sole inventor (if only one name is listed below) or an original, first and joint inventor (if plural names are listed below) of the subject matter which is claimed and for which a patent is sought on the invention entitled: **VEHICLE TRACKING UNIT WITH DOWNLOADABLE CODES AND ASSOCIATED METHODS**, the specification of which:

(check one)

__X__ is attached hereto

_____ was filed on _____

as Application Serial No. _____

and was amended on _____
(if applicable)

I hereby state that I have reviewed and understand the contents of the above-identified specification, including the claims, as amended by any amendment referred to above.

I acknowledge the duty to disclose information which is material to the patentability of this application in accordance with Title 37, Code of Federal Regulation, 1.56(a).

I hereby claim foreign priority benefits under Title 35, United States Code, 119 of any foreign application(s) for patent or inventor's certificate listed below and have also identified below any foreign application for patent or inventor's certificate having a filing date before that of the of the application on which priority is claimed:

Prior Foreign Application(s) Priority Claimed

(Number)	(Country)	(Day/Month/Year Filed)	[ ] Yes	[ ] No
(Number)	(Country)	(Day/Month/Year Filed)	[ ] Yes	[ ] No
(Number)	(Country)	(Day/Month/Year Filed)	[ ] Yes	[ ] No

I hereby claim the benefit under Title 35, United States Code, 120, of any United States application(s) listed below and, insofar as the subject matter of each of the claims of this application is not disclosed in the prior United States application in the manner provided by the first paragraph of Title 35, United States Code, 112, I acknowledge the duty to disclose material information as defined in Title 37, Code of Federal Regulations, 1.56(a) which occurred between the filing date of the prior application and the national or PCT international filing date of this application:

(Appln Serial No.)	(Filing Date)	(Status)
(Appln Serial No.)	(Filing Date)	(Status)

I hereby declare that all statements made herein of my own knowledge 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 false statements may jeopardize the validity of the application or any patent issued thereon.

English Language Declaration

POWER OF ATTORNEY: As a named inventor, I hereby appoint the practitioners associated with Customer No.:

27975

to prosecute this application and transact all business in the Patent and Trademark Office connected therewith.

Send Correspondence to:

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Full name of sole inventor: **Kenneth E. FLICK**

Inventor's Signature: _____ Date: 7-2-07

Residence: **Douglasville, GA**

Citizenship: **Citizen of United States**

Mailing Address: **5236 Presley Place**
Douglasville, GA 30135

IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

In re Patent Application of: **FLICK**	)	
Serial No. **NOT YET ASSIGNED**	)	Attorney Docket: 58106CIP1
Filing Date: **HEREWITH**	)	
For: **VEHICLE TRACKING UNIT WITH DOWNLOADABLE CODES AND ASSOCIATED METHODS**	)	

CITATION UNDER 37 CFR §1.97

Commissioner for Patents
P.O. Box 1450
Alexandria, VA 22313-1450

Sir:

Attached is Form PTO-1449 listing several references for consideration in the examination of the above-identified application. In accordance with current USPTO procedures published 05 AUG. 2003, in 1276 OG 55, copies of the U.S. patent documents cited in the form 1449A are not attached. The undersigned would be happy to provide copies of these references if requested. Copies of non-U.S. patent references, if any, are attached. It is requested that these references be considered by the Examiner and officially made of record in accordance with the provisions of 37 CFR §1.97 and Section 609 of the MPEP.

Respectfully submitted,

CHRISTOPHER F. REGAN
Reg. No. 34,906
Allen, Dyer, Doppelt, Milbrath
& Gilchrist, P.A.
Attorneys of Record

SUBSTITUTE FORM PTO-1449A LIST OF PATENTS AND APPLICANT'S INFORMATION DISCLOSURE STATEMENT	Atty Docket: Serial No.: Applicant: Filing Date: Group:	58106CIP1 Not Yet Assigned FLICK Herewith

U.S. PATENT DOCUMENTS

Examiner Initials		Document Number	Date	Name	Class	Sub Class	Filing Date
	AA	6,756,885	6/29/04	Flick	340	426.1	
	AB	6,011,460	1/4/00	Flick	340	426	
	AC	5,719,551	2/17/98	Flick	340	426	
	AD	5,654,688	8/5/97	Flick	340	426	
	AE	5,515,043	5/7/96	Flick	340	988	
	AF	5,223,844	6/29/93	Flick	342	357	
	AG						
	AH						
	AI						
	AJ						
	AK						
	AL						

FOREIGN PATENT DOCUMENTS

		Document Number	Date	Country	Class	Sub Class	Translation
	AM						
	AN						
	AO						
	AP						

OTHER ART (Including Author, Title, Date, Pertinent Pages, etc.)

	AQ	
	AR	
	AS	

EXAMINER:	DATE CONSIDERED:

*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.

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:	Christopher F. Regan/Barbara Goree
Attorney Docket Number:	58106CIP1
Filed as Large Entity	

Utility Filing Fees

Description	Fee Code	Quantity	Amount	Sub-Total in USD($)
Basic Filing:				
Utility application filing	1011	1	300	300
Utility Search Fee	1111	1	500	500
Utility Examination Fee	1311	1	200	200
Pages:				
Claims:				
Claims in excess of 20	1202	10	50	500
Independent claims in excess of 3	1201	1	200	200
Miscellaneous-Filing:				

Description	Fee Code	Quantity	Amount	Sub-Total in USD($)
Petition:				
Patent-Appeals-and-Interference:				
Post-Allowance-and-Post-Issuance:				
Extension-of-Time:				
Miscellaneous:				
		Total in USD ($)		**1700**

Electronic Acknowledgement Receipt

EFS ID:	1938528
Application Number:	11773272
International Application Number:	
Confirmation Number:	1046
Title of Invention:	VEHICLE TRACKING UNIT WITH DOWNLOADABLE CODES AND ASSOCIATED METHODS
First Named Inventor/Applicant Name:	Kenneth E. Flick
Customer Number:	27975
Filer:	Christopher F. Regan/Barbara Goree
Filer Authorized By:	Christopher F. Regan
Attorney Docket Number:	58106CIP1
Receipt Date:	03-JUL-2007
Filing Date:	
Time Stamp:	17:25:59
Application Type:	Utility

Payment information:

Submitted with Payment	yes
Payment was successfully received in RAM	$1700
RAM confirmation Number	1945
Deposit Account	

File Listing:

Document Number	Document Description	File Name	File Size(Bytes)	Multi Part /.zip	Pages (if appl.)

1		app.pdf	2973098	yes	84

Multipart Description/PDF files in .zip description		
Document Description	**Start**	**End**
Application Data Sheet	1	1
Specification	2	58
Claims	59	65
Abstract	66	66
Drawings	67	79
Oath or Declaration filed	80	82
Information Disclosure Statement (IDS) Filed	83	84

Warnings:

Information:

2	Fee Worksheet (PTO-06)	fee-info.pdf	8589	no	2

Warnings:

Information:

Total Files Size (in bytes):	2981687

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.

07/03/07

PTO/SB/06 (12-04)

Approved for use through 7/31/2006. OMB 0651-0032
U.S. Patent and Trademark Office; U.S. DEPARTMENT OF COMMERCE
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PATENT APPLICATION FEE DETERMINATION RECORD
Substitute for Form PTO-875

Application or Docket Number
11,773,272

APPLICATION AS FILED – PART I

FOR	(Column 1) NUMBER FILED	(Column 2) NUMBER EXTRA	SMALL ENTITY RATE ($)	SMALL ENTITY FEE ($)	OR	OTHER THAN SMALL ENTITY RATE ($)	OTHER THAN SMALL ENTITY FEE ($)
BASIC FEE (37 CFR 1.16(a), (b), or (c))	N/A	N/A	N/A			N/A	300
SEARCH FEE (37 CFR 1.16(k), (i), or (m))	N/A	N/A	N/A			N/A	500
EXAMINATION FEE (37 CFR 1.16(o), (p), or (q))	N/A	N/A	N/A			N/A	200
2 (37 CFR 1.16(i))	30 minus 20 =	* 10	X 25=		OR	X 50=	500
INDEPENDENT CLAIMS (37 CFR 1.16(h))	4 minus 3 =	* 1	X 100=			X 200=	200
APPLICATION SIZE FEE (37 CFR 1.16(s))							
MULTIPLE DEPENDENT CLAIM PRESENT (37 CFR 1.16(j))			N/A			N/A	
* If the difference in column 1 is less than zero, enter "0" in column 2.			TOTAL				1700

APPLICATION AS AMENDED – PART II

		(Column 1) CLAIMS REMAINING AFTER AMENDMENT		(Column 2) HIGHEST NUMBER PREVIOUSLY PAID FOR	(Column 3) PRESENT EXTRA	SMALL ENTITY RATE ($)	SMALL ENTITY ADDITIONAL FEE ($)	OR	OTHER THAN SMALL ENTITY RATE ($)	OTHER THAN SMALL ENTITY ADDITIONAL FEE ($)
AMENDMENT A	Total (37 CFR 1.16(i))	*	Minus	**	=	X =		OR	X =	
	Independent (37 CFR 1.16(h))	*	Minus	***	=	X =		OR	X =	
	Application Size Fee (37 CFR 1.16(s))									
	FIRST PRESENTATION OF MULTIPLE DEPENDENT CLAIM (37 CFR 1.16(j))					N/A		OR	N/A	
						TOTAL ADD'T FEE		OR	TOTAL ADD'T FEE	

		(Column 1) CLAIMS REMAINING AFTER AMENDMENT		(Column 2) HIGHEST NUMBER PREVIOUSLY PAID FOR	(Column 3) PRESENT EXTRA	SMALL ENTITY RATE ($)	SMALL ENTITY ADDITIONAL FEE ($)	OR	OTHER THAN SMALL ENTITY RATE ($)	OTHER THAN SMALL ENTITY ADDITIONAL FEE ($)
AMENDMENT B	Total (37 CFR 1.16(i))	*	Minus	**	=	X =		OR	X =	
	Independent (37 CFR 1.16(h))	*	Minus	***	=	X =		OR	X =	
	Application Size Fee (37 CFR 1.16(s))									
	FIRST PRESENTATION OF MULTIPLE DEPENDENT CLAIM (37 CFR 1.16(j))					N/A		OR	N/A	
						TOTAL ADD'T FEE		OR	TOTAL ADD'T FEE	

* If the entry in column 1 is less than the entry in column 2, write "0" in column 3.
** If the "Highest Number Previously Paid For" IN THIS SPACE is less than 20, enter "20".
*** If the "Highest Number Previously Paid For" IN THIS SPACE is less than 3, enter "3".
The "Highest Number Previously Paid For" (Total or Independent) is the highest number found in the appropriate box in column 1.

This collection of information is required by 37 CFR 1.16. 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 12 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: Commissioner for Patents, P.O. Box 1450, Alexandria, VA 22313-1450.**

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