

UNITED STATES PATENT AND TRADEMARK OFFICE

BEFORE THE PATENT TRIAL AND APPEAL BOARD

DATASPEED INC.,
Petitioner,

v.

SUCXESS LLC,
Patent Owner.

IPR2020-00268
Patent 10,454,707 B2

Before TREVOR M. JEFFERSON, MINN CHUNG, and
NATHAN A. ENGELS, *Administrative Patent Judges*.

JEFFERSON, *Administrative Patent Judge*.

DECISION
Final Written Decision
Determining Some Challenged Claims Unpatentable
35 U.S.C. § 318(a)

I. INTRODUCTION

In this *inter partes* review, Dataspeed Inc. (“Petitioner”) challenges claims 1–20 (“the challenged claims”) of U.S. Patent No. 10,454,707 B2 (Ex. 1201, “the ’707 patent”) owned by Success LLC (“Patent Owner”). Paper 1 (“Pet.”). Patent Owner disclaimed claims 1–14 and 16–19 of the ’707 patent (Ex. 2002), leaving only claims 15 and 20 (“the remaining challenged claims”) of the ’707 patent for our consideration.

We have jurisdiction under 35 U.S.C. § 6. This Final Written Decision, issued pursuant to 35 U.S.C. § 318(a), addresses issues and arguments raised during the trial in this *inter partes* review. For the reasons discussed herein, we determine that Petitioner has shown by a preponderance of the evidence that claim 15 of the ’707 patent is unpatentable, but has not shown by a preponderance of the evidence that claim 20 of the ’707 patent is unpatentable.

A. Procedural History

Petitioner filed a Petition challenging claims 1–20 of the ’707 patent (Pet. 3, 18–65). We instituted trial on all grounds of unpatentability. Paper 8 (“Dec.”), 27–28. Patent Owner filed a Response (Paper 14, “PO Resp.”) addressing the remaining challenged claims. PO Resp. 2; Ex. 2002. Petitioner filed a Reply (Paper 16, “Reply”), and Patent Owner filed a Sur-reply (Paper 18, “Sur-reply”).

Petitioner submits the Declaration of Robert Leale (Ex. 1203) in support of the Petition and the Second Declaration of Robert Leale (Ex. 1213) in support of the Reply. Patent Owner supports its Response and Sur-reply with the Declaration of Dr. Mahdi Shahbakhti (Ex. 2004). Petitioner also submits the Deposition Transcript of Mahdi Shahbakhti,

Ph.D. (Ex. 1212), and Patent Owner submits the Deposition Transcript of Robert Leale (Ex. 2005) and the Second Deposition Transcript of Robert Leale (Ex. 2009).

An oral hearing for this *inter partes* review was held on February 11, 2021, and a copy of the hearing transcript has been entered into the record. Paper 23 (“Tr.”).

B. Instituted Grounds

We instituted *inter partes* review of the remaining challenged claims on the following grounds asserted by Petitioner under 35 U.S.C. §§ 102 and 103¹ (Dec. 7; PO Resp. 2–3):

Challenged Claims	35 U.S.C. §	Reference(s)/Basis
20	102	Walker ²
20	103	Walker
20	102	Smart Roadster ³
20	103	Smart Roadster

¹ The Leahy-Smith America Invents Act, Pub. L. No. 112-29, 125 Stat. 284 (2011) (“AIA”), amended 35 U.S.C. §§ 102 and 103. Because the ’707 patent has an effective filing date prior to the effective date of the applicable AIA amendments, we refer to the pre-AIA versions of §§ 102 and 103.

² U.S. Patent No. 6,647,328 B2, filed Dec. 18, 2000; issued Nov. 11, 2003. (Ex. 1204, “Walker”).

³ Joachim Schröder, et al, *Smart Roadster Project: Setting up Drive-by-Wire or How to Remote-Control your Car in Intelligent Autonomous Systems 9 - IAS-9* (Tamio Arai, et al eds., Feb. 2006) (Ex. 1205, “Smart Roadster”).

Challenged Claims	35 U.S.C. §	Reference(s)/Basis
15, 20	103	Dietz ⁴ , SAE ⁵ , Bosch ⁶ , Negley ⁷
20	103	Dietz, SAE, Negley, Bosch, Smart Roadster
15	103	Walker, one or more of Dietz, SAE, Negley, Bosch

C. Real Party-in-Interest

Petitioner states that it, Dataspeed Inc., is the sole real party-in-interest. Pet. 2.

D. Related Proceedings

Patent Owner states that two patents, namely, US 10,027,505 and US 10,454,707, are the subject of five district court cases involving Patent Owner and various third parties, namely, *Sucxess LLC v. AutoX Technologies, Inc.*, Case No. 1:19-cv-02121 (D. Del.); *Sucxess LLC v. Phantom Auto, Inc.*, Case No. 1:19-cv-02122 (D. Del.); *Sucxess LLC v. Pony.ai, Inc.*, Case No. 1:19-cv-02123 (D. Del.); *Sucxess LLC v. SF Motors, Inc.*, Case No. 1:19-cv-02124 (D. Del.); and *Sucxess LLC v. WeRide Corp.*, Case No. 1:19-cv-02130 (D. Del.). Pet. 2, Paper 5, 1.

⁴ Audiotechnik Dietz, Installation/connection manual for multimedia interface 1280, March 16, 2005, <http://www.dietz.biz>. (Ex. 1005, “Dietz”).

⁵ Craig Szydlowski, *A Gateway for CAN Specification 2.0 Non-Passive Devices*, SAE Technical Paper Series, 930005, Society of Automotive Engineers, Inc. 1993, pages 29–37. (Ex. 1009, “SAE”).

⁶ Robert Bosch, CAN Specification Version 2.0, Bosch, Sept. 1991. (Ex. 1010, “Bosch”).

⁷ Bruce Negley, *Getting Control Through CAN*, The Journal of Applied Sensing Technology, Oct. 2000, vol. 17, no. 10, pages 16–33. (Ex. 1006, “Negley”).

E. The '707 Patent (Ex. 1201)

Titled “Method, Apparatus and System for Retrofitting a Vehicle” (Ex. 1201, code [54]), the '707 patent states that a vehicle could be retrofitted to add, for example, an emergency call apparatus. Ex. 1201, 2:46–47. The retrofit apparatus is used to transmit a message on the vehicle data bus. *Id.* at 2:52–55. The '707 patent states that a retrofit apparatus may be added to the vehicle with two data buses, with the first bus used to communicate with the original vehicle equipment and the second bus used to communicate with the rest of the vehicle. *Id.* at 3:32–36. With respect to this communication, the '707 patent states that the retrofit apparatus can be configured to mimic command messages to enable the original vehicle equipment to perform specified functions not originally enabled. *Id.* at 9:28–9:50.

In one embodiment of the '707 patent, the retrofit apparatus is an emergency call apparatus 214 that sends a message to a first apparatus, i.e., telecommunication apparatus 200 as seen in Figure 4, reproduced below.

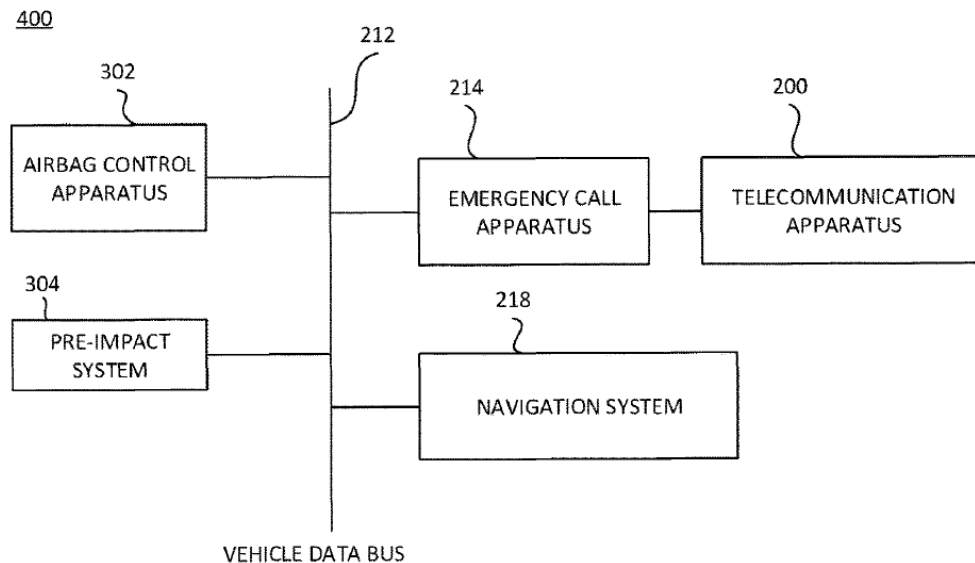


FIG. 4

Figure 4 illustrates vehicle communication system 400 having telecommunication apparatus 200 in communication with vehicle data bus 212 using an indirect connection through emergency call apparatus 214. Ex. 1201, 7:59–63. Emergency call apparatus 214 mimics the dial command message by using “the same message identifier segment that has been assigned to navigation system 218 when transmitting its telephone dial command message.” *Id.* at 9:39–41. “By sharing the same message identifier segment a telephone dial command message originating from emergency call apparatus 214 and a telephone dial command message originating from navigation system 218 become indistinguishable for the telecommunication apparatus 200.” *Id.* at 9:42–9:47. “Telecommunication apparatus 200 hence responds properly to a telephone dial command message originating from emergency call apparatus 214 even though it may not have been designed for this purpose.” *Id.* at 9:46–50.

Messages to telecommunication apparatus 200 are communicated through first and second data buses, as depicted in Figure 7, reproduced below.

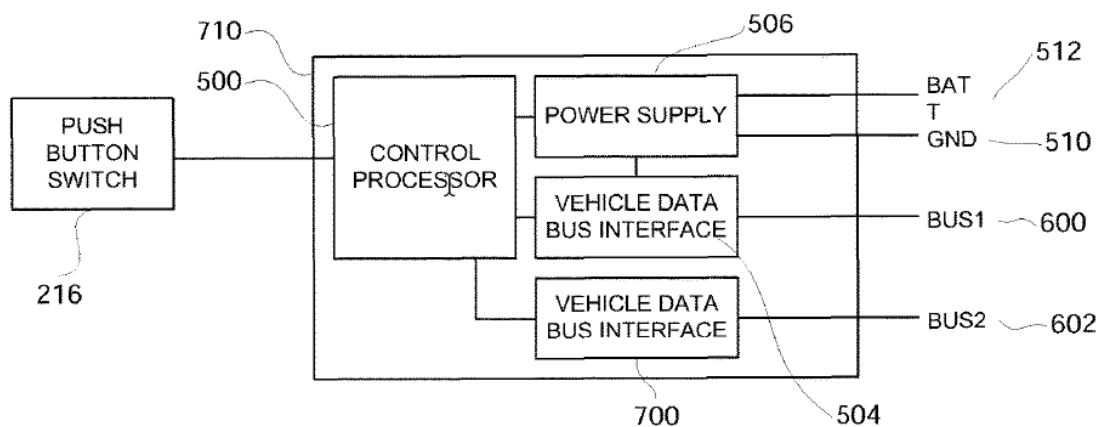


FIG. 7

Figure 7 is a block diagram that depicts emergency call apparatus 710. Ex. 1201, 8:36–37. In Figure 7, control processor 500 communicates with telecommunication apparatus 200 through vehicle data bus interface 504 and electric terminal 600. *Id.* at 8:37–40. Control processor 500 also communicates with other electronic modules connected to vehicle data bus 212 through second vehicle data bus interface 700 and electric terminal 602. *Id.* at 8:40–47. “Control processor 500 retransmits any messages it receives from vehicle data bus interface 504 through vehicle data bus interface 700 and any messages it receives from vehicle data bus interface 700 through vehicle data bus interface 504, thereby functionally connecting telecommunication apparatus 200 with vehicle data bus 212.” *Id.* at 8:50–56.

F. Illustrative Claims

Challenged dependent claim 15 depends from claims 6 and 13, and challenged dependent claim 20 depends from claims 6, 18, and 19. Claims 6, 13, 15, 18, 19, and 20 are reproduced below with added identification of claim elements in brackets.

6. [pre] A vehicle, comprising:

[a] a factory-installed first apparatus configured to generate an electrical signal;

[b] a factory-installed second apparatus configured to receive the electrical signal; and

[c] a retrofit apparatus electrically connected to the factory-installed second apparatus,

[d] wherein the retrofit apparatus generates a mimicked electrical signal independently of the electrical signal generated by the factory-installed first apparatus, and

[e] wherein the factory-installed second apparatus receives the mimicked electrical signal.

13. The vehicle as in claim 6, wherein a first electrical interface between the factory-installed first apparatus and the retrofit apparatus and a second electrical interface between the retrofit apparatus and the factory-installed second apparatus are identical.

15. The vehicle as in claim 13, wherein the first electrical interface is a CAN vehicle data bus.

18. The vehicle as in claim 6, wherein the retrofit apparatus includes an electronically controlled switch to selectively separate a direct electrical connection between the factory-installed first apparatus and the factory-installed second apparatus.

19. The vehicle as in claim 18, wherein the electronically controlled switch is a relay.

20. The vehicle as in claim 19, wherein the relay is selectively controlled in response to a presence of an electrical failure.

Ex. 1201, 11:24–36, 12:15–19, 12:22–23, 12:30–39.

II. ANALYSIS

A. Level of Ordinary Skill in the Art

Our Decision instituting *inter partes* review included a preliminary determination that a person of ordinary skill in the art (“POSITA”) would have had a bachelor’s degree in engineering with relevant coursework or post-secondary education (Bachelor’s or associate degree) and four years of work experience in the design, operation, and functioning of CAN systems or systems using similar communications protocols. Dec. 8; *see* Pet. 9 (citing Ex. 1203 ¶ 46). Petitioner did not contest the level of ordinary skill,

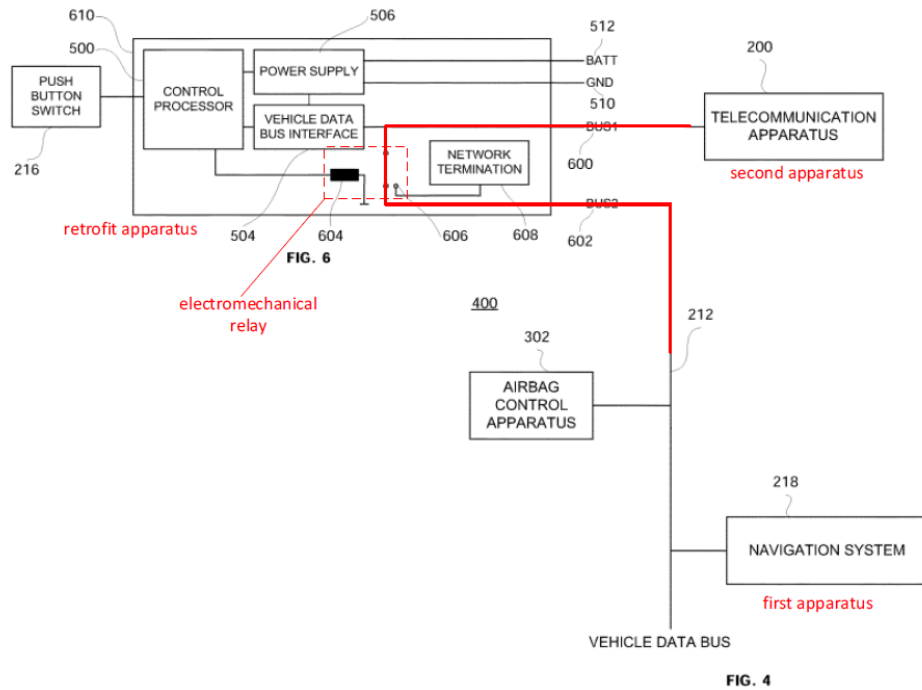
and Patent Owner “adopted the Board’s guidance” (PO Resp. 9–10). Accordingly, we apply the same level articulated in the Decision.

B. Claim Construction

Because the Petition was filed after November 13, 2018, we construe claims of the challenged patent using the same claim construction standard used to construe claims in a civil action under 35 U.S.C. § 282(b), including construing the claims in accordance with the ordinary and customary meaning as understood by one of ordinary skill in the art reading the claims in light of the intrinsic evidence. 37 C.F.R. § 42.100(b) (2019); *see Phillips v. AWH Corp.*, 415 F.3d 1303, 1312–14 (Fed. Cir. 2005).

Petitioner does not seek construction of any claim term. Pet. 5–6. Patent Owner asserts that construction is necessary for the term “electronically controlled switch,” as recited in claim 18 and incorporated into challenged claim 20. PO Resp. 6–9. Patent Owner argues that “the ‘electronically controlled switch’ of claim 18 [refers] to ‘a switch that is caused to open and close by an electronic circuit’ . . . [and] a switch that is operated by a human or controlled by a mechanical device would not be considered an ‘electronically controlled switch.’” PO Resp. 9 (citing Ex. 2004 ¶ 23).

Patent Owner provides annotated Figures 4 and 6 of the ’707 patent showing the electronically controlled switch. PO Resp. 6–7.



Patent Owner annotates Figures 4 and 6 combined to show the electromechanical relay 606 with coil 704. PO Resp. 7; Ex. 1201, 8:12–13. Patent Owner argues that the '707 patent teaches that because “[c]ontrol processor 500 electronically controls switch 606,’ a POSITA would understand the ‘electronically controlled switch’ of claim 18 to refer to ‘a switch that is caused to open and close by an electronic circuit,’” limiting the switch to being electronically controlled by the control processor. PO Resp. 9; *see* Ex. 1201, 8:12–28; Ex. 2004 ¶¶ 21–23.

Petitioner notes that Patent Owner disclaimed claim 19, which introduces the limitation that an electronically controlled switch is a relay, and that claim 20 adds no terms of patentable weight regarding control of the relay introduced in claim 19. Reply 1–2. Patent Owner’s arguments introduce an unnamed controller into claim 20, which recites that “the relay is selectively controlled in response to a presence of an electrical failure” but does not require implementing a particular type of control. *Id.* Indeed,

Petitioner argues that claim 19 is a functional recitation of the nature of the relay, that is suggested by claim 18 to change based on an electronic control signal. *Id.* at 12–13. As such, Petitioner avers that claim 20, which depends from claim 19, does not introduce a controller.

In this case, claims 18 and 19 recite that the electronically controlled switch is a relay that responds to electronic control. Ex. 1201, 12:30–39. We disagree with Patent Owner’s proposed construction limiting the method of controlling the electronically controlled switch, as claims 15 and 20 do not expressly require a control processor or otherwise limit the source of the electronic control. On the full record, Patent Owner has not demonstrated that the example of controlling the switch in the specification limits the type of control applied in claim 20. PO Resp. 6–9. We determine it is unnecessary to interpret that the relay is an “electronically controlled switch” that is selectively controlled as recited in claim 20, and we apply the term’s plain and ordinary meaning. *See Nidec Motor Corp. v. Zhongshan Broad Ocean Motor Co.*, 868 F.3d 1013, 1017 (Fed. Cir. 2017) (explaining the need to construe only terms that are in controversy and only to the extent necessary to resolve the controversy) (citations omitted).

C. Asserted References

1. Walker (Ex. 1204)

Walker is entitled “Electrically Controlled Automated Devices to Control Equipment and Machinery with Remote Control and Accountability Worldwide.” Ex. 1204, code [54]. Walker describes trickster circuits inserted between OEM sensors and OEM control modules that “are intended to interrupt and interface with . . . OEM control and processor products to augment normal operating data streams and provide specific electrical

signals as [an] automated and/or remote control PFN [Primary Focal Node] response to initiate a desired OEM function without changing the OEM's software and/or system in general.” Ex. 1204, 100:21–26. Figure 24A of Walker, depicted below, shows a trickster circuit. *Id.*

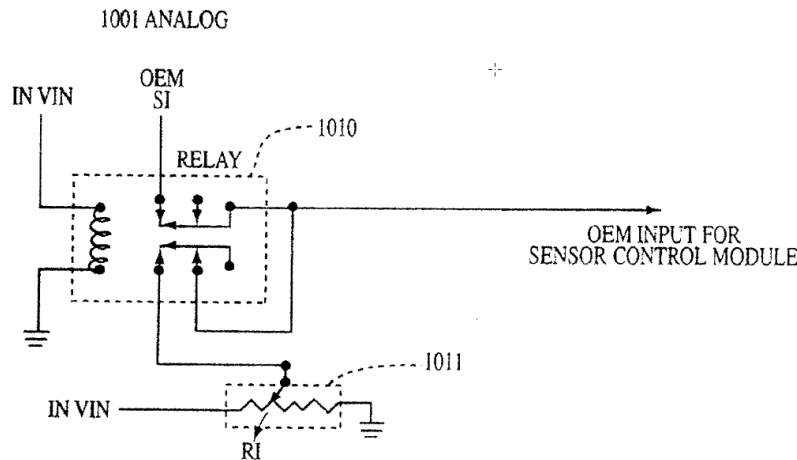


FIG. 24A

Figure 24A depicts a trickster circuit where relay 1010 and variable resistor 1011 allow the circuit “to send an adjusted but specific voltage level to simulate an analog OEMS senders signal” to the OEM Input for Sensor Control Module. Ex. 1204, 101:15–18. The “OEM SI terminal is the OEM sensor signal coming into . . . the relay and on to the OEM control module in the normal state” when the signal is not sent by variable resistor 1011. *Id.* at 101:58–60.

2. Smart Roadster (Ex. 1205)

Smart Roadster, entitled “Smart Roadster Project: Setting up Drive-by-Wire or How to Remote-Control your Car,” describes interfacing with existing vehicle control systems, sensors, and components to control to provide drive-by-wire capability for a vehicle. Ex. 1205, Abstract, 383, 385.

Smart Roadster teaches a control circuit to interface the steering control and the CAN bus to force steering movements and switch between the regular sensor and the CAN bus used for control. Ex. 1205, 387–388.

3. Buehler (Ex. 1211)

Buehler discloses a device and method for remote operation of a first vehicle from a second vehicle. Ex. 1211, code [57]. For the throttle-by-wire system, Buehler discloses that a gas pedal is connected to a transducer that may be a potentiometer. Ex. 1211 ¶ 46.

4. Dietz (Ex. 1005)

Dietz discloses an installation manual for a multimedia interface that processes data from the CAN-protocol of a vehicle. Ex. 1005, 2. Dietz describes a device called “Multimedia Interface 1280” that is added to a vehicle that allows playback of video through the factory-installed vehicle navigation screen. Ex. 1005, 2–3.

5. Negley (Ex. 1006)

Negley discloses that a Controller Area Network (“CAN”) is a protocol that “creates a communications path that links all the nodes connected to the bus and enables them to talk to one another.” Ex. 1006, 18. Negley discloses the CAN protocol uses a message-based data format to transfer information from one location to another. *Id.* at 20. Among other things, Negley describes that all messages have an identifier field and that the node uses the identifier to determine whether to accept and act upon an incoming message. *Id.* at 21.

6. SAE (Ex. 1009)

SAE discloses that the CAN protocol “offers a comprehensive solution to managing communication between multiple CPUs,” using message identifiers. Ex. 1009, 29.

7. Bosch (Ex. 1010)

Bosch discloses that CAN is a serial communications protocol that supports distributed real-time control with a high level of security. Ex. 1010, 4. Bosch explains that information on a bus is sent in fixed format messages and that the content of a message uses an identifier, so that all nodes in a network are able to decide whether the data is to be acted upon by them. Ex. 1010, 6.

D. Anticipation and Obviousness Based on Walker

Petitioner argues that Walker discloses the limitations of claims 1–14 and 16–20. Pet. 13–40; Ex. 1203 ¶¶ 85–171. Specifically, Petitioner argues that Walker discloses the limitations of independent claims 1 and 6, by disclosing retrofitting vehicles with trickster circuits between OEM sensors and control modules. Pet. 17–23, 26–29; Ex. 1204, 100:21–26; Ex. 1203 ¶ 87. Petitioner maps the limitations of claims 1 and 6 to the disclosure in Walker and provides evidence supporting the retrofit device generating mimicked signals received by the OEM equipment. Pet. 17–23; Ex. 1204, Figs. 24A, 24B, 100:14–102:24, 101:16–23; Ex. 1203 ¶¶ 105–111.

With respect to independent claim 6, Petitioner provides argument and evidence mapping the claim limitations to the trickster circuit in Walker. Pet. 27–30; Ex. 1204, 24:54–64, 100:15–102:34, 101:16–23, Figs. 24A, 24B; Ex. 1203 ¶¶ 132–141. Petitioner provides an annotated version of Walker’s Figure 24A, shown below, to illustrate its teachings. Pet. 39.

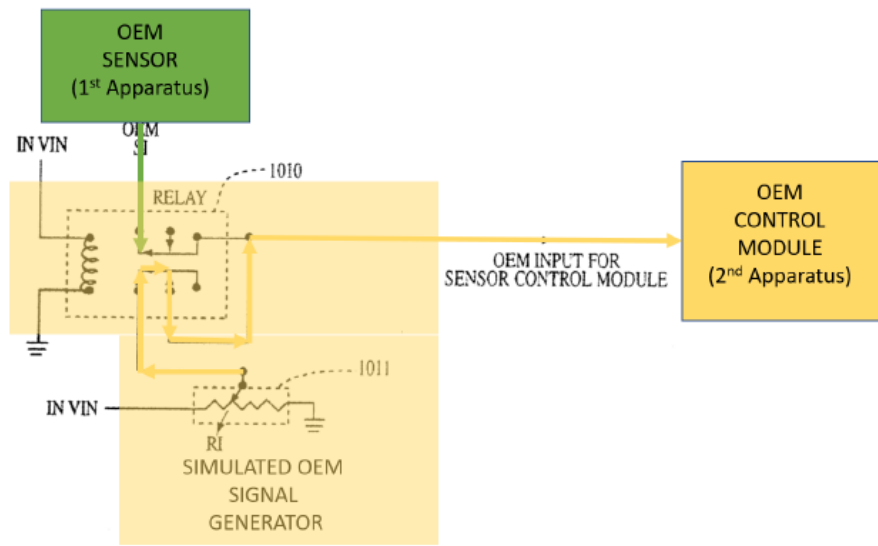


FIG. 24A

Petitioner's annotated Figure 24A shows Relay 1010 an electronically controlled switch between the OEM Sensor and OEM control Module. Pet. 38–39.

Petitioner argues that Walker discloses or renders obvious claims 18 and 19, because “[r]elay 1010 in Walker’s trickster circuits is an electronically controlled switch that selectively separates a direct electrical connection between the OEM sensor (1st apparatus) and OEM control module (2nd apparatus).” Pet. 38 (citing Ex. 1204, 101:32–37; Ex. 1203 ¶¶ 167–169); *see also* Pet. 14–15; Ex. 1203 ¶ 88–89 (describing signal passed through relay 1010). For claim 20, Petitioner argues that when the battery is disconnected or discharged from the IN VIN voltage of Figure 24A, the relay electrically connects the OEM sensor and the OEM control module.

We agree with Patent Owner’s argument that the selective control limitation of claim 20 is not met in the case where a vehicle battery is disconnected or discharged because no voltage in signal necessary to operate

the relay is provided during such an electrical failure. PO Resp. 12–13. Petitioner does not address Patent Owner’s contentions. *See, generally*, Reply. We credit Patent Owner’s argument and evidence that without IN VIN of Figure 24A supplying power to the relay, the relay cannot selectively separate the apparatuses as required in claim 18 and subsequently claim 20. PO Resp. 14; Ex. 2004 ¶ 28.

Based on the full record, Petitioner has not shown by a preponderance of the evidence that Walker anticipates or renders obvious claim 20.

E. Anticipation and Obviousness Based on Smart Roadster

Petitioner argues Smart Roadster discloses each element of claims 1–3, 5–10, 12, 13, and 16–20, or a person of ordinary skill in the art would have found claims 1–3, 5–10, 12, 13, and 16–20 to have been obvious over Smart Roadster. Pet. 40–64; Ex. 1203 ¶¶ 172–253. Petitioner provides detailed argument and testimony regarding the power steering control circuit of Smart Roadster describing the connection and operation of the circuit to the OEM control module and sensor of the vehicle. Pet. 40–43; Ex. 1203 ¶¶ 172–178; Ex. 1205, 387–388. Petitioner maps the functions and operation of the Smart Roadster circuit to the limitations of claims 1–3, 5–10, 12, 13, and 16–20. Pet. 40–64; Ex. 1203 ¶¶ 172–253. Petitioner provides citations to the record and testimony to support that a person of ordinary skill in the art would understand the control circuit (Ex. 1205, 387–388, Fig. 4) to disclose the functions or operations to generate and mimic sensor values to remotely control a vehicle via the CAN bus system of the vehicle. Pet. 48–49; Ex. 1203 ¶¶ 191–198.

Patent Owner has disclaimed claims 1–14 and 16–19. Ex. 2002. With respect to the remaining challenged claim 20, which recites that “the

relay is selectively controlled in response to a presence of an electrical failure,” Petitioner’s argument in full asserts that

Smart Roadster discloses or renders obvious claim 20. In the remote control circuits of Smart Roadster, relays K1 and K2 controlled the position of switches K1 and K2 in response to the presence of an electrical failure. In particular, if the NOTAUS_SENSE line falls to a low level, which a POSITA would understand to be an electrical failure or which *a POSITA would find obvious as occurring in the case of the vehicle battery being disconnected or discharged, or in the case of some other cause or fault resulting in a failure to supply the* NOTAUS_SENSE signal, the relays are set to electrically connect the OEM sensors to the OEM control devices to allow the human driver to take control of the vehicle instead of the remote control. *See* Smart Roadster [Ex. 1205], Figure 4, p. 387-388 (“The state of the relay depends on ... the level of NOTAUS_SENSE line”); Smart Roadster [Ex. 1205], p. 388 (“Connection ... [is] only established if level of NOTAUS_SENSE is high.”); Leale [Ex. 1203], ¶249.

Pet. 62–63 (emphasis added) (alterations added).

Patent Owner contends that the relays in Smart Roadster are a hardwired connection to a physical button, and that the “NOTAUS_SENSE line falling to a low level as an electrical failure is not supported by Smart Roadster.” PO Resp. 15–16. Furthermore, Patent Owner argues that Mr. Leale agreed that the low level in the NOTAUS_SENSE line that Petitioner cites occurs when the emergency button is pushed. PO Resp. 16; Ex. 2005, 29:12–20, 32:22–24. Patent Owner argues that Petitioner failed to recognize that when the “NOTAUS_SENSE is low [in Smart Roadster] the second apparatus receives the output of the first apparatus, not the mimicked electrical signal” as required in claim element 6[e]. PO Resp. 17 (citing Ex. 2004 ¶ 32; Pet. 63). Finally, Patent Owner argues that in the event of

electrical failure by the vehicle battery disconnected or discharged, the Smart Roadster control circuit would lose power and no mimicked electrical signal would be available. PO Resp. 17–18. Accordingly, Petitioner does not demonstrate sufficiently that Smart Roadster teaches the claim 20 limitation of “the relay [being] selectively controlled in response to a presence of an electrical failure.” *Id.* at 16–18.

Petitioner asserts that Smart Roadster discloses an emergency circuit that controls the state of relays as argued for claims 18 and 19. Pet. 61–62 (citing Ex. 1205, 387–388 (“The state of the relays depends on the emergency circuit”); Ex. 1203 ¶¶ 246–247). Thus, Petitioner argues that “‘in response to the presence of an electrical failure,’ such as when the NOTAUS_SENSE is not maintained at a high level, for example due to battery discharge, the relays will be opened, as opposed to when NOTAUS_SENSE is maintained at a high level where the relays are caused to be closed,” and thus meets the limitations of claim 20. Reply 13; Ex. 1213 ¶¶ 27–29.

On the full record we are not persuaded by Petitioner’s argument that the Petition persuasively demonstrates the limitations of claim 20. Petitioner argues that when the NOTAUS_SENSE line falls to a low level, where the relays are controlled by the emergency circuit of Smart Roadster, an ordinarily skilled artisan would recognize the NOTAUS_SENSE line falling to a low level to be an electrical failure as recited in claim 20. Reply 13. Petitioner’s support for this argument depends on testimony and argument that the emergency circuit controls the state of the relays and switches (Pet. 63; Ex. 1205, 387–388), such that “if the NOTAUS_SENSE line falls to a low level, [] a POSITA would understand [that] to be an electrical failure”

(Pet. 62). In its Reply, Petitioner specifically asserts that this low level on the NOTAUS_SENSE line occurs when any component in the safety chain cuts the emergency circuit. Reply 13 (citing Ex. 1203 ¶¶ 175–178, 202–203). This argument connecting the low level with a component triggering the emergency circuit, however, is not supported adequately or persuasively by the Petition. *See* Pet. 61–63; Ex. 1203 ¶¶ 244–249. Petitioner’s Reply cites testimony that addresses the connection of Smart Roadster’s control circuit to the OEM equipment and the Smart Roadster teaching the limitations of claim 3 (concerning mimicked electrical signal being initiated in response to the external input). Ex. 1203 ¶¶ 175–178, 202–203. This testimony fails to sufficiently demonstrate that the electrical failure recited in claim 20 is disclosed in Smart Roadster. *See* Pet. 62–63. In addition, Petitioner fails to show adequately that a person of ordinary skill in the art would have understood that the Smart Roadster control circuit teaches the electrical failure limitation of claim 20 when there is a low level on the NOTAUS_SENSE line. *Id.*

We also note that Petitioner’s Reply argument that Smart Roadster discloses or teaches opening the relays when “any component in the safety chain cuts the emergency circuit” (Reply 13) is not adequately presented in the Petition. Reply 13; Ex. 1213 ¶¶ 27–29. Our rules require that the Petition identify where claimed elements are found in the reference(s) and must explain the relevance of those identified portions of the reference(s). *See, e.g.*, 37 C.F.R. § 42.104(b)(4) (“The petition must specify where each element of the claim is found in the prior art patents or printed publications relied upon.”); *see also* 37 C.F.R. § 42.104(b)(5) (the petition must identify

“the relevance of the supporting evidence to the challenge raised, including identifying specific portions of the evidence that support the challenge”).

Here, Petitioner’s argument in the Reply regarding the functions of the emergency circuit, DSPs, and the circuits functions during electrical failure (Reply 14–17; Ex. 1213 ¶¶ 20–40) do not merely provide clarification of the argument presented in the Petition but, instead, address the explanation that should have been included in the Petition, as required by our rules. Petitioner’s arguments and evidence in the Reply are the type of material that should have been included in the Petition in the first instance to present a *prima facie* case of unpatentability, and, therefore, are improperly introduced for the first time in the Petitioner Reply. *See* Patent Trial and Appeal Board Consolidated Trial Practice Guide 73–75 (Nov. 2019) (“Consolidated Trial Practice Guide”), *available at* <https://www.uspto.gov/TrialPracticeGuideConsolidated> (discussing the appropriate scope for a reply); *id.* at 73 (“Petitioner may not submit new evidence or argument in reply that it could have presented earlier, e.g. to make out a *prima facie* case of unpatentability.”). It was Petitioner’s burden to demonstrate sufficiently in the Petition that the cited prior art renders the challenged claims unpatentable, including showing that the Petition’s contentions are supported by evidence. *See* 35 U.S.C. § 314(a); *see also* *Harmonic Inc. v. Avid Tech., Inc.*, 815 F.3d 1356, 1363 (Fed. Cir. 2016) (“In an IPR, the petitioner has the burden *from the onset* to show *with particularity* why the patent it challenges is unpatentable.” (emphases added)) (citing 35 U.S.C. § 312(a)(3)); *Intelligent Bio-Systems*, 821 F.3d at 1369 (requiring “*the initial petition* identify ‘*with particularity*’ the ‘evidence that supports the grounds for the challenge to each claim.’” (emphases added)); 37 C.F.R. §§ 42.104(b)(4) &

(5). Petitioner's arguments in its Reply are not supported sufficiently by the Petition. Accordingly, we accord Petitioner's new argument in the Reply no weight.

Referring back to only the arguments introduced in the Petition, Petitioner's conclusory argument regarding the Smart Roadster circuit and performance when the battery is being disconnected or discharged fails to show that Smart Roadster anticipates the limitations of claim 20. Pet. 62–63. Furthermore, Petitioner fails to provide sufficient argument and evidence in the Petition to establish that Smart Roadster teaches that when the NOTAUS_SENSE is not maintained at a high level due to battery discharge or disconnection an electrical failure as recited in claim 20 has occurred. Pet. 62–63. Petitioner's obviousness arguments rely on the same NOTAUS_SENSE signal arguments addressed above and fail to adequately address how a battery disconnection or discharge performs with respect to the Smart Roadster emergency circuit that Petitioner cites in its Reply. *Id.*; Reply 17.

Based on the foregoing, we find that Petitioner has not shown by a preponderance of the evidence that Smart Roadster anticipates or renders obvious claim 20.

F. Obviousness based on Dietz

Petitioner argues that Dietz, Negley, SAE, and Bosch teach the limitations of claims 1–3, 5–10, 12, 13, 15–20, providing argument and evidence mapping the limitations of the challenged claims to Dietz. Pet. 64–77; Ex. 1203 ¶¶ 214–327; Ex. 1005, 3, 4–6. Petitioner also argues that Dietz, Negley, SAE, Bosch, and Smart Roadster teach the limitations of claims 6 and 18–20. Pet. 78–79; Ex. 1203 ¶¶ 333–335. Petitioner's

argument and evidence rely on a figure in the Dietz installation manual showing a retrofit module inserted into the CAN bus between a navigation OEM apparatus and the vehicle. Pet. 66 (showing annotated figure); Ex. 1005, 3. Petitioner argues that a skilled artisan would have understood the operation of the OEM CAN bus and the signaling necessary to add the 1280 module in Dietz to the vehicle. Pet. 64–66; Ex. 1005, 3, 4–6; Ex. 1203 ¶¶ 254–258.

In our Decision on Institution, we determined Petitioner provided insufficient evidence and argument to support the conclusions regarding Dietz’s functions relied on to support Petitioner’s argument regarding claim 6, from which claims 15 and 20 depend. Dec. 17–18. Petitioner does not address the grounds based on Dietz. *See generally* Reply. Petitioner’s analysis relies on page 3 of the Dietz 1280 installation manual and testimony from Mr. Leale to support the specific messaging and signal limitations of independent claims 1 and 6. Pet. 68–70, 72. We find that Petitioner has not provided sufficient evidence and argument to support the conclusions regarding Dietz’s functions. *See* Pet. 65–66; Ex. 1005, 3; Ex. 1203 ¶¶ 256–258, 290–294. We do not find that the Dietz installation manual figures and text adequately support Petitioner’s conclusory argument regarding the motion of the vehicle or CAN bus messaging. Pet. 68; Ex. 1203 ¶¶ 271–272. On the full record, we agree with Patent Owner that Petitioner’s argument and evidence are insufficient to show that Dietz, Negley, SAE, and Bosch, or Dietz, Negley, SAE, Bosch, and Smart Roadster teach the limitations of claims 15 and 20, both of which depend from claim 6. PO Resp. 18–23; Ex. 2004 ¶¶ 35–42.

Based on the full record, we determine that Petitioner has not shown by a preponderance of the evidence that (1) Dietz, Negley, SAE, and Bosch render claims 15 and 20 obvious, or that (2) Dietz, Negley, SAE, Bosch, and Smart Roadster render obvious claim 20.

G. Obviousness of Claim 15 based on Walker and One or More of Dietz, SAE, Negley, and Bosch

Petitioner argues Walker in combination with one or more of Dietz, SAE, Negley, and Bosch teaches the limitations of claims 6, 13, and 15. Pet. 79–80; *see id.* at 27–30, 35–36; Ex. 1203 ¶¶ 132–141. Petitioner contends that Walker discloses the limitations of claim 6 for the reasons Petitioner explained with respect to alleged anticipation of claim 6 by Walker. *See* Pet. 79; *see also* Part II.D *supra*. Specifically, Petitioner asserts that Figure 24A of Walker teaches a retrofit apparatus connected between the factory-installed first and second apparatuses (the OEM Sensor and OEM Control Module), where the retrofit apparatus mimics an electrical signal generated by the first apparatus that is received by the second apparatus. Pet. 26–30; Ex. 1203 ¶¶ 130–141. Patent Owner does not specifically dispute Petitioner’s contention that Walker discloses the limitations of claim 6. *See* PO Resp. 10–14. Based on the complete record and for the reasons explained by Petitioner, we find that Petitioner has demonstrated sufficiently that Walker teaches the limitations of claim 6.

Claim 13 depends from claim 6 and further recites “wherein a first electrical interface between the factory-installed first apparatus and the retrofit apparatus and a second electrical interface between the retrofit apparatus and the factory-installed second apparatus are identical.” Ex. 1201, 12:15–19. Petitioner contends that Walker discloses the

additionally recited limitation of claim 13 because an ordinarily skilled artisan would understand that the input and output of the retrofit device installed between existing OEM devices would require the same input and output signals to use the same wiring and connections. *See* Pet. 35–36; Ex. 1203 ¶¶ 158–159. Patent Owner does not specifically dispute Petitioner’s contention that Walker discloses the additionally recited limitation of claim 13. *See* PO Resp. 10–14; 25–28. Based on the complete record and for the reasons explained by Petitioner, we find that Petitioner has demonstrated sufficiently that Walker teaches the additionally recited limitation of claim 13.

Claim 15 depends from claim 13 and further adds the requirement that the first electrical interface of claim 13 is a CAN vehicle data bus. Ex. 1201, 12:22–23. Petitioner argues that a person of ordinary skill in the art would have understood that OEM sensors provide signals to over a CAN bus to OEM control modules. Pet. 80 (citing Ex. 1006, 7; Ex. 1009, 3 (“The Controller Area Network (CAN) protocol . . . offers a comprehensive solution to managing communication between multiple CPUs.”); Ex. 1010, 6–16, 38–51, 58). Petitioner argues that “[i]t would have been obvious for a POSITA to use a CAN bus to provide signals from an OEM sensor to an OEM control module in Walker,” which teaches installing a trickster circuit on the CAN bus and CAN bus control module node. Pet. 80; Ex. 1204, 119:41–46, 117:38–46; Ex. 1203 ¶ 340.

With respect to the motivation to combine the references, we determined in our Decision on Institution that Petitioner has not provided sufficient evidence and argument to support the motivation to combine Dietz and Walker. Dec. 18–19. Petitioner does not contest our preliminary

determination. Reply 3. With respect to the remaining references, however, Petitioner argues Walker in combination with one or more of SAE, Negley, and Bosch teaches the limitations of claims 6, 13, and 15. Pet. 79–80; Reply 3–9. Specifically, Petitioner contends that an ordinarily skilled artisan would have understood to use a CAN bus to provide signals from an OEM sensor to an OEM controller in Walker because

Such an arrangement is explained in SAE, Negley, and Bosch. *See* SAE, 3 (“The Controller Area Network (CAN) protocol . . . offers a comprehensive solution to managing communication between multiple CPUs.”); Negley, 7 (identifying the structure of a “typical smart sensor node” as including a Microcontroller); *id.* (“Every other node captures the message and examines it to see if it is required to take some action.”); Bosch, 6–16, 38–51, 58; *id.*, 40 (disclosing “all nodes in the network are able to decide by Message Filtering whether the data is to be acted upon by them or not.”).

Pet. 80. Petitioner argues “[i]t would have been obvious for a POSITA to use a CAN bus to provide signals from an OEM sensor to an OEM control module in Walker” as “a CAN bus would have numerous advantages over the use of a continuous wire, including that the CAN bus could allow multiple sensors to share the same continuous wire.” *Id.*

Patent Owner argues that Walker teaches two different circuits for the OEM sensor and control module that are not known to use a CAN bus. PO Resp. 27. In addition, Patent Owner contends that to modify Walker to work on a CAN bus would require wholesale replacement of the Walker circuit with something else. *Id.* at 27–28 (citing Ex. 2004 ¶ 51). Patent Owner further contends that Walker’s simple circuit with hardwired signals is one direction and cannot be applied to a CAN bus that requires bidirectional communication capability. *Id.*

Patent Owner’s arguments improperly rely on physically incorporating the circuits of Walker in the CAN bus field described by SAE, Negley, and Bosch. PO Resp. 26–28. Bodily incorporation, however, is not the standard for obviousness analysis. *See In re Mouttet*, 686 F.3d 1322, 1332–33 (Fed. Cir. 2012); *see also MCM Portfolio LLC v. Hewlett-Packard Co.*, 812 F.3d 1284, 1294 (Fed. Cir. 2015) (“[t]he test for obviousness is not whether the features of a secondary reference may be bodily incorporated into the structure of the primary reference” (citation omitted)), *cert. denied*, 137 S. Ct. 292 (2016).

In the present case, Patent Owner contends that Walker’s specific circuit would not properly output to the CAN interface of an OEM control module. PO Resp. 26; Ex. 2004 ¶ 50. We disagree and are persuaded by Petitioner’s argument and evidence that it would have been within the scope of knowledge of a person of ordinary skill in the art to apply a CAN bus to the first electrical interface as required in claim 15. Pet. 79–81; Reply 3–9. Petitioner argues that in view of Patent Owner’s disclaimer of dependent claim 13, which recites that the first and second electrical interfaces are identical, Patent Owner concedes that identical interfaces are obvious and are not limited to specific interfaces or signals. Reply 3–4; *see id.* at 4 n.2 (citing Ex. 1212, 22:12–23:13).

With respect to claim 15, Petitioner contends that “consistent with the teachings of Walker . . . it would have been obvious to install a trickster CAN bus node in series with the OEM sensor CAN bus node and OEM control module CAN bus node as a retrofit.” Pet. 80 (citing Ex. 1204, 119:41–46; *see also* Ex. 1204, 117:38–46); Ex. 1203 ¶ 340. Thus, Petitioner asserts that a trickster CAN bus node is utilized in the combination and not

the precise circuit of Walker. *Id.* We credit Petitioner's evidence that Walker in combination with one or more of SAE, Negley, and Bosch teaches the interface of its control system with existing OEM controllers or computers of varied types, which a skilled artisan would have understood to include CAN bus nodes. *See* Ex. 1203 ¶ 340; Ex. 1204, 117:38–46, 119:41–46; *see also* Ex. 1006, 20–21; Ex. 1009, 3, Ex. 1010, 6–16, 38–51, 58.

We are not persuaded by Patent Owner's contention that the broad idea of trickster circuits disclosed in Walker does not establish obviousness because it does not teach a particular embodiment of a CAN bus trickster circuit. Sur-reply 3–4 (citing *Knauf Insulation, Inc. v. Rockwool, Int'l A/S*, 788 Fed. App'x 728, 733 (Fed. Cir. 2019)). We are also not persuaded by Patent Owner's arguments that Petitioner's declarant, Mr. Leale confirmed the unpredictability of the modifications to the CAN bus circuit. Sur-reply 5–6 (citing Ex. 2009, 20:18–22:2). We credit Petitioner's expert's testimony and Petitioner's citation to Walker as establishing that Walker teaches integrating the circuit and controller using signals sent from processors with various known interfaces. *See* Ex. 1203 ¶ 340; Ex. 1204, 117:38–46, 119:41–46; Reply 8–9; Ex. 1213 ¶¶ 12–14.

Patent Owner asserts Petitioner offers no analysis of how Walker's circuit teaches the elements of claims 6 and 13, from which claim 15 depends, working with a CAN bus. Sur-reply 5. Patent Owner argues that Mr. Leale confirms that applying Walker's circuit to a CAN bus is an uncertain outcome. *Id.* at 5–6; Ex. 2009, 20:18–22:2. Patent Owner also argues that Mr. Leale confirms that a person of ordinary skill in the art would not have been aware of using Walker with a CAN bus at the time of application for the Walker invention. Sur-reply 6–7; Ex. 2009, 29:1–15.

Patent Owner argues that a person of ordinary skill in the art would have not been motivated to combine the teachings of Walker with one or more of SAE, Negley, and Bosch, because Petitioner's argument uses impermissible hindsight requiring wholesale modification of Walker. Sur-reply 9–10 (citing *Uber Techs., Inc. v. X One, Inc.*, 957 F.3d 1334 (Fed. Cir. 2020)).

We disagree with Patent Owner. With respect to CAN buses not being available at the time of Walker's application, we credit Mr. Leale's testimony that CAN buses were widely implemented after Walker's time of invention not that CAN bus. Ex. 1213 ¶ 13; Ex. 2009, 26:2–16, 27:18–28:15. We further determine that Petitioner provides persuasive evidence that Walker teaches installation of trickster circuits in various settings using alternative controllers. See Pet. 80; Ex. 1204, 117:38–46, 119:41–46.

Where a technique has been used to improve one device, an ordinarily skilled artisan would recognize its use to improve similar devices in a same way. *KSR Int'l Co. v. Teleflex Inc.*, 550 U.S. 398, 417 (2007). In this case, we agree with Petitioner's evidence that Walker teaches implementation beyond the specific circuit embodiments, and describes integrated circuits and software using processors to adapt its disclosure to different vehicle settings. Reply 8; Pet. 80; Ex. 1203 ¶ 340; Ex. 1213 ¶ 10; Ex. 1204, 117:38–55, 102:23–28.

We are also not persuaded by Patent Owner's contention that an ordinarily skilled artisan would not have been motivated extend Walker to a CAN bus because it would replace Walker's inexpensive circuit with a costly CAN gateway. Sur-reply 7–8; Ex. 2009, 24:3–5, 15–18. It is well-settled law that a prior art reference's disclosure is not limited to the exemplary embodiments it discloses in the specification. See, e.g., *In re*

Applied Materials, Inc., 692 F.3d 1289, 1298 (Fed. Cir. 2012) (“A reference must be considered for everything that it teaches, not simply the described invention or a preferred embodiment.”). Here, Walker teaches applications of circuit could involve controllers, processors, firmware and software to realize its functions. Ex. 1203 ¶ 340; Ex. 1204, 117:38–55, 102:23–28. We do not find that increased expense of CAN gateway discourages the combination of Walker with the CAN bus references. As discussed above, we find that Petitioner has articulated reasoning supported by evidentiary bases as to why the ordinarily skilled artisan would have combined the references in the manner proposed by Petitioner. Furthermore, a person of ordinary skill in the art would have had engineering knowledge and experience in the design, operation, and functioning of CAN systems. *See* Part II.A *supra*. In that regard, Petitioner’s combination does not rely on knowledge gleaned from the ’707 patent’s disclosure. *See In re McLaughlin*, 443 F.2d 1392, 1395 (CCPA 1971) (“Any judgment on obviousness is in a sense necessarily a reconstruction based upon hindsight reasoning, but so long as it takes into account only knowledge which was within the level of ordinary skill at the time the claimed invention was made and does not include knowledge gleaned only from applicant’s disclosure, such a reconstruction is proper.”). We find Petitioner’s evidence that application of Walker to a CAN bus is within the scope of knowledge of a person of ordinary skill in the art. Ex. 1203 ¶ 380; Ex. 1213 ¶¶ 10–18.

On the record before us, Petitioner provides persuasive evidence that Walker in combination with one or more of SAE, Negley, and Bosch teach the application of Walker’s trickster architecture to a CAN bus via a CAN gateway. Pet. 80–81; *see* Ex. 1203 ¶ 340; Ex. 1213 ¶¶ 11–13; Ex. 1204,

117:38–46, 119:41–46; *see also* Ex. 1006, 20–21; Ex. 1009, 3; Ex. 1010, 6–16, 38–51, 58; Ex. 1204, 102:23–28 (stating that retrofit functions “will be performed by integrated circuits and preprogrammed as limited software and/or firmware signals sent from . . . mini controller computers and/or processors”); Ex. 1212, 27:19–28:4 (Patent Owner declarant agreeing that a CAN bus gateway can be used to connect in series between nodes on separate CAN buses).

Based on the foregoing and the complete record, we find that Petitioner has shown sufficiently that Walker in combination with one or more of SAE, Negley, and Bosch teaches the limitations of claim 15. In addition, based on the foregoing and upon consideration of the complete record, we determine that Petitioner articulates sufficient reasons, supported by rational underpinning, for the combination of teachings from Walker and one or more of SAE, Negley, and Bosch that it proposes. Accordingly, based on the complete record, we find that Petitioner has demonstrated by a preponderance of the evidence that claim 15 would have been obvious over the combination of Walker and one or more of SAE, Negley, and Bosch. We do not find that Petitioner has demonstrated by a preponderance of the evidence that claim 15 would have been obvious in view of Walker in combination with Dietz.

III. CONCLUSION

For the reasons given, based on the arguments and evidence of record, Petitioner has met its burden to prove by a preponderance of the evidence

that claim 15 is unpatentable under 35 U.S.C. § 103(a) as obvious over Walker in combination with one or more of Negley, SAE, and Bosch.⁸

Petitioner has *not* established by a preponderance of the evidence that (1) claim 20 is unpatentable under 35 U.S.C. § 103(a) or 35 U.S.C. § 102 over Walker; (2) claim 20 is unpatentable under 35 U.S.C. § 102 or 35 U.S.C. § 103 over Smart Roadster; (3) claims 15 and 20 are unpatentable under 35 U.S.C. § 103(a) as obvious over Dietz, SAE, Bosch, and Negley; or (4) claim 20 is unpatentable under 35 U.S.C. § 103(a) as obvious over Dietz, SAE, Bosch, Negley, and Smart Roadster.

⁸ Should Patent Owner wish to pursue amendment of claim 15 in a reissue or reexamination proceeding subsequent to the issuance of this Decision, we draw Patent Owner's attention to the April 2019 *Notice Regarding Options for Amendments by Patent Owner Through Reissue or Reexamination During a Pending AIA Trial Proceeding*. See 84 Fed. Reg. 16,654 (Apr. 22, 2019). If Patent Owner chooses to file a reissue application or a request for reexamination of the challenged patent, we remind Patent Owner of its continuing obligation to notify the Board of any such related matters in updated mandatory notices. See 37 C.F.R. § 42.8(a)(3), (b)(2).

The table below summarizes our conclusions with respect to the remaining challenged claims:

Claim(s)	35 U.S.C. §	Reference(s)/ Basis	Claims Shown Unpatentable	Claims Not Shown Unpatentable
20	102	Walker		20
20	103(a)	Walker		20
20	102	Smart Roadster		20
20	103(a)	Smart Roadster		20
15, 20	103(a)	Dietz, SAE, Bosch, Negley		15, 20
20	103(a)	Dietz, SAE, Bosch, Negley, Smart Roadster		20
15	103(a)	Walker, Dietz		15
15	103(a)	Walker, one or more of SAE, Negley, Bosch	15	
Overall Outcome			15	20

IV. ORDER

Accordingly, it is:

ORDERED that claim 15 of the '707 patent is determined to be unpatentable;

FURTHER ORDERED that claim 20 of the '707 patent has not been shown to be unpatentable; and

FURTHER ORDERED that, because this is a final written decision, parties to this proceeding seeking judicial review of our Decision must comply with the notice and service requirements of 37 C.F.R. § 90.2.

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