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Paper 10
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UNITED STATES PATENT AND TRADEMARK OFFICE

BEFORE THE PATENT TRIAL AND APPEAL BOARD

CAREFUSION CORPORATION,
Petitioner,

v.

BAXTER INTERNATIONAL, INC.,
Patent Owner.

Case IPR2016-01460
Patent 5,764,034

Before RICHARD E. RICE, ROBERT J. WEINSCHENK, and AMANDA F. WIEKER, *Administrative Patent Judges.*

WIEKER, *Administrative Patent Judge.*

DECISION
Institution of *Inter Partes* Review
37 C.F.R. § 42.108

I. INTRODUCTION

Petitioner, CareFusion Corporation, filed a Petition requesting an *inter partes* review of claims 1–4 and 9–12 of U.S. Patent No. 5,764,034 (Ex. 1001, "the '034 patent"). Paper 1 ("Pet."). In response, Patent Owner, Baxter International, Inc., filed a Preliminary Response. Paper 7 ("Prelim. Resp."). We have jurisdiction under 35 U.S.C. § 314, which provides that an *inter partes* review may not be instituted "unless . . . the information presented in the petition . . . shows that there is a reasonable likelihood that the petitioner would prevail with respect to at least 1 of the claims challenged in the petition." *See also* 37 C.F.R. § 42.4(a).

Upon consideration of the information presented in the Petition and Preliminary Response, and for the reasons set forth below, we determine that Petitioner has demonstrated that there is a reasonable likelihood that claims 1–4, but not claims 9–12, are unpatentable. Accordingly, we institute an *inter partes* review of claims 1–4 of the '034 patent based on the grounds identified in the Order section of this Decision.

A. Related Matters

According to the parties, infringement of the '034 patent is alleged in the following proceeding: *Baxter International, Inc. v. CareFusion Corporation and Becton, Dickinson and Company*, No. 1:15-cv-9986 (the "Related Litigation"). Pet. 1–2; Paper 4, 1.

According to Patent Owner, the '034 patent is also involved in PTAB proceeding IPR2017-00202. Paper 9, 2.

B. The '034 Patent

The '034 patent is directed to a battery gauge for an infusion pump that "provides an estimate of the amount of time left on the battery by

monitoring not only the voltage available from the battery, but also the amount of current flowing from the battery." Ex. 1001, 2:12–25. Figure 11 is reproduced below.

FIG. 11

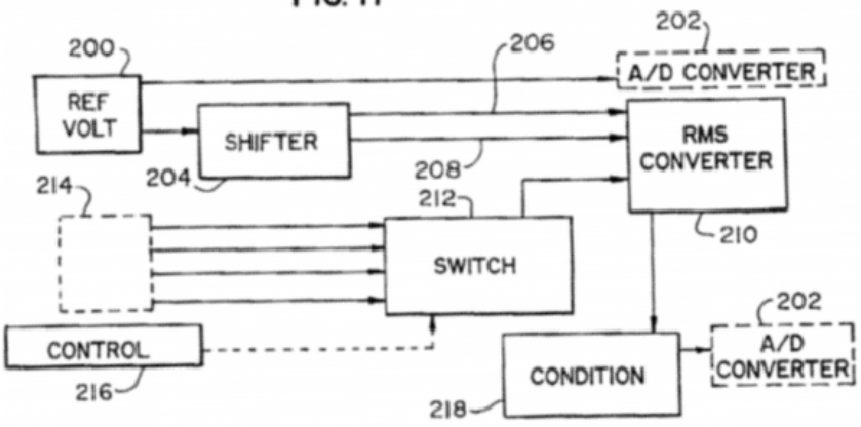

Figure 11 depicts a block diagram of the battery gauge circuit. *Id.* at 2:47–49. Circuit 216 controls switch 212 to select the voltage or current range 214 to be measured, e.g., high-voltage, low-voltage, high-current, or low-current. *Id*. at 9:38–42, 10:55–56. The selected signal is sent to RMS converter 210 and conditioning circuit 218, before being input to A/D (analog-to-digital) converter 202 of a slave microprocessor for analysis. *Id.* at 9:43–47. Reference voltage 200 is also sent to RMS converter 210 and A/D converter 202. *Id.* at 9:25–28, Fig. 11. Additionally, a coarse voltage signal (not shown) is supplied to the slave microprocessor. *Id.* at 11:13–23.

These signals are used to generate visual and audible indicators of battery status. *Id.* at 5:12–18, 5:35–37, 8:26–39, 11:39–41. For example, a "Battery Alarm occurs when the battery voltage falls below a critically determined value," e.g., 10.8 volts. *Id.* at 11:46–49, 13:21–30, Fig. 14 (step 14). A "Battery Alert is generated when less than a predetermined time is left until the Alarm is generated," e.g., 30 minutes. *Id.* at 11:43–46, 13:36–52, 14:50–56, Fig. 14 (step 17).

C. Illustrative Claims

Challenged claims 1 and 9 are independent claims. Ex. 1001, 15:36–50, 16:25–40. Challenged claims 2–4 depend directly from independent claim 1. *Id.* at 15:51–59. Challenged claims 10–12 depend directly or indirectly from independent claim 9. *Id.* at 16:40–48.

Claims 1 and 9, reproduced below, are illustrative:

> 1. An infusion pump comprising:
>
> a pump drive mechanism for applying the pumping action to a liquid for infusion in a patent;
>
> a battery for powering the pump drive mechanism;
>
> a circuit which monitors the voltage and current from the battery;
>
> a circuit responsive to the monitoring circuit which determines the remaining time of charge in the battery;
>
> a battery alarm which occurs when the remaining time of charge in the battery is below a predetermined level;
>
> a battery low alert which occurs when the remaining time of charge in the battery is below a predetermined level but above the battery alarm level; and
>
> display means for displaying the remaining time of charge in the battery.

Id. at 15:36–50.

> 9. A method of infusing a liquid into a patient comprising:
>
> infusing the liquid into the patient by use of an electrically powered mechanism;
>
> powering the electronically powered mechanism with a battery;
>
> monitoring the voltage of the battery;

monitoring the current from the battery;

determining from the voltage and the current the remaining time of charge in the battery;

alarming when the remaining time of charge in battery is below a predetermined level;

alerting when the remaining time of charge in battery is below a predetermined level but above the battery alarm level; and

displaying the remaining time of charge in the battery.

Id. at 16:25–40.

D. Prior Art Relied Upon

Petitioner relies upon the following prior art references. Pet. 18.

Name	Reference	Date	Exhibit No.
Layman	US 5,712,795	Jan. 27, 1998	Ex. 1004
Gargano	US 5,814,015	Sept. 29, 1998	Ex. 1005
EDN	Malcolm McClure, *Energy gauges add intelligence to rechargeable batteries*, EDN, May 26, 1994		Ex. 1006
LTC1325	Linear Technology, *LTC1325 Microprocessor-Controlled Battery Management System* (1994)		Ex. 1007

E. Asserted Grounds of Unpatentability

Petitioner asserts the following unpatentability grounds. Pet. 18.

References	Basis	Challenged Claims
Layman and Gargano	§ 103(a)	1–4 and 9–12
Layman, Gargano, and LTC1325	§ 103(a)	1–4 and 9–12
Layman, Gargano, and EDN	§ 103(a)	1–4 and 9–12

II. ANALYSIS

A. Claim Interpretation

The parties agree that the ’034 patent has expired. Pet. 7, 13–14; Prelim. Resp. 5. “[T]he Board’s review of the claims of an expired patent is similar to that of a district court’s review.” *In re Rambus, Inc.*, 694 F.3d 42, 46 (Fed. Cir. 2012). Therefore, we apply the principles set forth by the Court of Appeals for the Federal Circuit, in *Phillips v. AWH Corp.*, 415 F.3d 1303 (Fed. Cir. 2005) (en banc). Accordingly, the “words of a claim ‘are generally given their ordinary and customary meaning’” as understood by a person of ordinary skill in the art at the time of the invention. *Id.* at 1312 (quoting *Vitronics Corp. v. Conceptronic, Inc.*, 90 F.3d 1576, 1582 (Fed. Cir. 1996)). “In determining the meaning of the disputed claim limitation[s], we look principally to the intrinsic evidence of record, examining the claim language itself, the written description, and the prosecution history, if in evidence.” *DePuy Spine, Inc. v. Medtronic Sofamor Danek, Inc.*, 469 F.3d 1005, 1014 (Fed. Cir. 2006). “[T]he specification ‘is always highly relevant to the claim construction analysis. Usually, it is dispositive; it is the single best guide to the meaning of a disputed term.’” *Phillips*, 415 F.3d at 1315 (quoting *Vitronics*, 90 F.3d at 1582). Extrinsic evidence is “less significant than the intrinsic record in determining the legally operative meaning of claim language.” *Id.* at 1317 (internal quotation marks omitted).

1. “a circuit responsive to the monitoring circuit which determines the remaining time of charge in the battery”

Challenged claim 1 recites “a circuit responsive to the monitoring circuit which determines the remaining time of charge in the battery.” Ex. 1001, 15:42–43. Petitioner contends that this phrase should be construed as “‘a circuit that determines the remaining time of charge in the battery based

on both the monitored voltage and monitored current.'" Pet. 15. Patent Owner argues that Petitioner's construction improperly limits claim 1, which does not recite that both voltage and current are used in determining the remaining time of charge, and that further construction of this limitation is not necessary. Prelim. Resp. 6–10.

On the current record, we agree with Patent Owner that Petitioner's construction is improperly limiting. Claim 1 does not specify how the circuit determines the remaining time of charge, other than to require it "respon[d] to the monitoring circuit." Ex. 1001, 15:42–43. By contrast, claim 9 explicitly limits the determination by stating, "determining *from the voltage and the current* the remaining time of charge." *Id.* at 16:32–33 (emphasis added). We will not, through claim construction, import limitations into claim 1 that are not recited. *See, e.g., U.S. v. Telectronics, Inc.*, 857 F.2d 778, 783–784 (Fed. Cir. 1988) ("'There is presumed to be a difference in meaning and scope when different words or phrases are used in separate claims. . . .' 'Where some claims are broad and others narrow, the narrow claim limitations cannot be read into the broad.'") (citations omitted).

The '034 patent Specification supports this interpretation. For example, the remaining time of charge is determined, in the first instance, from "current drain and amp/hours remaining" and, separately, in the second instance, from "true RMS voltage." Ex. 1001, 13:36–57, Fig. 14 (at 15, 18).

Petitioner's citations to the prosecution history do not compel a different conclusion. Pet. 15. The cited portions indicate only that voltage and current "are monitored and utilized as inputs to determine the amount of charge remaining." Ex. 1002, APP0140, APP0178 (same). However, that

voltage and current are "utilized as inputs" does not require that they *both* be utilized as inputs *together*, as Petitioner's argument assumes.

Thus, on the current record and for purposes of this Decision, we conclude that "a circuit responsive to the monitoring circuit which determines the remaining time of charge in the battery" does not require that the remaining time of charge be determined "based on both the monitored voltage and monitored current," as Petitioner proposes. No further construction is required. *See Vivid Techs., Inc. v. Am. Sci. & Eng'g, Inc.*, 200 F.3d 795, 803 (Fed. Cir. 1999).

2. "display means"

Challenged claim 1 recites "display means for displaying the remaining time of charge in the battery." Ex. 1001, 15:49–50. Petitioner contends this phrase is a means-plus-function limitation under 35 U.S.C. § 112, sixth paragraph, and construes this limitation in accordance with positions put forth by Patent Owner in the Related Litigation. Pet. 16 (citing Ex. 1012, APP0456). Specifically, the Petition states, "the function is 'displaying the remaining time of charge in the battery' and the [corresponding] structure disclosed in the '034 patent is an LCD." *Id.* Patent Owner argues that the Petition fails to comply with 37 C.F.R. § 42.104(b)(3), which Patent Owner contends to be fatal to the challenge to claims 1–4. Prelim. Resp. 11–12.

Our Rules require that, "[w]here the claim to be construed contains a means-plus-function [limitation] . . ., the construction of the claim must identify the specific portions of the specification that describe the structure, material, or acts corresponding to each claimed function." 37 C.F.R. § 42.104(b)(3). Here, the Petition identifies the function and corresponding

structure of the "display means." Pet. 16. In addition, the passages of the '034 patent in which this structure can be found are apparent from the evidence cited in the Petition. *See* Pet. 16 (citing Ex. 1012, APP0456); Ex. 1012, APP0456–57 (citing Ex. 1001, 3:12–16, 9:9–16, Fig. 10).

Accordingly, in this case, we are not persuaded by Patent Owner's argument that the Petition is deficient. Further, on this record, we agree with Petitioner's construction. For purposes of this Decision, we determine that the recited function is "displaying the remaining time of charge in the battery," and the corresponding structure is an LCD. *See* Ex. 1001, 3:11–16, 6:17–25, 9:5–9.

3. "means for sampling"

Challenged claim 2 recites "means for sampling the voltage and the current of the battery." Ex. 1001, 15:52–53.[1] Petitioner contends this phrase is a means-plus-function limitation under 35 U.S.C. § 112, sixth paragraph, and construes this limitation in accordance with positions put forth by Patent Owner in the Related Litigation. Pet. 17 (citing Ex. 1012, APP0460). Specifically, the Petition states, "the function is sampling the voltage and current of the battery and the [corresponding] structure disclosed in the '034 patent is an analog-to-digital converter." *Id.* Patent Owner again argues that the Petition fails to comply with Rule 104(b)(3). Prelim. Resp. 11–12.

In this case and consistent with our discussion above, we are not persuaded by Patent Owner's argument that the Petition is deficient. *See* Pet. 17 (citing Ex. 1012, APP0460); Ex. 1012, APP0460–61 (citing Ex. 1001, 9:38–47, 12:36–42, 12:45–59, Fig. 11). Further, on this record, we

[1] The parties appear to agree that "the monitoring circuit means" also recited in claim 2 refers to the "circuit which monitors the voltage and current from the battery," as recited in claim 1. Pet. 15; Ex. 1012, APP0457.

agree with Petitioner's construction. For purposes of this Decision, we determine that the recited function is "sampling the voltage and current of the battery," and the corresponding structure is an analog-to-digital converter. *See* Ex. 1001, 9:38–47, 12:36–59, Fig. 11.

4. "means for alternatively sampling"

Challenged claim 3 recites "means for alternatively sampling the voltage of the battery and the current from the battery." Ex. 1001, 15:55–56. Petitioner contends this phrase is a means-plus-function limitation under 35 U.S.C. § 112, sixth paragraph, and construes this limitation in accordance with positions put forth by Patent Owner in the Related Litigation. Pet. 17–18 (citing Ex. 1012, APP0463, APP0465). Specifically, the Petition states, "the function is alternatively sampling the voltage of the battery and the current from the battery and the [corresponding] structure disclosed in the '034 patent is a switch that selects among analog inputs such as voltage and current." *Id.* at 18. Patent Owner again argues that the claim fails to comply with Rule 104(b)(3). Prelim. Resp. 11–12.

In this case and consistent with our discussion above, we are not persuaded by Patent Owner's argument that the Petition is deficient. *See* Pet. 17–18 (citing Ex. 1012, APP0463, APP0465); Ex. 1012, APP0465–66 (citing Ex. 1001, 9:38–47, 12:36–42, 12:45–59, Fig. 11). Further, on this record, we agree with Petitioner's identification of the function and, for purposes of this Decision, determine that the recited function is "alternatively sampling the voltage of the battery and the current from the battery." *See* Ex. 1001, 9:38–47, 12:36–59, Fig. 11.

However, we do not agree with Petitioner's identification of the corresponding structure as "a switch that selects among analog inputs such

as voltage and current" because we find that structure to be incomplete to perform the recited function. The '034 patent explains that switch 212 "determines which of the four voltage/current ranges 214 is being measured" and sends "the selected signal" to RMS converter 210, conditioning circuit 218, and analog-to-digital converter 202. Ex. 1001, 9:38–47. Therefore, although the Specification may associate switch 212 with the function of "*alternatively*" selecting voltage or current ranges, this structure does not appear to be associated with the function of "*sampling*." *See also* Pet. 17 (identifying an analog-to-digital converter as the structure that performs a "sampling" function). Thus, on this record and for purposes of this Decision, we determine that the corresponding structure associated with this limitation is a switch that selects among analog inputs such as voltage and current, and an analog-to-digital converter. *See* Ex. 1001, 9:38–47, 12:36–59, Fig. 11.

B. Obviousness over Layman and Gargano

Petitioner contends that claims 1–4 and 9–12 of the '034 patent are unpatentable under 35 U.S.C. § 103(a) over Layman and Gargano. Pet. 19–41. In particular, Petitioner explains how Layman and Gargano purportedly render obvious the subject matter of the challenged claims, and presents rationales to combine the references' teachings. *Id.* Petitioner also relies upon the Declaration of Yangming Xu (Ex. 1003, the "Xu Declaration") to support its positions. *Id.* Patent Owner counters that Petitioner fails to identify the differences between the asserted prior art and the claims, precluding rational discussion of the proposed combination of references. Prelim. Resp. 15–16. Patent Owner also contends that Layman and Gargano fail to render obvious certain claim limitations, and that Petitioner fails to

present a plausible rationale for combining the references. *Id.* at 17–37. Patent Owner relies upon the Declaration of Mr. Warren P. Heim (Ex. 2001, the "Heim Declaration") to support its arguments. *Id.*

We have reviewed the parties' contentions and evidence and, on this record, are persuaded that Petitioner has shown a reasonable likelihood of prevailing on its assertion that claims 1–4, but not claims 9–12, are obvious over Layman and Gargano.

1. Principles of Law

A claim is unpatentable under 35 U.S.C. § 103(a) if the differences between the claimed subject matter 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. *KSR Int'l Co. v. Teleflex Inc.*, 550 U.S. 398, 406 (2007). The question of obviousness is resolved on the basis of underlying factual determinations including: (1) the scope and content of the prior art; (2) any differences between the claimed subject matter and the prior art; (3) the level of ordinary skill in the art; and (4) objective evidence of nonobviousness. *Graham v. John Deere Co.*, 383 U.S. 1, 17–18 (1966).

2. Level of Ordinary Skill in the Art

Petitioner contends a person of ordinary skill in the art of the '034 patent would have had "education and research/industry experience in biomedical engineering and at least 2 years' experience designing hardware, software and/or firmware for electrical devices in the biomedical industry." Pet. 10–11. Patent Owner contends such a person would have had "an engineering degree and at least six years [of] experience designing medical devices using electronics and electro-mechanical components powered by

batteries." Prelim. Resp. 4–5.

At this stage of the proceeding, we determine that it is not necessary to establish a specific level of skill in the art. The level of ordinary skill in the art is reflected by the prior art of record. *See Okajima v. Bourdeau*, 261 F.3d 1350, 1355 (Fed. Cir. 2001); *In re GPAC Inc.*, 57 F.3d 1573, 1579 (Fed. Cir. 1995); *In re Oelrich*, 579 F.2d 86, 91 (CCPA 1978).

3. *Overview of Layman (Ex. 1004)*

Layman discloses a power management system for an infusion pump. Ex. 1004, Abst. Figure 2 is reproduced below.

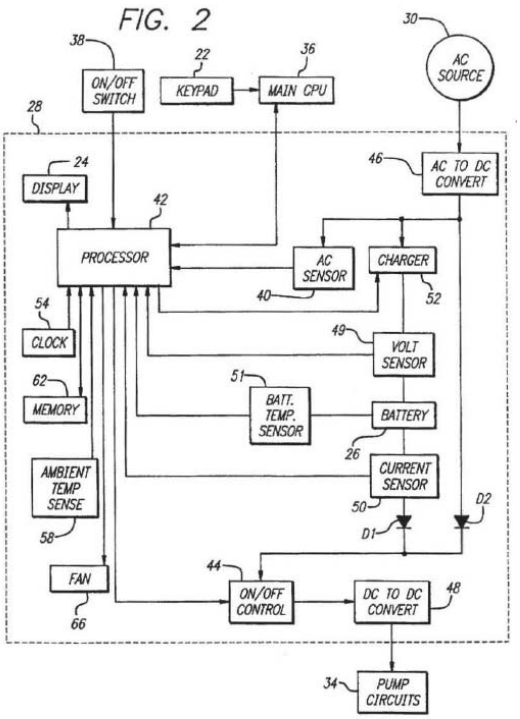

Figure 2 depicts a block diagram of power management system 28, which includes processor 42, battery 26, voltage sensor 49, and current sensor 50. *Id.* at 3:41–42, 4:54–58. Remaining battery life is determined "based on the amount of charge remaining in the battery and the present current draw from the battery" and is depicted on a display in fifteen minute increments. *Id.* at 2:4–5, 7:15–27, 10:38–42, Fig. 3. Additionally, audible

and visual alarms indicate low battery voltage levels. *Id.* at 10:52–59.

4. *Overview of Gargano (Ex. 1005)*

Gargano discloses an infusion pump that continuously displays the remaining life of the pump battery. Ex. 1005, 1:5–6, 2:17–23, 7:36–37. Additionally, warnings indicate when thirty minutes and fifteen minutes of battery life remain (*id.* at 19:50–20:8, Figs. 60–61), a "battery alarm" indicates when five minutes of battery life remain (*id.* at 20:9–15, Fig. 62), and a "battery depleted" alarm indicates when battery life is expended (*id.* at 20:16–19, Fig. 62).

5. *Discussion*

Petitioner contends that Layman and Gargano render obvious claims 1–4 and 9–12. Pet. 19–41. For many claim limitations, Petitioner provides citations to portions of both Layman and Gargano. *See, e.g., id.* at 24; Prelim. Resp. 15–17. Petitioner explains, however, that it would have been obvious for a person of ordinary skill in the art to have combined "the Layman infusion system with the alarm and alert triggers of the infusion pump disclosed in Gargano." Pet. 22–23, 32. With this explanation, Petitioner identifies sufficiently the differences between the claim limitations and the respective references. Accordingly, we are unpersuaded by Patent Owner's argument that the Petition fails to satisfy the requirements of *Graham v. John Deere Co.*, 383 U.S. 1 (1966). Prelim. Resp. 15–17.

Claims 1–4

With respect to independent claim 1, Petitioner contends that Layman discloses a pump with a pump drive mechanism, a battery, a circuit which monitors the voltage and current, a circuit responsive to the monitoring circuit which determines the remaining time of charge in the battery, and

display means. Pet. 24–28, 33–34. Petitioner relies on Gargano's disclosure of an infusion pump with alarms and alerts that indicate the remaining battery life (*id.* at 30–33), and concludes that it would have been obvious to incorporate Gargano's alarms and alerts into Layman's pump (*id.* at 22–23).

On the current record, Petitioner has shown sufficiently that Layman and Gargano render obvious the limitations of claim 1. Specifically, with respect to the "circuit . . . which determines the remaining time of charge in the battery," Petitioner relies on Layman's disclosure of a processor that calculates the remaining "run time" for the battery based on the level of current drawn from the battery. Pet. 27–28. As discussed above in Section II(A)(1), this limitation does not require that the remaining time of charge be determined based on voltage *and* current. Therefore, Petitioner has shown sufficiently that Layman's system determines the remaining time of charge based on current, which satisfies this limitation. Ex. 1004, 2:4–5, 7:15–27.

On the current record, Patent Owner's opposing argument that Layman does not determine the remaining time of charge based on voltage *and* current is not persuasive because it is not commensurate with the scope of claim 1, as properly construed. Prelim. Resp. 17–18.

Patent Owner also argues that Petitioner fails to provide a plausible rationale to combine the references. Prelim. Resp. 29–37. For example, Patent Owner argues that the Petition provides generic statements of case law and "leaves it to the Patent Owner and this Board to decipher from vague generalizations what specific teachings and components from each are to be allegedly combined." *Id.* at 36.

The Petition explains sufficiently that "Layman and Gargano are each directed to an infusion pump system with battery life monitoring

functionality." Pet. 22, 24. Specifically, Layman discloses an infusion pump having a battery life display and alarms that indicate when the battery charge reaches a predetermined level, e.g., 12.1 volts. *See, e.g.*, *id.* at 24, 29; Ex. 1004, 3:60–63, 10:38–49, 10:53–59. Similarly, Gargano discloses an infusion pump having a battery life display and alarms that indicate when the remaining battery life reaches predetermined levels, e.g., thirty, fifteen, or five minutes remaining. Pet. 24, 30–33; Ex. 1005, 1:7–8, 2:21–23, 7:32–38, 20:9–15. The Petition concludes that a skilled artisan would have found it obvious to combine Layman's infusion system with Gargano's alarms and alerts, which indicate the remaining time of charge in the battery, "because it would have been '[u]se of [a] known technique to improve similar devices in the same way." Pet. 22–23, 31, 32.

On the current record, Petitioner has shown sufficiently that Layman and Gargano are directed to similar devices. Pet. 24. Furthermore, on the current record, Petitioner provides a sufficient rationale to combine the teachings of Layman and Gargano, namely, to use Gargano's known battery alarms and alerts to improve Layman's infusion pump. *Id.* at 23. We understand that such a modification would improve Layman's pump by providing an alternate indication of battery capacity, e.g., in units of time rather than in units of charge. *Id.* at 29–33. We have considered Patent Owner's opposing argument, but at this stage of the proceeding we are persuaded that a skilled artisan would have found it obvious to incorporate Gargano's alarms and alerts into Layman's system to improve the similar device.

With respect to dependent claim 2, Petitioner contends that Layman discloses sampling voltage at a sample rate of five seconds and "inherently

discloses sampling the battery current, because battery current sensor 50 provides a signal to processor 42 (inherently a digital signal) that is representative of the (inherently analog) battery current," and "[c]onverting analog signals to digital values inherently requires sampling the analog signals and an analog-to-digital converter." *Id.* at 34–35 (citing Ex. 1004, 7:6–14, 7:21–26, 11:3–5; Ex. 1008, APP0398, APP0402). Petitioner also contends that sampling voltage and current would have been obvious. *Id.*

Patent Owner argues that the Petition fails to demonstrate the inherency of claim 2 because Layman discloses two techniques for measuring current, "the second of which has nothing to do with analog to digital converters or sampling the current from the battery." Prelim. Resp. 19–20, 22–24 (citing Ex. 1004, 7:20–21, 7:28–33). Patent Owner also argues that Petitioner errs in contending that current sensor 50 provides a digital signal to processor 42. *Id.* at 24–25 (citing Ex. 1004, 12:10–11, Fig. 4D-4; Ex. 2001 ¶¶ 51–52).

On the current record, Petitioner has shown sufficiently that the subject matter of claim 2 is inherently disclosed by Layman. Patent Owner's opposing arguments and evidence are not persuasive at this stage of the proceeding for two reasons. First, Layman discloses that current may be monitored in two ways. Specifically, "the actual current leaving the battery can be directly measured by an electrical circuit" or, alternatively, stored current draws can be retrieved from memory and applied. Ex. 1004, 7:20–39. Therefore, that Layman's second measurement technique may not involve sampling (Prelim. Resp. 22–24) is immaterial because the Petition relies on the *first* technique of direct measurement. Pet. 34. Patent Owner

has not explained persuasively that "direct[] measure[ment] by an electrical circuit" does not involve sampling and an analog-to-digital converter.

Second, the Heim Declaration is insufficient, at this stage of the proceeding, to establish that the signal received by processor 42 from current sensor 50 is analog. Prelim. Resp. 24–25. Layman appears to disclose a digital processor (e.g., Toshiba four-bit CMOS micro-controller, TMP 47C446), which supports Petitioner's contention that processor 42 receives digital signals. Ex. 1004, 4:28–32; Pet. 34–35. Although Mr. Heim states that current sensor 50 includes conventional analog components, this testimony does not account for the Petition's contention that the analog current signal obtained by sensor 50 is converted into digital form before receipt by processor 42. *Compare* Ex. 2001 ¶¶ 50–52, 55, *with* Pet. 35.

With respect to dependent claim 3, Petitioner contends that "because the same digital circuit cannot process two signals simultaneously, Layman inherently teaches that the processor alternates between sampling the voltage signal and the current signal," and, "even if it were not inherent, it would at most have been an obvious design choice for the processor 42 to alternate between sampling the various inputs being fed to it." Pet. 36–37 (citing Ex. 1003 ¶ 16).

Patent Owner argues that the Petition fails to demonstrate the inherency of claim 3 because the Xu Declaration is conclusory and does not account for the independent connections between processor 42 and sensors 49, 50, which suggests that the processor receives separate signals from voltage sensor 49 and current sensor 50, rather than "alternatively sampling" those signals. Prelim. Resp. 19–23, 26–28 (citing Ex. 1004, Fig. 2; Ex. 2001 ¶¶ 53–63).

On the current record, Petitioner has shown sufficiently that the subject matter of claim 3 is inherently disclosed by Layman. Patent Owner's opposing arguments and evidence are not persuasive at this stage of the proceeding. As discussed above with respect to claim 2, Petitioner has shown sufficiently that Layman inherently discloses "means for sampling" voltage and current. The Petition's contention that a single circuit cannot process two signals simultaneously is supported by the Xu Declaration, which states that a switch is required to direct the circuit to sample the correct voltage or current signal. *See* Ex. 1003 ¶ 16; *see also* 37 C.F.R. § 42.108(c) ("[A] genuine issue of material fact created by [Patent Owner's] testimonial evidence will be viewed in the light most favorable to the petitioner solely for purposes of deciding whether to institute an *inter partes* review."). Furthermore, although Layman's Figure 2 depicts voltage sensor 49 and current sensor 50 connected independently to processor 42, this is described as a "block diagram functionally illustrating elements of a power management system," and Patent Owner has not established that this functional diagram depicts separate input signals that are provided directly to the processor, without a switch, as argued. Ex. 1004, 3:41–43.

With respect to dependent claim 4, Petitioner contends that Layman discloses an alert that occurs when battery charge is below a predetermined level. Pet. 37, 29–32 (citing Ex. 1004, 10:38–49, 10:53–59, Fig. 3).

On the current record, Petitioner has shown sufficiently that Layman and Gargano render obvious the limitations of claim 4. Specifically, Petitioner relies on Layman's disclosure of "audible and visual alarms," which occur when the battery voltage reaches predetermined levels, e.g., 12.1 volts, 11.45 volts, or 10.25 volts. *Id.*; Ex. 1004, 10:53–59.

On the current record, we are unpersuaded by Patent Owner's opposing argument that "Petitioner provides no citation to any particular disclosure in Layman." Prelim. Resp. 28–29 (emphasis omitted). In discussing claim 4, the Petition incorporates its discussion of claim 1, which provides citations to several portions of Layman. *See* Pet. 37, 29–32 (citing Ex. 1004, 10:38–49, 10:53–59, Fig. 3). The cited portions of Layman support Petitioner's contention.

Accordingly, we have reviewed the proposed ground of unpatentability and Patent Owner's arguments, and we are persuaded, at this stage of the proceeding and on the record before us, that Petitioner has established a reasonable likelihood that it will prevail on its assertion that claims 1–4 would have been obvious over Layman and Gargano.

Claims 9–12

Claims 9–12 require that the remaining time of charge is "determin[ed] from the voltage *and* the current." Ex. 1001, 16:32–33 (emphasis added), 16:40–48 (claims 10–12 depending from claim 9). Petitioner relies on Layman's disclosure of determining "run time" based on a "level of current draw," as discussed above with respect to claim 1. Pet. 27–28, 39. Petitioner also contends that Layman discloses "low-battery alerts from the voltage" and concludes "it would have been obvious in light of Layman to determine the time of charge remaining from a combination of the two calculations." *Id.* at 28. Finally, Petitioner contends that Gargano also discloses determining the remaining time of charge in a battery. *Id.* at 39 (citing Ex. 1005, 7:33–37).

We have reviewed Petitioner's contentions, but are persuaded by Patent Owner's argument that the Petition does not establish sufficiently that

either Layman or Gargano suggests determining the remaining time of charge from voltage *and* current. Prelim. Resp. 18–19. As discussed with respect to claim 1, Layman's system determines the remaining time of charge based on a level of current draw. Ex. 1004, 7:15–20. The Petition does not provide any evidence to support the conclusion that it would have been obvious to determine the remaining time of charge from voltage as well. *See* Pet. 28 (failing to identify any supporting expert testimony and failing to provide any persuasive reasoning to support the bare conclusion). Similarly, the portion of Gargano cited by Petitioner shows that current is applied through a voltage regulator to a battery management circuit, but fails to demonstrate that remaining time of charge is determined from both voltage and current. Ex. 1005, 7:33–37.

We have reviewed the proposed ground of unpatentability and Patent Owner's arguments, and we are persuaded that Petitioner has not established a reasonable likelihood that it will prevail on its assertion that claims 9–12 would have been obvious over Layman and Gargano.

6. Summary

Accordingly, we institute an *inter partes* review of claims 1–4 of the '034 patent on this ground. We do not institute an *inter partes* review of claims 9–12 on this ground.

C. Obviousness based on Layman, Gargano, and LTC1325

Petitioner contends that claims 1–4 and 9–12 of the '034 patent are unpatentable under 35 U.S.C. § 103(a) over Layman, Gargano, and LTC1325. Pet. 41–50. In particular, Petitioner explains how the references purportedly render obvious the subject matter of the challenged claims, and presents rationales to combine the references' teachings. *Id.* Petitioner also

relies upon the Xu Declaration to support its positions. *Id.* Patent Owner presents arguments similar to those discussed above, *see* Section II(B)(5), and also contends that further reliance on LTC1325 fails to render obvious certain limitations of the claims. Prelim. Resp. 15–16, 37–42.

We have reviewed the parties' contentions and evidence and, on this record, are persuaded that Petitioner has shown a reasonable likelihood of prevailing on its assertion that claims 1–4, but not claims 9–12, are obvious over Layman, Gargano, and LTC1325.

1. Overview of LTC1325 (Ex. 1007)

LTC1325 is a datasheet for the LTC1325 chip, which provides "an integrated battery management system." Ex. 1007, 1. In a "gas gauge mode, the average voltage across [a] sense resistor can be measured to determine the average battery load current." *Id.* at 9, 15. After being measured, the voltage is filtered, amplified, and converted by an analog-to-digital (ADC) converter. *Id.* at 15. A "microprocessor can then accumulate the ADC measurements and do a time average to determine the total charge leaving the battery." *Id.*

2. Discussion

Claims 1–4

The Petition cites to portions of LTC1325 and Layman with respect to certain limitations of claims 1 (a "circuit which monitors" and a "circuit . . . which determines the remaining time of charge"), 2, and 3. Pet. 45–48. The Petition cites only Layman for the limitation added by claim 4. *Id.* at 49. Although Patent Owner argues that Layman, Gargano, and LTC1325 do not

render obvious claim 1 (*see* Prelim. Resp. 38–41),[2] we have determined already, as discussed above, that Petitioner has shown sufficiently that the combination of Layman and Gargano renders obvious not only claim 1, but claims 2–4 as well. *See supra* Section II(B)(5).

Accordingly, we have reviewed the proposed ground of unpatentability and Patent Owner's arguments, and we are persuaded, at this stage of the proceeding and on the record before us, that Petitioner has established a reasonable likelihood that it will prevail on its assertion that claims 1–4 would have been obvious over Layman, Gargano, and LTC1325.

Claims 9–12

As discussed in Section II(B)(5), the Petition does not establish that either Layman or Gargano suggest determining the remaining time of charge from voltage *and* current, as required by claims 9–12. Petitioner does not rely upon LTC1325 with respect to this limitation of claim 9. *See* Pet. 49; *see also supra* n.2.

We have reviewed the proposed ground of unpatentability and Patent Owner's arguments, and we are persuaded that Petitioner has not established a reasonable likelihood that that it will prevail on its assertion that claims 9–12 would have been obvious over Layman, Gargano, and LTC1325.

[2] We agree with Patent Owner, however, that the cited portions of LTC1325 do not disclose a circuit that monitors both voltage *and* current. *See* Prelim. Resp. 39; Pet. 45; Ex. 1007, 15 (measuring voltage across a resistor to determine current). We also agree that the cited portions do not disclose sufficiently a circuit that determines the remaining time of charge in the battery. Prelim. Resp. 4–41; Pet. 46; Ex. 1007, 15 (determining "the total charge leaving the battery," not remaining time).

3. *Summary*

Accordingly, we institute an *inter partes* review of claims 1–4 of the '034 patent on this ground. We do not institute an *inter partes* review of claims 9–12 on this ground.

D. Obviousness based on Layman, Gargano, and EDN

Petitioner contends that claims 1–4 and 9–12 of the '034 patent are unpatentable under 35 U.S.C. § 103(a) over Layman, Gargano, and EDN. Pet. 51–61. In particular, Petitioner explains how the references purportedly render obvious the subject matter of the challenged claims, and presents rationales to combine the references' teachings. *Id.* Petitioner also relies upon the Xu Declaration to support its positions. *Id.* Patent Owner presents arguments similar to those discussed above, *see* Section II(B)(5), and also contends that further reliance on EDN fails to render obvious certain limitations of the claims. Prelim. Resp. 15–16, 42–46. Patent Owner also relies upon the Heim Declaration to support its positions. *Id.*

We have reviewed the parties' contentions and evidence and, on this record, are persuaded that Petitioner has shown a reasonable likelihood of prevailing on its assertion that claims 1–4, but not claims 9–12, are obvious over Layman, Gargano, and EDN.

1. *Overview of EDN (Ex. 1006)*

EDN discloses improved energy gauges for rechargeable batteries. Ex. 1006, 125. According to EDN, prior art battery gauges were unreliable because they measured only voltage. *Id.* More accurate gauges measure current and integrate it over time. *Id.* at 125–126. Such measurement requires a current-sensing device (e.g., a low-value resistor in series with the

current path and over which the voltage drop is measured), an analog-to-digital converter, and a processor. *Id.* at 126.

EDN discloses that battery information, including percentage of remaining charge, instantaneous readings of voltage or current, and low battery warnings, may be transmitted to a host by serial link. *Id.* at 128.

2. Discussion

Claims 1–4

The Petition cites EDN (in addition to Layman or Gargano) with respect to certain limitations of claim 1 ("a circuit which monitors," "a circuit . . . which determines the remaining time of charge," "a battery alarm," "a battery low alert," and "display means"). Pet. 56–59.

Although Patent owner argues that EDN does not disclose a "circuit . . . which determines the remaining time of charge," "a battery alarm," and "a battery alert," as required by claim 1, (*see* Prelim. Resp. 42–45), we have determined already that Petitioner has shown sufficiently that the combination of Layman and Gargano renders obvious claim 1, as well as claims 2–4.[3] *See supra* Section II(B)(5).

Accordingly, we have reviewed the proposed ground of unpatentability and Patent Owner's arguments, and we are persuaded, at this stage of the proceeding and on the record before us, that Petitioner has

[3] We agree with Patent Owner that EDN discloses determining the remaining *charge* left in a battery, not the remaining *time* of charge, and that the Petition fails to support the conclusion that it would have been obvious to modify this determination to reflect time. Prelim. Resp. 43–45; Pet. 56–57. The cited portion of the Xu Declaration does not explain the basis for the stated opinion and does not explain why such a modification would have been desirable. Ex. 1003 ¶ 17. We also agree that EDN's low battery warnings do not occur based on the remaining time of charge, but instead occur based on a charge level. Prelim. Resp. 45; Ex. 1006, 128.

established a reasonable likelihood that that it will prevail on its assertion that claims 1–4 would have been obvious over Layman, Gargano, and EDN.

Claims 9–12

As discussed in Section II(B)(5), the Petition does not establish that either Layman or Gargano suggest determining the remaining time of charge from voltage *and* current, as required by claims 9–12. Petitioner's reliance on EDN with respect to this limitation of claim 9 does not remedy this deficiency. *See* Pet. 56–57, 60; *see also supra* n.3; Prelim. Resp. 43–45. Specifically, EDN determines the remaining *charge* in a battery but does not determine the remaining *time* of charge. Ex. 1006, 125. The Petition's conclusion that it would have been obvious to instead determine the remaining charge (*see* Pet. 57) is conclusory and unsupported by persuasive evidence. *See* Ex. 1003 ¶ 17; *see supra* n.3.

We have reviewed the proposed ground of unpatentability and Patent Owner's arguments, and we are persuaded that Petitioner has not established a reasonable likelihood that it will prevail on its assertion that claims 9–12 would have been obvious over Layman, Gargano, and LTC1325.

3. Summary

Accordingly, we institute an *inter partes* review of claims 1–4 of the '034 patent on this ground. We do not institute an *inter partes* review of claims 9–12 on this ground.

III. CONCLUSION

For the foregoing reasons, we are persuaded that the information presented in the Petition establishes a reasonable likelihood that Petitioner would prevail in showing that claims 1–4 of the '034 patent are unpatentable. At this stage of the proceeding, the Board has not made a final

determination with respect to the patentability of the challenged claims, nor with respect to claim construction.

IV. ORDER

In consideration of the foregoing, it is

ORDERED that pursuant to 35 U.S.C. § 314(a), an *inter partes* review is hereby instituted based on the following grounds:

A. claims 1–4 of the ’034 patent as unpatentable under 35 U.S.C. § 103(a) over Layman and Gargano;

B. claims 1–4 of the ’034 patent as unpatentable under 35 U.S.C. § 103(a) over Layman, Gargano, and LTC1325; and

C. claims 1–4 of the ’034 patent as unpatentable under 35 U.S.C. § 103(a) over Layman, Gargano, and EDN;

FURTHER ORDERED that no other ground of unpatentability asserted in the Petition is authorized for this *inter partes* review; and

FURTHER ORDERED that pursuant to 35 U.S.C. § 314(c) and 37 C.F.R. § 42.4, notice is hereby given of the institution of a trial; the trial will commence on the entry date of this Decision.

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