

UNITED STATES PATENT AND TRADEMARK OFFICE

BEFORE THE PATENT TRIAL AND APPEAL BOARD

SMA SOLAR TECHNOLOGY AMERICA LLC,
Petitioner,

v.

TIGO ENERGY, INC.,
Patent Owner.

IPR2023-01184
Patent 8,823,218 B2

Before KRISTINA M. KALAN, ELIZABETH M. ROESEL, and
JULIA HEANEY, *Administrative Patent Judges*.

HEANEY, *Administrative Patent Judge*.

DECISION
Granting Institution of *Inter Partes Review*
35 U.S.C. § 314

I. INTRODUCTION

SMA Solar Technology America LLC (“Petitioner”) filed a Petition to institute an *inter partes* review of claims 1–19 of U.S. Patent No. 8,823,218 B2 (Ex. 1001, “the ’218 patent”). Paper 1 (“Petition” or “Pet.”). Tigo Energy, Inc. (“Patent Owner”) did not file a Preliminary Response.

Institution of an *inter partes* review is authorized by statute when “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.” 35 U.S.C. § 314(a) (2018). Upon consideration of the Petition and the evidence of record, we determine that Petitioner has established a reasonable likelihood that it would prevail in showing the unpatentability of at least one claim challenged in the Petition. Accordingly, we institute an *inter partes* review of all claims and all grounds asserted in the Petition.¹

A. *Related Proceedings*

The parties identify the following litigation involving the ’218 patent: *Tigo Energy Inc. v. SMA Solar Technology America LLC*, 22-915-VAC (D. Del.). Pet. 83–84; Paper 4, 2.

The parties further identify the following petitions as related matters: IPR2023-00879 against U.S. Patent No. 9,584,021, IPR2023-01133 against U.S. Patent No. 10,333,405, and IPR2023-01175 against U.S. Patent No. 9,966,848. Pet. 84; Paper 4, 2.

¹ 37 C.F.R. § 42.108(a) (“When instituting . . . review, the Board will authorize the review to proceed on all of the challenged claims and on all grounds of unpatentability asserted for each claim.” *See also SAS Inst., Inc. v. Iancu*, 138 S. Ct. 1348, 1359–60 (2018).

Petitioner also identifies as related matters the following prior *inter partes* review proceedings that are pending appeals: IPR2021-01286 against U.S. Patent No. 8,933,321 and IPR2021-01287 against U.S. Patent No. 10,256,770. Pet. 84–85.

B. The '218 patent

The '218 patent, titled “System and Method for Enhanced Watch Dog in Solar Panel Installations,” relates to a “system and method for automated shutdown, disconnect, or power reduction of solar panels” including “one or more master management units (MMUs) and one or more local management units (LMUs).” Ex. 1001, codes (54), (57). The patent relates to “the field of electrical safeguards for photovoltaic systems,” more specifically, “a system and method to monitor one or more sensors for anomalies in the operation of a photovoltaic system” and a “watchdog system to monitor communication signals between a central controller and a local controller.” *Id.* at 1:61–62, 2:51–53, 2:56–58. Figure 22, reproduced below, “illustrates an embodiment of an energy production system including a master management unit.” *Id.* at 3:39–40.

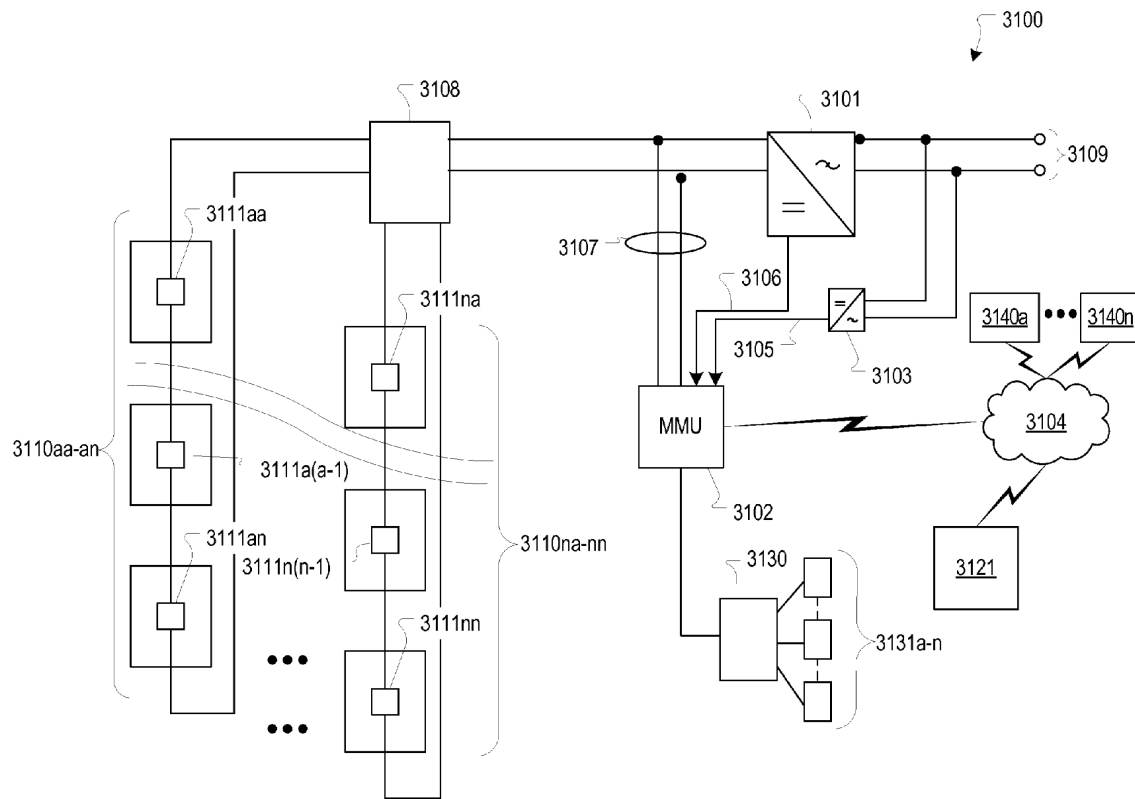


FIGURE 22

Figure 22 depicts energy production system 3100 including a plurality of solar panels 3110aa–3110nn installed in multiple strings and their respective LMUs 3111aa–3111nn. *Id.* at 18:6–8, 18:34–35. “The outputs of the strings are typically joined in combiner box 3108, which then connects to inverter 3101, which in turn connects to power grid 3109.” *Id.* at 18:8–11. Figure 22 also depicts a “master management unit (MMU) 3102 (which is an example of a local system controller).” *Id.* at 18:19–20. “MMU 3102 connects via lines 3107 to the dc wiring system and can, therefore, feed back dc current to the solar panel array, via the combiner box(es) 3108 (only one shown) to the panels and their respective LMUs.” *Id.* at 18:23–26. Figure 22 also shows MMU 3102 coupled to controller 3130 that “controls multiple sensors 3131a-n, which could be, for example, smoke sensors, fire

sensors, flow sensors, or other practical emergency sensors.” *Id.* at 18:53–55. According to the Specification, “the sensors may be connected directly to the MMU 3102 through additional ports.” *Id.* at 19:2–3.

Figure 23, reproduced below, shows an embodiment of “an exemplary process 3200 implemented by a software instance residing in MMU 3102.” *Id.* at 18:56–58.

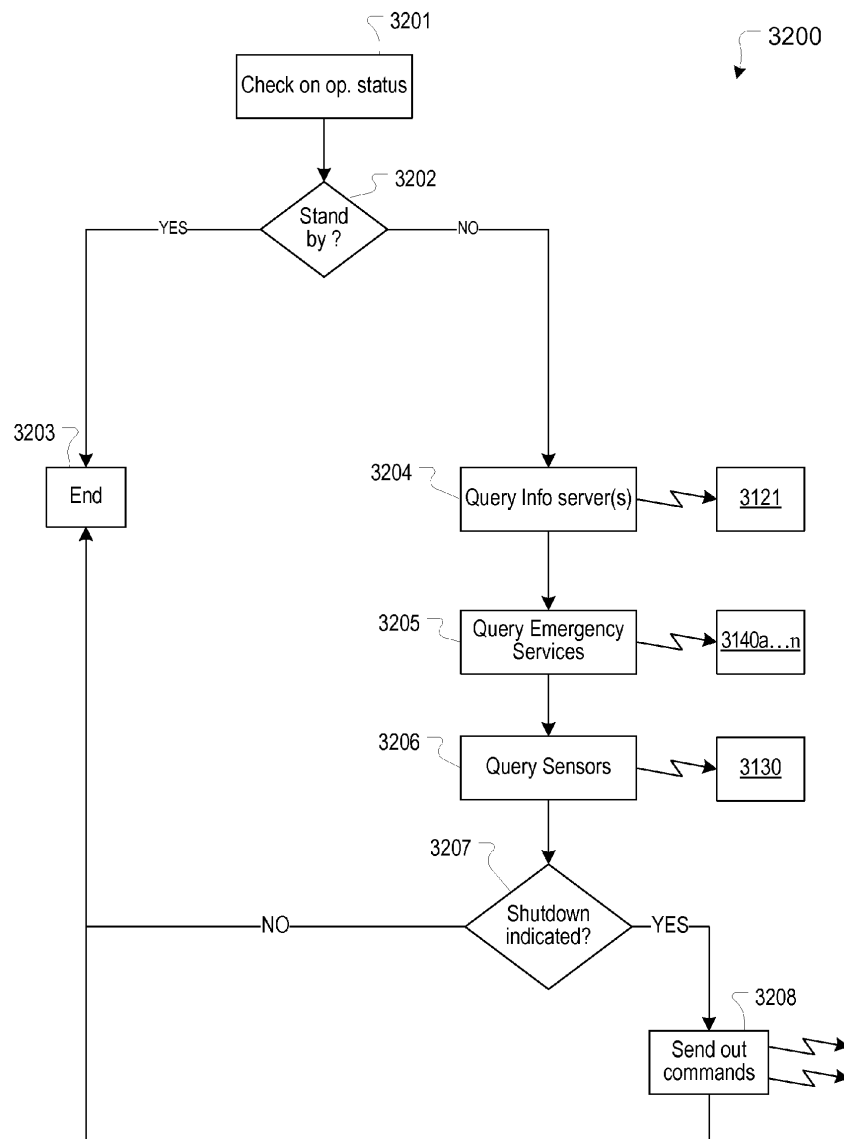


FIGURE 23

As shown in Figure 23, in operation 3206, the program “queries controller 3130 for input from sensors 3131a-n.” *Id.* at 18:67–19:2. In operation 3207, “the program checks, based on some pre-existing values and rules . . . whether any of the query results indicate a shut down anywhere in or in all the solar array.” *Id.* at 19:8–12. “If yes, the process moves to operation 3208, where the program sends out commands to the indicated units, which commands could shut down or disconnect the inverter 3101.” *Id.* at 19:13–16. “In some cases the program also instructs the LMUs to shut down” *Id.* at 19:18–19.

C. The Challenged Claims

Petitioner challenges claims 1–19 of the ’218 patent. Pet. 1. Claims 1, 15, and 18 are independent. Claims 2–14 depend, directly or indirectly, from claim 1, claims 16 and 17 depend from claim 15, and claim 19 depends from claim 18. Claim 1, reproduced below with Petitioner’s bracketing and labels, is illustrative of the subject matter of the challenged claims:

1. [1A] A system comprising:
 - [1B] a master management unit (MMU); and
 - [1C] a local management unit (LMU) in communication with the master management unit (MMU), the LMU controlling one or more solar modules;
 - [1D] wherein the MMU is connected to at least one sensor, the sensor configured to detect an anomaly; and
 - [1E] wherein upon detection of the anomaly by the sensor, the MMU sends a command to the LMU to alter the state of an associated solar module; and

[1F] wherein upon receiving a command from the MMU, the LMU alters the state of the one or more solar modules in accordance with command.

Ex. 1001, 19:39–51.

D. Asserted Grounds of Unpatentability

Petitioner asserts the following grounds of unpatentability:

Challenged Claim(s)	35 U.S.C. § ²	Reference(s)/Basis
1–4, 6–16, 18, 19	103(a)	Adest, ³ Kronberg ⁴
1–4, 6–16, 18, 19	103(a)	Adest, Kronberg, Goldack ⁵
1–4, 6–16, 18, 19	103(a)	Adest, Goldack
1–5, 15–17	103(a)	Moine, ⁶ Adest
1–4, 6–14, 18, 19	103(a)	Moine, Adest, Goldack
1–4, 6–14, 18, 19	103(a)	Moine, Goldack

Pet. 1–2. Petitioner relies on the Declaration of Randy Dunton (Ex. 1002).

II. ANALYSIS

A. Claim Construction

Petitioner states that “[n]o express constructions are necessary; the claim terms should be given their ordinary meanings.” Pet. 16 (citing Ex. 1002 ¶¶ 55–56).

² The Leahy-Smith America Invents Act (“AIA”) included revisions to 35 U.S.C. § 103 that became effective on March 16, 2013. Because the ’218 patent issued from an application filed before March 16, 2013 (Ex. 1001, code (22)), we apply the pre-AIA versions of the statute.

³ U.S. Patent No. 8,531,055 B2 to Adest et al., issued September 10, 2013 (Ex. 1005).

⁴ U.S. Patent No. 5,054,023 to Kronberg, issued October 1, 1991 (Ex. 1006).

⁵ U.S. Patent No. 6,650,031 B1 to Goldack, issued November 18, 2003 (Ex. 1007).

⁶ FR Patent Application Publication No. 2894401 A1 to Moine, published June 8, 2007 (Ex. 1008).

We determine we need not explicitly construe any claim terms at this stage of the proceeding. *See Nidec Motor Corp. v. Zhongshan Broad Ocean Motor Co.*, 868 F.3d 1013, 1017 (Fed. Cir. 2017) (“we need only construe terms ‘that are in controversy, and only to the extent necessary to resolve the controversy’” (quoting *Vivid Techs., Inc. v. Am. Sci. & Eng’g, Inc.*, 200 F.3d 795, 803 (Fed. Cir. 1999))).

B. Level of Ordinary Skill in the Art

Factors pertinent to a determination of the level of ordinary skill in the art include “(1) educational level of the inventor; (2) type of problems encountered in the art; (3) prior art solutions to those problems; (4) rapidity with which innovations are made; (5) sophistication of the technology; and (6) educational level of workers active in the field.” *Envtl. Designs, Ltd. v. Union Oil Co.*, 713 F.2d 693, 696–697 (Fed. Cir. 1983). Not all such factors may be present in every case, and one or more of these or other factors may predominate in a particular case. *Id.*

Petitioner argues a person of ordinary skill in the art at the time of the invention “would have had a bachelor’s or similar degree in electrical engineering and one year of experience designing solar power systems, power control systems, and/or power safety systems.” Pet. 8 (citing Ex. 1002 ¶¶ 24–26).

For purposes of this Decision, we adopt Petitioner’s proposal regarding the level of ordinary skill in the art. Based on our review of the ’218 patent and the asserted prior art, we determine that Petitioner’s definition of the level of ordinary skill in the art is consistent with the teachings of the ’218 patent and the asserted prior art.

C. Principles of Law

A claim is unpatentable under 35 U.S.C. § 103 if “the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains.” *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) when available, evidence such as commercial success, long felt but unsolved needs, and failure of others.⁷ *Graham v. John Deere Co.*, 383 U.S. 1, 17–18 (1966); *see KSR*, 550 U.S. at 407 (“While the sequence of these questions might be reordered in any particular case, the [Graham] factors continue to define the inquiry that controls.”).

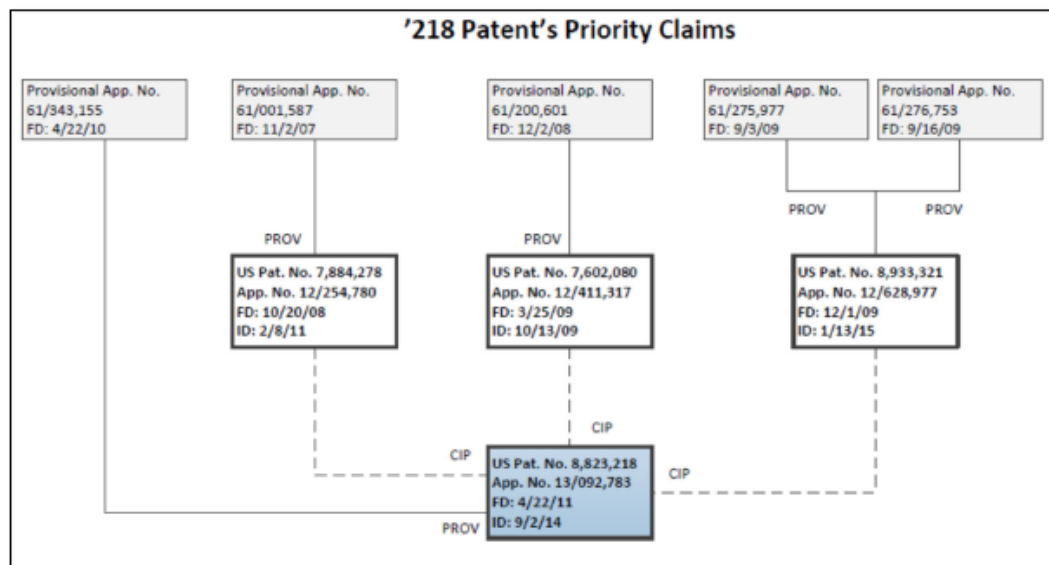
The Supreme Court made clear that we apply “an expansive and flexible approach” to the question of obviousness. *KSR*, 550 U.S. at 415. Whether a patent claiming the combination of prior art elements would have been obvious is determined by whether the improvement is more than the predictable use of prior art elements according to their established functions. *Id.* at 417. Reaching this conclusion, however, requires more than merely showing that the prior art includes separate references covering each separate limitation in a challenged claim. *Unigene Labs., Inc. v. Apotex, Inc.*, 655 F.3d 1352, 1360 (Fed. Cir. 2011). Rather, obviousness

⁷ Neither party presents any objective evidence of nonobviousness as to any of the challenged claims.

additionally requires that a person of ordinary skill at the time of the invention “would have selected and combined those prior art elements in the normal course of research and development to yield the claimed invention.” *Id.*

D. Effective Filing Date

Application No. 13/092,783 (“the ’783 application”) was filed on April 22, 2011. Ex. 1001, codes (21), (22). Petitioner provides a map of the priority claims of the ’783 application, reproduced below:



Pet. 3. The figure reproduced above is titled “’218 Patent’s Priority Claims” and provides a chart of the applications to which the ’783 application claims priority. Ex. 1001, codes (60), (63).

Petitioner contends “no challenged claim is supported by any priority application, and thus the claims are not entitled to a priority date earlier than the ’783 Application’s April 22, 2011 filing date.” Pet. 4. Petitioner presents a chart identifying the elements of independent claims 1, 15, and 18 that are allegedly unsupported by the earlier applications. We determine that

Petitioner has satisfied its initial burden to show that all of the asserted references—Adest, Kronberg, Goldack, and Moine—are prior art as to the filing date of the '783 application (April 22, 2011) as well as the filing date of the '155 provisional application (April 22, 2010). *See* Pet. 2–3 (asserting that Adest is prior art under §§ 102(e) and 102(a) and that Kronberg, Moine, and Goldack are prior art under § 102(b)); *Dynamic Drinkware, LLC v. National Graphics, Inc.*, 800 F.3d 1375, 1379–80 (Fed. Cir. 2015) (discussing burden framework in *inter partes* review).

Although Petitioner has asserted the absence of specific supporting disclosure for claims 1, 15, and 18 from the '780, '317, and '977 applications and the '155, '587, '601, '977, and '753 provisional applications, the burden to show an effective filing date (or dates) of the challenged claims prior to April 22, 2010 falls on Patent Owner here because Petitioner has asserted prior art references with earlier effective dates. *In re Magnum Oil Tools Int'l, Ltd.*, 829 F.3d 1364, 1376 (Fed. Cir. 2016) (In an *inter partes* review, “a patentee bears the burden of establishing that its claimed invention is entitled to an earlier priority date than an asserted prior art reference.”). An earlier effective filing date is not presumed because, as shown in the above figure, the '783 application is a continuation-in-part to each of the '780, '317, and '977 applications that have filing dates earlier than April 22, 2010. *See PowerOasis, Inc. v. T-Mobile USA, Inc.*, 522 F.3d 1299, 1305 (Fed. Cir. 2008) (“When neither the PTO nor the Board has previously considered priority, there is simply no reason to presume that claims in a [continuation-in-part] application are entitled to the effective filing date of an earlier filed application.”).

On this record, and in the absence of the development of any contrary argument, we find that Petitioner has demonstrated sufficiently for institution that each of the asserted references are prior art to the challenged claims. The parties will have an opportunity to present their positions on the issue of the effective filing date of the challenged claims further during trial.

E. Ground 1: Alleged Obviousness Based on Adest and Kronberg

The Petition’s heading for Ground 1 is “Adest and Kronberg render obvious claims 1–4, 6–16, and 18–19” (Pet. 16); in the “Specific Relief Requested” summary of the grounds (*id.* at 1), the Petition also identifies the combination of Adest in view of Kronberg as the basis for challenging claims 1–4, 6–16, 18, and 19 in Ground 1. The body of the Petition, however, sets forth challenges to claims 1–4, 15, 16, 18, and 19 based on Adest alone, and to claims 6–14 based on the combination of Adest and Kronberg. *Id.* at 17–47.

Petitioner’s presentation of Ground 1 in its summary and heading differs from the references Petitioner relies on in its challenge to each claim in the body of the Petition, where Petitioner presents its substantive arguments. In our analysis below, therefore, we discuss Petitioner’s challenges as they are set forth in the body of the Petition.

1. Adest (Ex. 1005)

Adest is titled “Safety Mechanisms, Wake Up and Shutdown Methods in Distributed Power Installations,” and relates to “wake-up and shutdown algorithms for . . . photovoltaic distributed power systems.” Ex. 1007, code (54), 1:26–27.

Figures 2 and 2A, reproduced below, are block diagrams respectively illustrating a distributed power harvesting circuit and a direct-current (“DC”)-to-DC converter. *Id.* at 4:39–44.

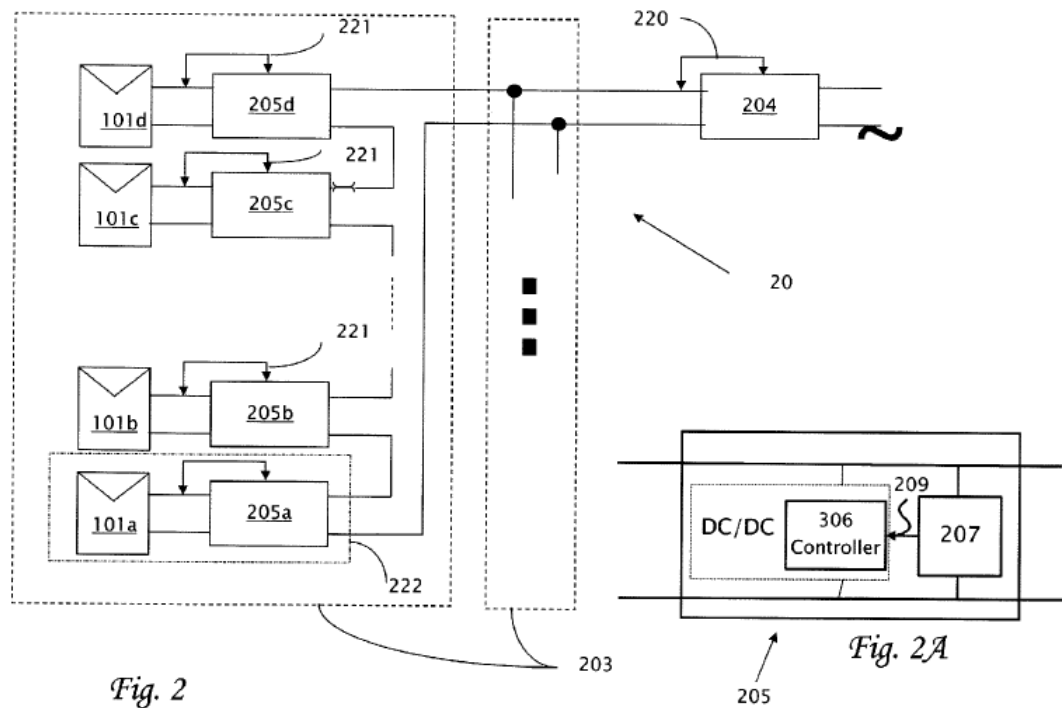


Figure 2 illustrates a distributed power harvesting circuit including power converter circuits or modules 205a–205d, and Figure 2A illustrates converter 205 in more detail. *Id.* at 5:39–40, 6:53–55. Circuit 20 enables connection of multiple distributed power sources (*e.g.*, solar panels 101a–101d) to a single power supply. *Id.* at 5:41–43. Series strings 203 of solar panels 101 are coupled to inverter 204. *Id.* at 5:44–45. In configuration 20, each solar panel 101a–101d is connected individually to a separate power converter circuit or module 205a–205d. *Id.* at 5:46–48. Each solar panel 101 together with its associated power converter circuit 205 forms a power generating element 222. *Id.* at 5:49–50. Each converter 205a–205d adapts optimally to the power characteristics of connected solar panel 101a–101d and transfers

the power efficiently from input to output of converter 205. *Id.* at 5:52–55. Further, information regarding wakeup or shut-down is conveyed from inverter 204 to converters 205. *Id.* at 6:32–34.

As shown in Figure 2A, integrated with power converter 205 is a detector/receiver 207, which is configured to receive a signal originated in inverter 204. *Id.* at 6:55–59. Controller 306 either polls a signal input 209 from receiver/detector 207 or uses signal input 209 as an interrupt so that only when detector/receiver 207 detects the signal is module 205 in a normal operating mode converting power from its input to its output. *Id.* at 6:60–64.

2. *Kronberg (Ex. 1006)*

Kronberg is titled “‘Smart’ Watchdog Safety Switch,” and relates to “a method and apparatus for monitoring the output signal of process control equipment and for shutting down process equipment in the event of control equipment failure” through the usage of a “‘smart’ watchdog safety switch.” Ex. 1006, code (54), 2:5–9, 2:30.

Figure 1 of Kronberg, reproduced below, shows the circuitry of process equipment including a “smart” watchdog safety switch. *Id.* at 2:50–51.

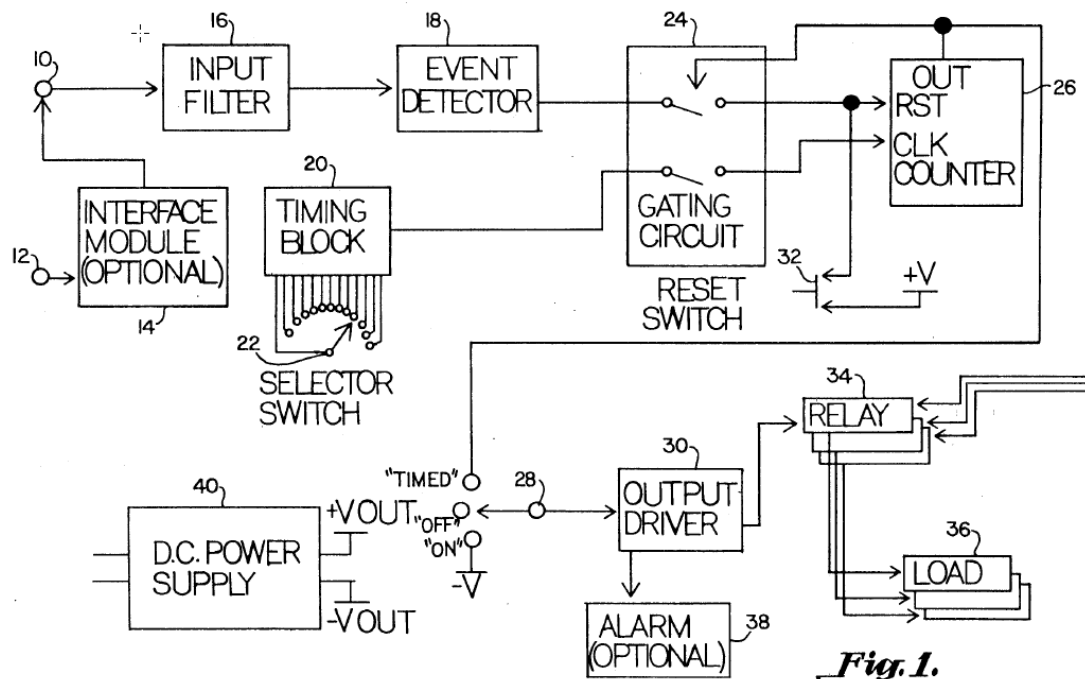


Fig. 1.

Figure 1 depicts components that make up the circuit corresponding to the process equipment. *Id.* at 3:4–12. The signal to be monitored is introduced at input 10. *Id.* at 3:13. A filtered output of input filter 16 enters event detector section 18 where valid transitions in the signal are identified and marked by a series of short “event” pulses. *Id.* at 3:23–26. In timing block 20, a train of timing pulses is continuously generated having a frequency determined by the position of selector switch 22. *Id.* at 3:27–29. The timing pulses pass to gating circuit 24, which normally allows free passage to multistage binary counter 26 incremented by each timing pulse. *Id.* at 3:29–32. If no further event pulses arrive before a specified number of timing pulses, counter 26 is incremented and the output of counter 26 changes state from a logic “0” to a logic “1.” *Id.* at 3:38–43. When logic “1” appears, gating circuit 24 blocks timing and event pulses from reaching counter 26, so that the count is frozen and the output of counter 26 remains at logic “1” until manually reset by reset switch 32. *Id.* at 3:47–51.

Through the described interactions, prompt shutdown of critical load elements 36 is implemented whenever valid transitions fail to arrive at input 10 within the period set by timing block 20 and counter 26. *Id.* at 4:5–9.

3. *Claim 1*

Petitioner contends that Adest discloses or suggests all of the elements of claim 1. Pet. 17–25 (citing Ex. 1002 ¶¶ 65–92). More particularly, Petitioner argues that Adest discloses or suggests each limitation as follows:

[1A]: “A system comprising:”

Petitioner argues that Adest discloses claim 1’s preamble. Pet. 17 (relying on Ex. 1005, Abstract, Figs. 2, 2A, 1:26–27; Ex. 1002 ¶ 64). Generally, a preamble does not limit a claim. *Allen Eng’g Corp. v. Bartell Indus., Inc.*, 299 F.3d 1336, 1346 (Fed. Cir. 2002). We need not decide whether this preamble limits claim 1 because Petitioner establishes sufficiently for purposes of institution that Adest discloses claim 1’s preamble. Pet. 17.

[1B]: “a master management unit (MMU);”

Petitioner argues, with reference to Figure 22 of the ’218 patent, that a person of ordinary skill in the art would have understood that “Adest discloses the same configuration as the ’218 patent.” Pet. 17 (citing Ex. 1001, 16:63–17:3, 18:6–19:29, Fig. 22; Ex. 1002 ¶¶ 65–71). Petitioner argues that a person of ordinary skill would have understood that Adest’s signaling mechanism 420 is an MMU because it controls operation of the solar module and sends signals to confirm normal operation. *Id.* at 19–20 (citing Ex. 1005, Figs. 4, 4A, 4B, 2:66–3:1, 3:32–34, 9:2–4, 9:34–41; Ex. 1002 ¶¶ 67–71).

[1C]: “a local management unit (LMU) in communication with the master management unit (MMU), the LMU controlling one or more solar modules;”

Petitioner argues a person of ordinary skill in the art would have understood that Adest’s power module 405 is an LMU because it includes controller 306, receives input from signaling mechanism 420, and shuts down operation of solar panel 101. Pet. 20–21 (citing Ex. 1001, 7:6–10, 16:63–17:3, 18:29–36, Fig. 12; Ex. 1005, 9:34–49; Ex. 1002 ¶¶ 73–76).

[1D]: “wherein the MMU is connected to at least one sensor, the sensor configured to detect an anomaly; and”

Petitioner argues Adest discloses this limitation because microcontroller 422 of signaling mechanism 420 is typically connected to one or more sensors, such as a Hall-effect sensor, in order to monitor the operation of inverter 104. Pet. 21 (citing Ex. 1005, 9:13–20, Fig. 4B; Ex. 1002 ¶¶ 77–81). Petitioner further argues Adest’s sensor can monitor components and detect anomalies in their operation, such as an over-voltage condition, resulting in “microcontroller 422 stopping signaling through relay 428 and/or opening one or more protective relays 424, 426” *Id.* (citing Ex. 1005, 9:22–26). Petitioner further argues a person of ordinary skill in the art would understand that the over-voltage condition detected by the sensor of Adest’s signaling mechanism 420 is an anomaly, detected in a similar manner using a similar sensor to the ’218 patent. *Id.* at 22 (citing Ex. 1001, 18:53–55, Fig. 22; Ex. 1005, 9:21–26, 11:4–9, Fig. 5B; Ex. 1002 ¶¶ 79–80).

[1E]: “wherein upon detection of the anomaly by the sensor, the MMU sends a command to the LMU to alter the state of an associated solar module; and”

Petitioner argues Adest discloses this limitation because controller 306 of power module 405 detects a signal from inverter 204 or signaling block 420 and, depending on whether the signal is received, enters into a state of normal operation or safety mode, as described in Figure 5A’s flow diagram. Pet. 22–24 (citing Ex. 1005, 9:34–49, 10:9–12, 10:40–46, 10:59–62, Figs. 4A, 5A; Ex. 1002 ¶¶ 82–87). Petitioner further argues a person of ordinary skill in the art would have understood power module 405 receives communications from signaling mechanism 420 and shuts down or disconnects a solar module, similar to how claim 1’s LMU receives communications from the MMU and alters the state of a solar module. *Id.* at 24 (citing Ex. 1002 ¶¶ 86–87).

[1F]: “wherein upon receiving a command from the MMU, the LMU alters the state of the one or more solar modules in accordance with command.”

Petitioner argues Adest discloses this limitation for the reasons discussed above for limitation [1E], and that a person of ordinary skill in the art would understand Adest performs this limitation “in the same way and using the same configuration as the ’218 patent.” Pet. 25 (citing Ex. 1002 ¶ 91).

Conclusion as to Claim 1

Having reviewed Petitioner’s undisputed evidence and argument regarding claim 1, we determine Petitioner has demonstrated a reasonable likelihood of prevailing on its obviousness challenge with respect to claim 1.

4. Dependent Claims 2–4

Claims 2–4 depend from claim 1. Petitioner, relying on Mr. Dunton’s testimony, contends that Adest discloses or suggests the additional limitations of these claims. Pet. 25–27 (citing Ex. 1002 ¶¶ 93–105).

Having reviewed the undisputed evidence and arguments in the Petition, we determine Petitioner has demonstrated a reasonable likelihood of prevailing on its obviousness challenge with respect to claims 2–4.

5. Dependent Claims 6–8

Claims 6–8 depend directly or indirectly from claim 1. We first discuss claim 6 and motivation to combine.

Petitioner contends Adest, alone or in combination with the teachings of Kronberg, discloses or suggests all of the elements of claim 6. Pet. 28–34 (citing Ex. 1002 ¶¶ 107–148). More particularly, Petitioner argues that Adest discloses the limitations of claims 6, but to the extent there is a dispute that Adest discloses the “watchdog unit” limitation [6A], a person of ordinary skill in the art would have been motivated to combine the watchdog apparatus taught by Kronberg with the solar power system taught by Adest to monitor communications between signal mechanism 420 and power modules 405 of Adest. *Id.* at 32 (citing Ex. 1002 ¶ 127). Petitioner further argues that the watchdog taught by Kronberg was a well-known technique for detecting malfunctions at the time of the invention, and would have been one of a number of solutions for detecting the absence of a periodic signal. *Id.* (citing Ex. 1002 ¶¶ 128–129; Ex. 1009, 1269). Petitioner further argues that Kronberg “suggests that its watchdog apparatus is to be used to provide ‘automatic shutdown of critical devices in case of failure,’” consistent with Adest’s objective of shutting down a power generating facility when a

transmitter fails to send a communication because of, for example, a fire or theft of a photovoltaic module. *Id.* at 32–33 (citing Ex. 1006, 1:12–15; Ex. 1005, 7:6–12).

Petitioner argues that Adest or Kronberg discloses or suggests each limitation as follows:

[6A]: “The system of claim 1, further comprising: a watchdog unit to monitor a communication in a solar array between the master management unit (MMU) and a respective local management unit (LMU);”

Petitioner argues, with reference to Figure 13 of the ’218 patent, that a person of ordinary skill in the art would have understood that Adest’s power modules 405 perform in whole or in part as a watchdog unit, because each power module includes detector/receiver 207, which receives a signal produced by signal mechanism 420, and in the event controller 306 within a power module does not detect the signal, the controller stops normal operation of power. Pet. 29–30 (citing Ex. 1005, 6:60–64, 9:33–49, 10:36–39, 10:57–62, Figs. 4, 4A; Ex. 1001, 9:34–47, 7:1–10, 16:63, 17:59–61, Fig. 13; Ex. 1002 ¶¶ 107–110). Petitioner further argues that Kronberg discloses a watchdog unit as recited in limitation [6A] because Kronberg’s Figure 1 depicts a watchdog apparatus that monitors a signal at input 10, using internal timing block 20, selector switch 22, and multistage binary counter 26 to monitor attainment of a specified count of timing pulses, in order to detect irregularity in the signal, and thus a malfunction. *Id.* at 31–32 (citing Ex. 1006, 2:30–32, 3:13–43, 3:59–61, Fig. 1; Ex. 1002 ¶¶ 119–137). Citing Mr. Dunton’s testimony about motivation to combine, Petitioner argues Kronberg’s watchdog “could be used as part of the receiver/detector 207 of Adest to detect the absence of Adest’s communications signal” by

providing the output of the watchdog to Adest's controller 306. *Id.* at 32 (citing Ex. 1002 ¶¶ 126–137).

[6B]: “wherein if the communication is interrupted between the MMU and the respective LMU, the watchdog unit sends polls to the MMU up to a specified number of times;”

Petitioner argues Adest's controller 306 is capable of polling signal input 209 from detector/receiver 207, and in the event the signal is not received, controller 306 “functions to stop normal operation of power.” Pet. 33 (citing Ex. 1005, 9:35–48). Petitioner further argues “the LMU in whole or in part performs as a watchdog unit” and a person of ordinary skill in the art would have understood Adest's controller polling “to be polling of a watchdog unit that may poll the MMU.” *Id.* at 33 (citing Ex. 1002 ¶¶ 139–140, 142). Petitioner further argues it would have been obvious to a person of ordinary skill to apply Adest's teaching of polling detector/receiver 207 to polling the MMU for a 100Hz signal. *Id.* (citing Ex. 1002 ¶ 142).

[6C]: “wherein if the watchdog unit receives no response after completing the polls, receives a command to modify operation of a solar module, or receives an inappropriate response, then the watchdog unit issues an instruction to the respective LMU to modify operation of the solar module.”

Petitioner refers to its arguments in relation to limitations [1F] and [6A] and argues it would have been obvious to a person of ordinary skill in the art to use the MMU and LMU taught by Adest to implement limitation [6C]. Pet. 34 (citing Ex. 1002 ¶¶ 144–148). Petitioner further argues Kronberg discloses a watchdog unit, with reference to its argument in relation to limitation [6A]. *Id.* (citing Ex. 1002 ¶ 148).

Having reviewed the undisputed evidence and arguments presented in the Petition, we find sufficient support for Petitioner’s contentions that Adest and Kronberg disclose or suggest all of the limitations in claim 6, and that a person of ordinary skill in the art would have combined Adest’s teaching of a solar power system with Kronberg’s implementation of a watchdog apparatus to arrive at the system of claim 6 with a reasonable expectation of success.

Accordingly, we determine that Petitioner has shown a reasonable likelihood of prevailing on its obviousness challenge to claim 6.

Relying on Mr. Dunton’s testimony, Petitioner contends that Adest or Kronberg disclose or suggest the additional limitations of claims 7 and 8. Pet. 35 (citing Ex. 1002 ¶¶ 149–154). Having reviewed this undisputed evidence and argument in the Petition, we determine Petitioner has demonstrated a reasonable likelihood of prevailing on its obviousness challenge with respect to claims 7 and 8.

6. Dependent Claims 9–14

Claim 9 depends from claim 1, and like dependent claim 6, recites a watchdog unit. Ex. 1001, 20:17–18. Claim 9 additionally recites that the watchdog unit has “means to poll the central controller to determine if an interruption of the communication is transient.” *Id.* at 20:25–26. Petitioner contends Adest discloses or suggests all of the elements of claim 9. Pet. 36–39. Petitioner does not present argument as to whether the “means to poll” limitation invokes pre-AIA 35 U.S.C. § 112 ¶ 6, and merely refers to its argument as to the “watchdog unit” limitation [6A]. *See* Pet. 39.

The limitation “means to poll the central controller to determine if an interruption of the communication is transient” presumptively invokes 35

U.S.C. § 112 ¶ 6. *Williamson v. Citrix Online, LLC*, 792 F.3d 1339, 1348 (Fed. Cir. 2015) (en banc in relevant part). Claims subject to 35 U.S.C. § 112 ¶ 6 are construed in a “two-step process,” whereby we “first identify the claimed function,” and then “determine what structure, if any, disclosed in the specification corresponds to the claimed function.” *Id.* at 1351. Accordingly, our rules require that the Petition “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). Further, “the corresponding structure for a § 112 ¶ 6 claim for a computer-implemented function is the algorithm disclosed in the specification” *Aristocrat Techs. Austl. Pty Ltd. v. Int’l Game Tech.*, 521 F.3d 1328, 1333 (Fed. Cir. 2008) (quoting *Harris Corp. v. Ericsson Inc.*, 417 F.3d 1241, 1249 (Fed. Cir. 2005)). Federal Circuit precedent requires disclosure of an algorithm in the specification for any computer-implemented function beyond “basic functions of a microprocessor.” *See EON Corp. IP Holdings, LLC v. AT&T Mobility LLC*, 785 F.3d 616, 623 (Fed. Cir. 2015) (“A microprocessor or general purpose computer lends sufficient structure only to basic functions of a microprocessor. All other computer implemented functions require disclosure of an algorithm.”).

Petitioner does not identify any portion of the ’218 patent specification that describes corresponding structure for performing the claimed function of “poll[ing] the central controller to determine if an interruption of the communication is transient.” *See* Pet. 39. Accordingly, Petitioner has not identified sufficient corresponding structure for performing the function of this presumptive means-plus-function limitation.

With regard to claims 10–14, which depend from claim 9, Petitioner does not cure the deficiency in its argument of claim 9, as discussed above. *See* Pet. 39–43.

7. Claims 15, 16, 18, and 19

Petitioner argues that Adest discloses or suggests the limitations of independent claim 15, which is a method claim reciting steps that correspond to the apparatus elements of claim 1. Pet. 44–45 (citing Ex. 1002 ¶¶ 194–199). Petitioner further argues that Adest discloses or suggests the limitations of claim 16, which depends from claim 15. *Id.* at 45 (citing Ex. 1002 ¶ 200); *see* Ex. 1001, 21:7.

Petitioner argues that Adest discloses or suggests the limitations of independent claim 18, relying on its contentions for claims 1, 9, 15, and 18. Pet. 45–47 (citing Ex. 1002 ¶¶ 201–209). Petitioner further argues that Adest discloses or suggests the limitations of claim 19, which depends from claim 18. *Id.* at 47 (citing Ex. 1002 ¶ 210).

Having reviewed the undisputed evidence and arguments presented by Petitioner, we find sufficient support for Petitioner’s contentions as to claims 15, 16, 18, and 19. Accordingly, we determine Petitioner has demonstrated a reasonable likelihood of prevailing on its obviousness challenge with respect to claims 15, 16, 18, and 19.

F. Alleged Obviousness Based on Moine and Adest

Petitioner contends the combination of Moine and Adest renders obvious claims 1–5 and 15–17. Pet. 56–67.

1. Moine (Ex. 1008)

Moine is titled “System for Controlling an Electric Power Generation Facility and Electric Power Generation Facility Implementing Such a System,” and relates to “a system for controlling an electrical power production facility” including “photovoltaic modules mounted in series and/or in parallel” to constitute “an electrical circuit,” where the electrical circuit incorporates “an electric switch capable of neutralizing the electric power provided by the output of the power terminals of [the photovoltaic] modules.” Ex. 1005, code (54), 3:11–16.

Figure 1 of Moine, reproduced below, is an illustration of a circuit in which the electrical power production facility is connected either to a domestic power supply or to an electrical load using the electricity produced. *Id.* at 4:24–26.

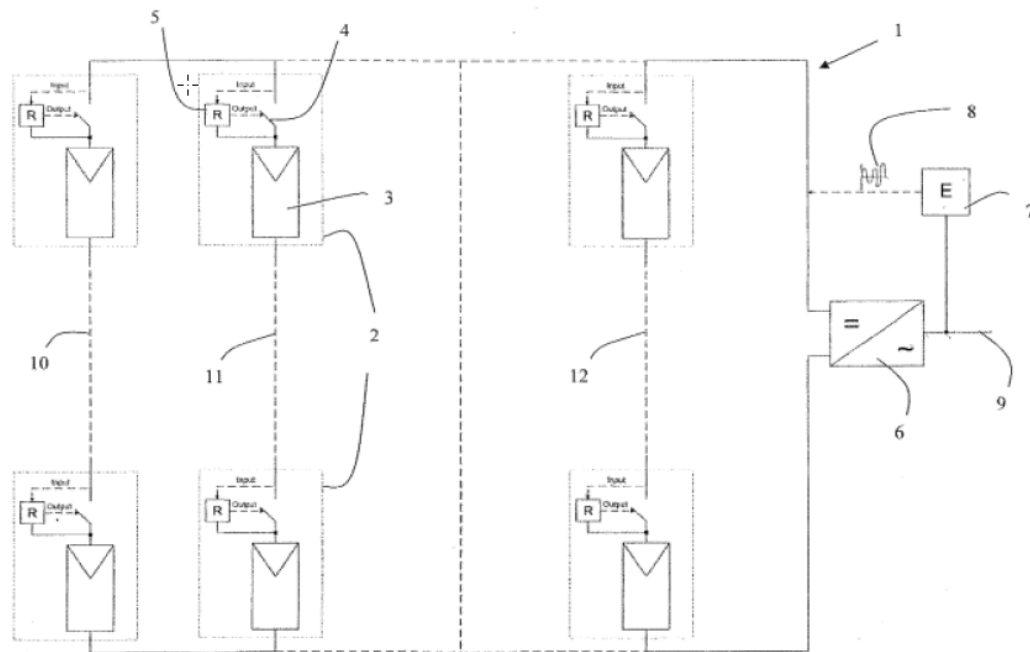


Figure 1

Figure 1 shows an electrical diagram of a photovoltaic electric power production facility. *Id.* at 4:32–33. The facility includes three series of

electric generators 2 mounted in parallel. *Id.* at 5:1–3. Each of the generators is composed of a photovoltaic power module 3 that converts solar radiation into direct electric current. *Id.* at 5:5–7. Each of the modules further includes electronic switch 4, specifically a field-effect transistor. *Id.* at 5:9–10. The operation of the transistor is controlled by receiver 5, which causes the switch to open or close according to a coded signal sent as an alternating signal through power circuit 1, where the alternating signal is generated by electrically-powered transmitter 7 upstream or downstream from inverter or converter 6. *Id.* at 5:19–21, 5:23–27. Thus, if the transmitter detects a lack of current in a domestic power supply network or failure thereof, it stops the periodic transmission of the coded alternating signal through the circuit, whose absence, identified by the receivers, causes the latter to open the corresponding switches, such that the circuit powers down. *Id.* at 6:1–5.

2. Claim 1

Petitioner argues that Moine discloses or suggests limitations [1A]–[1F] of claim 1, and to the extent Moine does not disclose limitations [1E] and [1F], Adest discloses these limitations. Pet. 56–64 (citing Ex. 1002 ¶¶ 267–306). Petitioner argues that a person of ordinary skill in the art would have been motivated to combine Moine with Adest because both taught known techniques for improving the safety of photovoltaic power systems, i.e., Moine recognizes safety issues inherent to photovoltaic power systems, and Adest is directed to safety mechanisms for waking up and shutting down equipment in distributed power systems using an operational safety mode. *Id.* at 62 (citing Ex. 1008, 2:27–33; Ex. 1005, code (54), Figs. 5, 5A). Petitioner further contends a person of ordinary skill in the art would

have had a reasonable expectation of success using Adest’s safety mechanism to implement Moine’s system because Adest utilizes a similar system to Moine, that ends normal operation upon interruption of a signal. *Id.* at 63 (citing Ex. 1002 ¶¶ 303–304).

As discussed above, we determine Petitioner has met its burden of showing a reasonable likelihood of prevailing in its challenge that claims 1–4, 6–8, 15, 16, 18, and 19 are unpatentable under Ground 1. Because there is a reasonable likelihood that Petitioner would prevail on those challenges under Ground 1, we institute an *inter partes* review as to all challenges raised in the Petition. *See* 37 C.F.R. § 42.108(a).

G. Alleged Obviousness Based on “Adest, Kronberg, and/or Goldack” and “Moine, Adest, and/or Goldack”

Petitioner contends “Adest, Kronberg, and/or Goldack” render obvious claims 1–4, 6–16, 18, and 19 (Pet. 47–55) and that “Moine, Adest, and/or Goldack” render obvious claims 1–4, 6–14, 18, and 19. *Id.* at 68–79.

As discussed above, we determine Petitioner has met its burden of showing a reasonable likelihood of prevailing in its challenge that claims 1–4, 6–8, 15, 16, 18, and 19 are unpatentable under Ground 1. Because there is a reasonable likelihood that Petitioner would prevail on those challenges under Ground 1, we institute an *inter partes* review as to all challenges raised in the Petition. *See* 37 C.F.R. § 42.108(a).

III. CONCLUSION

Based on the arguments in the Petition and the evidence of record, we determine that Petitioner has established a reasonable likelihood of prevailing in showing that at least one claim of the ’218 patent is

unpatentable. Accordingly, we institute an *inter partes* review on all the challenged claims and all of the grounds presented in the Petition. *See PGS Geophysical AS v. Iancu*, 891 F.3d 1354, 1360 (Fed. Cir. 2018) (interpreting the statute to require “a simple yes-or-no institution choice respecting a petition, embracing all challenges included in the petition”).

Our factual findings, conclusions of law, and determinations at this stage of the proceeding are preliminary, and based on the evidentiary record developed thus far. This is not a final decision as to the patentability of claims for which *inter partes* review is instituted. Our final decision will be based on the record as fully developed during trial.

IV. ORDER

In consideration of the foregoing, it is hereby:

ORDERED that an *inter partes* review of all challenged claims of the '218 patent is instituted with respect to all grounds set forth in the Petition; and

FURTHER ORDERED that pursuant to 35 U.S.C. § 314(a), *inter partes* review of the '218 patent is hereby instituted commencing on the entry date of this Decision, and 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.

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PETITIONER:

Philip W. Marsh
Jeffrey A. Miller
philip.marsh@arnoldporter.com
jmillerptab@apks.com
Arnold & Porter Kaye Scholer LLP

Thomas G. Eschweiler
Nathanial J. Smith
teschweiler@epiplaw.com
njsmith@epiplaw.com
Eschweiler & Potashnik LLC

PATENT OWNER:

Heath J. Briggs
Trenton Ward
Leif Olson
Greenberg Traurig, LLP
BriggsH@gtlaw.com
Trenton.Ward@gtlaw.com
OlsonL@gtlaw.com
TigoIPRs@gtlaw.com