

UNITED STATES PATENT AND TRADEMARK OFFICE

BEFORE THE PATENT TRIAL AND APPEAL BOARD

SUNSPEC ALLIANCE,
Petitioner,

v.

TIGO ENERGY, INC.,
Patent Owner.

IPR2021-01287
Patent 10,256,770 B2

Before KRISTINA M. KALAN, WESLEY B. DERRICK, and
JULIA HEANEY, *Administrative Patent Judges*.

KALAN, *Administrative Patent Judge*.

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

I. INTRODUCTION

SunSpec Alliance (“Petitioner”) filed a Petition requesting *inter partes* review of claims 12–16 of U.S. Patent No. 10,256,770 B2 (Ex. 1001, “the ’770 patent”). Paper 2 (“Pet.”). Tigo Energy, Inc. (“Patent Owner”) waived the filing of a Preliminary Response. Paper 6 (“Waiver”).

We have jurisdiction under 35 U.S.C. § 314, which provides that *inter partes* review may not be instituted unless “there is a reasonable likelihood that the petitioner would prevail with respect to at least 1 of the claims challenged in the petition.” Upon considering the Petition and the evidence of record, we determine that Petitioner has shown a reasonable likelihood that it would prevail in showing the unpatentability of at least one of the claims challenged in the Petition. Accordingly, we institute *inter partes* review of all claims and all grounds asserted in the Petition.¹

A. *Related Proceedings*

The parties identify IPR2021-01286, filed against related U.S. Patent No. 8,933,321 B2, as well a number of terminated federal district court litigations involving the ’770 patent and one IPR involving the ’770 patent that was terminated before institution. Pet. 73–74; Paper 3, 3.

B. *The ’770 Patent*

The ’770 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

¹ *Guidance on the Impact of SAS on AIA Trial Proceedings* (Apr. 26, 2018), <https://www.uspto.gov/patents-application-process/patent-trial-and-appeal-board/trials/guidance-impact-sas-aia-trial>; see also *SAS Inst., Inc. v. Iancu*, 138 S. Ct. 1348, 1359–60 (2018).

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 1:51–52, 2:40–42; 2:45–47. Figure 21 of the ’770 patent is reproduced below:

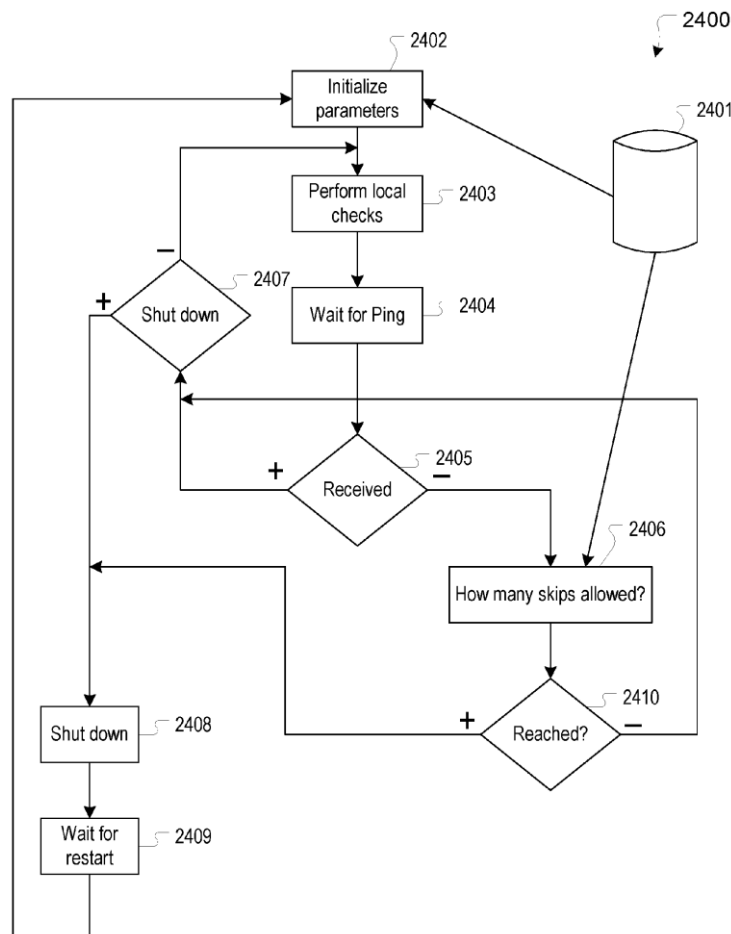


FIGURE 21

Figure 21 “illustrates an embodiment of a method of controlling the output of a solar module” and “an exemplary process 2400 for implementation of the watch dog code 2308.” *Id.* at 3:27–28, 17:49–51. In Figure 21, the

software can wait for a “ping” (2404) from a main controller, and may allow some skips (2406), but if there is “no response by the time/count the skip limit is reached,” the software will shut down the system (2408). *Id.*

at 17:49–18:18.

C. Challenged Claims

Claim 12 is the only independent claim among challenged claims 12–16 and is reproduced below:

- 12(a). A photovoltaic panel, comprising:
- (b) at least one photovoltaic cell;
- (c) a local unit configured on the photovoltaic panel, the local unit having:
- (d) a voltage regulator coupled to the at least one photovoltaic cell to receive electric power generated by the at least one photovoltaic cell; and
- (e) a controller coupled to the voltage regulator;
- (f) wherein the voltage regulator provides a power output of the photovoltaic panel using the electric power generated by the at least one photovoltaic cell;
- (g) wherein the controller communicates with a remote unit, disposed at a location remote from the local unit, to control operations of the voltage regulator;
- (h) wherein the controller detects an anomaly in heartbeat signals from the remote unit; and
- (i) wherein in response to the anomaly, the controller causes the voltage regulator to reduce the power output of the photovoltaic panel.

Ex. 1001, 20:49–67 (bracketing and lettering added).

D. The Asserted Grounds of Unpatentability

Petitioner challenges claims 12–16 of the ’770 patent on the following grounds (Pet. 3–4):²

² Petitioner argues that the Board should not exercise its discretion to deny institution. See Pet. 69–72. In light of Patent Owner’s Waiver, it is not

Ground	Reference(s)	35 U.S.C. § ³	Claims Challenged
1	Adest '055 ⁴	§ 102(e)	12–15
2	Adest '055, Kronberg ⁵	§ 103(a)	12–15
3	Adest '178, ⁶ Moine ⁷	§ 103(a)	12–16
4	Adest '178, Moine, Kronberg	§ 103(a)	14–16

Petitioner relies on the testimony of Randy R. Dunton in support of its arguments. Ex. 1002.

II. ANALYSIS

A. Claim Construction

We apply the claim construction standard articulated in *Phillips v. AWH Corp.*, 415 F.3d 1303 (Fed. Cir. 2005) (en banc). 37 C.F.R. § 42.100(b). Under *Phillips*, claim terms are afforded “their ordinary and customary meaning.” *Phillips*, 415 F.3d at 1312. The “ordinary and customary meaning of a claim term is the meaning that the term would have to a person of ordinary skill in the art in question at the time of the invention.” *Id.* at 1313. Only terms that are in controversy need to be construed, and then only to the extent necessary to resolve the controversy.

necessary to reach Petitioner’s discretionary denial arguments, and thus, we do not exercise our discretion to deny institution.

³ 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 ’770 patent has an effective filing date prior to the effective date of the applicable AIA amendments, we refer to the pre-AIA version of § 102 and § 103.

⁴ U.S. Patent No. 8,531,055 B2, issued September 10, 2013 (Ex. 1007).

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

⁶ U.S. Patent No. 9,088,178 B2, issued July 21, 2015 (Ex. 1008).

⁷ French Patent App. Pub. FR2894401A1, published June 8, 2007 (Ex. 1005).

Vivid Techs., Inc. v. Am. Sci. & Eng'g, Inc., 200 F.3d 795, 803 (Fed. Cir. 1999).

Petitioner “believes that no express constructions of the claims are necessary to assess whether the prior art reads on the challenged claims” and “has given the terms of the claims their plain and ordinary meanings.”

Pet. 15. In our view, we can determine the reasonable likelihood of proving unpatentability of the challenged claims without making an express construction of any term at this time. We determine that, for purposes of this Decision, no term requires express construction. *See, e.g., Vivid Techs.*, 200 F.3d at 803.

B. Level of Ordinary Skill in the Art

For the purpose of this Decision, we accept Petitioner’s undisputed contention that a person of ordinary skill in the art “would have had a bachelor’s degree or similar degree in electrical engineering and one year of experience in the design of solar power systems, power control systems, and/or power safety systems” or “could have also obtained similar knowledge and experience through other means.” Pet. 4. The level of ordinary skill in the art is further demonstrated by the prior art. *See Okajima v. Bourdeau*, 261 F.3d 1350, 1355 (Fed. Cir. 2001).

C. Principles of Law

To establish anticipation under 35 U.S.C. § 102, each and every element in a claim, arranged as recited in the claim, must be found in a single prior art reference. *Net MoneyIN, Inc. v. VeriSign, Inc.*, 545 F.3d 1359, 1369 (Fed. Cir. 2008). Each element of the challenged claim must be found, either expressly or inherently, in the single prior art reference. *Verdegaal Bros., Inc. v. Union Oil Co. of Cal.*, 814 F.2d 628, 631 (Fed. Cir. 1987). Although the elements must be arranged or combined in the

same way as in the claim, “the reference need not satisfy an *ipsissimis verbis* test,” i.e., identity of terminology is not required. *In re Gleave*, 560 F.3d 1331, 1334 (Fed. Cir. 2009). Thus, the dispositive question is whether one skilled in the art would have reasonably understood or inferred from a prior art reference that every claim element is disclosed in that reference. *Eli Lilly v. Los Angeles Biomedical Research Inst. at Harbor-UCLA Med. Ctr.*, 849 F.3d 1073, 1074–75 (Fed. Cir. 2017).

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) differences between the claimed subject matter and the prior art; (3) the level of ordinary skill in the art; and (4) if in evidence, objective evidence of nonobviousness. *Graham v. John Deere Co.*, 383 U.S. 1, 17–18 (1966). A decision on the ground of obviousness must include “articulated reasoning with some rational underpinning to support the legal conclusion of obviousness.” *In re Kahn*, 441 F.3d 977, 988 (Fed. Cir. 2006). The obviousness analysis “should be made explicit” and it “can be important to identify a reason that would have prompted a person of ordinary skill in the relevant field to combine the elements in the way the claimed new invention does.” *KSR*, 550 U.S. at 418.

D. Asserted Anticipation based on Adest ’055 (Ground 1)

Petitioner argues that Adest ’055 anticipates claims 12–15. Pet. 15–32.

1. *Adest '055*

Adest '055 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.

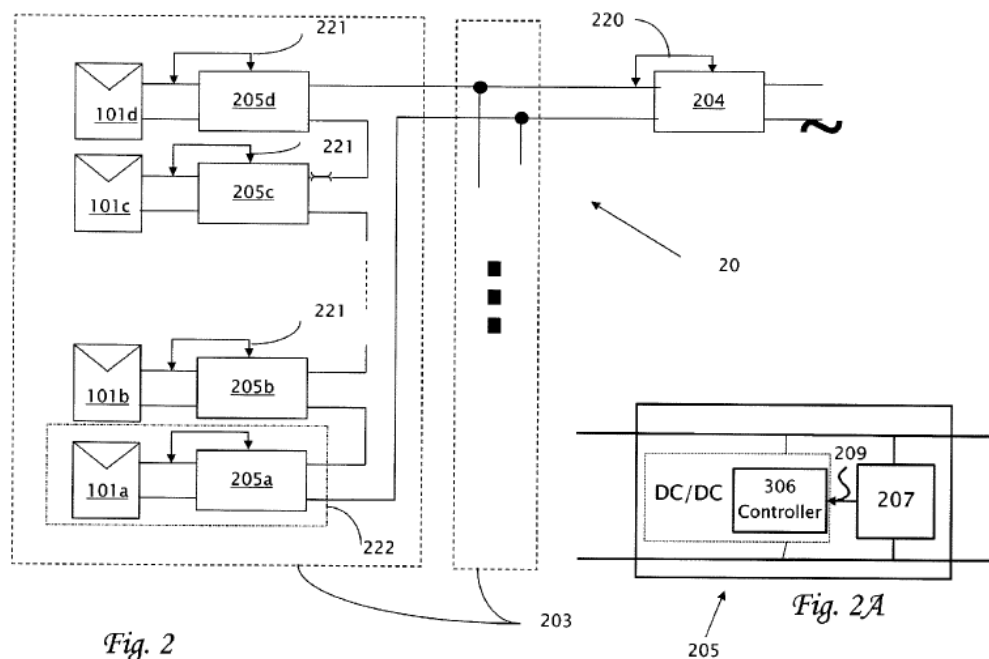


Figure 2 illustrates distributed power harvesting circuit 20 including power converter circuits or modules 205a–205d, and Figure 2A illustrates converter 205 in more detail. *Id.* at 5:39–48, 6:53–55. Circuit 20 enables connection of multiple distributed power sources (*e.g.*, solar panels 101a–101d) 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 a 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 the 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.

In Figure 2A, power converter 205 is integrated with detector/receiver 207, which is configured to receive a signal originated in inverter 204. *Id.* at 6:55–59. Controller 306 either polls 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, module 205 is in a normal operating mode converting power from its input to its output. *Id.* at 6:60–64.

2. *Petitioner's Arguments Regarding Adest '055's Disclosure*

Petitioner argues that Adest '055 discloses every element of claim 12, as set forth in more detail below:

- (a) A photovoltaic panel, comprising: (Pet. 15–16 (citing Ex. 1007, 5:39–6:8; Ex. 1002 ¶¶ 42–44));
- (b) at least one photovoltaic cell; (Pet. 16 (citing Ex. 1007, 7:29–31; Ex. 1002 ¶ 45));
- (c) a local unit configured on the photovoltaic panel, the local unit having: (Pet. 16–19 (citing Ex. 1007, 5:46–48, Figs. 2, 2A, 3, 11; Ex. 1002 ¶¶ 46–50));
- (d) a voltage regulator coupled to the at least one photovoltaic cell to receive electric power generated by the at least one photovoltaic cell; and (Pet. 19–22 (citing Ex. 1007, 7:1–16, 7:29–39, 8:1–3, Fig. 3; Ex. 1002 ¶¶ 51–56));
- (e) a controller coupled to the voltage regulator; (Pet. 22–24 (citing Ex. 1007, 7:18–22, Figs. 3, 10; Ex. 1002 ¶¶ 57–59));
- (f) wherein the voltage regulator provides a power output of the photovoltaic panel using the electric power generated by the at least

- one photovoltaic cell; (Pet. 24–25 (citing Ex. 1007, 7:31–47; Ex. 1002 ¶ 59));
- (g) wherein the controller communicates with a remote unit, disposed at a location remote from the local unit, to control operations of the voltage regulator; (Pet. 25–27 (citing Ex. 1007, 10:40–51, Figs. 2, 2A; Ex. 1002 ¶¶ 60–61));
- (h) wherein the controller detects an anomaly in heartbeat signals from the remote unit; and (Pet. 27–28 (citing Ex. 1007, 10:56–62, 6:42–43; Ex. 1002 ¶¶ 62–66));
- (i) wherein in response to the anomaly, the controller causes the voltage regulator to reduce the power output of the photovoltaic panel (Pet. 28–30 (citing Ex. 1007, 10:40–11:9, Fig. 5A; Ex. 1002 ¶¶ 67–70)).

3. *Petitioner’s Argument Regarding Adest ’055’s Prior Art Status*

Petitioner asserts that the “application for *Adest ’055* was filed on December 5, 2008 and *Adest ’055* issued on September 10, 2013,” and, thus, *Adest ’055* “qualifies as prior art at least under pre-AIA 35 U.S.C. § 102(e) with respect to the ’770 patent.” Pet. 2–3; Ex. 1007, codes (22), (45).

Adest ’055 is a continuation-in-part of an application filed December 4, 2007, and claims priority to six provisional applications with filing dates of December 6–7, 2006, March 26, 2007, May 9, 2007, and December 5, 2007.

Ex. 1007, code (60). Petitioner also asserts that the “application for *Adest ’055* was published on June 4, 2009” and “qualifies as prior art to the ’770 patent under pre-AIA 35 U.S.C. § 102(a). Pet. 3 n.2; Ex. 1007, code (65).

The ’770 patent, which was filed on September 27, 2017 (Ex. 1001, code (22)), claims priority to a number of applications filed between October 20, 2008–July 6, 2016 (*id.* at code (63)), and a number of provisional

applications filed between November 2, 2007–April 22, 2010 (*id.* at code (60)). Petitioner asserts that the “challenged claims of the ’770 patent are

not entitled to a priority date earlier than December 1, 2009, which is the filing date of the U.S. Patent No. 8,933,321 (“the ’321 patent”), which

issued from the '977 application" because "several features of the challenged claims are not supported by the disclosures of the '317 application, '780 application, '977 provisional, or '753 provisional." Pet. 5–6 (relying on Exs. 1009–1012, comparing the specification of the '770 patent with the specifications of the '317 application, '780 application, '977 provisional, and '753 provisional"). On this record, and in the absence of the development of any argument to the contrary, the evidence and comparison of the respective priority dates of Adest '055 and the '770 patent would appear to qualify Adest '055 as prior art. This argument may be further developed at trial.

4. Conclusion

We have considered the arguments and evidence presented by Petitioner, which currently stand unrebutted, and are persuaded that Petitioner has demonstrated a reasonable likelihood that independent claim 12 would have been anticipated by Adest '055. We also have considered Petitioner's arguments and evidence as to dependent claims 13–15, and are persuaded that Petitioner has demonstrated a reasonable likelihood that it would prevail as to those claims. For the foregoing reasons, Petitioner has established a reasonable likelihood of prevailing in showing the anticipation of claims 12–15 over Adest '055.

E. Asserted Obviousness based on Adest '055 and Kronberg (Ground 2)

Petitioner argues that claims 12–15 would have been obvious in view of Adest '055 and Kronberg. Pet. 32–43.

1. Kronberg

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, 30.

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

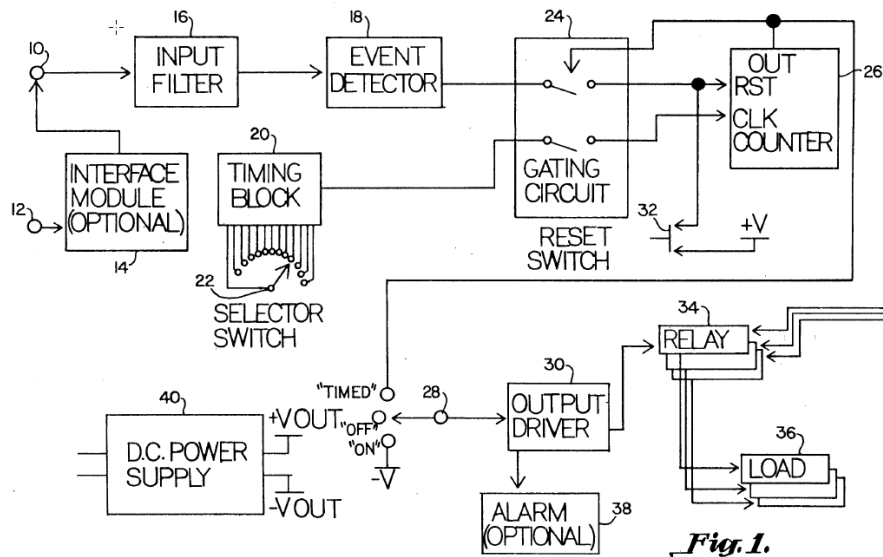


Fig. 1.

Figure 1 illustrates the 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.

2. *Petitioner’s Arguments*

Petitioner argues that Adest ’055 discloses the features of claim 12, and to the extent Adest ’055 alone does not disclose limitation 1(h) (“wherein the controller detects an anomaly in heartbeat signals from the remote unit; and”), Kronberg “discloses a watchdog apparatus that receives an input from a periodically varying output.” Pet. 32–34. One of ordinary skill in the art would have been motivated to combine the watchdog apparatus of Kronberg with the solar power system of Adest ’055, Petitioner argues, because watchdog timers, “such as the watchdog apparatus taught by *Kronberg*, were a well-known technique for detecting malfunctions at the time of the invention” and merely “one of a number of solutions for detecting the absence of a periodic signal.” *Id.* at 36–37 (citing Ex. 1002 ¶¶ 92–98). 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 the objective of Adest ’055. *Id.* at 37 (citing Ex. 1006, 1:12–15). Furthermore, Petitioner argues, one of ordinary skill in the art would have had a reasonable expectation of success in making this combination, because Kronberg is capable of detecting 100 Hz signals, like those of Adest ’055. *Id.* (citing Ex. 1006, 11:34–61).

Petitioner argues that Adest ’055 and Kronberg disclose the additional limitations of challenged dependent claims 13–15. *Id.* at 39–43. Regarding claim 13 (“wherein the anomaly includes skips of heartbeat signals”),

Petitioner relies on its claim 12 arguments and argues that the “watchdog apparatus detects whether the input signal has not been received for a ‘specified number of timing pulses.’” *Id.* at 39. Regarding claim 14 (“wherein the controller causes the voltage regulator to reduce the power output of the photovoltaic panel when the anomaly includes a predetermined number of skips of the heartbeat signals”), Petitioner relies on its claim 12 arguments and argues that receiver/detector 207 detects that the 100 Hz communication is not being received and controller 306 subsequently causes module 205 to reduce power output, and it would have been obvious to use the watchdog apparatus of *Kronberg* to implement receiver/detector 207. *Id.* at 40. Regarding claim 15 (“wherein when skips of the heartbeat signals are less than the predetermined number, the controller does not cause the voltage regulator to reduce the power output of the photovoltaic panel”), Petitioner relies on its claim 12 arguments and argues that the “counter of the watchdog timer of *Kronberg* only outputs a ‘1’ when the number of timing pulses reaches the specified number, indicating the absence of the signal.” *Id.* at 42 (citing Ex. 1006, 3:38–46).

3. Conclusion

We have considered the arguments and evidence presented by Petitioner, which currently stand unrebutted, and are persuaded that Petitioner has demonstrated a reasonable likelihood that independent claim 12 would have been obvious based on the combination of *Adest* '055 and *Kronberg*. We also have considered Petitioner’s arguments and evidence as to dependent claims 13–15, and are persuaded that Petitioner has demonstrated a reasonable likelihood that it would prevail as to those claims. For the foregoing reasons, Petitioner has established a reasonable likelihood

of prevailing in showing the obviousness of claims 12–15 over Adest '055 and Kronberg.

F. Asserted Obviousness Based on Adest '178 and Moine (Ground 3)

Petitioner argues that claims 12–16 would have been obvious in view of Adest '178 and Moine. Pet. 43–62.

1. Adest '178

Adest '178 is titled “Distributed Power Harvesting Systems Using DC Power Sources,” and is directed “generally to power production from distributed DC power sources, and more particularly to management of distributed DC power sources in series installations.” Ex. 1008, code (54), 1:34–37. Figure 3 of Adest '178 is reproduced below:

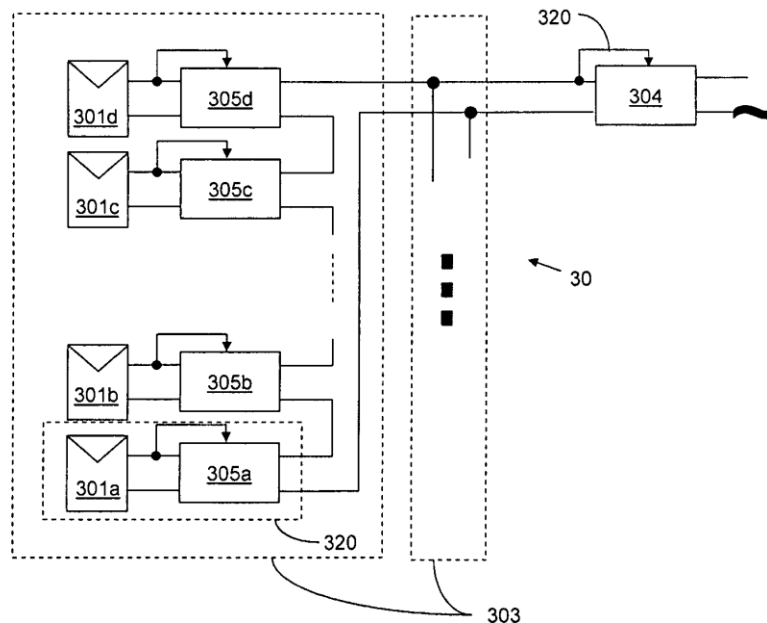


Figure 3

Figure 3 of Adest '178 shows “a distributed power harvesting system, according to aspects of the invention, using DC power sources.” *Id.* at 9:25–27. More particularly, Figure 3 shows solar panels 301a-d, each having corresponding power converter circuits 305a-d, wherein each solar panel

together with its associated power converter circuit forms a module, e.g., module 320. *Id.* at 10:66–11:2. Each converter 305a-d “adapts optimally to the power characteristics of the connected solar panel 301a-301d and transfers the power efficiently from converter input to converter output.” *Id.* at 11:2–5.

2. *Moine*

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 in order 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.

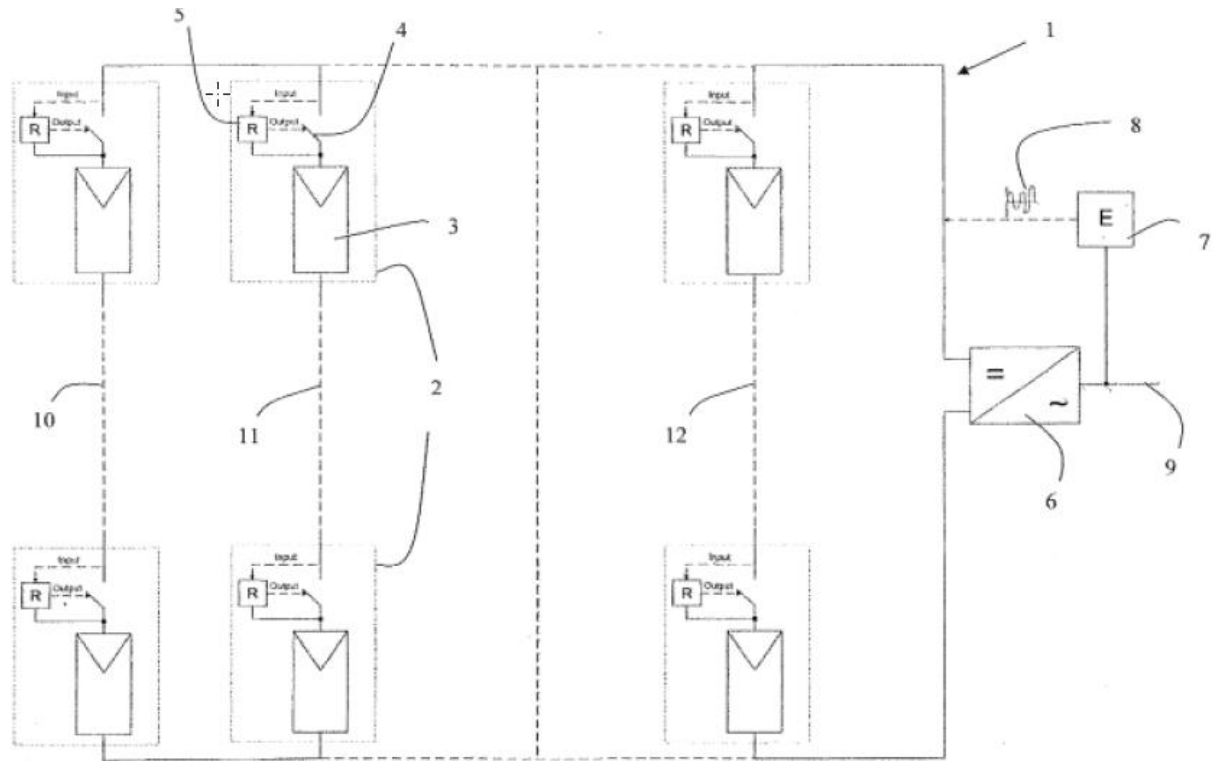


Figure 1

Figure 1 shows the 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 (2) is composed of 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) that causes switch (4) 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, 23–27. Thus, if transmitter (7) detects a lack of current in domestic power supply network (9) or failure thereof, it stops the periodic transmission of the coded alternating signal through circuit (1), whose absence, identified by

receivers (5), causes the latter to open corresponding switches (4) such that the circuit powers down. *Id.* at 6:1–5.

3. *Petitioner's Arguments Regarding the Combination of Adest '178 and Moine*

Petitioner argues that the combination of Adest '178 and Moine discloses every element of claim 12, as set forth in more detail below:

- (a) A photovoltaic panel, comprising: (Pet. 43 (citing Ex. 1008, 5:39–6:8; Ex. 1002 ¶¶ 112–115));
- (b) at least one photovoltaic cell; (Pet. 44–45 (citing Ex. 1008, 7:21–24, Fig. 11; Ex. 1002 ¶¶ 116–119));
- (c) a local unit configured on the photovoltaic panel, the local unit having: (Pet. 45–47 (citing Ex. 1008, 10:66–11:2, Figs. 3, 11; Ex. 1002 ¶¶ 120–125));
- (d) a voltage regulator coupled to the at least one photovoltaic cell to receive electric power generated by the at least one photovoltaic cell; and (Pet. 47–50 (citing Ex. 1008, 11:5–43, 7:36–39, 8:1–3, Fig. 3; Ex. 1002 ¶¶ 126–129));
- (e) a controller coupled to the voltage regulator; (Pet. 50 (citing Ex. 1008, 16:11–29, 17:8–10, 21:46–50, Fig. 6; Ex. 1002 ¶¶ 130–131));
- (f) wherein the voltage regulator provides a power output of the photovoltaic panel using the electric power generated by the at least one photovoltaic cell; (Pet. 51 (citing Ex. 1008, 16:39–52; Ex. 1002 ¶ 132));
- (g) wherein the controller communicates with a remote unit, disposed at a location remote from the local unit, to control operations of the voltage regulator; (Pet. 51–54 (citing Ex. 1005, 4:33–5:27, Fig. 1; Ex. 1008, Fig. 6; Ex. 1002 ¶¶ 133–142));
- (h) wherein the controller detects an anomaly in heartbeat signals from the remote unit; and (Pet. 55–56 (citing Ex. 1005, 6:1–5, 7:1–4; Ex. 1002 ¶¶ 143–147));
- (i) wherein in response to the anomaly, the controller causes the voltage regulator to reduce the power output of the photovoltaic panel (Pet. 56–57 (citing Ex. 1005, 6:6–10; Ex. 1008, Fig. 6; Ex. 1002 ¶¶ 148–151)).

Petitioner argues that one of ordinary skill in the art would have been motivated to combine Moine's receiver 5 and transmitter 7 with the solar

power system of Adest '178, because Moine “was a known technique for improving the safety of photovoltaic power systems” and the safety issues recognized in Moine are equally present in the system of Adest '178. *Id.* at 53 (citing Ex. 1002 ¶¶ 137–141). Petitioner further argues that one of ordinary skill in the art “would have recognized that FET 630 [of Adest '178] could perform the same function (and more) as the switch (4) of *Moine*” and, thus, “application of *Moine*’s technique to the system of Adest '178 would have yielded a predictable result of improving the safety of the system.” *Id.* at 54 (citing Ex. 1002 ¶ 141). Petitioner presents arguments directed to dependent claims 13–16, which depend directly or indirectly from claim 12, directing us to portions of Adest '178 and Moine that Petitioner asserts disclose the additional limitations of these claims, together with citations to evidence and testimony. Pet. 58–62 (citing Ex. 1002 ¶¶ 152–162).

4. *Petitioner’s Arguments Regarding Adest '178’s Prior Art Status*

Petitioner asserts that “*Adest '178* was filed on Dec. 4, 2007, claiming priority to multiple provisional applications dated December 6, 2006, December 7, 2006, March 26, 2007, and May 9, 2007, was published on June 19, 2008 (as U.S. App. Pub. No. 2008/0143188A1), and issued on July 21, 2015.” Pet 3; Ex. 1008, codes (22), (45), (60), (65). Petitioner also asserts that “*Adest '178* qualifies as prior art at least under pre-AIA 35 U.S.C. § 102(b) with respect to the '770 patent” and that to the extent Patent Owner argues “that the '770 patent is entitled to a priority date of October 20, 2008, *Adest '178* would qualify as prior art under pre-AIA 35 U.S.C. § 102(a).” Pet. 3, 3 n.3; Ex. 1020, 12 (Patent Owner stating in related litigation that for claims 12–15 of the '770 patent, it “asserts that those claims are entitled to a priority date of October 20, 2008”). On this record,

and in the absence of the development of any argument to the contrary, a comparison of the respective priority dates of Adest '178 and the '770 patent would appear to qualify Adest '178 as prior art. This argument may be further developed at trial.

5. Conclusion

We have considered the arguments and evidence presented by Petitioner, which currently stand unrebutted, and are persuaded by Petitioner's arguments and evidence supporting this ground. On this record, Petitioner has established a reasonable likelihood of prevailing in showing the obviousness of claims 12–16 in view of Adest '178 and Moine.

G. Asserted Obviousness Based on Adest '178, Moine, and Kronberg (Ground 4)

Petitioner argues that claims 14–16 would have been unpatentable as obvious under 35 U.S.C. § 103 in view of Adest '178, Moine, and Kronberg. Pet. 63–69.

Regarding claim 14 (“wherein the controller causes the voltage regulator to reduce the power output of the photovoltaic panel when the anomaly includes a predetermined number of skips of the heartbeat signals”), Petitioner relies on its Ground 3 arguments and argues that Moine does not teach explicitly how receiver (5) detects whether the “set timing” has elapsed, but Kronberg “provides a specific mechanism for detecting whether a signal has been absent for a predetermined amount of time,” namely, a “watchdog apparatus that receives an input from a periodically varying output.” Pet. 63–64 (citing Ex. 1006, Fig. 1; Ex. 1002 ¶¶ 163–174). One of ordinary skill in the art would have been motivated to combine the watchdog apparatus of Kronberg with the solar power system of Adest '178 and Moine, Petitioner argues, because watchdog timers, “such as the

watchdog taught by *Kronberg*, were a well-known technique for detecting malfunctions at the time of the invention” and were merely “one of a finite number of solutions for detecting the absence of a periodic signal.” *Id.* at 66–67 (citing Ex. 1002 ¶¶ 169–170). 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.’” *Id.* at 67 (citing Ex. 1006, 1:12–15). Furthermore, Petitioner argues, one of ordinary skill in the art would have had a reasonable expectation of success in making this combination, because through “careful selection of a counter and a timing block frequency” as taught in *Kronberg*, its watchdog “detects when a signal had not been sent in five minutes, which is the function performed by receiver (5) of *Moine*.” *Id.* at 67–68 (citing Ex. 1002 ¶¶ 171–172). Regarding claims 15 and 16, Petitioner relies on its Ground 3 arguments. *Id.* at 69.

We have considered the arguments and evidence presented by Petitioner, which currently stand unrebutted, and are persuaded by Petitioner’s arguments and evidence supporting this ground. On this record, Petitioner has established a reasonable likelihood of prevailing in showing the obviousness of claim 14–16 in view of *Adest* ’178, *Moine*, and *Kronberg*.

III. CONCLUSION

We have considered the Petition and the evidence relied upon by the Petitioner and, for the foregoing reasons, we are persuaded that Petitioner has established a reasonable likelihood of prevailing in challenging claims 12–16 of the ’770 patent. This is not a final decision as to the construction of any claim term or the patentability of claims 12–16. Our final decision will be based on the full record developed during trial.

IV. ORDER

In consideration of the foregoing, it is hereby:

ORDERED that *inter partes* review of all challenged claims of the '770 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 '770 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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