

UNITED STATES PATENT AND TRADEMARK OFFICE

BEFORE THE PATENT TRIAL AND APPEAL BOARD

VICOR CORPORATION,
Petitioner,

v.

DELTA ELECTRONICS, INC.,
Patent Owner.

IPR2024-00706
Patent 10,877,534 B2

Before THU A. DANG, NATHAN A. ENGELS, and
SHEILA F. McSHANE, *Administrative Patent Judges*.

McSHANE, *Administrative Patent Judge*.

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

I. INTRODUCTION

Vicor Corporation (“Petitioner”) filed a Petition (Paper 3, “Pet.”) requesting *inter partes* review of claims 1–8 and 10–12 (the “challenged claims”) of U.S. Patent No. 10,877,534 B2 (Ex. 1001, “the ’534 patent”). Delta Electronics, Inc. (“Patent Owner”) filed a Preliminary Response (Paper 8, “Prelim. Resp.”). Petitioner filed a “Notice Ranking and Explaining Material Differences Between Petitions” directed to the filing of this Petition as well as one in IPR2024-00706. Paper 2 (“Not.”). With our authorization, Petitioner filed a Preliminary Reply To Patent Owner’s Preliminary Response (Paper 11, “Pet. Prelim. Reply”), and Patent Owner filed a Preliminary Sur-reply (Paper 12, “PO Prelim. Sur-reply”).

The Board has authority to determine whether to institute an *inter partes* review. See 35 U.S.C. § 314; 37 C.F.R. § 42.4(a). Under 35 U.S.C. § 314(a), we may not authorize an *inter partes* review unless the information in the petition and the preliminary response “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.”

For the reasons stated below, we determine that Petitioner has not established a reasonable likelihood that it would prevail with respect to at least one claim. We therefore do not institute *inter partes* review.

II. BACKGROUND

A. Related Matters

The parties identify the following court proceeding that involves the ’534 patent: *Delta Electronics, Inc. v. Vicor Corporation*, Civil Action No. 1:23-cv-01246-JLH (D. Del.). Pet. 88; Paper 5, 2. Petitioner also identifies

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another petition that challenges certain claims of the '534 patent in IPR2024-00715 (“the -715 case”). Pet. 88.

Petitioner identifies two other *inter partes* reviews of Patent Owner’s patents: IPR2024-00704 (challenging claims of U.S. Patent No. 8,711,580, which is asserted in the same Delaware civil action as the '534 patent) and IPR2024-00705 (challenging claims of U.S. Patent No. 9,819,263, which is asserted in *Delta Electronics, Inc. v. Vicor Corporation* 6-23-cv-00726 (W.D. Tex.). Pet. 88–89.

B. The '534 patent

The '534 patent is titled “Power Supply Apparatus” and issued on December 29, 2020, from an application filed on April 12, 2018. Ex. 1001, codes (22), (45), (54). The application for the '534 patent is a divisional of Application No. 14/840,063, filed August 31, 2015 and claims priority to Chinese Application No. 201410442972, filed September 2, 2014. *Id.* at codes (30), (62), 1:5–9.

The '534 patent is directed to “address[ing] the deficiency . . . with both the power pressure and the efficiency [requirement]” as “it is suitable for use in application settings requiring a larger horizontal area; such as the demand for power supply in data processing settings like the data center.” Ex. 1001, 2:59–64. The '534 patent states that “technical solutions” are provided through “a stack structure so that the height of the power supply can be properly utilize[d]” and “when the volume is fixed, it is possible to achieve a smaller floor space; meanwhile, it retains sufficient volume to ensure a higher efficiency, thereby addressing both the high power pressure and high efficiency” requirement for a data processing apparatus with better performances. *Id.* at 3:10–23. The '534 patent provides a power supply

apparatus “which can be used in a server” and “uses the stack structure . . . so that a smaller floor space can be realized when the volume is fixed” as illustrated in Figure 1, which is reproduced below. *Id.* at 3:34–36, 4:1–7.

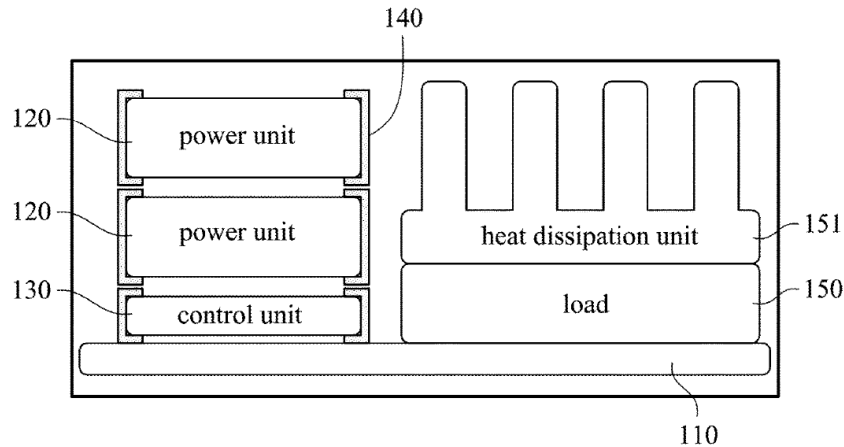


Fig. 1

Figure 1, above, is a lateral view of a power supply apparatus including main board 110, power units 120, control unit 130, and pins 140. *Ex.* 1001, 4:8–13. Main board 110 “further has a load 150 disposed thereon” and control unit 130 and power units 120 are stacked on main board 110 at a position adjacent to load 150. *Id.* at 4:13–17. Pins 140 are electrically coupled to main board 110, control unit 130, and power units 120 in a configuration that allows multiple pins 140 to be “disposed on a lateral side of each of the power unit[s] 120 and the control unit 130.” *Id.* at 4:17–21. Two power units 120 and control unit 130 are stacked with one another on main board 110 such that control unit 130 is configured to control power units 120 via pins 140 and that power units 120 supply electricity to adjacent load 150. *Id.* 4:21–27. Load 150 “is a digital processing IC [(integrated circuit)], such as a central processing unit (CPU), and the CPU has a heat dissipation unit/heat dissipation device” such as heat dissipater unit 151 disposed thereon. *Id.* at 4:27–30. Power units 120 comprise at least one

power semiconductor device, such as switch tubes, and control unit 130 comprises at least one chip having control or driving ability, such as, a control circuit. *Id.* at 4:30–36. The '534 patent discloses that “control unit 130 comprises a bearing plate, such as the printed circuit board or the lead frame, etc.” *Id.* at 15:12–14.

Figure 25, reproduced below, illustrates an exemplary pin arrangement. Ex. 1001, 3:45–46.

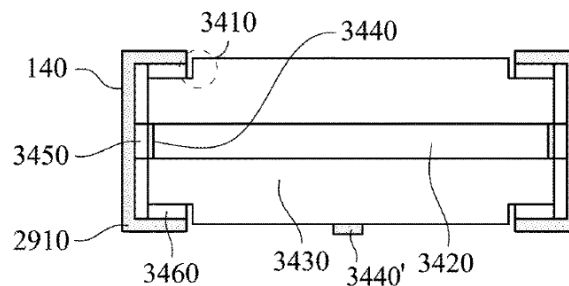


Fig. 25

Figure 25 above shows a control unit or a power unit comprising bearing plate 3420 and insulation material 3430 formed on the two opposite surfaces of bearing plate 3420. Ex. 1001, 19:34–38. “[T]he lateral side” of bearing plate 3420 “is disposed” with pads 3440 and soldering material 3450 is used to solder pads 3440 to pins 140. *Id.* at 19:38–40. At the edge of the upper and lower surfaces of insulation material 3430 are recesses 3410 which allow the two terminals of each pin 140 which have SMD [Surface Mount Device] pads 2910 to extend to recesses 3410. *Id.* at 19:40–44. Recesses 3410 have bonding material 3460 “disposed thereon for bonding with” SMD pads 2910. *Id.* at 19:44–46. The '534 patent discloses that before the assembly of pins 140, power unit 120 or control unit 130 “can be encapsulated with the packaging technique such as molding or embedding to

for [sic] a regular surface,” since insulation material 3430 has recesses 3410 “disposed thereon for fitting the installation” of pins 140. *Id.* at 19:27–32.

C. Illustrative Claim

The ’534 patent has 19 claims, 11 of which are challenged in this *inter partes* review. Of those challenged claims, claims 1 and 10 are independent. Claim 1 is illustrative of the claimed subject matter and is reproduced below, with bracketed designations added to the limitations for reference purposes.

1. [1pre] A power supply apparatus, comprising:
 - [1a] a bearing plate;
 - [1b] insulation material formed on two opposite surfaces of the bearing plate; and
 - [1c] a plurality of pins electrically connected to the bearing plate and allocated along lateral sides of the insulation material, wherein two terminals of each of the pins have two SMD pads, wherein the two SMD pads of each of the pins are extending to an upper surface and a lower surface of the insulation material, respectively.

Ex. 1001, 21:24–33.

D. Asserted Grounds of Unpatentability

Petitioner challenges the patentability of claims 1–8 and 10–12 of the ’534 patent on the following grounds:

Claims Challenged	35 U.S.C. § ¹	Reference(s)
1–8, 10–12	103	Vinciarelli-218, ² Zeng-014 ³
1–8, 10–12	102(a)(1)	Zeng-014
1–8, 10–12	103	Zeng-014, Jun ⁴
1–3, 5–8	102(a)(2)	Park ⁵
1–3, 5–8	103	Park, Jun
4, 10–12	103	Park, Zeng-014, Jun
1–8, 10–12	103	Vinciarelli-218, Park
4, 10–12	103	Vinciarelli-218, Park, Zeng-014

Pet. 1–3.

III. DISCRETIONARY DENIAL

Concurrently with this Petition, Petitioner filed a petition in IPR2024-00715 (“the -715 case”), that challenges claims 13–19 of the ’534 patent and that relies much of the same art as that asserted here. *See* IPR2024-00715, Paper 3, 1–2. Petitioner argues that the two petitions differ because: 1) the claim sets are mutually exclusive; 2) there are “significant differences” in claim scopes in the two cases; 3) different prior art combinations are needed;

¹ The Leahy-Smith America Invents Act (“AIA”), Pub. L. No. 112-29, 125 Stat. 284, 287–88 (2011), amended 35 U.S.C. §§ 102 and 103, effective March 16, 2013. Because the application of the ’534 patent is a divisional of a nonprovisional application that was filed after this date, the AIA versions of §§ 102 and 103 apply. *See* Ex. 1001, code (62).

² U.S. Patent Application Publication No. 2014/0355218 A1, published Dec. 4, 2014 (Ex. 1006).

³ U.S. Patent Application Publication No. 2009/0175014 A1, published July 9, 2009 (Ex. 1007).

⁴ U.S. Patent Application Publication No. 2005/0098874 A1, published May 12, 2005 (Ex. 1012).

⁵ U.S. Patent Application Publication No. 2015/0116891 A1, published Apr. 30, 2015 (Ex. 1009).

and 4) there are differences in priority dates of the claims in each case. Not.

3. Petitioner argues that the claims at issue here are challenged based on a September 2, 2014 priority date, whereas the claims in the -715 case are challenged based on two priority dates. *Id.* at 3–4. More specifically, Petitioner argues that the claims in the two parallel cases differ because intervening art, Vinciarelli-664, is available against the claims in the -715 case, but not against the claims challenged here. Pet. Prelim. Resp. 2.

Petitioner asserts that the claims in the -715 case require a pin covering two lateral sides of a bearing plate, and “the pin covers at least part of a lower surface, at least part of an upper surface of the insulation material and at least part of two lateral sides of the bearing plate,” and are materially different than the claims at issue in this case. Not. 4; *see also* Pet. Prelim. Reply 1.

Patent Owner contends that Petitioner has asserted an excessive number of cumulative grounds against the claims of the ’534 patent, with eight separate grounds asserted here and six separate grounds in the -715 case. Prelim. Resp. 63–64. Patent Owner argues that Petitioner has rationalized the need for different grounds and a separate petition because of a different priority date being used, but that Petitioner only identifies one piece of prior art that relies upon a different priority date in the -715 case. *Id.* at 64. Patent Owner argues that the claims in the respective case “share substantially overlapping claim scope . . . and Petitioner presented substantially the same art in both.” PO Prelim. Sur-reply 1. Patent Owner points to similarities in the claims and asserts that “[d]espite Petitioner’s contentions that fewer references allegedly disclose the ‘two lateral sides’ limitation, the 715 Petition relies on the same permutations of four

references as the 706 Petition.” *Id.* at 1–2. Patent Owner further asserts that “the primary and secondary references of Grounds 1–4 of the 715 Petition are respectively identical to Grounds 1, 4, 5, and 7 of the 706 Petition.” *Id.* at 2.

The Board has indicated that “one petition should be sufficient to challenge the claims of a patent in most situations.” Consolidated Trial Practice Guide 59 (Nov. 2019) (“CTPG”).⁶ But “the Board recognizes that there may be circumstances in which more than one petition may be necessary.” *Id.* Here, although there is overlap in the prior art asserted, there are clear differences in the limitations in the respective claim sets in each case, which requires different analysis. The issues related to a potentially different priority date for claims in the -715 case also support the need for two petitions. Additionally, under these circumstances, it is not apparent there has been a substantial benefit afforded to Petitioner by filing two petitions. Thus, we determine that Petitioner’s filing of two parallel petitions does not weigh in favor of exercising our discretion to deny institution in this particular case.

IV. ANALYSIS

A. *Level of Ordinary Skill in the Art*

According to Petitioner, a person of ordinary skill in the art “would have had (1) at least a bachelor’s degree in electrical engineering or a related field, and (2) at least two years of industry experience in power engineering” as of the date of the invention and that “[a]dditional graduate education

⁶ Available at <https://www.uspto.gov/TrialPracticeGuideConsolidated>.

could substitute for professional experience, and *vice versa*.” Pet. 3–4 (citing Ex. 1003 ¶¶ 47–48).

Patent Owner does not challenge Petitioner’s definition of a person of ordinary skill in the art and its definition appears to be similar to that of Petitioner’s definition. Prelim. Resp. 10.

For the purposes of this Decision, we adopt the assessment offered by Petitioner as it is consistent with the ’534 patent and the prior art before us. *See Okajima v. Bourdeau*, 261 F.3d 1350, 1355 (Fed. Cir. 2001).

B. Claim Construction

In this *inter partes* review, claims are construed using the same claim construction standard that would be used to construe the claims in a civil action under 35 U.S.C. § 282(b). 37 C.F.R. § 42.100(b) (2021). Under the principles set forth by our reviewing court, the “words of a claim ‘are generally given their ordinary and customary meaning,’” as would be understood by a person of ordinary skill in the art in question at the time of the invention. *Phillips v. AWH Corp.*, 415 F.3d 1303, 1312 (Fed. Cir. 2005) (en banc) (quoting *Vitronics Corp. v. Conceptronic, Inc.*, 90 F.3d 1576, 1582 (Fed. Cir. 1996)). “In determining the meaning of the disputed claim limitation, 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) (citing *Phillips*, 415 F.3d at 1312–17).

Petitioner argues that “[t]he invalidity issues raised in this Petition may be resolved without any formal claim construction.” Pet. 3. Patent Owner offers no claim construction. Prelim. Resp. 9–10.

We determine that we need not expressly construe any claim terms to resolve the parties' disputes on the current record. *See Nidec Motor Corp. v. Zhongshan Broad Ocean Motor Co.*, 868 F.3d 1013, 1017 (Fed. Cir. 2017) (“[W]e 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))).

C. Principles of Law

A claim is unpatentable under 35 U.S.C. § 102 if a prior art reference discloses each and every limitation of the claimed invention, either explicitly or inherently. *Glaxo Inc. v. Novopharm Ltd.*, 52 F.3d 1043, 1047 (Fed. Cir. 1995); *see MEHL/Biophile Int’l Corp. v. Milgraum*, 192 F.3d 1362, 1365 (Fed. Cir. 1999) (“To anticipate, a claim a prior art reference must disclose every limitation of the claimed invention . . .;” any limitation not explicitly taught must be inherently taught and would be so understood by a person experienced in the field); *In re Baxter Travenol Labs.*, 952 F.2d 388, 390 (Fed. Cir. 1991) (the dispositive question is “whether one skilled in the art would reasonably understand or infer” that a reference teaches or discloses all of the limitations of the claimed invention).

A patent 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) when in evidence, objective indicia of nonobviousness. *Graham v. John Deere Co.*, 383 U.S. 1, 17–18 (1966).

D. Obviousness of Claims 1–8 and 10–12 Over Vinciarelli-218 and Zeng-014

Petitioner contends that claims 1–8 and 10–12 would have been obvious over the combination of Vinciarelli-218 and Zeng-014. Pet. 5–35. To support its contentions, Petitioner provides explanations as to how the combination of Vinciarelli-218 and Zeng-014 discloses each claim limitation. *Id.* Petitioner also relies upon the Baker Declaration (Ex. 1003) to support its positions. Patent Owner argues that the combination of references fails to teach certain limitations of the claims and a person of ordinary skill in the art would not have been motivated to combine Vinciarelli-218 and Zeng-014. Prelim. Resp. 10–37. In support, Patent Owner relies on the Phinney Declaration (Ex. 2001).

We begin our discussion with brief summaries of Vinciarelli-218 and Zeng-014, and then address certain issues.

1. Vinciarelli-218 (Ex. 1006)

Vinciarelli-218 is a U.S. patent application publication titled “Panel-Molded Electronic Assemblies,” filed on May 11, 2012, and published on December 4, 2014. Ex. 1006, codes (12), (22), (43), (54). Vinciarelli-218 “relates to the field of encapsulating electronic assemblies and more particularly to encapsulated power converters.” *Id.* ¶ 2. A method of encapsulating a panel of electronic components is used to “reduce[] wasted printed circuit board area” in which a panel may include a plurality of components and may be cut into one or more individual pieces after

encapsulation. *Id.* at code (57). “Interconnection features [are] provided along boundaries of individual circuits” that “are exposed during the singulation process” to “provid[e] electrical connections to the components without wasting valuable PCB surface area.” *Id.* Connection adapters are used with a module of the panel “in vertical or horizontal mounting positions in connector, through-hole, surface-mount solder variations.” *Id.*

Vinciarelli-218's Figure 35 is a top exploded perspective view of a singulated module with connectors and is reproduced below. Ex. 1006 ¶ 71.

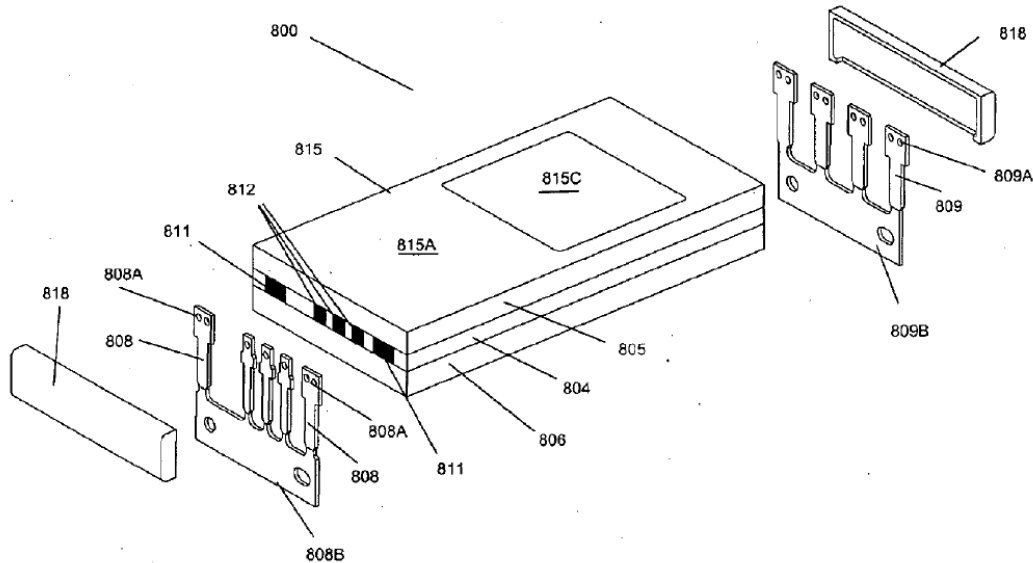


FIG. 35

Figure 35 above shows electronic module 800, for power converters, including singulated module 815 and adapters 803A, 803B.⁷ Ex. 1006 ¶ 159. Top 815A and bottom 815B surfaces of singulated module 815 are

⁷ Item 800 is not identified in the written description but is similar to electronic module 100, for example. *See* Ex. 1006 ¶ 82, Fig. 1. Adapters 803 are not labeled in Figure 35 but are labeled in Figures 33 and 34. *Id.* ¶ 159, Fig. 33–34. Item 804 is not also identified in the written description but is similar to PCB 104, for example. *See id.* ¶ 82, Fig. 1.

defined by “cured encapsulant 805, 806 in which the magnetic core surfaces 815C, 815D are exposed.” *Id.* Edges of singulated module 815 have exposed interconnects 811, 812. *Id.* ¶ 160. Adapters 803 have terminal portions 808 and interconnect portions 808A that “may be formed for example by a precision metal stamping process.” *Id.* Terminal portions 808 may be coupled to lead frame 808B “forming a unitary unit for ease of assembly.” *Id.* Interconnect portions 808A may be soldered to exposed interconnects 811, 812 and protective caps 818 “may be attached, e.g. with epoxy,” covering interconnect portions 808A, to provide structural integrity, and exposing only terminals 808. *Id.* Lead frame 808B initially connected to terminal portions 808 may be separated after terminal portions 808 are attached to exposed interconnects 811, 812. *Id.*

2. *Zeng-014 (Ex. 1007)*

Zeng-014 is a U.S. patent application publication titled “Assembled Circuit and Electronic Component,” filed on January 2, 2009, and published on July 9, 2009. Ex. 1007, codes (12), (22), (43), (54). Zeng-014’s assembled circuit comprises an inductive component, a connecting conductor, and a first electronic component, in which the connecting conductor wraps a first surface of the inductive component. *Id.* at code (57). The first electronic component stacks on the inductive component and the assembled circuit is electrically connected to a carrier via the connecting conductor. *Id.* The electronic component and the assembled circuit “can improve power density of a power supply as a whole by reducing an overall size of the electronic component.” *Id.* ¶ 3.

Figures 4A–4D show Zeng-014’s “first embodiment” and are reproduced below. Ex. 1007 ¶¶ 21–24.

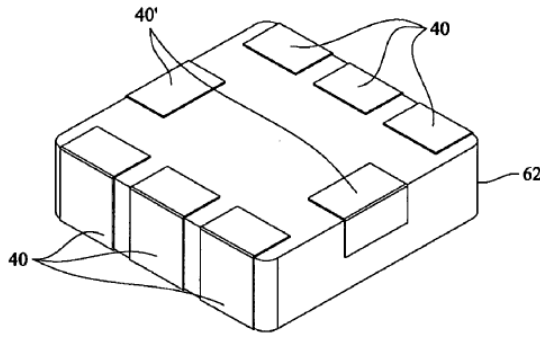


FIG. 4A

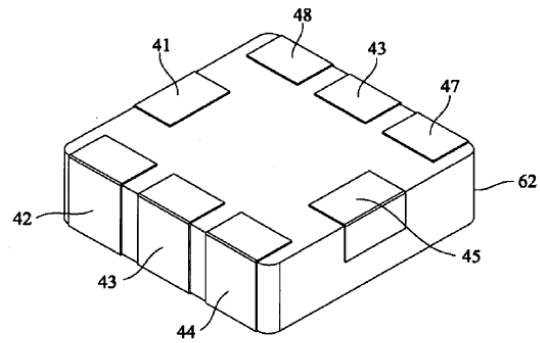


FIG. 4C

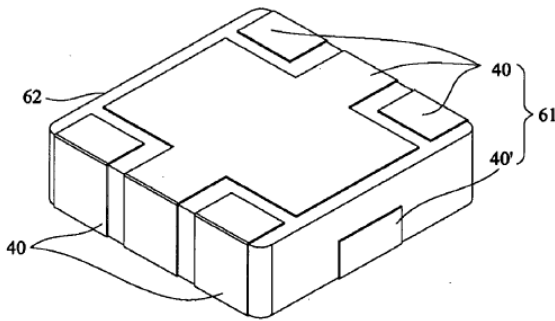


FIG. 4B

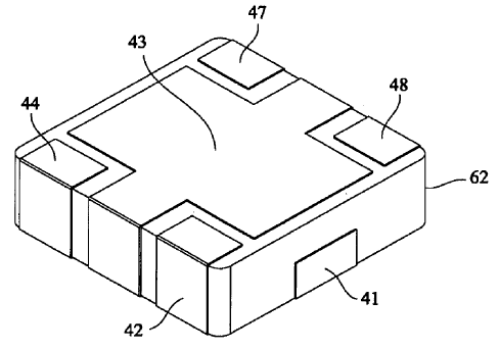


FIG. 4D

Figures 4A and 4B above show a top view and a bottom view, respectively, of a first electronic component wrapped with a first conductive layer in a DC to DC converter and Figures 4C and 4D show a top view and a bottom view, respectively, of another first electronic component wrapped with a first conductive layer in a DC to DC converter. Ex. 1007 ¶¶ 21–24. Inductive component 62 “may be a co-fired magnetic material inductor or a wire wound compressed inductor” and is wrapped with first conductive layer 61 on an outer surface thereof. *Id.* ¶¶ 57–58. As shown in Figures 4A and 4B, first conductive layer 61 has a connecting conductor 40 and pin conductor 40’ in which conductor 40 wraps a first surface of the outer surface of inductive component 62 and pin conductor 40’ wraps a second outer surface of the outer surface of inductive component 62. *Id.* ¶ 58. Inductive

component 62 “by itself is connected to external circuits” via pin conductor 40.’ *Id.* The first surface comprises several areas of the outer surface of inductive component 62, including a portion of a side surface, a portion of a top surface and a portion of a bottom surface and the second surface comprises several other areas of the outer surface of inductive component 62, including other portions of the side surface and other portions of the top surface. *Id.* Only when inductive component 62 is connected with other electronic components or a circuit board, will connecting conductor 40 as a whole be electrically connected with the pin conductor 40’ indirectly via the other electronic components or the circuit board. *Id.* ¶ 59. In another embodiment as shown in Figures 4C and 4D, pin conductor 40’ has two pins 41, 45 “disposed at two ends respectively on the outer surface” of inductive component 62. The pins 41, 45 act as pins of the inductive component 62 to electrically connect inductive component 62 “with any other components or carriers (e.g., a circuit board).” *Id.* In this embodiment, connecting conductor 40 has a number of different conductor regions 42, 43, 44, 47, 48 wrapping and attaching on the first surface of a body of inductive component 62. *Id.* Here, conductor regions 42, 43, 44 “act as power pins to connect to e.g. an FET switch,” and conductor regions 47, 48 “act as signal pins to connect to e.g. a control IC.” *Id.*

Figures 11A–11D show Zeng-014’s “third embodiment” and are reproduced below. Ex. 1007 ¶¶ 36–39.

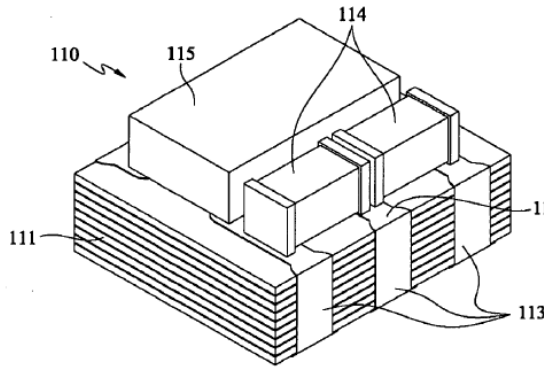


FIG. 11A

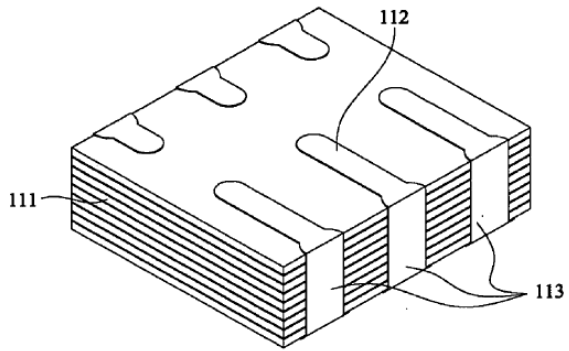


FIG. 11C

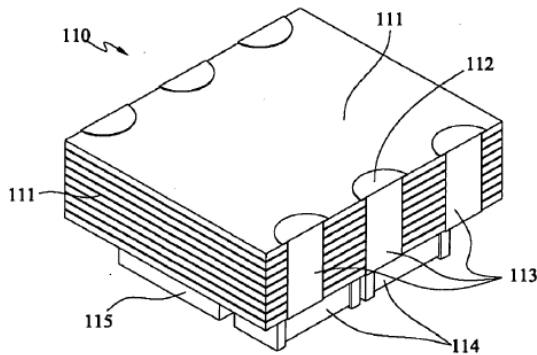


FIG. 11B

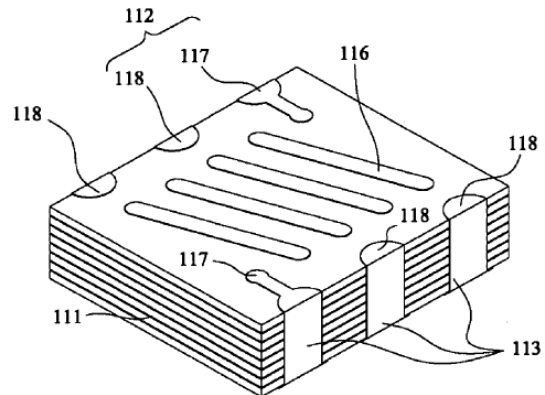


FIG. 11D

Figures 11A and 11B above show a top view and a bottom view, respectively, of a POL (point of load) DC to DC converter and Figures 11C and 11B show schematic views of a co-fired magnetic material substrate. Ex. 1007 ¶¶ 36–39. POL DC to DC converter 110 “adopts an inductor made of a co-fired magnetic material as a substrate” and has first conductive layer 112, co-fired magnetic material substrates 111, and conductor 113. *Id.* ¶ 73. POL DC to DC converter 110 further includes two capacitors 114 and IC (integrated circuit) 115. *Id.* “[T]he connecting conductor has four pins 118 and a conductor 113 connected therewith, and the pin conductor has two pins 117 and a conductor 113 connected therewith.” *Id.* First conductive layer 112 wraps a first surface of the outer surface of stacked co-fired

magnetic material substrate 111 in which “[t]he first surface comprises a top surface, a bottom surface and side surfaces.” *Id.* The side surfaces are wrapped by conductors 113 and first conductive layer 112 on the top surface provides electrical connections between capacitors 114 and IC 115. *Id.* Multiple magnetic material layers are laminated together to form inductance coil 116 and a portion of first conductive layer 113, with inductance coil 116 being electrically connected to pins 117 of the pin conductor. *Id.* ¶ 74.

Figures 12A–12C show Zeng-014’s “fourth embodiment” and are reproduced below. Ex. 1007 ¶¶ 43–45.

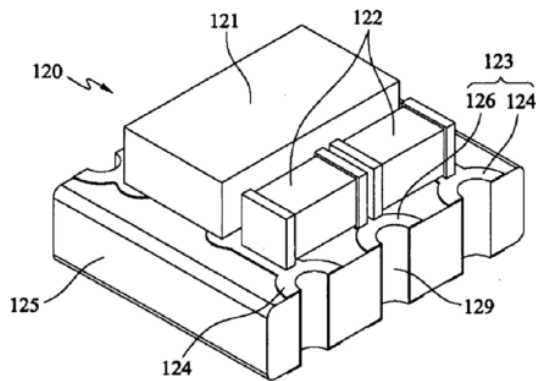


FIG. 12A

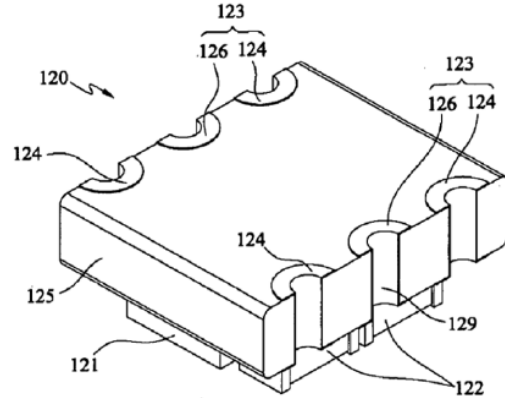


FIG. 12B

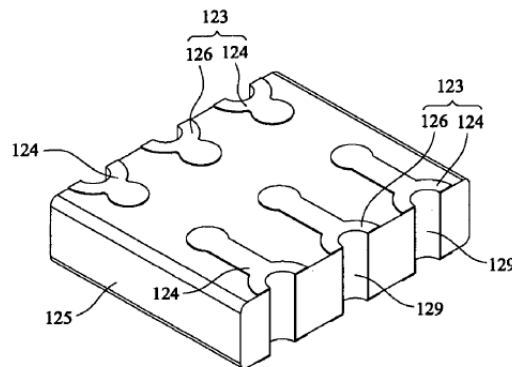


FIG. 12C

Figures 12A and 12B above show a top view and a bottom view, respectively, of a POL DC to DC converter and Figures 12C shows a

schematic view of “a substrate made of a magnetic material, a first conductive layer and a conductor.” Ex. 1007 ¶¶ 43–45. POL DC to DC 120 includes magnetic material substrate 125, first conductive layer 123, IC (integrated circuit) 121, two capacitors 122, and inductance coil 127 (shown in Figure 12D) that is compressed in magnetic material substrate 125. *Id.* ¶ 76. “[F]irst conductive layer 123 comprises a connecting conductor having four pins 124 and a pin conductor having two pins 126. Each of the pins 124 of the connecting conductor and the pins 126 of the pin conductor has a conductor 129.” *Id.* First conductive layer 123 wraps a first surface of the outer surface of magnetic material substrate 125 in which “[t]he first surface comprises a top surface, a bottom surface and side surfaces.” *Id.* ¶ 77.

3. Discussion

a. Claims 1 and 10

Petitioner asserts that one of ordinary skill in the art would have been motivated to modify Vinciarelli-218 to use Zeng-014’s pin scheme, such as those depicted in Figures 11D and 12C, which would be “electrically connected to the bearing plate (Vinciarelli-218’s PCB 804) via the edge interconnects 811, 812 on Vinciarelli-218’s PCB 804 just as pins 808/808A in Vinciarelli-218’s adapters 803 are electrically connected to PCB 804.” Pet. 17–18 (citing Ex. 1003 ¶ 73; Ex. 1006, Fig. 35, ¶ 160; Ex. 1007, Figs. 11D, 12C, ¶¶ 73–78); Ex. 1003 ¶¶ 73–78. Petitioner argues that “the pins in the combination would each have (c) two terminals (one on the top and one on the bottom of the module) and each terminal would have a surface mount device (SMD) pad (portions of pins 117 or 126 forming the conductive layers 112 or 123 on the top and bottom surfaces of substrates 111 or 125,

respectively),” like the pins 117 and 126 in Zeng-014. *Id.* at 18. We agree with Patent Owner that Petitioner’s case for obviousness is tainted by improper hindsight bias to reach the invention of claims 1 and 10. *See* Prelim. Resp. 11, 13–27.

Petitioner refers to the pins shown in several embodiments of Zeng-014 in the combination, and Petitioner specifically points to pins 117 and 126 as shown in Figure 11D and 12C. Pet. 17–19. Petitioner asserts it would have been obvious to modify Vinciarelli-218 to use Zeng-014’s pin scheme to allow Vinciarelli-218’s power converter module to be surface mounted on a PCB, enable additional electronic components to be stacked on and electrically connected with the module, and “would result in the structure claimed.” *Id.* at 16 (citing Ex. 1003 ¶¶ 70–86; Ex. 1007 ¶ 11).

An issue that is apparent is whether there is motivation, rather than improper hindsight bias, in combining the references to meet the claim limitations; that is, has rationale been established to modify Vinciarelli-218 by adding specific pins of Zeng-014 and forming the resulting configuration. There has to be evidence of “glue” to make this specific combination, and not just the use of the claim as the roadmap for making the combination of prior art. *See, e.g., InTouch Technologies, Inc. v. VGO Communications, Inc.*, 751 F.3d 1327, 1348–49 (Fed. Cir. 2014) (“Dr. Yanco’s testimony was nothing more than impermissible hindsight; she opined that all of the elements of the claims disparately existed in the prior art, but failed to provide the glue to combine these references.”).

Here, Petitioner’s alleged motivations to make the modification of using contact 43 of Zeng-014 in Vinciarelli-218 do not directly relate to a rationale to make the specific modification proposed and/or are not accurate

in view of the evidence of record. Instead, Petitioner's rationale reflects impermissible hindsight bias.

Petitioner presents several alleged reasons to modify Vinciarelli-218 with Zeng-014 pins. Pet. 21–24. Petitioner first argues that Vinciarelli-218 discloses that there are many variations for contacts to external components or circuits, such as through-hole and surface mount options. Pet. 21 (citing Ex. 1006, Figs. 15–26, 33–36). This may be true, and while Vinciarelli-218's disclosures indicate that some different types of contacts could be used, the issue remains as to why a skilled artisan would have selected pins 117 and 126 of Zeng-014 for the modification, as well as to modify Vinciarelli-218 in the manner that Petitioner proposes. Vinciarelli-218 discloses that its interconnects 811/812 (bar codes) are connected to interconnect portions 808A with terminal portions 808 extending downwards for connection. *See* Ex. 1006, Figs. 34, 35. Petitioner provides no reason why one of skill in the art would have modified this specific configuration of Vinciarelli-218 and substitute pins 117 and 126 which would require forming conductors in the encapsulated layers or drilling through those layers. Instead, it appears that the objective was to substitute Zeng-014's pins to meet the claim limitations and end up with alleged pads—argued to be the terminal end of the pins (Pet. 20–21)—that “extend to an upper surface and lower surface of [the] insulation material.”

Further, Petitioner asserts that Vinciarelli-218 states that it may be beneficial to have a module that is flush mounted or press-fit to a motherboard or to decrease the mounting area on a motherboard, and that Zeng-014's conductors would provide a flush mount without the need for a surface mount adaptor (Pet. 21–22 (citing Ex. 1003 ¶ 81; Ex. 1006 ¶¶ 124–

125, 130–133)). Vinciarelli-218, however, already teaches that its modules may be flush mounted and its invention decreases the mounting area. Ex. 1006, code (57), ¶ 125. Petitioner also asserts that Zeng-014’s conductors would provide a flush mount without the need for a surface mount adaptor. Pet. 22 (citing Ex. 1003 ¶ 81). While that may be so, there is no reason provided as to why a person of skill would specifically be led to the specific pins of Zeng-014, absent the alleged motivation to stack electronic components in Vinciarelli-218, which we discuss further below.

Petitioner argues that the use of Zeng-014’s pin conductors could be used to stack components and save board space. Pet. 20–21 (citing Ex. 1003 ¶ 80). Dr. Baker testifies a skilled artisan would have been motivated to stack external components to allow multiple power converters to be connected in parallel to increase power throughput, as disclosed in Vinciarelli-166. Ex. 1003 ¶ 80 (citing Ex. 1015, Fig. 31, 12:61–64). While stacked components have space advantages, as the ‘534 patent notes, this proposed modification would change the nature of Vinciarelli-218’s device. More specifically, Petitioner proposes to change Vinciarelli-218’s interconnects with downward terminals to a stacked module with the alleged pads at the ends of the terminals of Zeng-014’s pins, which is a fundamental change to Vinciarelli-218’s assemblies of electronic devices and would require flush mounting of Vinciarelli-218’s electronic devices to achieve electrical connection between the alleged pads at the ends of the terminals of the respective devices. Pet. 18–21. Patent Owner’s expert, Dr. Phinney, provides testimony as to why a person of ordinary skill in the art would not be motivated to directly stack the encapsulated power converters of Vinciarelli-218. Dr. Phinney’s testimony, which we afford weight to

because it is supported by the evidence of record, states that Vinciarelli-218's electronic components with the flush mounting of components in stacks, as Petitioner proposes, are not suitable because of heat dissipation issues, and refers Vinciarelli-218's restrictions where the singulated encapsulated modules require heat sink panels, such as flat heat sink surfaces, finned heat sinks, or pinned heat sinks on their surfaces for heat dissipation. Ex. 2001 ¶¶ 58–65. Moreover, Petitioner's proposed fundamental change to stacking in Vinciarelli-218 is precipitated by the clear objective of the modification, which is to substitute the pins of Zeng-014 to meet the claim limitations—and represents a case of the tail wagging the dog.

Similarly, Petitioner asserts that “Vinciarelli-218 and Zeng-014 both concern improvements to small power converters to provide increased ‘power density’ and decreas[e] the circuit board ‘area’ used by the power converters,” so “Zeng-014’s connecting/pin conductors [would be applied] to Vinciarelli-218’s module to provide contact surfaces on the top, bottom, and sides of the module, as taught by Zeng-014.” Pet. 22–23 (citing Ex. 1003 ¶¶ 83–85; Ex. 1006 ¶ 3; Ex. 1007 ¶¶ 3, 8, 10, 12, 65, 74, 75). Once more, at a basic level, Petitioner proposes a specific substitution to Vinciarelli-218, which would require a change to a stacked structure, and which is unsuitable in Vinciarelli-218 and its encapsulated modules. Accordingly, Petitioner’s proposed modification appears to be motivated by improper hindsight.

Petitioner also argues that because Zeng-014 discloses “the inductor in the figures ‘is only for purpose[s] of illustration, and in practice, the technology disclosed in [Zeng-014] may be applied to other electronic

component[s],” a person of skill “would have recognized Zeng-014’s applicability to the power converter modules of Vinciarelli-218, which are electronic components having a cuboid general form factor like the inductor component and substrates of Zeng-014.” Pet. 22 (citing Ex. 1003 ¶ 82). Zeng-014’s general statement is insufficient to support a rationale to make the specific modification to Vinciarelli-218 proposed by Petitioner.

Thus, we are not persuaded that Petitioner has provided sufficient support for its rationale to combine Vinciarelli-218 with Zeng-014.

Accordingly, on this record, Petitioner has not demonstrated a reasonable likelihood of prevailing on its assertion that claims 1 and 10 are obvious over the combination of Vinciarelli-218 and Zeng-014.

b. Claims 2–8, 11, and 12

Claims 2–8, 11, and 12 depend directly or indirectly from claim 1 or claim 10. Petitioner’s argument and evidence for these claims fail to cure the deficiencies of its showing for claims 1 and 10. Pet. 25–35.

On this record, Petitioner has not demonstrated a reasonable likelihood of prevailing on its assertion that claims 2–8, 11, and 12 are obvious over the combination of Vinciarelli-218 and Zeng-014.

E. Anticipation by Zeng-014 or Obviousness over Zeng-014, with or without Jun, of Claims 1–8 and 10–12

Petitioner contends that claims 1–8 and 10–12 are anticipated by or would be rendered obvious over Zeng-014, with or without Jun. Pet. 35–52. We begin with a brief summary of Jun and then address certain issues.

1. Jun (Ex. 1012)

Jun is a U.S. patent application publication titled “Ceramic Multilayer Substrate and Method for Manufacturing the Same,” filed on November 8,

2004, and published on May 12, 2005. Ex. 1012, codes (12), (22), (43), (54). Jun is:

Relate[d] to a ceramic multilayer substrate with an improved connection structure between internal patterns and an external terminal, and a method for manufacturing the substrate, and more particularly to a low temperature co-fired ceramic multilayer substrate formed by vertically stacking and firing a plurality of ceramic sheets or layers, in which a connection bar is vertically formed on connection areas between internal patterns and an external terminal of each ceramic sheet, thereby preventing metallic conductive layers of the internal patterns from being deformed during the formation of the external terminal and stably connecting the internal patterns to the external terminal, and a method for manufacturing the substrate.

Ex. 1012. ¶ 3. Jun's Figure 10 is a perspective view of an exemplary multilayer substrate and is reproduced below. *Id.* ¶ 34.

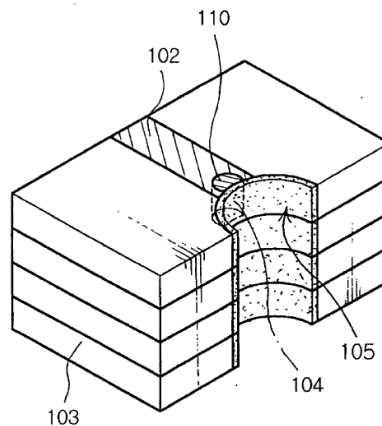


FIG. 10

Figure 10 above shows

connection bar 110 is formed in the ceramic sheets 103 by filling a via [sic] hole located between the pattern layer 102 and the notch 105. One side of the connection bar 110 contacts the notch 105 so as to be exposed at an inner surface of the notch 105, and the other side of the connection bar 110 contacts the pattern layer

102. Differently from the pattern layer 102, the connection bar 110 is vertically formed through the ceramic sheets 103, and directly contacts the external electrode 104. The external electrode 104 is formed on the inner wall of the through hole 105, and connected to the pattern layer 102 and the connection bar 110, thereby serving to exchange external signals with the internal patterns.

Ex. 1012 ¶ 43.

2. Discussion

Petitioner asserts that Zeng-014 discloses the claimed bearing plate of limitations [1a] and [10a] with its “stack of co-fired magnetic substrates 111 for converter 110 and magnetic material substrate 125 or the internal inductance coil 127 and laterally surrounding substrate layer for converter 120.” Pet. 36 (citing Ex. 1003 ¶ 125; Ex. 1007, Figs. 11A–B, 12A–B, ¶¶ 73, 76), *id.* at 48. Petitioner refers to annotated Figures 11A and 12A, reproduced below.

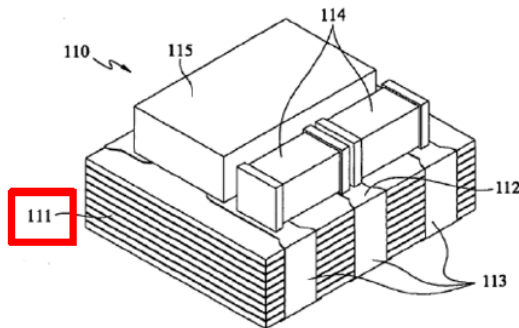


FIG. 11A

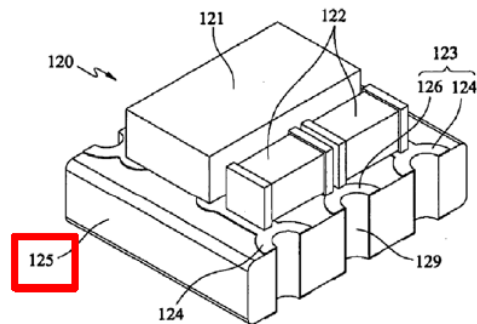


FIG. 12A

Annotated Figures 11A and 12A, above, show views of DC to DC converters of embodiments of Zeng-014. Ex. 1007 ¶¶ 36, 42. Petitioner asserts that “[e]ach magnetic substrate (or stack of magnetic substrates) is a bearing plate because it is used for mounting other elements, such as integrated circuit 115 and capacitors 114 in DC to DC converter 110, and

integrated circuit 121 and capacitors 122 in DC to DC converter 120.” Pet. 36 (citing Ex. 1003 ¶ 125).

We do not find Petitioner’s argument and evidence are sufficient to support Zeng-014’s disclosure of a bearing plate. The ’534 patent describes a “bearing plate” as “the printed circuit board (PCB) or the direct bonding circuit (DBC), etc. for bearing the components of the unit.” Ex. 1001, 8:27–29. The Specification further states that a bearing plate is used for bearing certain switch devices, as shown, for instance, in Figure 16. *Id.* at 14:29–31. Dr. Baker provides no explanation as to why a magnetic substrate, stack of magnetic substrates, or internal inductance coil 127 and laterally surrounding substrate layer for converter 120, should be considered to be a “bearing plate,” such as a printed circuit board. Ex. 1003 ¶ 125. Absent explanation, Dr. Baker’s testimony and Petitioner’s related assertions are deficient. *See* 37 C.F.R. § 42.65(a) (“Expert testimony that does not disclose the underlying facts or data on which the opinion is based is entitled to little or no weight.”). Instead, we agree with Patent Owner that magnetic substrates are internal structure of the converters. Prelim. Resp. 38. We further agree that integrated circuit 115 and capacitors 114 are not mounted on the magnet substrates and instead are mounted on conductive layers 122 and 123, which Petitioner has not identified as being part of the claimed “bearing plate.” *Id.*

Thus, we are not persuaded that Petitioner has provided sufficient support for Zeng-014’s disclosure of limitations [1a] and [10a] in its anticipation ground.

In its obviousness ground based on Zeng-014, Petitioner asserts that “[t]o the extent not implicit or immediately envisaged, it would have been

obvious to insulate the upper and lower surfaces of Zeng-014's substrate 125 to prevent short circuits between pins 124 and 126 disposed on the surface of the substrate." Pet. 50.

For dependent claim 2, which requires "first pads disposed on a lateral side of the bearing plate," Petitioner contends that a person of skill "would have understood that Zeng-014's DC to DC converters 110 and 120 have (or at the very least it would have been obvious to provide) pads attached to the interior side of the lateral pins to electrically connect the pins to the internal components." Pet. 50. Petitioner also asserts that "it would have been obvious in view of Zeng-014 alone, and, if necessary, Jun to include such pads on lateral sides of the bearing plate." *Id.* at 51.

Petitioner's additional arguments for obviousness fail to address the deficiencies noted in the anticipation ground of Park. Accordingly, we find that Petitioner's showing is deficient for the reasons discussed above in the Park anticipation ground.

On this record, Petitioner has not demonstrated a reasonable likelihood of prevailing on its assertion that claims 1–8 and 10–12 are anticipated by Zeng-014 or would be rendered obvious over Zeng-014, with or without Jun.

F. Anticipation or Obviousness of Claims 1–3 and 5–8 By Park, with or without Jun

Petitioner contends that claims 1–3 and 5–8 are anticipated by or would be rendered obvious by Park, with or without Jun. Pet. 52–67. To support its contentions, Petitioner provides explanations as to how Park discloses or teaches each claim limitation, with or without Jun. *Id.* Patent

Owner argues that Park fails to disclose several elements of the claims.
Prelim. Resp. 49–56.

We begin our discussion with a brief summary of Park, and then address some of the evidence and arguments presented.

1. *Park (Ex. 1009)*

Park is a U.S. patent application publication titled “Composite Electronic Component and Board for Mounting the Same,” filed on April 22, 2014, and published on April 30, 2015. Ex. 1009, codes (12), (22), (43), (54). Park discloses that “the provision of various functions in electronic devices leads to an increase in the number of DC/DC convertors provided in a PMIC [(power management integrated circuit)] and the number of passive elements required to be provided in a power input terminal and a power output terminal of a PMIC as well.” *Id.* ¶ 5. Consequently, one aspect of Park is to “provide a composite electronic component having a reduced component mounting area in a driving power supply system, and a board for mounting the same.” *Id.* ¶ 13. Figure 1 of Park is a perspective view schematically illustrating such composite electronic component and Figure 2 is a cross-sectional view thereof taken along line A-A,’ both of which are reproduced below. *Id.* ¶¶ 34–35.

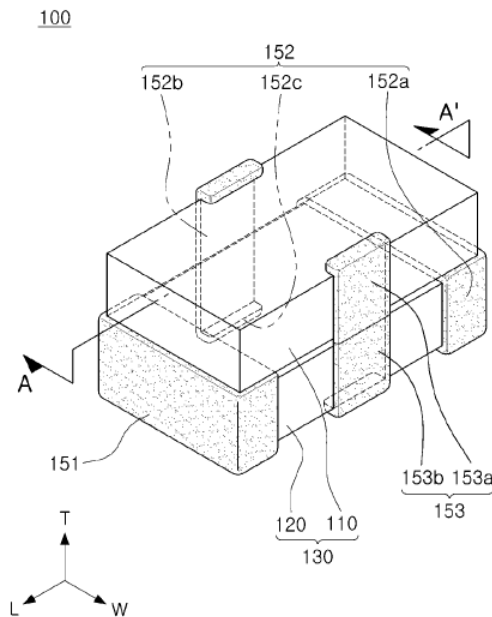


FIG. 1

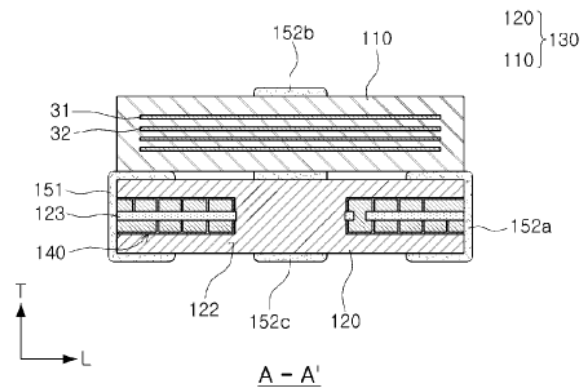


FIG. 3

Figures 1 and 2 above show composite electronic component 100 having composite body 130 that includes a combination of capacitor 110 and inductor 120 in which inductor 120 “is formed of a magnetic body including a coil unit 140.” Ex. 1009 ¶ 68. “The magnetic body may be formed by filling upper and lower portions of the insulating substrate 123 having the coil formed on at least one surface thereof with a magnet 122.” *Id.* ¶ 87. Composite electronic component 100 also includes input and output terminals or third and fourth external electrodes 151 and 152, respectively. *Id.* ¶ 100.

Park’s Figure 13 is a perspective view of a composite electronic component mounted on a printed circuit board, and is reproduced below. Ex. 1009 ¶ 46.

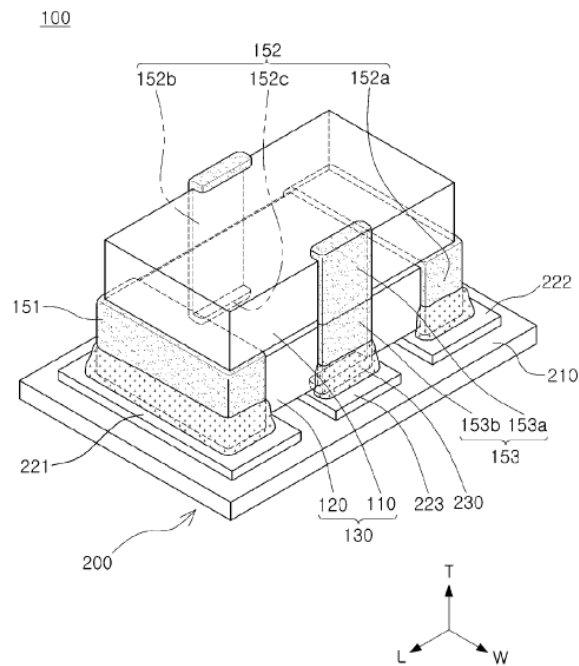


FIG. 13

Figure 13 above shows composite electronic component 100 with board 200. Ex. 1009 ¶¶ 212, 216. Board 200 includes printed circuit board (PCB) 210 with electrode pads 221–223 positioned on top thereof for mounting composite electronic component 100. *Id.* ¶ 216.

2. Discussion

a) Claim 1

Petitioner's arguments and evidence are insufficient to demonstrate that Park discloses or teaches certain limitations of claim 1. Petitioner relies upon Figure 3 of Park, reproduced below, with annotations in red (Pet. 59).

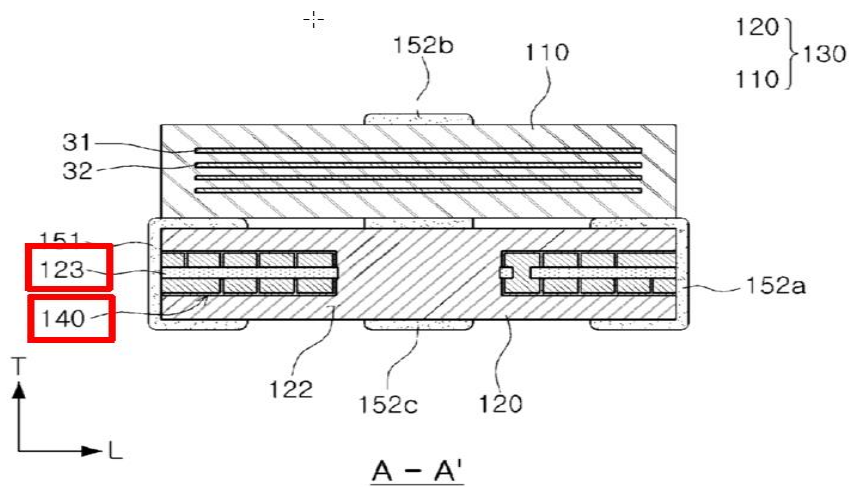


FIG. 3

Annotated Figure 3, above, depicts a cross-section of a composite electronic component of Park, with capacitor 71, inductor 120, magnet 122, insulating substrate 123, coil unit 140, and external electrodes 151 and 152a. Ex. 1009 ¶¶ 36, 68, 77, 87, 100.

Petitioner asserts that Park discloses all the limitations of claim 1. Pet. 57–61. Petitioner contends that limitation [1a], a bearing plate, is disclosed by either inductor 120, substrate 123, or the combination of substrate 123 and coil 140 in Park. *Id.* at 58–59. For limitation [1b] and the teaching of “insulation material,” Petitioner contends that “Park’s composite electronic component 100 includes an insulation material (magnet 122 made of non-conductive ferrite) formed on two opposite surfaces (the top surface and the bottom surface) of the bearing plate (inductor 120, substrate 123, or the combination of substrate 123 and coil 140).” *Id.* at 59 (citing Ex. 1003 ¶¶ 162–163; Ex. 1009 ¶¶ 80, 87, 90, Fig. 3). Petitioner further argues that because Park’s pin (electrode 151 or 152a) is electrically connected to coil

140 of the bearing plate, limitation [1c] is disclosed. *Id.* at 60–61 (citing Ex. 1003 ¶¶ 164; Ex. 1009, Figs. 1, 3, 13).

Dr. Baker testifies that that inductor 120 is a “bearing plate” because it supports capacitor 110 on top of it. Ex. 1003 ¶ 159. The ’534 patent describes a “bearing plate” as “the printed circuit board (PCB) or the direct bonding circuit (DBC), etc. for bearing the components of the unit.” Ex. 1001, 8:27–29. The Specification further states that a bearing plate is used for bearing certain switch devices, as shown, for instance, in Figure 16. *Id.* at 14:29–31. Dr. Baker provides no explanation as to why a component such as the inductor of Park should be considered to be a “bearing plate,” such as a printed circuit board. Absent explanation, Dr. Baker’s testimony and Petitioner’s related assertions are deficient. *See* 37 C.F.R. § 42.65(a) (“Expert testimony that does not disclose the underlying facts or data on which the opinion is based is entitled to little or no weight.”). Additionally, it is not clear whether Petitioner is asserting that the “bearing plate” is Park’s entire inductor assembly or just the outer surface of inductor 120 under capacitor 110. Pet. 33, 36–37. If Petitioner intended the mapping to be just the outer upper surface of the inductor, this conflicts with Petitioner’s assertions regarding the teaching of limitation [1c], which alleges that there is a pin “electrically connected to coil 140 of the bearing plate,” that is, the coil would have to be part of the inductor. If Petitioner intended the mapping to comprise the entire inductor, this presents a conflict with limitation [1b], which requires that “insulation material [be] formed *on* two opposite surfaces of the bearing plate.” *Id.* at 59–60. Petitioner asserts that magnet 122 is the insulating material, so with a mapping of the bearing plate as the entire inductor, a magnet that is part of the inductor could not be the

distinctly-claimed insulating material. Accordingly, we find that Petitioner's assertion that inductor is the bearing plate is insufficiently supported and, additionally, is inconsistent with Petitioner's assertions for other limitations of the claims.

Petitioner alternatively contends that Park's insulating substrate 123 is the claimed bearing plate, where insulating substrate 123 has "the surface of which is formed an inductor coil unit 140." Pet. 58 (citing Ex. 1009 ¶¶ 77, 86, Fig. 3; Ex. 1003 ¶ 160). Dr. Baker testifies that "[s]ubstrate 123 is a bearing plate because it supports at least coil 140 (as well as portions of magnet 122 and conductor 110) on top of it." Ex. 1003 ¶ 160. Again, Dr. Baker provides no explanation why insulating substrate 123 should be considered to be a "bearing plate." Additionally, Park provides support for Patent Owner's argument that its inductor is formed by magnet 122 with the coil wrapped around it. See Ex. 1009 ¶ 81 ("inductor manufactured by winding a line material (coil conducting wire) around a core"); Prelim. Resp. 52–53; *see also* Ex. 2001 ¶¶ 152, 154 ("Substrate 123 with coil unit 140 are wrapped around magnet 122."). Limitation [13b] requires that "insulation material be formed on two opposite surfaces of the bearing plate," where Petitioner asserts that the claimed "insulation material" is Park's magnet 122. Petitioner fails to explain how Park's magnet could be "formed on two opposite surfaces" of insulating material 123 when insulating substrate 123 and the coil are wrapped around the magnet. Accordingly, we find that Petitioner's assertion that insulating material is the bearing plate is insufficiently supported and, additionally, is inconsistent with Petitioner's assertions for other limitations of the claims.

Petitioner's alternative assertion that the bearing plate is the combination of substrate 123 and coil 140 (Pet. 59) has the same deficiencies as those discussed above for Petitioner's assertion that substrate 123 is the bearing plate.

Accordingly, Petitioner has not demonstrated a reasonable likelihood that it would prevail in showing that claim 1 is anticipated by Park.

Petitioner additionally asserts that “[t]o the extent not immediately envisaged or inherent, it would have been obvious for ferrite magnet 122 [of Park] to be an insulating material to prevent short circuits.” Pet. 66.

For dependent claim 2, which requires “first pads disposed on a lateral side of the bearing plate,” Petitioner contends that a person of skill “would have understood that Park’s composite electronic component 100 includes a plurality of first pads . . . that are disposed on lateral sides of the bearing plate.” Pet. 66. Petitioner also asserts that “it would have been obvious in view of Jun to include such pads on lateral sides of the bearing plate.” *Id.*

Petitioner's additional arguments fail to address the deficiencies noted in the anticipation ground of Park. Accordingly, we find that Petitioner's showing of obviousness over Park, with or without Jun, is deficient for the reasons discussed above in the Park anticipation ground.

On this record, Petitioner has not demonstrated a reasonable likelihood of prevailing on its assertion that claim 1 would have been anticipated by or obvious over Park, with or without Jun.

b) Claims 2, 3, and 5–8

Claims 2, 3, and 5–8 depend directly or indirectly from claim 1. Petitioner’s argument and evidence for these claims fail to cure the deficiencies of its showing for claim 1. Pet. 61–65.

On this record, Petitioner has not demonstrated a reasonable likelihood of prevailing on its assertion that claims 2, 3, and 5–8 are anticipated by or rendered obvious by Park, with or without Jun.

G. Obviousness of Claims 1–8 and 10–12 Over Vinciarelli-218 and Park

Petitioner contends that claims 1–8 and 10–12 would have been obvious over the combination of Vinciarelli-218 and Park. Pet. 73–84. Petitioner relies on the combination of Park’s electrodes 151, 152a with Vinciarelli-218’s power converter for the teaching of limitation [1c]. *Id.* at 73 (citing Ex. 1003 ¶¶ 203–215). Petitioner asserts that “a skilled artisan would have found it obvious to design Vinciarelli-218’s bearing plate (PCB) to include interconnects where they are needed (e.g., by placing one interconnect on each side to accommodate Park’s electrodes 151, 152a).” *Id.* (citing Ex. 1003 ¶ 203; Ex. 1006 ¶ 107, Figs. 10A, 10B). Petitioner argues that the resulting module “which resemble[] Park’s inductor 120 and electrodes 151, 152a, the plurality of pins (Park’s electrodes 151, 152a) are electrically connected (via Vinciarelli-218’s interconnects) to the bearing plate (Vinciarelli-218’s PCB) and allocated along lateral sides of the insulation material in accordance with Park.” *Id.* at 74 (citing Ex. 1003 ¶ 204). Petitioner argues that “two terminals of each of the pins (Park’s electrodes 151, 152a) have two SMD pads (upper portion of each electrode), wherein the two SMD pads of each of the pins extend to an upper surface

(top surface of Vinciarelli-218's encapsulant 805) and a lower surface (bottom surface of Vinciarelli-218's encapsulant 806) of the insulation material, respectively.” *Id.* at 75 (citing Ex. 1003 ¶ 205).

Petitioner asserts that there are several reasons a person of ordinary skill would have been modified to modify Vinciarelli-218. Pet. 75–77. Similar to the discussion above for the first ground presented, we find that Petitioner employs impermissible hindsight. Petitioner is proposing a specific modification: using Park's electrodes at a particular connection point and in a particular way in Vinciarelli-218. Similar to the first ground, Petitioner's alleged motivations to make the modification of using Park's electrodes in Vinciarelli-218 do not directly relate to a rationale to make the specific modification proposed and/or are not accurate in view of the evidence of record.

As its first alleged motivation, Petitioner argues that Vinciarelli-218 discloses that many variations for contacts to external components or circuits and that it would be beneficial to have a module to press-fit into a surface mount adaptor or flush mount to a motherboard. Pet. 75 (citing Ex. 1006, Figs. 15–26, 33–36). While Vinciarelli-218 indicates that some different types of contacts could be used, the issue remains as to why a skilled artisan would have specifically selected Park's electrodes for the modification, as well as opting for the specific manner of modifying Vinciarelli-218. Patent Owner provides no reason why one of skill in the art would have modified this specific configuration of Vinciarelli-218 in the way proposed by, for instance, placing conductors on top of its encapsulated top. Instead, it appears that the objective was to substitute Park's electrode, with its different contact positions, to meet the claim limitations. Further,

Vinciarelli-218 already teaches that its modules may be flush mounted and its invention decreases mounting area. Ex. 1006, code (57), ¶ 125.

Petitioner also argues that “a skilled artisan would have recognized that Park’s electrodes provide surface mount contacts identified as desirable in Vinciarelli-218 without the need for a surface mount adapter.” Pet. 76 (citing Ex. 1003 ¶ 210). While that may be so, there is no reason provided as to why a person of skill would specifically be led to Park’s electrodes, absent the alleged motivation to stack electronic components in Vinciarelli-218, which we discuss further below.

Petitioner also argues that “the skilled artisan would turn to Park given Park’s teaching that board space can be saved by using Park’s surface conductor to ‘stack[]’ external components on the module using the surface conductor.” Pet. 75–76 (citing Ex. 1009 ¶¶ 72, 100, 101, 117–125). We do not find this rationale persuasive because, as discussed for the first ground, the proposed modification would change the nature of Vinciarelli-218’s device and flush mounting Vinciarelli-218’s electronic components by stacking would not be suitable because of heat dissipation issues. Instead, Petitioner’s proposed change appears to be precipitated by objective of the modification, which is to substitute Park’s electrodes to meet the claim limitations.

Petitioner additionally asserts that “Vinciarelli-218 and Park both concern improvements to small power converters and decreasing the circuit board ‘area’ used by the power converters.” Pet. 76 (citing Ex. 1003 ¶ 211; Ex. 1006 ¶ 3; Ex. 1009 ¶¶ 141, 188, 209, 228). Petitioner argues that a “skilled artisan applying the teachings of Park to Vinciarelli-218 would have been motivated to reduce the space used by the contact adapters of

Vinciarelli-218 by applying Park’s electrodes to Vinciarelli-218’s module to provide contact surfaces on the top, bottom, and sides of the module, as taught by Park.” *Id.* at 76–77 (citing Ex. 1003 ¶ 212). Petitioner is proposing a specific substitution to Vinciarelli-218 and changing to a stacked structure, which is unsuitable in Vinciarelli-218 and its encapsulated modules. Thus, Petitioner’s proposed modification appears to be solely motivated by impermissible hindsight.

Accordingly, Petitioner has not demonstrated a reasonable likelihood that it would prevail in showing that claims 1–8 and 10–12 are obvious over the combination of Vinciarelli-218 and Park.

H. Obviousness of Claims 4 and 10–12 over Vinciarelli-664, Park, and Zeng-014

Petitioner proposes that Zeng-014’s teachings should be considered in combination with Vinciarelli-218 and Park only for the teachings of the limitations of claim 4 and element [10c]. Pet. 84–86.

Petitioner’s additional arguments fail to address the deficiencies noted in the obviousness grounds based on Vinciarelli-664 and Park for claims 1 and 10. Claim 4 depends from claim 1 and the additional teaching cited does not cure the deficiencies as to claim 1. Accordingly, we find that Petitioner’s showing of obviousness over Vinciarelli-664, Park, and Zeng-014 is deficient for the reasons discussed above.

V. CONCLUSION

For the foregoing reasons, we have determined that Petitioner has not shown a reasonable likelihood that it will prevail with respect to at least one of the claims challenged in the Petition. We therefore do not institute trial as to all challenged claims on all grounds stated in the Petition.

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VI. ORDER

Upon consideration of the record before us, it is:

ORDERED that the Petition is *denied* and we do not institute an *inter partes* review.

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Patent 10,877,534 B2

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