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Paper 35
Entered: February 5, 2018

UNITED STATES PATENT AND TRADEMARK OFFICE

BEFORE THE PATENT TRIAL AND APPEAL BOARD

KINGSTON TECHNOLOGY COMPANY, INC.,
Petitioner,

v.

POLARIS INNOVATIONS LTD.,
Patent Owner.

Case IPR2016-01622
Patent 6,850,414 B2

Before SALLY C. MEDLEY, JEAN R. HOMERE,
and KEN B. BARRETT, *Administrative Patent Judges*.

BARRETT, *Administrative Patent Judge.*

FINAL WRITTEN DECISION
35 U.S.C. § 318(a) and 37 C.F.R. § 42.73

I. INTRODUCTION

A. Background and Summary

Kingston Technology Company, Inc. ("Petitioner") filed a Petition requesting *inter partes* review of claims 1–8 of U.S. Patent No. 6,850,414 B2 ("the '414 patent," Ex. 1001). Paper 2 ("Pet."). Polaris Innovations Ltd. ("Patent Owner")[1] filed a Preliminary Response to the Petition. Paper 6 ("Prelim. Resp."). The Board instituted *inter partes* review (Paper 7, "Inst. Dec.") of claims 1 and 5–8 on the ground of obviousness under 35 U.S.C. § 103(a) over Simpson[2]. The Board did not institute a review as to dependent claim 4. Petitioner filed a Request for Rehearing of The Board's Institution Decision on Claim 4 (Paper 11), which was denied (Paper 16).

Patent Owner filed a Motion to Amend seeking to cancel the instituted challenged claims and proposing to substitute a newly-presented claim 9 for dependent claim 8. Paper 18 ("MTA"). Patent Owner did not file a Response to the Petition. Subsequently, Petitioner filed an Opposition to Patent Owner's Motion to Amend (Paper 20, "MTA Opp."), and Patent Owner filed a Reply to Petitioner's Opposition to Motion to Amend (Paper 23, "MTA Reply").

On October 4, 2017, the Federal Circuit issued an *en banc* decision in *Aqua Products, Inc. v. Matal*, 872 F.3d 1290 (Fed. Cir. 2017) addressing the burden of proof that the Board applies when considering the patentability of

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[1] Patent Owner identifies Polaris Innovations Ltd., Wi-LAN Inc., and Quarterhill Inc. as real parties-in-interest. Paper 4, 1; Paper 19, 1.
[2] UK Patent Application GB 2 289 573 A, published Nov. 22, 1995 (Ex. 1002).

substitute claims presented in a motion to amend filed under 35 U.S.C. § 316(d).

Pursuant to our authorization (Paper 25), Petitioner filed a Surreply to Patent Owner's Motion to Amend (Paper 28, "MTA Surreply"). Thereafter and pursuant to our authorization (Paper 29), Patent Owner filed a Brief Addressing Impact of *Aqua Products v. Matal* (Paper 30).

An oral hearing was held on November 14, 2017, and a transcript of the hearing is included in the record. Paper 34 ("Tr.").

This Final Written Decision is entered pursuant to 35 U.S.C. § 318(a). After consideration of the parties' arguments and evidence, and for the reasons discussed below, we determine that Petitioner has shown by a preponderance of the evidence that claims 1 and 5–8 of the '414 patent are unpatentable. Based on the entirety of record before us, we also determine that a preponderance of the evidence establishes that substitute claim 9 presented in the Motion to Amend is unpatentable over the prior art of record.

B. Related Proceedings

According to the parties, the '414 patent is involved in *Polaris Innovations Ltd. v. Kingston Tech. Co., Inc.*, Case No. 8:16-cv-300 (C.D. Cal.). Pet. 1; Paper 4, 1.

Petitioner filed a petition seeking *inter partes* review of claim 4 of the '414 patent in Patent Trial and Appeal Board Case IPR2017-00974 (Paper 2). In that case, the Board exercised its discretion under 35 U.S.C. §§ 314(a) and 325(d) to not institute an *inter partes* review. IPR2017-00974, Paper 8. Petitioner's request for reconsideration of that decision was denied. IPR2017-00974, Papers 9, 11.

C. The '414 Patent

The '414 patent, titled "Electronic Printed Circuit Board Having a Plurality of Identically Designed, Housing-Encapsulated Semiconductor Memories," issued February 1, 2005, from U.S. Patent Application No. 10/187,763. Ex. 1001 at [54], [45], [21].

The '414 patent generally relates to an electronic printed circuit board having a memory module comprised of identically designed semiconductor memories configured on the printed circuit board. *Id.* at Abstract. "Printed circuit boards of this type are inserted into motherboards of personal computers or network computers and serve as the main memory." *Id.* at 1:21–23. Figures 1A and 1B are reproduced below.

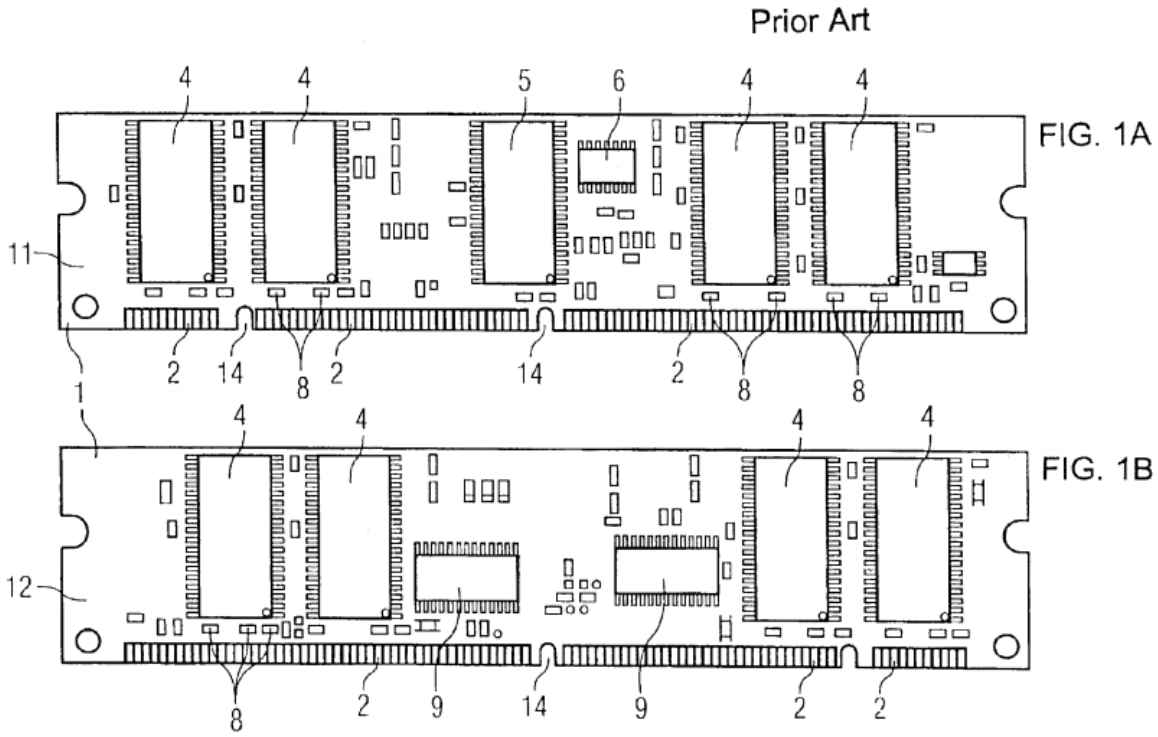


Figure 1A shows the front side of a conventional printed circuit board and Figure 1B shows the rear side of a conventional printed circuit board. *Id.* at 5:6–10. According to the '414 patent, in a conventional arrangement,

semiconductor memories 4 are arranged on the front and rear sides of the printed circuit board in the same orientation as error correction chip 5. *Id.* at 1:62–67. "In the case of this conventional arrangement . . . there is no more leeway for a further reduction of the circuit board height (the height of the printed circuit board perpendicular to the contact strip)." *Id.* at 2:37–41. In network computers, however, "the printed circuit boards are inserted into compartment-type elements having a small height, for which reason the printed circuit boards themselves should also have only a small height." *Id.* at 1:23–27.

To address this problem, the '414 patent discloses an electronic printed circuit board in which the error correction chip remains oriented perpendicular to the contact strip but the other semiconductor memories are oriented parallel to the contact strip, such that it is "possible to reduce the height of the printed circuit board while enabling the rectangular housing to keep the same physical form." *Id.* at Abstract. Figure 3 is reproduced below.

FIG 3

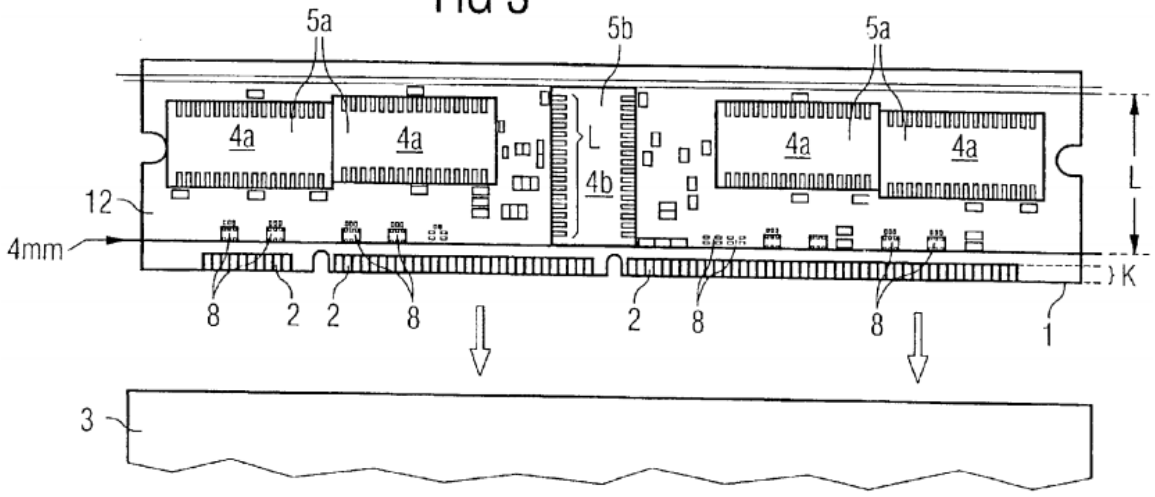


Figure 3 shows the rear side of a printed circuit board according to an embodiment of the '414 patent. *Id.* at 5:13–14. In this arrangement, housings 5a of semiconductor memories 4a are arranged horizontally on printed circuit board 1, and only housing 5b of error correction chip 4b is arranged vertically. *Id.* at 6:19–28. Housing 5b is "brought up to [] contact strip 2 as close as possible" because "there is no need for any resistors 8 [between housing 5b and contact strip 2], as in the case of all of the other identically designed semiconductor memories 4*a* that are configured horizontally." *Id.* at 6:28–35. "As a result, the height of printed circuit board 1 can be reduced from a value of H_1 to a smaller value H_2" (*id.* at 6:41–42), as shown in Figure 2, which is reproduced below.

FIG 2

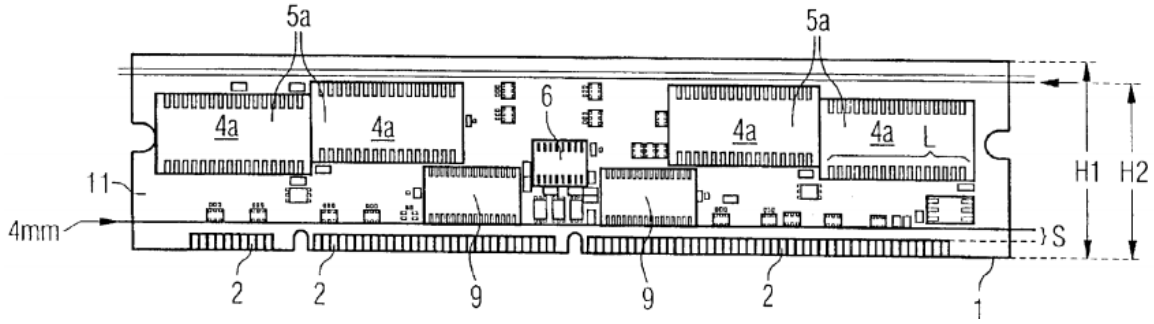


Figure 2 shows the front side of a printed circuit board according to an embodiment of the '414 patent. *Id.* at 5:11–12.

D. Illustrative Claim

Claim 1 of the '414 patent is an independent claim. Claims 2–8 all depend directly from Claim 1. Claim 1, reproduced below, is illustrative:

> 1. An electronic printed circuit board configuration, comprising:
>
> an electronic printed circuit board having a contact strip for insertion into another electronic unit; and

> a memory module having at least nine identically designed integrated semiconductor memories;
>
> each one of said semiconductor memories being encapsulated in a rectangular housing having a shorter dimension and a longer dimension;
>
> said housing of each one of said semiconductor memories being identically designed and being individually connected to said printed circuit board;
>
> one of said semiconductor memories being connected as an error correction chip;
>
> said longer dimension of said housing of said error correction chip being oriented perpendicular to said contact strip; and
>
> said longer dimension of said housing of each one of said semiconductor memories, other than said error correction chip, being oriented parallel with said contact strip.

Ex. 1001, 7:24–8:3.

II. ANALYSIS OF THE INSTITUTED CHALLENGE

A. Principles of Law

Petitioner bears the burden of proving unpatentability of the claims challenged in the Petition, and that burden never shifts to Patent Owner. *Dynamic Drinkware, LLC v. Nat'l Graphics, Inc.*, 800 F.3d 1375, 1378 (Fed. Cir. 2015). To prevail, Petitioner must establish the facts supporting its challenge by a preponderance of the evidence. 35 U.S.C. § 316(e); 37 C.F.R. § 42.1(d).

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 skill in the art; and (4) any objective evidence of non-obviousness. *Graham v. John Deere Co.*, 383 U.S. 1, 17–18 (1966).

B. The Level of Ordinary Skill in the Art

Petitioner's expert, Dr. Vivek Subramanian, opines that "a person of ordinary skill in the art as of the time of the '414 Patent would have a Bachelor's degree in Electrical Engineering and at least 2 years' experience working in the field of semiconductor memory design." Ex. 1006 ¶ 17; *see* Pet. 5–6 (citing the same). This definition is consistent with the level of ordinary skill reflected in the prior art references of record. *See Okajima v. Bourdeau*, 261 F.3d 1350, 1355 (Fed. Cir. 2001) (the prior art itself may reflect an appropriate level of skill in the art). Patent Owner does not dispute Petitioner's definition. We adopt Dr. Subramanian's definition of the person of ordinary skill in the art.

C. Claim Construction

In an *inter partes* review, claim terms in an unexpired patent are given their broadest reasonable construction in light of the specification of the patent in which they appear. 37 C.F.R. § 42.100(b); *see also Cuozzo Speed Techs. LLC v. Lee*, 136 S. Ct. 2131, 2144–46 (2016). Under the broadest reasonable construction standard, claim terms are given their ordinary and customary meaning, as would be understood by one of ordinary skill in the art in the context of the entire patent disclosure. *In re Translogic Tech., Inc.*, 504 F.3d 1249, 1257 (Fed. Cir. 2007).

1. Individually Connected

Claim 1 recites "said housing of each one of said semiconductor memories . . . being *individually connected* to said printed circuit board" and "one of said semiconductor memories being *connected* as an error correction chip." Ex. 1001, 7:33–37 (emphasis added).

In the Institution Decision, we addressed the construction of the claim term "connected" due to the parties' arguments concerning the Simpson reference. Inst. Dec. 7–8. Patent Owner argued in its Preliminary Response that Simpson does not teach "'connecting' an error correction chip to the PCB [printed circuit board] as claimed," because the Simpson chip identified by Petitioner as an error correction chip is mounted in a socket rather than soldered directly to the printed circuit board. Prelim. Resp. 31. Petitioner argued that "a socket is a type of connection." Pet. 22–23 (citing Ex. 1006 ¶ 60). We agreed with Petitioner, noting that the '414 patent does not explicitly define "connected" and Patent Owner identified nothing in the Specification to support a construction of that term to exclude connections via a socket. Inst. Dec. 8. Accordingly, we determined, for purposes of the Institution Decision, "the broadest reasonable interpretation of 'connected' encompasses being connected to the printed circuit board via a socket." *Id.*

Patent Owner, in its reply to Petitioner's opposition to the Motion to Amend, impliedly argues that the modifier "individually" means the memory housings must be *directly* connected to the printed circuit board. MTA Reply 10. Specifically, Patent Owner argues that being connected through "an intermediary with receptacles" is not "directly connected" and thus Simpson lacks the recited "individually connected" semiconductor memory housings in that "Simpson's alleged memory chips are connected to

sockets, that are in turn connected to its printed circuit board." *Id.* at 10–11 (citations omitted). Patent Owner asserts that its proposed construction of "individually" as meaning "directly" is supported by a purported admission of Petitioner's expert, Dr. Subramanian, during cross examination. *Id.* (citing Ex. 2012 (Subramanian Dep. Tr.), 234:6–237:22; Ex. 2013 (deposition exhibit)). We have reviewed the cited pages of the deposition transcript and agree with Petitioner that that portion of the deposition involves a "confusing hypothetical arrangement" (MTA Surreply 1–2). Patent Owner does not explain adequately or persuasively how this ambiguous extrinsic evidence supports its argument that the claim phrase "individually connected" should be construed as limited to direct connections.

Having considered the parties' arguments and the complete record, we again determine that the broadest reasonable interpretation of "connected" encompasses being connected to the printed circuit board via a socket, and further determine that the claim term "individually" does not require the subject components to be directly connected.

2. Error Correction Chip

In the Institution Decision, we indicated that we were persuaded that the '414 patent uses, in independent claim 1, the term "error correction" broadly enough to encompass parity, and we preliminarily construed "error correction chip" as "a chip that is able to perform at least error checking on data stored in other semiconductor memories." Inst. Dec. 8–9 (quoting Ex. 1001, 7:1–9). Although Patent Owner did not propose in the Preliminary Response an explicit construction for the term, we determined that a preliminary construction in the Institution Decision was necessary due

to Patent Owner's arguments concerning claim 1. *Id.* at 7. After issuance of the Institution Decision, Patent Owner did not address further the meaning of the term, and it appears that it no longer is in dispute. We adopt that earlier construction in this Final Decision.

D. The Instituted Challenge: The Alleged Obviousness of Claims 1 and 5–8 over Simpson

As mentioned above, we instituted an *inter partes* review of Petitioner's challenge to claims 1 and 5–8 as being obvious over Simpson. Inst. Dec. 23; *see* Pet. 10–27. In the Petition, Petitioner relied upon the Declaration of Vivek Subramanian, Ph.D. (Ex. 1006). *See, e.g.*, Pet. 9–10. Patent Owner did not file a response to the petition after the decision on institution, but did file a Motion to Amend. In that motion, which we deny for the reasons discussed below, Patent Owner requests the cancellation of the instituted claims 1 and 5–8 and proposes the entry of a substitute claim. MTA 1. By not filing a response to the Petition, and requesting cancellation of claims 1 and 5–8 not based on any apparent contingency, Patent Owner has waived any argument that the challenged claims for which we instituted review—claims 1 and 5–8 of the '414 patent—would not have been obvious over Simpson. *See, e.g.*, Paper 8, 3 (Scheduling Order stating: "The patent owner is cautioned that any arguments for patentability not raised and fully briefed in the response will be deemed waived."). Nonetheless, we review anew Petitioner's arguments and the evidence concerning the obviousness challenge to claims 1 and 5–8 and we consider Patent Owner's arguments (*see* MTA Reply 10–11), made in the context of the Motion to Amend, concerning limitations of at least claim 1 that necessarily are incorporated in

proposed substitute claim 9 by virtue of its dependency from independent claim 1.

1. Simpson (Ex. 1002)

Simpson describes a memory module with memory devices and with sockets on one or both faces of the module for coupling additional memory modules. Ex. 1002, [57]. Figures 1 and 3 of Simpson are reproduced below.

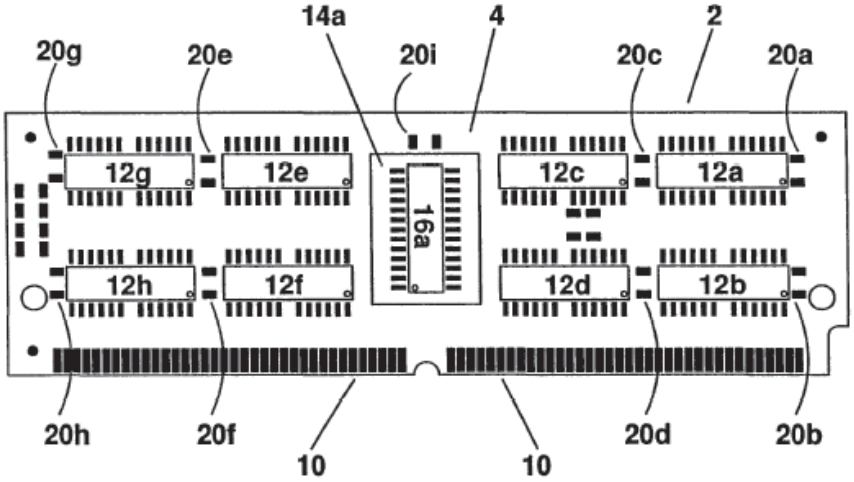


Fig 1

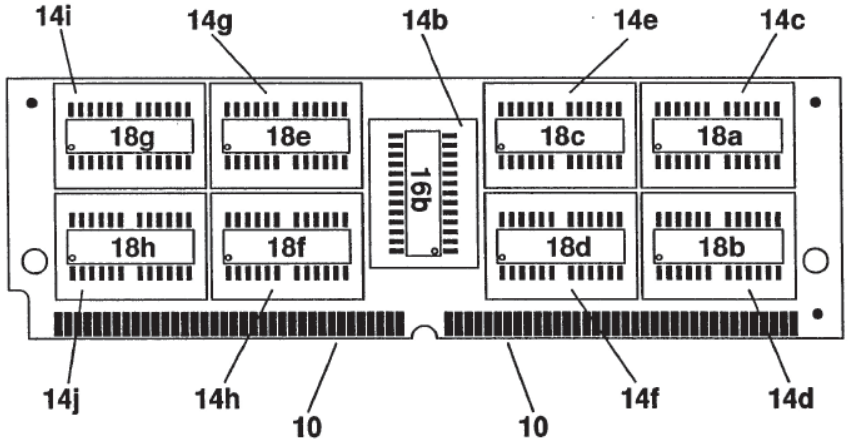


Fig 3

Figures 1 and 3 depict a front view and a rear view, respectively, of a memory module according to Simpson. *Id.* at 12:19–26. As shown in Figure 1 (in which lowercase letters are used in element numbers), a printed circuit board includes memory devices 12A–12H oriented horizontally to connector terminal strip 10 and parity memory device 16A mounted in

socket 14A oriented vertically to connector terminal strip 10. *Id.* at 9:18–10:17. "The memory devices 12A–12H are electrically and mechanically connected to the substrate 4." *Id.* at 10:1–2. "In addition to the memory devices 12A–12H, the sockets 14A–14J to take additional devices are also attached to the substrate 4." *Id.* at 10:5–7.

2. Independent Claim 1

With respect to claim 1, Petitioner asserts, and we agree, that Simpson's printed circuit board with connector terminal strip 10 teaches the claim's recited "electronic printed circuit board having a contact strip." *See* Pet. 16–18; Ex. 1006 ¶¶ 42–46.

Petitioner relies upon Simpson's memory devices 12A–12H and 16A as teaching the recited "at least nine identically designed integrated semiconductor memories," and relies upon Figure 1 as teaching that memory devices 12A–12H and 16A are "encapsulated in a rectangular housing," each of which is "identically designed" and "individually connected to said printed circuit board." Pet. 18–22; Ex. 1006 ¶¶ 47–61. In this regard, Petitioner, relying on the testimony of Dr. Subramanian, persuasively asserts that "[t]hose of ordinary skill in the art would understand that the memory device 16A is identical to each of memory devices 12A-12H," and, alternatively, that it would have been obvious to one of ordinary skill in the art to use identically designed memory and error correction chips. Pet. 19 (citing Ex. 1006 ¶ 48; Ex. 1002, 10:22-28, 12:10–14); *id.* at 25–26 (citing Ex. 1006 ¶¶ 63–64). As discussed above, we have declined to adopt a construction of "individually connected" that would exclude an indirect connection. Petitioner notes that "Simpson further discloses that the 'memory devices 12A-12H are electrically and mechanically connected to

the substrate 4.'" Pet. 22 (quoting Ex. 1002, 10:1-5). Regarding Simpson's disclosure of the use of sockets on the circuit board, we also are persuaded by Petitioner's contention that "[o]ne of ordinary skill in the art would understand that connection of a memory chip via a socket is a type of connection." Pet. 22 (citing Ex. 1006 ¶ 60).

Petitioner asserts, and we agree, that Simpson's parity memory device 16A is "an error correction chip," and that Figure 1 teaches memory device 16A "being oriented perpendicular to said contact strip." Pet. 23–27; Ex. 1006 ¶¶ 62–66.

Lastly, Petitioner notes that Simpson's Figure 1 depicts memory devices 12A–12H "being oriented parallel with said contact strip." Pet. 27; Ex. 1006 ¶¶ 67–69.

We are persuaded by Petitioner's showing, and adopt it as our own, that Simpson renders obvious independent claim 1.

3. Dependent Claims 5–8

Patent Owner, in its Preliminary Response to the Petition, did not present separate arguments for dependent claims 5–8 and Patent Owner did not submit a response to the Petition after institution. We have reviewed Petitioner's explanations and supporting evidence regarding dependent claims 5–8, *see* Pet. 38–43, and we determine that Petitioner has shown by a preponderance of the evidence that dependent claims 5–8 are unpatentable under 35 U.S.C. § 103 over Simpson.

III. MOTION TO AMEND

A. Proposed Substitute Claim

Patent Owner filed a Motion to Amend and moves to cancel all the instituted challenged claims—claims 1 and 5 through 8—and to substitute

new claim 9 for challenged claim 8. MTA 1, 2, Appendix. Proposed substitute claim 9 adds to claim 8 (which depends directly from independent claim 1) the printed circuit board height limitation of dependent claim 4 (which also depends directly from independent claim 1). Proposed substitute claim 9 is reproduced below with underlining indicating text added to dependent claim 8.

> 9. The printed circuit board according to claim 1, wherein: said printed circuit board has a width of 5.25 inches and has a height of 1 to 1.2 inches perpendicular to said contact strip.

MTA, Appendix. As a dependent claim, proposed substitute claim 9 necessarily includes all the limitations of independent claim 1 from which it depends.

We note that this is not simply a case where Patent Owner seeks to rewrite dependent claim 4 in independent form. Because dependent claim 4 and dependent claim 8—which together now form proposed substitute claim 9—both depend directly from independent claim 1, the Motion to Amend is the first time that the width and height limitations have appeared in the same claim. *See* Tr. 86:3–20.

B. Motions to Amend in view of Aqua Products

On October 4, 2017, the Federal Circuit issued an *en banc* decision in *Aqua Products, Inc. v. Matal*, 872 F.3d 1290 (Fed. Cir. 2017). In light of the *Aqua Products* decision, the Board will not place the burden of persuasion on a patent owner with respect to the patentability of substitute claims presented in a motion to amend. *Aqua Products*, 872 F.3d at 1327; *see also* "Guidance on Motions to Amend in view of *Aqua Products*" (Nov. 21, 2017) (https://www.uspto.gov/sites/default/files/documents/guidance

_on_motions_to_amend_11_2017.pdf) ("Guidance"). A motion to amend still must meet the statutory requirements of 35 U.S.C. § 316(d) and the procedural requirements of 37 C.F.R. § 42.121. *See* Guidance.

Because, for the reasons set forth below, we determine that the proposed substitute claim is not patentable, we do not need to determine whether the Motion to Amend meets the requirements of 35 U.S.C. § 316(d) and 37 C.F.R. § 42.121.

C. The Alleged Untimeliness of Petitioner's Arguments in Opposition to the Motion to Amend

Patent Owner argues that Petitioner's arguments in opposition to the Motion to Amend and proposed substitute claim 9 are untimely attacks on dependent claim 4, and urges that we proceed immediately to a determination that the proposed substitute claim 9 is patentable without further input from Petitioner after the decision declining to institute a review of dependent claim 4. *See* MTA Reply 1, 5, 9. In effect, Patent Owner contends that Petitioner should have made its case for unpatentability of the proposed amended claim 9 in the Petition and that Petitioner now should be foreclosed from opposing the Motion to Amend.

Patent Owner's position apparently is premised on several misconceptions based on the denial of institution as to Petitioner's challenges to claim 4. For example, Patent Owner implies that we conclusively ruled on the merits of the patentability of claim 4 at the institution stage in this case and that we found that the height limitation of claim 4 was not disclosed in the prior art. *See* MTA Reply 1 ("the Board has already rejected [Petitioner's] positions on the merits at least three times"); *id.* at 3 (emphasis omitted, "Claim 9 simply adds to the limitations of

instituted Claim 8 the limitation of Claim 4—the exact same limitation that the Board has found, three times, not disclosed by Petitioner's references and arguments."); *id.* at 3 ("Patent Owner's Motion adds a substitute claim, Claim 9, that has a limitation the Board has already repeatedly found was not in the references raised by Petitioner. Patent Owner is entitled to rely on those prior rulings for purposes of its Motion to Amend."); MTA 3–4 ("the limitation that already appears in claim 4 has already been found to not have been shown by Petitioner in this case to be disclosed or suggested by the prior art.").

The decision on institution was made pursuant to 35 U.S.C. § 314, while our final written decision—including the consideration of the Motion to Amend—is made pursuant to a different statute, 35 U.S.C. § 318. Here, our analyses made in arriving at these two types of decisions are not the same. In our institution decision and as detailed below, we evaluated Petitioner's articulation of a case of obviousness (*see*, *e.g.*, Inst. Dec. 16–17), whereas we now must render a final written decision on the patentability of a proposed substitute claim not previously considered based on the entirety of the record, *see* 35 U.S.C. § 318(a) ("If an inter partes review is instituted and not dismissed under this chapter, the Patent Trial and Appeal Board shall issue a final written decision with respect to the patentability of any patent claim challenged by the petitioner and any new claim added under section 316(d)."); *see also Aqua Prods.*, 872 F.3d at 1296 ("The matter is remanded for the Board to issue a final decision under § 318(a) assessing the patentability of the proposed substitute claims without placing the burden of persuasion on the patent owner.").

Contrary to Patent Owner's implied arguments, we have neither determined affirmatively that dependent claim 4 is patentable nor found the height limitation missing from the prior art. Petitioner challenged, in the Petition, claims 1–8 of the '414 patent. As to dependent claim 4 (reciting the height limitation), we did not institute on the ground of obviousness over Simpson, stating "Petitioner has not explained sufficiently how or why a person of ordinary skill in the art would have modified Simpson to achieve a height of '1 to 1.2 inches perpendicular to said contact strip.'" Inst. Dec. 17 (quoting Ex. 1001, 8:19–20 ('414 patent, claim 4)). Similarly, we did not institute a review on the ground of Simpson in combination with the Intel Specification[3] because "Petitioner continues to rely solely on its argument that the limitations would have been an 'obvious design choice' without explaining persuasively how and/or why a person of ordinary skill in the art would have made the proposed modifications to Simpson in view of the teachings of the Intel Specification." *Id.* at 18; *see also id.* at 20–21, 22 (declining to institute as to other grounds based on inadequate reasoning). We denied Petitioner's request for reconsideration, in pertinent part, because Petitioner had not addressed whether one of ordinary skill would have been able to fit two rows of chips on a circuit board having a height of only 1 to 1.2 inches. Paper 16, 6. Petitioner filed another petition challenging claim 4, and that second petition was the subject of a discretionary denial in light of the first petition. IPR2017-00974, Papers 2, 8. Petitioner's request for reconsideration of that decision was denied. IPR2017-00974, Papers 9,

[3] PC SDRAM UNBUFFERED DIMM SPECIFICATION, Rev. 1.0, Feb. 1998 (the "Intel Specification") (Ex. 1003).

11. In denying that request for reconsideration, we confirmed "[i]n neither decision [denying institution as to claim 4] did the Board determine affirmatively that claim 4 is patentable over the prior art asserted in the respective petitions." IPR2017-00974, Paper 9, 5. Accordingly, Patent Owner's reliance on those prior decisions is misplaced.

Patent Owner also argues that its desired outcome in this case is required by an unrelated Board decision, *Amerigen Pharms. Ltd. v. Shire LLC*, Case IPR2015-02009, Paper 38 (PTAB Mar. 31, 2017) (non-precedential) (Ex. 2011). MTA Reply 1, 6–8. In the *Amerigen* case, the panel granted a motion to amend after considering and finding unpersuasive the petitioner's arguments in opposition to the motion. *Amerigen*, slip op. 5–6. We fail to see how that fact-specific ruling supports Patent Owner's arguments that we should not consider Petitioner's arguments in this case. Additionally, Patent Owner acknowledges that a key consideration in the *Amerigen* panel's decision was the fact that the substitute claim "included only limitations of non-instituted or non-challenged claims." MTA Reply 7 (citing Ex. 2011, 4–5); *see Amerigen*, slip op. 5 ("the practical effect of [the proposed substitution] would be to leave no instituted claim remaining in the trial."). In *Amerigen*, the panel stated that, "[e]ffectively, no claim [was] being amended, and claims [were] only being cancelled . . . ." *Amerigen*, slip op. at 6 (quoting the patent owner's argument; internal quotations omitted); *id.* at 6 ("With the cancellation of claims 18–25, and the entry of substitute claim 26, there would be no claim remaining subject to *inter partes* review in this proceeding."). That fact pattern is not present in the case before us.

Amerigen does not, as Patent Owner implies, establish a procedural rule that precludes a petitioner from opposing a motion to amend.

Lastly, we note that—after the denials of institution as to claim 4 and at which point it no longer was involved in this *inter partes* review—Patent Owner did not remain silent as to that claim. Notwithstanding that Patent Owner's Motion to Amend reflects a willingness to cancel the instituted claims—a group which does not include claim 4—Patent Owner did not simply request to cancel the instituted claims and seek adverse judgment, which, if granted, would have ended this *inter partes* review and would have left claim 4 unaddressed ever again in this proceeding. *Cf.* Inst. Dec. 23; Tr. 88:7–8 (Patent Owner asserting: "Everyone agrees that had we not filed a motion to amend, you couldn't revisit the claim 4 decision in this case."). Rather, Patent Owner made a strategic decision to propose a substitute amended claim that includes the limitation of challenged and instituted dependent claim 8 along with the limitation of non-instituted dependent claim 4. Petitioner argues that Patent Owner added the limitation of claim 4 back into the case in the form of proposed claim 9 in order for estoppel to attach to it, and thereby "materially harm[] the petitioners in District Court," and maintains that it would be a due process violation to attach estoppel based on a decision at the institution stage.[4] Tr. 74, 102; *see also id.* at 73–

[4] *See Shaw Indus. Grp. Inc. v. Automated Creel Sys., Inc.*, 817 F.3d 1293, 1300 (Fed. Cir. 2016) (discussing estoppel and distinguishing between the pre-institution phase and the *inter partes* review, which "does not begin until it is instituted."). We express no opinion as to whether and to what extent estoppel would or would not apply in the hypothetical situation presented here.

74 (Petitioner drawing a distinction between an institution decision under 35 U.S.C. § 314 and a final written decision under § 318). Regardless as to the reasons underlying Patent Owner's actions, it is because of those actions that the height limitation of claim 4 is again involved in this proceeding.

After consideration of the parties' arguments and because Patent Owner has not directed our attention to any statute, rule,[5] or legal precedent that supports its position, we decline to foreclose an opposition to the Motion to Amend from Petitioner.

D. Patentability

As discussed above, Patent Owner does not have the burden of persuasion with respect to the patentability of the substitute claim presented in its Motion to Amend. *See Aqua Products*, 872 F.3d at 1327; *see also* Guidance. We determine whether the substitute claim is unpatentable by a preponderance of the evidence based on the entirety of the record, including any opposition made by the petitioner. *See Aqua Products*, 872 F.3d at 1325–26; *see also* Guidance. For the reasons explained below, considering the entirety of the record before us, we determine that the preponderance of the evidence shows that the proposed substitute claim is not patentable over the prior art of record. Specifically, we determine that proposed substitute claim 9 is unpatentable at least under 35 USC § 103(a) as obvious over Simpson (discussed above) and the Intel Specification.

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[5] 37 C.F.R. § 42.20(d), under the heading "Petition and Motion Practice," states that "[t]he Board may order briefing on any issue involved in the trial." We have issued orders permitting briefing on the Motion to Amend. *See* Paper 8, 25, 29.

1. The Intel Specification

The Intel Specification describes "the electrical and mechanical requirements for 168-pin, 3.3 volt, 64-bit and 72-bit wide, 4 clock, unbuffered Synchronous DRAM Dual In-Line Memory Modules (SDRAM DIMMs)." Ex. 1003, 7. "This specification largely follows the JEDEC[6] defined 168-pin unbuffered SDRAM DIMM as of JEDEC committee meeting of December 1996." *Id.* The Intel Specification "give[s] the specific dimensions and tolerances for a 168-pin DIMM." *Id*. at 11. The Intel Specification specifies that the overall length[7] of the DIMM module is in the range of 5.245 to 5.257 inches (133.22 to 133.52 mm) with a nominal dimension of 5.251 inches (133.37 mm), and that the overall height is in the range of 1.0 to 1.5 inches. Ex. 1003, 11, 13 (dimensions D1 and A, respectively); Ex. 1006, ¶¶ 96–98, 107–110.

2. Proposed Substitute Claim 9 and the Combination of Simpson and the Intel Specification

Petitioner opposes Patent Owner's Motion to Amend, arguing that proposed substitute claim 9 is unpatentable as obvious over Simpson and the

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[6] According to Petitioner: "JEDEC stands for the 'Joint Electron Device Engineering Council.' JEDEC is a recognized standard setting body within the industry. Specifically, the JEDEC memory standards are the specifications for semiconductor memory circuits and similar storage devices promulgated by JEDEC." Pet. 6 n.1.

[7] The printed circuit board "width" in the claims of the '414 patent corresponds to the "length" of the board in the Intel Specification. *See* Ex. 1001, 4:12–13 (The '414 patent explaining that "the length of the edge parallel to which the contact strip runs is called the board width."); Ex. 1003, 11, 13 (Intel Specification Figure 1 depicting overall length dimension D1).

Intel Specification. MTA Opp. 4–15.[8] Petitioner, with its Opposition to the Motion to Amend, submitted and relied upon additional declarations of Dr. Vivek Subramanian (Ex. 1016 and Ex. 1022). Patent Owner, in reply, argues that Simpson fails to disclose the "individually connected" limitation of claim 1 and that there was no motivation to utilize or modify Simpson's layout. MTA Reply 10–11.

Proposed substitute claim 9 is the combination of the limitations of independent claim 1, which define the printed circuit board configuration, with the addition of the circuit board width of dependent claim 8 and the addition of the circuit board height of dependent claim 4.

In articulating its opposition, Petitioner relies on Simpson for the general teaching of a layout of memory chips on a circuit board and relies on the Intel Specification for disclosing a "known design standard for the height and width" to which to apply Simpson's layout. MTA Opp. 5–6 (citing Ex. 1022 ¶¶ 17–18).

We have discussed the limitations of independent claim 1 above in the context of the challenge thereto in the Petition. The limitation of claim 8, now incorporated into proposed substitute claim 9, recites the "printed circuit board has a width of 5.25 inches." Dr. Subramanian testifies credibly that "[b]y mid-2001, the dimensions of printed circuit boards had been

[8] Petitioner's Opposition also includes challenges based on the combination of Simpson and Karabatsos and the combination of Bechtolsheim, Tokunaga, and Karabatsos. Because we determine that the proposed substitute claim is unpatentable over the combination of Simpson and the Intel Specification, we do not reach the merits of Petitioner's arguments concerning these other combinations.

standardized for some time," and points to the Intel Specification's disclosure of the 5.25 inch dimension. Ex. 1006 ¶¶ 106–107; *see also* Ex. 1001, 4:53–55 (the '414 patent acknowledging that "[t]his board width [of 5.25 inches] has gained acceptance in the case of memory module boards."). We find that the claimed circuit board width was known in the art.

The limitation of claim 4, also now incorporated into proposed substitute claim 9, recites that the printed circuit board "has a height of 1 to 1.2 inches perpendicular to said contact strip." The claimed range falls completely within the range disclosed in the Intel Specification. "[A] prior art reference that discloses a range encompassing a somewhat narrower claimed range is sufficient to establish a *prima facie* case of obviousness." *In re Peterson*, 315 F.3d 1325, 1330 (Fed. Cir. 2003). Petitioner persuasively argues and presents evidentiary support that there was a recognized market need for "low profile" memory modules, thus providing a reason for one of ordinary skill to target the claimed height range when designing a memory module. MTA Opp. 13–14 (citing Ex. 1016 ¶¶ 50–52, 56); *see* Ex. 1017 ¶¶ 27–28; Ex. 1006 ¶ 39; *id.* at ¶ 28 (the Karabatsos reference disclosing a "low profile DIMM" circuit board "having a height of approximately 1.2 inches, and a width of approximately 5.25 inches").

Patent Owner does not ascribe any criticality to the claimed height range and does not dispute that that range was known in the art. *See, e.g.*, MTA Reply 10–11; Prelim. Resp. 42 (Patent Owner: "While the Intel Specification may disclose that its memory module has a height of 1.0 to 1.2 inches, such a disclosure in a completely different system that requires surface mounted DRAM chips, not socketed DRAM chips, does not mean

that a POSITA would be able to arrange two rows of sockets in Simpson to limit its height to 1.0 to 1.2 inches."); *but see* MTA 2 (Patent Owner arguing that the *combination* of component layout and height is absent in the prior art). Similarly, the '414 patent matter-of-factly states that "[t]he printed circuit board preferably has a height of 1 to 1.2 inches perpendicular to the contact strip," but does not state a basis for that preference. Ex. 1001, 4:7–8; *see also id.* at 6:50–56 (referring to the range in the same context as a standard DIMM design specification). Patent Owner, in the Motion to Amend, focuses on the layout of the circuit board while characterizing the height range merely as the result that flows from that layout. *See* MTA 2 ("The '414 Patent . . . recognize[es] and utilize[es] unique features relating to the placements of the error correction chip and various passive elements on the Printed Circuit Board . . . [which] permitted the PCB height to be reduced to 1.0–1.2 inches . . . .").

We determine that Petitioner has provided an articulated reason with rational underpinning to support the conclusion of obviousness of subject matter having the recited width and height.

Petitioner, also relying on the testimony of Dr. Subramanian, demonstrates that an ordinary skilled artisan would have had a reasonable expectation of success. MTA Opp. 4–11 (citing Ex. 1006 ¶¶ 37–41; Ex. 1022 ¶¶ 17–30). Specifically, Petitioner persuasively shows that one of ordinary skill in the art would have been able to apply Simpson's chip layout on a circuit board having the claimed width and height dimensions. *Id.*[9]

[9] In reaching our determination, we do not rely on the Kiehl reference (Ex. 1020 (German application), Ex. 1021 (English translation)) or

In reply to Petitioner's opposition, Patent Owner argues that the "housing . . . being individually connected" limitation incorporated from claim 1 is missing from the combination of Simpson and the Intel Specification. MTA Reply 10–11. Patent Owner asserts that "Simpson's alleged memory chips are connected to sockets, that are in turn connected to its printed circuit board," and thus, Simpson discloses an indirect connection. MTA Reply 10 (citing Ex. 1002, Fig. 1, 13:18-28). For the reasons set forth above in the discussion of claim construction, this argument is not persuasive, and we find that Simpson discloses memory housings individually connected to the circuit board.

Patent Owner also argues "[n]or was there motivation to utilize or modify Simpson's socketed invention as claimed." *Id.* at 11. Specifically, Patent Owner asserts that Simpson was concerned with an upgradable memory board and does not teach a reason for or benefit of the disclosed layout. *Id.* This argument is not persuasive. In an obviousness analysis, the prior art need not be directed to the same problem as the patentee and the references need not provide an explicit statement of motivation directed to the claimed subject matter. *See KSR Int'l. Co. v. Teleflex Inc.*, 550 U.S. 398, 418–20 (2007). Further, Patent Owner's argument, focusing only on the need discussed in Simpson, fails to address Petitioner's reasoning based on

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Dr. Subramanian's testimony pertaining thereto. Petitioner argues that "Kiehl provides clear evidence that memory chips existed contemporaneous to the '414 patent that would have permitted an arrangement of chips according to Simpson's pattern on a 5.25" by 1.2" PCB." MTA Surreply 7. However, Petitioner acknowledges that it is not alleging that Kiehl is prior art, merely "contemporaneous." *Id.* (asserting that certain applications were filed in Germany within two months of each other).

the ordinary artisan's recognition of a need to have shorter memory boards and recognition that Simpson's layout was one possible choice applicable to low profile circuit boards (*see* MTA Opp. 5–6, 11–14).

Accordingly, we determine based on a preponderance of the evidence that proposed substitute claim 9 is unpatentable, under 35 U.S.C. § 103(a), as obvious over Simpson and the Intel Specification. For this reason, Patent Owner's Motion to Amend is *denied*.

IV. CONCLUSION

Petitioner has demonstrated by a preponderance of the evidence that claims 1 and 5–8 of the '414 patent are unpatentable under 35 U.S.C. § 103(a) as obvious over Simpson.

Additionally, we determine, based on a preponderance of the evidence in the entire trial record, that proposed substitute claim 9 is unpatentable, under 35 U.S.C. § 103(a), as obvious over Simpson and the Intel Specification.

V. ORDER

For the foregoing reasons, it is

ORDERED that claims 1 and 5–8 of the '414 patent have been proven to be unpatentable;

FURTHER ORDERED that Patent Owner's Motion to Amend is *denied*; and

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

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