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Paper 40
Entered: December 27, 2016

UNITED STATES PATENT AND TRADEMARK OFFICE

BEFORE THE PATENT TRIAL AND APPEAL BOARD

FUNAI ELECTRIC CO., LTD., SAMSUNG DISPLAY CO., LTD., and TOSHIBA CORP.,
Petitioner,

v.

GOLD CHARM LTD.,
Patent Owner.

Case IPR2015-01468
Patent 6,909,053 B2

Before KARL D. EASTHOM, BRYAN F. MOORE, and CHARLES J. BOUDREAU, *Administrative Patent Judges*.

EASTHOM, *Administrative Patent Judge*.

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

I. INTRODUCTION

Funai Electric Co., Ltd., Samsung Display Co., Ltd., and Toshiba Corp. (collectively, "Petitioner") filed a Petition (Paper 1, "Pet.") requesting *inter partes* review of claims 1–10 of U.S. Patent No. 6,909,053 B2 (Ex. 1001, "'053 patent"). Pet. 1, 6. In response, Gold Charm Ltd. ("Patent Owner") filed a Preliminary Response. Paper 10 ("Prelim. Resp.").

We instituted trial for claims 1–10. Paper 14 ("Institution Decision" or "Inst. Dec."). After institution of trial, Patent Owner filed a Patent Owner Response. Paper 20 ("PO Resp.").[1] Petitioner filed a Reply. Paper 25 ("Pet. Reply"). The parties filed additional authorized briefing sought by Patent Owner to address a real party in interest issue. *See* Papers 11–13. The parties also filed additional authorized briefing sought by Patent Owner to address the impact of a recent case, *Cutsforth, Inc. v. Motivepower, Inc.*, 643 F. App'x 1008 (Fed. Cir. 2016) (non-precedential), on a related claim construction term. *See* Papers 22, 23 (authorizing extra pages to respond to Patent Owner's Paper 22 in Petitioner's Reply), 25. The record includes a transcript of the Oral Hearing that occurred on September 28, 2016. Paper 38 ("Tr.").

We have jurisdiction under 35 U.S.C. § 6. This Final Written Decision issues pursuant to 35 U.S.C. § 318(a). Petitioner has shown by a preponderance of the evidence that claims 1–10 of the '053 patent are unpatentable.

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[1] Prior to the Patent Owner Response, challenging the Institution Decision, Patent Owner filed a Patent Owner's Request for Rehearing (Paper 17, "Reh'g Req.") challenging the Institution Decision, and we responded with a Decision Denying Patent Owner's Request for Rehearing (Paper 19, "Reh'g Dec.").

A. *Related Proceedings*

Petitioner indicates that Patent Owner asserts the '053 patent "against multiple defendants in the District of Delaware," including in the following proceedings: (1) *MiiCs & Partners, America, Inc. v. Toshiba Corp.*, No. 1:14-cv-00803-RGA (D. Del.); (2) *MiiCs & Partners, America, Inc. v. Funai Electric Co.*, No. 1:14-cv-00804-RGA (D. Del.); and (3) *MiiCs & Partners, America, Inc. v. Mitsubishi Electric Corp.*, No. 1:14-cv-00805-RGA (D. Del.) (dismissed July 7, 2015). Pet. 2; *accord* Paper 6, 2–3.

Petitioner also filed other petitions challenging claims in patents owned by Patent Owner. *See* Inst. Dec. 3–4.

B. *The '053 Patent*

The '053 patent discloses flexible substrate 5 connected to substrate 4 via anisotropic conductive film (ACF) 20. Ex. 1001, Abstract, Fig. 4C. In one embodiment, conductive bonding assist member 17, formed in a lattice pattern on substrate 4 between connecting terminals 4b, prevents peeling of ACF 20 and provides a more reliable electrical and physical connection between substrates 4 and 5. *See id.* at 7:37–60, 9:1–17.

A reproduction of Figure 4B of the '053 patent follows:

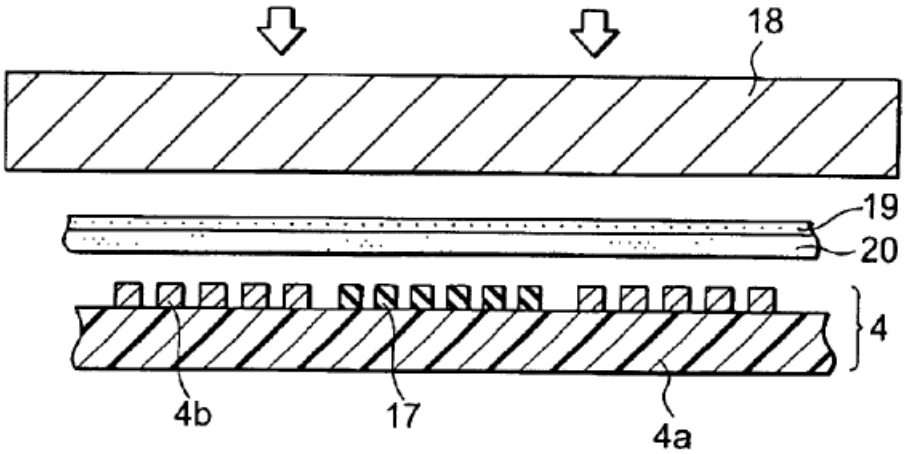

Figure 4B above represents a preliminary step of applying ACF 20 and layer 19 to terminal regions 4b and bonding assist member 17 using heat and pressure from press-bonding head 18, which transfers to bonding assist region 17 and wiring regions 4a and 4b. *See* Ex. 1001, 3:27–52, 9:18–54. Bonding assist member 17 helps prevent peeling of ACF 20 from substrate 5, which may occur in a later step of removing layer 19 in prior art processes that do not use bonding assist members. *See id*. at 3:10–52, 9:18–54, 10:28–54, Figs. 9A, 9B, 9C, 10A.

A reproduction of Figure 4C of the ’053 patent follows:

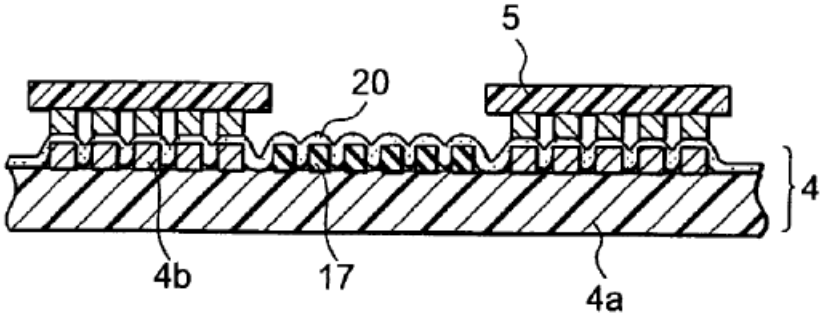

Figure 4C above represents the final product, with flexible substrates 5 connected to substrate 4 at terminal regions 4b via ACF 20. *Id.* at 10:15–25.

Figure 6C of the ’053 patent is reproduced below:

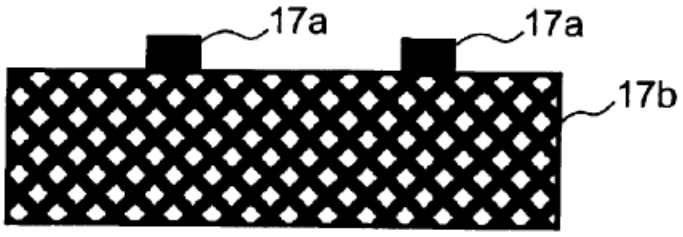

Figure 6C depicts a lattice structure for bonding assist member 17, having a plurality of protrusions 17a and “wiring pattern portion 17b.” *Id.* at 11:45–46, 12:1. According to the ’053 patent, “[t]he configuration of the

protrusion 17a is any provided that it can be connected to the GND line in the connecting substrate and the width and length of the protrusion 17a can be changed on demand." *Id.* at 11:42–45. The wiring pattern of bonding assist member 17b may or may not mimic the wiring pattern of connecting terminals 4b. *See id.* at 11:58–12:4.

C. Illustrative Challenged Claim

Claims 1 and 4 are independent. Challenged claim 1 follows:

> 1. A connecting structure of a circuit board, comprising:
>
> a circuit board connected to a substrate opposing thereto through an electrically conductive adhesive film;
>
> a connecting region formed by removing a surface protective member in a vicinity of side portions of said circuit board;
>
> a plurality of connecting terminal groups arranged in said connecting region at a predetermined interval, each connecting terminal group including a plurality of terminals formed by exposing portions of an internal wiring; and
>
> a bonding assist portion arranged between adjacent ones of said terminal groups in said connecting region, said bonding assist portion including at least one protrusion that connects to a fixed potential line on said circuit board.

Ex. 1001, 13:2–18. Claim 4 is similar to claim 1, but recites that the bonding assist portion "has a predetermined wiring pattern portion and a protrusion provided in an edge portion of said wiring pattern portion and connected to a fixed potential line on the side of said circuit board." *Id.* at 13:30–14:10.

D. *Evidence of Record*

Petitioner relies on the Declaration of Richard A. Flasck (Ex. 1002) and a certified English translation (Ex. 1009) of Japanese Pub. Patent Application No. 2000-82870 (Mar. 21, 2000) (Ex. 1008, "Yamada"). *See*

Pet. v, 6, 11. Petitioner also relies on a Reply Declaration of Richard A. Flasck. Ex. 1015 ("Reply Declaration"). Patent Owner relies on the Declaration of Roger Green Stewart. (Ex. 2021, "Stewart Declaration").

E. *Instituted Ground of Unpatentability*

We instituted trial on the ground that Yamada would have rendered claims 1–10 obvious. Inst. Dec. 29.

II. ANALYSIS

A. *Claim Construction*

The claims of an unexpired patent are interpreted using the broadest reasonable interpretation in light of the specification of the patent in which they appear. 37 C.F.R. § 42.100(b); *In re Cuozzo Speed Techs., LLC*, 793 F.3d 1268, 1278–79 (Fed. Cir. 2015), *aff'd sub nom. Cuozzo Speed Techs., LLC v. Lee*, 136 S. Ct. 2131, 2144–46 (2016) (upholding the use of the broadest reasonable interpretation standard).

For the purposes of this Decision, and on this record, most of the claim terms do not need express construction. *See Vivid Techs., Inc. v. Am. Sci. & Eng'g, Inc*., 200 F.3d 795, 803 (Fed. Cir. 1999) (only those terms that are in controversy need to be construed and only to the extent necessary to resolve the controversy).

1. protrusion

Independent claim 1 recites "said bonding assist portion including at least one protrusion that connects to a fixed potential line on said circuit board." Independent claim 4 recites "said bonding assist portion has a predetermined wiring pattern portion and a protrusion provided in an edge portion of said wiring pattern portion and connected to a fixed potential line on the side of said circuit board."

In the Institution Decision, we determined on the preliminary record then before us that the term "protrusion" means "something that juts, projects, or extends outward, with no set configuration, length, or width." Inst. Dec. 7. Patent Owner contends that "construction is unreasonably broad" (PO Resp. 16), primarily because the "*purpose* for providing a protrusion 17a jutting out from the surrounding wiring pattern . . . . is *to restrict the flow of heat*" (*id.* at 17 (emphasis added)). Citing *Cutsforth*, the '053 patent specification, prosecution history, dictionary evidence, and its declarant, Patent Owner contends that "protrusion" is "a part that extends or juts out *from a surrounding structure*." *Id.* at 15. The emphasized language presumptively would restrict the width of the protrusion relative to "[the] surrounding structure."

Petitioner agrees with the construction employed in the Institution Decision, contending that Patent Owner's "added language, that the protrusion 'juts out from the bonding assist region,' appears nowhere in the specification of the ['']053 Patent." Pet. Reply 4. According to Petitioner, Mr. Stewart, Patent Owner's declarant, "testified that the term protrusion was characterized not by 'jutting out' or its specific shape, but by its function." *Id.* (citing Ex. 1014, 140:5–142:14 (Mr. Stewart stating "[i]f [the protrusion is] too big then it will conduct so much heat away from the bonding-assist region that it will be much colder than it should be")).

The record supports Petitioner's position and the claim construction determined in the Institution Decision. The '053 patent specification broadly describes a protrusion as having any configuration: "The configuration of the protrusion 17a is any provided that it can be connected to the GND line in the connecting substrate and the width and length of the

protrusion 17a can be changed on demand." Ex. 1001, 11:42–45. According to a general dictionary cited in the Institution Decision, the plain meaning of "protrusion" is "something that protrudes," and "protrude" means "[t]o push or thrust outward" or "[t]o jut out; project." Ex. 3001; Inst. Dec. 6 (citing Ex. 3001).

The '053 patent specification shows protrusions that correspond to this evidence of plain meaning. For example, Figures 6A–6C show protrusions 17a projecting from an edge of wiring pattern portion 17b of a bonding assist portion. *See, e.g.*, Fig. 6C *supra*. Our claim construction and the plain meaning (as evidenced by the cited dictionary definition (Ex. 3001)) also comport with the statement in the specification that the protrusion configuration "*is any*" provided "it can be connected to the GND line" and "*the width and length* of the protrusion 17a *can be changed on demand*." Ex. 1001, 11:42–45 (emphases added).

As noted above, subsequent to the Patent Owner Response, we granted Patent Owner's request to supplement the record to address the impact of *Cutsforth* on the claim construction of "protrusion." *See* Papers 22, 23, 25. In Paper 23, Patent Owner stresses that *Cutsforth* impacts the claim construction of protrusion here. Paper 23. In *Cutsforth*, the court stated that

> [t]he Board's interpretation of "a projection extending from the mounting block" *far exceeds the scope of its plain meaning and is not justified by the specification*. We hold that the Board's interpretation, which encompasses a structure that recedes into the mounting block rather than jutting out from it, is unreasonable. . . . Cutsforth presented evidence that the plain meaning of "projection" in the context of a mechanical device requires a protrusion that juts out from its surroundings.

Cutsforth, 643 F. App'x at 1010 (emphasis added).

In contrast to *Cutsforth*, here: (1) the claim construction does not exceed the plain meaning (*see* Ex. 3001) and the specification supports it (as the inventors clearly state in the '053 patent specification that the protrusion can be any width or length); (2) the term "projection" is not claimed, and the term "protrusion" is claimed; (3) the prosecution history (as discussed below) shows that the inventors did not rely on limiting the protrusion length or width; and (4) the evidence (as discussed below) shows that even if a protrusion restrict heats flow, it may vary in length and width. *See* Ex. 1001, 11:42–45 ("The configuration of the protrusion 17a is any provided that it can be connected to the GND line in the connecting substrate and the width and length of the protrusion 17a can be changed on demand."). The specification not only supports allowing the protrusion to extend outward and have any width and length, the specification clearly describes it that way.

Patent Owner also relies on dictionary definitions to support an alternative plain meaning of the term "protrusion": "The plain and ordinary meaning of 'protrude,' is 'to jut out *from the surrounding surface or context*.'" Paper 23, 2 (citing Ex. 2028, 1). Some of the listed synonyms in Exhibit 1028 are broader than the definition, as is another listed definition. *See* Ex. 2028 (defining "protrude" as "to thrust forward," and listing synonyms as "project," "stick out"). Such extrinsic evidence, however, is "less significant than the intrinsic record" in construing claim terms. *Phillips v. AWH Corp.*, 415 F.3d 1303, 1317 (Fed. Cir. 2005) (en banc).

In any case, Patent Owner argues that "*the inventor did not act as his own lexicographer*, and the plain meaning of the term 'protrusion,'

consistent with the intrinsic record, is a part that juts out from its surroundings." Paper 23, 2 (emphasis added). Patent Owner's arguments imply that *Cutsforth* dictates that in the absence of evidence that the inventors created a lexicographer's "special definition," the Board must accept Patent Owner's dictionary definition as the plain meaning. *See also id*. ("[I]n the absence of the inventors acting as their own lexicographer, the Federal Circuit held there was no evidence to justify the Board's interpretation.") (citing *Cutsforth*, 643 F. App'x at 1010).[2] Patent Owner's arguments cut against *Phillips*, as the arguments place undue prominence on the "less significant," *see Phillips*, 415 F.3d at 1317, single dictionary definition to justify a demand for a lexicographic definition, even though the specification and other evidence clearly supports the broader meaning of the term "protrusion."

In contrast to the situation in *Cutsforth*, as explained above, the plain meaning cited above by the Board (Ex. 3001) tracks one of the definitions listed in Patent Owner's citation (Ex. 2028), and more importantly, comports with the clear guidance of the specification, i.e., the plain meaning of "protrusion" is "something that protrudes," and "protrude" means "[t]o push or thrust outward" or "[t]o jut out; project." Ex. 3001; *see also* Ex. 2008 ("to thrust forward"). The definition cited by the Board evidences a plain meaning that does not require "jut[ting] out from the *surrounding* surface or context" (emphasis added), and it comports with the clear description in the specification that "[t]he configuration of the protrusion 17a *is any provided that it can be connected to the GND line in the connecting substrate and the*

[2] Patent Owner cites a different reporting agency for *Cutsforth* than we employ here.

width and length of the protrusion 17a can be changed on demand." Ex. 1001, 11:42–45 (emphasis added). Our claim construction also includes all of the depicted and disclosed embodiments (*see id.* at Figs. 5C–6C), and comports with the experts' views of the function of the disclosed "protrusion," as discussed further below. Accordingly, contrary to Patent Owner's arguments, unlike the situation in *Cutsforth*, with no deviation from the cited plain meaning and with the specification supporting the plain meaning relied upon, the construction requires no lexicographic definition to support it. In contrast, *Cutsforth* turned on a construction that "far exceeds the scope of its plain meaning and is not justified by the specification." 643 F. App'x at 1010.[3]

[3] Typically, our reviewing court requires a lexicographic definition to *narrow* the plain meaning (by incorporating limitations from a specification), although *Cutsforth* indicates a lexicographic definition also may be required to *broaden* a term "to give a special definition . . . that *far exceeds the scope of its plain meaning*." *Compare Cutsforth*, 643 F. App'x at 1010 (citing *Thorner v. Sony Computer Entm't Am., LLC*, 669 F.3d 1362, 1365 (Fed. Cir. 2012) (emphasis added), *with Thorner*, 669 F.3d at 1366–67 ("We do not read limitations from the specification into claims; we do not redefine words. Only the patentee can do that. To constitute disclaimer, there must be a clear and unmistakable disclaimer."); *In re Paulsen*, 30 F.3d 1475, 1480 (Fed. Cir. 1994) (improper to "attempt to redefine the claimed invention by impermissibly incorporating language appearing in the specification into the claims"); *Teleflex, Inc. v. Ficosa N. Am. Corp.*, 299 F.3d 1313, 1327 (Fed. Cir. 2002) (written description may *restrict the scope* of the claims if "the patentee demonstrated an intent to deviate from the ordinary and accustomed meaning of a claim term by redefining the term or by characterizing the invention in the intrinsic record using words or expressions of manifest exclusion or restriction, representing a clear disavowal of claim scope"); *CCS Fitness, Inc. v. Brunswick Corp.*, 288 F.3d 1359, 1366 (Fed. Cir. 2002) ("as shown by our precedents, a court may

Furthermore, during his deposition, Patent Owner's expert contradicts Patent Owner, and argues that the claim term protrusion does not follow a dictionary definition: "[T]he meaning of protrusion is narrower by what the specification tells us this protrusion is and what it does. And therefore, *I think that's a narrower meaning than one might get by just looking at dictionary terms*." Ex. 1014, 175:22–176:4 (emphasis added). In other words, contrary to Patent Owner's arguments, Mr. Stewart, Patent Owner's declarant, testifies that the specification provides a narrow lexicographic definition that disavows the plain meaning of the term protrusion. *Compare* Paper 23, 2 (Patent Owner arguing "[t]here is no record evidence that the inventors intended to give the claim term 'protrusion' any special definition."), *with* Ex. 1014, 175:22–176:4 (Mr. Stewart as quoted above). In another portion of the deposition, Mr. Stewart answers "[b]ased on the intrinsic evidence of the specification, *yes*" to the following question: "*your construction* is substantially *narrower than the dictionary definition of protrusion; is it not*?" Ex. 1014, 176:12–16 (emphases added).

Contrary to Mr. Stewart's deposition testimony (which contradicts Patent Owner's arguments), neither the specification nor the full record supports a clear disavowal by implication or otherwise that substantially narrows the term "protrusion" from the plain meaning cited in the Institution

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constrict the ordinary meaning of a claim term in at least one of four ways")). In any case, *Cutsforth* is distinguishable from the case at hand as it is limited to cases where a construction "far exceeds" the plain meaning and "is not justified by the specification." 643 F. App'x. at 1010.

Decision. *See* Ex. 3001. The specification expressly tracks the normal meaning of protrusion, by not limiting its width, length, or shape, as discussed above.

Patent Owner also urges that the Board's construction violates the disclosed purpose of a protrusion as restricting heat flow—i.e., in simple terms, Patent Owner, through Mr. Stewart, contends that a "protrusion" must function as a heat flow valve—i.e., it must be restricted in width (by jutting out from its surrounding) to restrict heat flow. *See, e.g.*, PO Resp. 5, 14; Ex. 2021 ¶¶ 81, 106, 110. This argument is not persuasive for several reasons. First, our claim construction allows for any size or shape of protrusions including those that restrict heat flow, so it does not violate any stated purpose of restricting heat flow. Even if the specification describes restricting heat flow as a disclosed goal, that does not limit the width of the claimed protrusion otherwise broadly described as having any shape. Moreover, the specification describes *at least two goals* of "a protrusion," to "effectively shield the terminal groups against external noise and restrict potential variation of the connecting terminals" and to make it "possible to restrict transmission of heat," by "connecting the protruded portion to a fixed potential line such as a ground (GND) line." Ex. 1001, 6:43–52; *see also In re Rambus Inc.*, 694 F.3d 42, 47 (Fed. Cir. 2012) (determining that "preferred embodiments and goals of the invention that [patentee] argues are better met by single chip devices" did not "restrict the invention to single chip memory devices").

Second, the record evidence, discussed further below, shows that a protrusion restricts heat flow via length and width, not just width. In other words, as the record evidence shows, any heat objective for a protrusion can

be obtained by lengthening the protrusion as width increases—i.e., adjusting the length of the heat flow valve. Patent Owner does not argue for a particular length restriction. It follows that a particular width cannot limit the claimed protrusion. By example, Mr. Stewart testified during his deposition that a short protrusion could not "throttle" heat, yet Patent Owner does not seek to preclude such a short protrusion through its claim construction:

> Q. So I think we talked a little bit about width. How long is the protrusion that's recited in claim one?
>
> A. It's big enough to create a thermal gap. *It has to be long enough so that the heat doesn't bypass it*. In other words, *it's a throttle*. So you've got to make sure -- so it only has to be typically 10, maybe 100 microns.

Ex. 1014, 166:12–19 (emphases added).

Therefore, any alleged disclaimer of protrusion width or lexicographic definition does not exist on this record, as sufficient clarity defining the metes and bounds of any protrusion based on heat flow does not exist. Furthermore, this case does not present a single disclosed embodiment having a restricted protrusion width or length. Even "when the specification describes only a single embodiment, the claims of the patent will not be read restrictively unless the patentee has demonstrated a clear intention to limit the claim scope using 'words or expressions of manifest exclusion or restriction.'" *Liebel-Flarsheim Co. v. Medrad, Inc*., 358 F.3d 898, 906 (Fed. Cir. 2004) (citation omitted). In addition, the prosecution history discussed below shows that Patent Owner did not disavow a particular protrusion shape—i.e., with regard to width or any shape.

As to the record evidence regarding heat flow, Patent Owner quotes the '053 patent specification and contends that the "<u>width of each protrusion</u>

17a is preferably made as small as possible." *See* PO Resp. 32–33 (quoting Ex. 1001, 11:47–52). To make its point, Patent Owner provides the following illustration of a preferred protrusion:

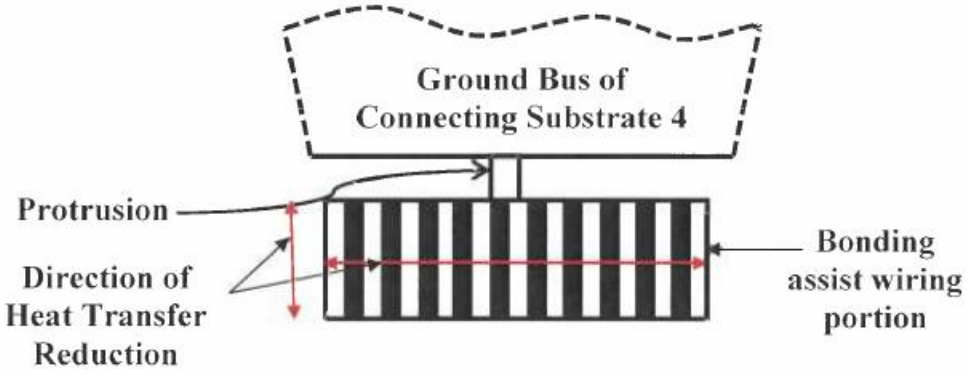


Figure A

Figure A above does not appear in the '053 patent. Rather, it illustrates a preferred protrusion that restricts heat flow (as a throttle or valve) to a ground bus as described by Patent Owner. *See id.* at 20.

In contrast to Figure A, Patent Owner provides the following illustration of a protrusion that Patent Owner contends does not satisfy its allegedly broadest reasonable claim construction:

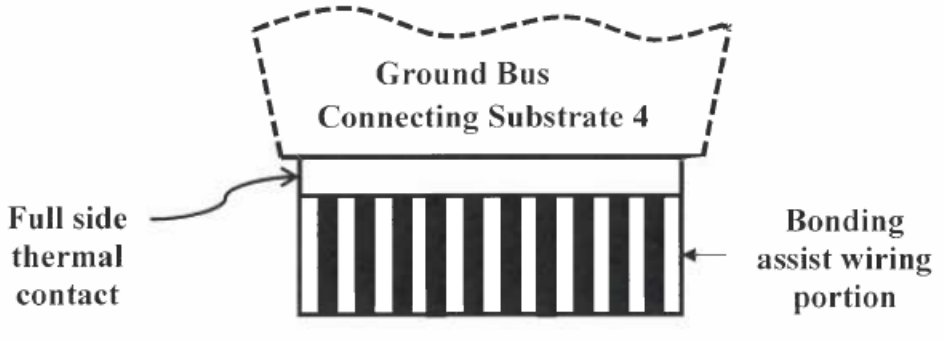


Figure B

See PO Resp. 22. Figure B illustrates a protrusion (i.e., the protrusion is the intermediate metal region designated as in "[f]ull side thermal contact" with ground bus 4) that Patent Owner contends would be unreasonably broad and

encompassed by our claim construction (i.e., a construction that does not limit the width of the protrusion relative to the bonding assist portion). *See id.* at 21–22.

Contrary to Patent Owner's position, a mere "preference" for a certain disclosed embodiment (narrow width) cannot support a disavowal (narrowing) of scope of the plain meaning of a term claim. Furthermore, answering a question during his deposition concerning how to restrict heat flowing to a ground line using a protrusion, Patent Owner's expert, Dr. Stewart, explains how a protrusion can vary in *width and length* as "a combination" to control heat flow to the ground bus:

> By making the width of the protrusion as narrow as you can. You *could clearly do it by making the protrusion longer as well*. It is obviously a *combination of those*. *And that depends on the details. How far are you going to go to get to that ground line*. There are lots of details beyond that. But the principles of the protrusion, I think, are clear here. *The purpose is to restrict or control the flow of heat into the ground line*.

Ex. 1014, 149:10–18 (emphases added). Dr. Stewart explains further in response to a similar question:

> So it is limited. It can't just be anything. *But what happens is the details, how much is the combination of width and length are affected by how far it is to the ground line, how wide the ground line is*. There are other details that are going to, that are going to affect the final design of that protrusion.

Ex. 1014, 150:13–19 (emphasis added).

Despite noting that the disclosed protrusion can vary in *combination* as to *length and width*, Mr. Stewart also testifies that the claimed protrusion "clearly cannot be the entire width of the bonding-assist region because we know that that would violate the description, because it would no longer be limiting the flow of heat into the ground line at all." *Id.* at 180:17–21.

Dr. Stewart's overall testimony regarding the combination of length and width itself undermines this testimony about an alleged width restriction, and it also fails to account for the evidence discussed above showing one disclosed goal of reducing noise based on a grounded protrusion. *See* Ex. 1014, 150:13–19 (citing other factors); Ex. 1001, 6:43–52 (at least two goals). As another example, the next colloquy also clearly shows that Mr. Stewart agrees that the width can be a function of conductor length to the ground region:

> Q. What if the ground line was not close to the bonding-assist region? Suppose it was much farther away from the ground bus? That would mean for a different dimension protrusion, wouldn't it?
>
> A. *The protrusion in that case might be wider to compensate for the fact that the ground line was further away*.

Id. at 181:1–7 (emphasis added).

We find that, despite Mr. Stewart's testimony that the width of the protrusion cannot extend the full width of the bonding assist portion (based in part on an alleged disclosed purpose for heat flow restriction), the weight of Mr. Stewart's testimony shows that the '053 patent does not limit the protrusion's width, because the protrusion width depends on the heat flow desired, which turns partly on the distance that any connecting protrusion must traverse to reach the ground line. In simple terms, a metal heat flow valve path or throttle includes a combination of metal width and length to control heat flow, as Mr. Stewart generally testifies.

Mr. Flasck's testimony supports this finding, and his testimony is persuasive, given that it agrees with Mr. Stewart to the extent that heat transfer depends on a combination of width and length:

> Mr. Stewart considers a protrusion width equal to the full width of the bonding assist region to be unreasonable or unnecessary in any circumstance (Exhibit 2021, ¶¶ 95-98, Exhibit 1014, 180:7-22). This is incorrect. *The heat leakage from the bonding assist region to the ground bus is dependent not only on the width of the protrusion, but also on the length of the protrusion required to reach the [printed circuit board] PCB ground bus*. As noted above in ¶ 34, if the PCB ground bus is close to the bonding assist area, then the protrusion width may be small, *but if the PCB ground bus is not close then the width of the protrusion would have to be many times the original width up to the full width of the bonding assist portion, to achieve the same heat leakage*. There is no reason to assume arbitrarily that the PCB ground bus in all cases must be close to the bonding assist portion. *A wide protrusion sometimes may be necessary (if the distance between the PCB ground plane and the main body of the bonding assist region is large)* to provide equal heat leakage levels necessary between the terminal regions and the bonding assist regions to achieve reliable ACF connections, and the [']053 Patent inventor understood and acknowledged this.

Ex. 1015 ¶ 42 (emphases added).

Patent Owner also contends that the prosecution history supports its limiting construction of protrusion. PO Resp. 23–24 (citing Ex. 1005, 26).[4] Contrary to these arguments, the prosecution history shows that the reasons for allowance had nothing to do with the shape of the protrusion. Rather, then-Applicant's amendment merely required any protrusion type to "*connect*" to "a fixed potential line," and that amendment resulted in allowance. *See* PO Resp. 23 (showing the amendment as adding "<u>said bonding assist portion including at least one protrusion that connects to a fixed potential line on said circuit board</u>") (citing Ex. 1005, 26).

[4] Page number citations refer to pages in Exhibit 1005 counted by the Board. Petitioner must number the pages in its exhibits in future cases. *See* 37 C.F.R. § 42.63(d)(2)(i).

Contrary to Patent Owner's current argument that its prosecution history arguments disavow the full width of the claimed protrusion, the prosecution history arguments did not disavow any claim scope relative to width, sufficiently clearly or otherwise. Patent Owner now contends that it argued during prosecution that its claimed protrusion "*made it possible to*: (i) protect the connecting terminals against external noise (i.e., provide a ground connection); and (ii) restrict the flow of heat from the press-bonding head." *Id.* at 23 (citing Ex. 1005, 30–31) (emphasis added).

Patent Owner's arguments about "possible" benefits at most show dual possible purposes for the protrusion—electrical connection providing noise suppression and heat removal. *See* Ex. 1001, 6:43–52 (describing at least two "possible" purposes for grounding protrusions). Nevertheless, according to Patent Owner, its "amendment specifically excludes from the claimed subject matter the disclosed embodiment having no protrusions." *Id.* at 24. Our claim construction does not embrace an embodiment having "no protrusions."

Contrary to any specific exclusion of width, during prosecution, then-Applicant ambiguously argued (in amending its claims in response to an indication of allowable subject matter by the Examiner in a previous Non-final Office Action (Nov. 9, 2004)) that "a protrusion . . . as presently claimed, *makes it possible* to protect the connecting terminals against external noise . . . . It *is also possible* to restrict flow of heat." Ex. 1005, 30–31 (emphases added).

In other words, nothing in the prosecution history arguments or the claims as amended *requires* heat flow to be restricted. *See* Pet. Reply 8 (noting that the amendments and arguments during prosecution do not

require any particular protrusion shape). As noted, and as Patent Owner currently acknowledges, then-Applicant characterized any functional features as "possible," and the heat flow feature was not even characterized "as presently claimed"—in contrast to the "possible" noise protection. In any event, our claim constructions of "protrusion" and "connects" (discussed below in the next section) allow for this "possible" heat flow result (and noise reduction), because the construction of "protrusion" does not preclude any combination of width and length that connects to a ground bus (and the construction of "connects" locates the protrusion between the bonding assist portion and ground).

Moreover, as alluded to above, prior to then-Applicant's cited prosecution history arguments, the Examiner already had indicated allowable subject matter in a Non-final Office Action based on language recited in original claim 3 that pertained only to the connection to a fixed potential—i.e., regardless of any heat flow predicated on a narrow protrusion (or any protrusion configuration):

> The following is a statement of reasons for the indication of allowable subject matter: Claim 3 states the limitation "and a protrusion provided in an edge portion of said wiring pattern portion and connected to a fixed potential line on the side of said substrate." *This limitation*, in conjunction with the other claimed limitations was neither found to be disclosed in, nor suggested by the prior art.

Ex. 1005, 40–41 (emphasis added).

More succinctly responding to the Examiner's indication of allowable subject matter, then-Applicant argued only about the protrusion *connection* claimed (as opposed to its shape):

> Applicant respectfully submits that Takahashi does not teach or fairly suggest at least the above-noted features as

> claimed by Applicant. *Specifically*, Takahashi does not disclose bonding assist portions arranged between adjacent ones of terminal groups in a connecting region, *wherein the bonding assist portion includes a protrusion that connects to a fixed potential line on the circuit board*, as is claimed by Applicant.

Id. at 31 (emphases added).

Furthermore, Patent Owner's current argument characterizing its prosecution history is circular, because it presupposes that a connecting or contact extension (protrusion) that traverses the full width of the claimed bonding assist portion does not limit heat flow and is not a protrusion—i.e., according to Patent Owner, it is "no protrusion[]." *See* PO Resp. 23–24. The record does not support this reasoning, because as discussed above (and further below), the experts agree with the unsurprising fact that heat flow through a metal path is a function of the combination of length and width of the metal path.

Moreover, during oral argument, Patent Owner acknowledged that its protrusion extended at least to 99.9% of the width of the bonding assist portion:

> JUDGE EASTHOM: Well, let me ask you this . . . a lot of you[r] a[r]gument has to do with preferably making this protrusion as small as possible so that you can restrict this heat flow, *but your claim covers something that's almost a hundred percent wide, right? It covers everything up to 99.9 percent width*.
>
> MR. ETTELMAN: If the design choices warranted allowing that much heat flow, I suppose that given that it just needs to protrude from the surroundings, that *arguably it covers a very wide protrusion*. The idea is to make it as narrow as possible to restrict heat flow. If for some reason the parameters of the heating process were so high and you had an ACF material that could

> endure that kind of heat or a PCB that wouldn't melt when you applied that much heat and you wanted to allow --
>
> JUDGE EASTHOM: What about a longer length? . . .
>
> MR. ETTELMAN: A longer length is possible and *we're not denying that you can adjust width and length*, but the length is really determined --

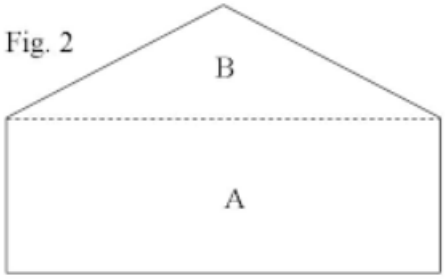
Tr. 28:22–29:16 (emphases added).

This range of up to 99.9% conflicts with some of Patent Owner's expert's testimony quoted above, and similar testimony wherein Mr. Stewart testifies that the specification limits the protrusion width "to minimize or limit the amount of heat flow[]." Ex. 2021 ¶ 106; *see also id.* ¶¶ 81, 95–98; Ex. 1014, 180:7–22. No conflict exists if the claim construction of protrusion allows for varying length and width, as it does according to our determination.

In essence, Patent Owner relies on a dictionary definition and *Cutsforth* to restrict its claim construction of a protrusion to just under 100% of the full width of a bonding assist portion, but this finds no support in the specification, and it contradicts the thrust of both declarants' testimonies regarding a combination of width and length when considered in full. *See, e.g.*, Ex. 2021 ¶ 81 ("Solely the ['']053 patent teaches that this would include the addition of a *contact* 'protrusion' that could be adjusted in length, width and configuration to limit heat flow . . . ."); Ex. 1015 ¶ 42 (disagreeing with Mr. Stewart's testimony that "a protrusion width equal to the full width of the bonding assist region [is] unreasonable or unnecessary in any circumstance," because controlling heat flow require controlling the protrusion width and length, which in turn depends on the distance between the ground bus to the bonding assist region distance).

Notwithstanding Patent Owner's arguments, no meaningful difference exists between 99.9% and 100% of protrusion width relative to the bonding assist portion in terms of restricting heat flow from that portion, given that the shape, width, and length of the protrusion governs heat flow—assuming for the sake of argument that the claimed protrusion must account for the disclosed but unclaimed function of heat flow.[5] The claims and disclosure fail to specify how much heat the bonding assist region experiences (from press-bonding head 18) during manufacture of the disclosed connecting structures, let alone how to structure the protrusions for a designed heat flow. *See supra* Section I.B; Ex. 1001, 9:35–54.

By way of one example of respective widths covered by the claims under our claim construction but precluded under Patent Owner's construction, a triangular protrusion would have equal width with a connecting rectangular bonding assist region and restrict heat flow, as follows:



[5] In response to Patent Owner's Request for Rehearing, the Rehearing Decision addresses this issue from a slightly different perspective. *See* Reh'g Dec. 5 n.3 ("Even if such a protrusion cannot extend across the whole edge of a symmetrical wiring pattern for some reason not articulated clearly by Patent Owner, the record at this preliminary juncture does not reveal a patentable distinction between a protrusion that extends across 99% of edge of the wiring pattern and a wiring structure that extends fully across the edge of the wiring pattern.").

In this case the triangular B portion would constitute a protrusion from the rectangular bonding assist portion A under our claim construction, even though the protrusion's width is equal to the width of the rectangular portion, but would be precluded under Patent Owner's claim construction. Consequently, equal widths cannot be a distinction for a protrusion, contrary to Patent Owner's arguments and claim construction. In a similar fashion, according to the testimony of record, a rectangle in place of the triangle above as a protrusion (i.e., *supra* Figure B) would limit heat flow too. Patent Owner otherwise agrees that a protrusion has any shape: "It is clear that the claimed protrusion may have any configuration (e.g., triangular, rounded, trapezoidal, square, etc.), length and width." Reh'g Req. 7; Reh'g Dec. 4–5 (quoting Reh'g Req. 7).

Accordingly, as we determined in the Institution Decision, the broadest reasonable construction of "protrusion" is "something that juts, projects, or extends outward, with no set configuration, length, or width."

2. Connects

Claim 1 recites "said bonding assist portion including at least one protrusion that connects to a fixed potential line on said circuit board." Claim 4 recites a similar limitation.

In our Institution Decision, we stated that "[o]n this preliminary record," the recited "connects" limitation includes an electrical connection of the whole bonding assist region. *See* Inst. Dec. 10. In its Response, Patent Owner does not set forth a specific claim construction for "connects," but otherwise implies through its arguments that the claimed "protrusion" portion of the bonding assist layer must "connect" to the ground layer in

Yamada by being located between the two regions in order to limit heat flow to the ground bus. *See, e.g.*, PO Resp. 3, 32–33.

Petitioner does not clearly argue that the protrusion may be located anywhere on the bonding assist region. Rather, Petitioner's arguments and evidence imply, similar to those of Patent Owner, that the claims require the *location* of the protrusion, as claimed, to be able to limit heat flow (i.e., the claims make it "possible" to limit heat flow if the protrusion includes proper *dimensions* to limit heat flow in a hypothetical product upon which the claims read—dimensions the claims do not require for the reasons explained above). *See* Ex. 1001, 6:42–53 ("possible" heat flow and noise reduction). For example, similar to the testimony outlined above, Mr. Flasck testifies that "[t]he heat leakage from the bonding assist region to the ground bus is dependent not only on the width of the protrusion, but also on the length of the protrusion *required to reach the PCB ground bus*." Ex. 1015 ¶ 42 (emphasis added); *see also* Pet. 33, 36; Ex. 1002 ¶¶ 72–73, 79, 81; Ex. 1014, 166:12–18 (Mr. Stewart characterizing the disclosed protrusion as a "throttle" requiring sufficient length "to create a thermal gap . . . so that the heat doesn't bypass" the protrusion); Ex. 1015 ¶¶ 18, 42.

Accordingly, we determine that "connects" serves to locate the protrusion in a part of the bonding assist region such that heat and electricity flows through it to the fixed potential (or ground) line. Note that this refinement constitutes a narrowed claim construction that Patent Owner raised in its Patent Owner Response. *See* PO Resp. 3–4. Accordingly Petitioner had the opportunity to respond to it in its Reply Brief and Reply Declaration. *See, e.g.*, Tr. 17:7–18:2 (Petitioner contending that Mr. Flasck

testifies in his Reply Declaration (Ex. 1015) that Yamada at least suggests a connection through the protrusion).

B. *Obviousness*

1. Independent Claims 1 and 4

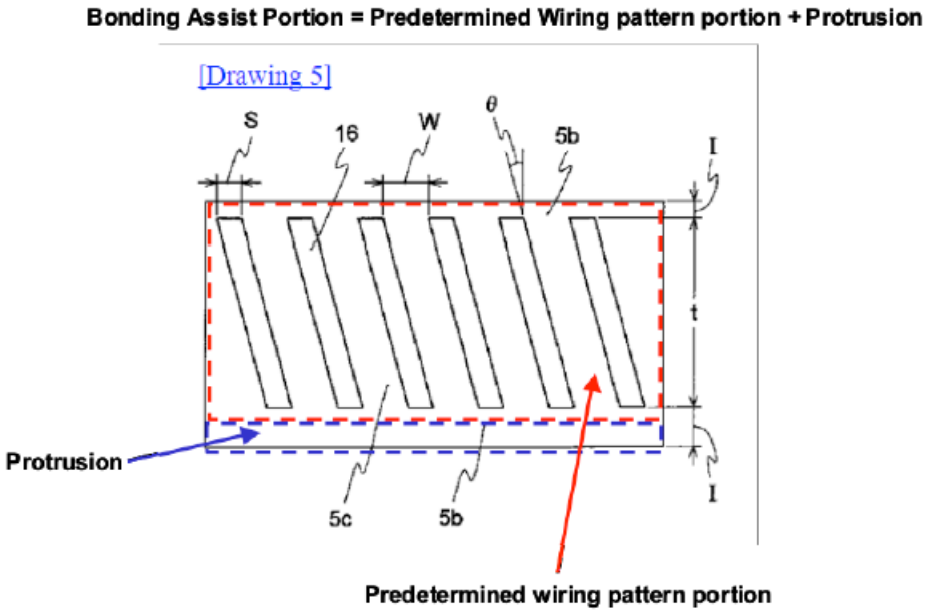
Claim 1 recites "a bonding assist portion arranged between adjacent ones of said terminal groups in said connecting region, said bonding assist portion including at *least one protrusion that connects to a fixed potential line on said circuit board*." (Emphasis added.) Independent claim 4 is similar in scope to independent claim 1. The central dispute regarding claims 1 and 4 involves whether Yamada teaches or suggests the claimed protrusion. *See* PO Resp. 2–3 ("Yamada simply does not teach or suggest a protrusion connected to ground as claimed in the ['053 patent."). With regard to all the claim limitations, we adopt as persuasive Petitioner's showing, including as summarized in the Institution Decision. *See* Pet. 11–47; Inst. Dec. 8–19.

Addressing the claimed bonding assist region and its protrusion, Petitioner generally relies on Yamada's conductive layer 5, which Yamada discloses as connected to ground to reduce electromagnetic noise—i.e., to provide an electromagnetic shielding path to ground (to shunt electromagnetic noise emanating within the circuit to ground). *See* Pet. 16–17 (citing Ex. 1008, Figs. 7–9; Ex. 1009 ¶¶ 5 ("a conductive layer 5 connected to a ground potential"), 7 (grounded conductive layer "functioning as an electrostatic shield in order to reduce electromagnetic noise radiation"), 22 (similar), 30 (similar); Ex. 1002 ¶¶ 52, 72, 73, 79), 33.

In other words, the whole bonding assist wiring pattern of conductive layer 5 of Yamada electrically "connects" (claim 1) or is "connected" (claim

4) somehow to ground ("a fixed potential," claims 1 and 4), as we found in the Institution Decision. Inst. Dec. 10. The parties do not dispute this factual finding with respect to Yamada. As discussed above in Section II.A.2 (Claim Construction), however, the parties now appear to agree that "connects" (claim 1) and "connected to" (claim 4) require the claimed protrusion to be located so that current and heat flows through the protrusion to the recited fixed potential line (Yamada's ground bus). *See* PO Resp. 3 (arguing that "Yamada . . . contains no disclosure or guidance whatsoever as to how and where the conductive layer is connected to ground" as opposed to connected to a protrusion); 32–33 (depicting a hypothetical direct connection in Yamada).

Portraying the alleged protrusion of Yamada's bonding assist layer, Petitioner cites to the Flasck Declaration and Yamada, and sets forth the following annotated version of Yamada's Figure 5:



Pet. 33 (citing Ex. 1002 ¶¶ 110–113).

Mr. Flasck contends that the downward extending portion in Yamada's Figure 5, as annotated above, constitutes a protrusion upon which at least claims 1 and 4 read. *See* Ex. 1002 ¶¶ 71–72, 110–113. Mr. Flasck also contends that it would have been obvious to connect a protrusion of a bonding assist layer of Yamada to ground, because Yamada discloses a connection to ground; therefore, some type of protrusion would have been necessary to connect the bonding assist layer to ground. *See id.* ¶ 79 (citing Ex. 1009 ¶¶ 5, 7, 22, 30), 81, 117. In reaching his conclusion about the claimed protrusion and corresponding protrusion in Yamada, Mr. Flasck notes that according to the '053 patent specification, a protrusion can be any length or width, and reasons that the protrusion in Yamada's Figure 5 "is equal to the width of the bonding assist portion." *Id.* ¶ 73 (quoting Ex. 1001, 11:41–44 ("The configuration of the protrusion 17a is any provided that it can be connected to the GND line in the connecting substrate and the width and length of the protrusion 17a can be changed on demand.")).

Relying on Mr. Flasck, Petitioner explains that connecting Yamada's ground to a protrusion anywhere on the bonding assist portion constitutes a design choice. *See* Pet. 36–37 (citing Ex. 1002 ¶¶ 121–124). Based on Petitioner's showing as a whole (i.e., including its showing with respect to claims 1, 4, and 5, which involve overlapping issues regarding the claimed protrusion), we initially determined that the Petition sets forth a reasonable likelihood of showing that Yamada "discloses or suggests, in a manner consistent with the '053 patent [s]pecification, the claimed bonding assist portion including a protrusion." Inst. Dec. 14, *see also id*. at 11 n.4 (similar obviousness reasoning), 18 (similar obviousness reasoning based on

Petitioner's showing—using a protrusion "in order to ensure a reliable electrical connection to a ground . . . and thereby form a shield").

Patent Owner contends that Yamada's protrusion, as depicted above, does not "extend[] or jut[] outward from *anywhere* along the horizontal wiring." PO Resp. 33 (emphasis added). As noted, Patent Owner's claim construction requires a protrusion to be "a part that extends or juts out *from a surrounding structure*." *Id.* at 15.

Patent Owner's contention is not persuasive, and we do not adopt Patent Owner's claim construction argument. A protrusion may jut out from "anywhere" without jutting out from a "surrounding structure." Factually, we find that Yamada's protrusion identified above with respect to Figure 5 juts out from the symmetrical ladder-like region defined by, and made of, slits between strips of metal. *See* Ex. 1008, Fig. 5. As outlined above, Mr. Flasck's testimony supports the finding regarding the protrusion. *See* Ex. 1002 ¶¶ 72–73, 112–113. Therefore, Yamada satisfies our claim construction of protrusion.

Patent Owner also argues that Yamada's Figure 5 does not disclose or suggest a protrusion because the "protrusion" identified by Petitioner merely represents what appears to be, but is not, an asymmetric part of a bonding assist portion, so that any asymmetry represents "artistic license, or artistic error." PO Resp. 38. In his deposition, as Patent Owner acknowledges, Mr. Flasck disagrees. *See id.* at 35 (citing Ex. 2020, 49:7–10, 21–25).[6] Patent

[6] In addressing whether Figure 5 itself discloses a protrusion, Mr. Flasck also testifies that because Yamada's bonding assist portion is grounded, "there's inherently a protrusion somewhere, you know, so that you can make contact to the ground on the printed circuit board." Ex. 2020, 50:1–5. This

Owner does not cite to expert testimony to support that position. *See* PO Resp. 35–38. Instead, Patent Owner contends that the sole difference described in relation to the difference between Figures 3 and 5 of Yamada is the incline in the slits, thereby showing that any asymmetry with respect to the relied-upon protrusion in Figure 5 is accidental. *See id.* at 36–37 (citing Ex. 1009 ¶¶ 50, 51, 54–56).

Patent Owner's arguments alleging accidental asymmetry in Yamada also are not persuasive. Yamada's Figure 5 clearly depicts an asymmetric protrusion—i.e., an extension from the symmetrical wiring portion pattern—and Yamada's written portion does not contradict Figure 5, or describe the inclines as the "sole" difference between Figures 3 and 5, contrary to Patent Owner's arguments. The embodiment of Figure 5 includes the following dimensions: "a width of the horizontal wiring 5b is l = 0.1 to 0.3 mm, a width of the vertical wiring 5c is w = 150 to 250 μm, a width of the slit 15 is s = 150 to 250 μm, and a length of the slit is t = 2 to 3 mm." Ex. 1009 ¶ 55. Yamada does not describe the width of the top and horizontal wiring portions 5b in Figure 5 (rails) as equal (i.e., symmetrical). The disclosed variance of width (0.1 to 0.3 mm) implies the top and bottom rails need not be equal, and Figure 5 portrays an embodiment in which they are not equal.[7]

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testimony, and other testimony by Mr. Flasck, tracks and is consistent with Mr. Flasck's original Declaration, and is responsive to the Patent Owner Response. *See* Ex. 1002 ¶ 79.

[7] Although Patent Owner does not rely on or cite Mr. Stewart's Declaration to address the alleged symmetry with respect to Figure 5 (*see* PO Resp. 35–41), Mr. Stewart testifies that Yamada teaches the "same dimensional ranges for every feature of the inclined slit shape as in the ladder shape." *See* Ex. 1021 ¶ 93. Dimensional ranges, in conjunction with Figure 5, as explained

Accordingly, nothing in Yamada indicates that the asymmetry depicted in Figure 5 is accidental, but even if it is, Patent Owner does not explain how that would make a difference. *See*, *e.g.*, *In re Wagner*, 63 F.2d 987, 986–87 (CCPA 1933) ("While it is true that drawings may not always be relied upon for anticipation of a later application, it is also true that, if a drawing clearly suggests to one skilled in the art the way in which the result sought is accomplished by a later applicant, it is immaterial whether the prior patentee's showing was accidental or intentional." (internal citations omitted)); *In re Mraz*, 455 F.2d 1069, 1072 (CCPA 1972) ("[W]e did not mean that things patent drawings show clearly are to be disregarded."); *In re Seid*, 161 F.2d 229, 231 (CCPA 1947) ("[A]n accidental disclosure, if clearly made in a drawing, is available as a reference.").

> We know of no rule that figures can never of themselves be an adequate anticipation of mechanical inventions, as of course they must be of designs, and we can see no reason for importing into the statute an arbitrary distinction, unrelated to its purposes . . . . Words have their equivocations quite as much as figures; the question always must be what the art necessarily gathered from what appeared.

Jockmus v. Leviton, 28 F.2d 812, 814 (2d Cir. 1928) (Judge L. Hand) (citations omitted).

Analogously to anticipation or obviousness, in proper circumstances, drawings alone may provide an adequate written description under § 112 if they describe what is claimed and convey to those of skill in the art that the patentee actually invented what is claimed. *Cooper Cameron Corp. v. Kvaerner Oilfield Prods.*, 291 F.3d 1317, 1322 (Fed. Cir. 2002) (discussing

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herein and below, suggest, instead of preclude, unequal widths within the ranges.

Vas-Cath, Inc. v. Mahurkar, 935 F.2d 1555, 1563 (Fed. Cir. 1991)). In *Vas-Cath*, 935 F.2d at 1566, the court held that one skilled in the art could derive claimed dimensions from drawings in a prior design patent.[8]

As indicated above, Petitioner's obviousness showing involves noting that Yamada teaches connecting the bonding assist region to ground in order to eliminate electrical noise through shielding. Pet. 17 (citing Ex. 1002 ¶ 79; Ex. 1009 ¶¶ 5, 7, 22, 30). Considering the teaching in Yamada of a necessary connection to ground for shielding, Petitioner cites Mr. Flasck, who declares that "one of ordinary skill in the art at the time of the '053 [invention] would have known that *some electrical protrusion* would be inherently necessary to connect the bonding assist portions to a fixed potential." Ex. 1002 ¶ 79 (emphasis added); Pet. 17 (citing Ex. 1002 ¶ 79). Petitioner also contends that "locating a protrusion" centrally or "at a different location is nothing more than a design choice," or skilled artisans

[8] *Compare Wagner*, 63 F.2d at 986–87 (relying on drawings), *Seid*, 161 F.2d at 231 (relying on accidental drawings), *Mraz*, 455 F.2d at 1072 (relying on drawings), *and Vas-Cath*, 935 F.2d at 1566 (relying solely on design patent drawings for written description of relative proportions), *with Hockerson-Halberstadt, Inc. v. Avia Group Int'l., Inc.*, 222 F.3d 951, 956 (Fed. Cir. 2000) (stating "it is well established that patent drawings do not define the precise proportions of the elements and may not be relied on to show particular sizes if the specification is completely silent on the issue."). As discussed above, notwithstanding the reasoning in *Hockerson-Halberstadt*, Yamada's specification is not "completely silent" on the issue, as it disclose ranges for wiring widths, implying all widths need not be equal. Also, notwithstanding the dicta regarding drawings, the holding in *Hockerson-Halberstadt* turned on patent owner's disavowal of claim scope based on prosecution history that overcame defendant's argument that relied on alleged drawing dimensions that the patent owner had distinguished during prosecution. *See id.* at 956–57.

"would be guided by design options." Pet. 36–37 (citing 1002 ¶¶ 121–122). In other words, the thrust of Petitioner's showing as summarized in the Institution Decision is that it would have been obvious to employ a protrusion somewhere in Yamada's bonding assist region in order to ensure a ground connection and to prevent noise—a connection that Yamada discloses. *See* Ex. 1002 ¶¶ 70, 72–73, 79; Ex. 1009 ¶¶ 5, 7, 22, 30; Pet. 11, 35–37; Inst. Dec. 10 (connection to ground), 11 n.4, 14 (obviousness), 18 (obviousness); *see also* PO Resp. 32 (joining the issue and arguing the opposite: "Yamada does not . . . teach or suggest . . . a protrusion connected to ground" as claimed in the '053 patent).

Petitioner's contentions are persuasive to show the obviousness of connecting Yamada's bonding assist region using a simple protrusion or contact extension, for the purpose of ensuring the electrical connection disclosed by Yamada. The claimed "connecting structure . . . comprising: . . . a bonding assist region . . . including" a "protrusion" (an electrical contact), as claims 1 and 4 recite, constitutes "the predictable use of prior art elements according to their established functions." *See KSR Int'l Co. v. Teleflex Inc.*, 550 U.S. 398, 417 (2007); *see also In re Kuhle*, 526 F.2d 553, 555 (CCPA 1975) ("We also agree that the particular placement of the contact provides no novel or unexpected result. The manner in which electrical contact is made for Smith's battery would be an obvious matter of design choice within the skill of the art.").

Patent Owner does not dispute that Yamada teaches some type of connection between ground and Yamada's bonding assist region. *See* Ex. 1009 ¶¶ 5, 7, 22, 30. Rather, Patent Owner contends "there is no indication whatsoever as to which side of the conductive layer is connected to ground."

PO Resp. 4. This argument does not address the obviousness of connecting a claimed protrusion somewhere on the bonding assist region as suggested, in order to establish a reliable connection to ground, as Yamada suggests. According to claim 1, a protrusion "connects to a fixed potential line" and, therefore, corresponds to a contact to ground or other fixed potential. Ex. 1001, 13:17–18.

With the exception of Patent Owner limiting protrusion width (to 99.9% of the bonding assist region width) as discussed in connection with the claim construction of protrusion, the parties generally agree a protrusion can be any shape or size, according to the '053 patent. Ex. 1002 ¶ 72; Reh'g Req. 7; *supra* Section II.B.1. In any event, both experts refer to a protrusion as a contact or having a contact function—i.e., making a connection. Ex. 2021 ¶ 81 ("[T]he ['053 patent teaches that this would include the addition of a *contact* 'protrusion' that could be adjusted in length, width and configuration to limit heat flow . . . ." (emphasis added)). Similarly, albeit with respect to Yamada, Mr. Flasck testifies that "if you're going to ground these things [which Yamada discloses], there has to be -- there's inherently a protrusion somewhere, you know, so that you can make *contact* to the ground on the printed circuit board." Ex. 2020, 50:1–5 (emphasis added).

Given this agreed-upon function of a protrusion as a contact, during his deposition, Dr. Stewart testified that skilled artisans would have located the protrusion anywhere to make an electrical connection: "if it were electrical it wouldn't matter where it was." Ex. 1014, 189:7–8; *accord Kuhle*, 526 F.2d at 555 ("[t]he manner in which electrical contact is made . . . would be an obvious matter of design choice within the skill of the art"). Tracking his initial testimony (Ex. 1002 ¶¶ 79, 81) and implicitly referring to

the required length of a connecting protrusion to ground, Mr. Flasck responds to Patent Owner's showing regarding the location of Yamada's bonding assist portion relative to the ground layer by stating in his Reply Declaration that "[t]here is no reason to assume arbitrarily that the PCB ground bus in all cases must be close to the bonding assist region." Ex. 1015 ¶ 34. In further response to Patent Owner's arguments about relative distance to the grounding layer in Yamada, Mr. Flasck explains that Yamada would have suggested to one of ordinary skill in the art varying protrusion widths "so as to equalize the heat leakage in the terminal regions and in the bonding assist regions" to provide "reliable ACF" bonding. *Id.* ¶¶ 34–35; Ex. 1009 ¶¶ 10–11.

Petitioner similarly contends in the Petition that one of Yamada's purposes is to "provide . . . temporary joint ACF reliability." *See* Pet. 19 (citing Ex. 1009 ¶¶ 8–11); Ex. 1002 ¶ 85 (citing Ex. 1009 ¶¶ 8–11, 41) (discussing dual purposes in Yamada). Accordingly, Petitioner establishes on this record the obviousness of using a contact of differing widths (relative to the bonding assist region width) in order to ensure joint reliability and to ensure noise reduction. In other words, Petitioner shows that Yamada would have rendered obvious a contact protrusion even under Patent Owner's narrow claim construction.

As another example, responding to Patent Owner's contentions regarding a protrusion in general, Mr. Flasck testifies that "[s]uch grounded conductor structures inherently necessitate some extension from the conductive material in the bonding assist regions to the ground bus on the substrate." Ex. 1015 ¶ 18. He also testifies that something that "'juts out

from' the surrounding material is just a usual, but not always necessary, natural consequence of the normal design process." *Id.*

Further with respect to the notion of a protrusion as a contact, Patent Owner contends that "both Figs. 3 and 5[] [of Yamada] *show* a horizontal portion 5b or even a vertical portion 5c, *that would be in intimate contact with the ground bus* of the PWB 1." *See* PO. Resp. 39 (emphases added).[9] This argument refers back to Patent Owner's similar contention that

> *[o]ne of ordinary skill in the art would understand* that the *entire* side of the grounded conductive layer 5 of Yamada, i.e., the entire side of the horizontal wiring portion 5b, is attached to the ground bus of the PWB 1, as illustrated below (utilizing the ladder-shape pattern of Yamada as an example):

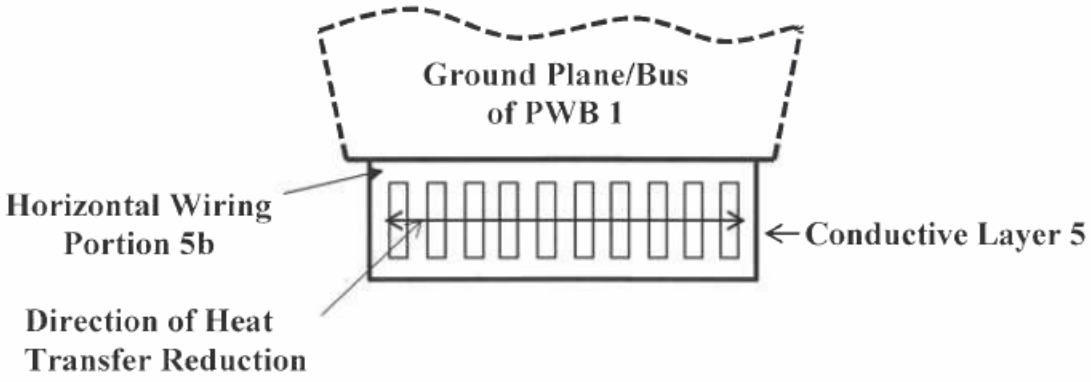

Figure C

PO Resp. 33 (emphases added). In other words, "Figure C" (labeled by this panel) above represents Patent Owner's hypothetical representation of how it contends "[o]ne of ordinary skill in the art would understand" Yamada's

[9] In making the statement that the vertical portions 5c (*see* Ex. 1009, Fig. 5) come in intimate contact with the ground plane, Patent Owner admits that vertical rungs 5c (protrusions) "in a wiring layer" are in contact with the ground plane. But Petitioner does not make this argument, so we decline to decide upon it.

"ladder-shape pattern" connects to the ground plane—"i.e., the entire side of the horizontal wiring portion 5b, is attached to the ground bus of the PWB 1." PO Resp. 33 (citing Ex. 2021 ¶ 94).

Therefore, Patent Owner's use of Figure C above concedes or verifies that a protrusion on this record functions as, or is, a contact (as Dr. Stewart and Mr. Flasck testify to as noted above), and concedes that skilled artisans ordinarily would have made an required electrical connection (which Yamada discloses) using a contact (i.e., a protrusion). When questioned about its hypothetical Figure C during the Oral Hearing, Patent Owner explained that its Patent Owner Response merely describes how, *if* Yamada discloses a protrusion, a skilled artisan would have connected it to the ground layer directly using that protrusion according to Figure C. *See* Tr. 45:25–46:7 ("if the entire side were the protrusion that would be in contact with the ground . . . if we're going to say that an entire edge is a protrusion, then what you would have is an entire edge in contact with the ground"), 45:3–9 (stating that the argument in the Patent Owner Response about the entire edge being connected is predicated on "if the entire edge were interpreted to be a protrusion, which we disagree with"). In other words, congruent with our explanation, Patent Owner verified during the Oral Hearing, that by presenting Figure C and the accompanying arguments in its Response, that skilled artisans would have recognized that protrusions constitute contacts (and vice versa). Therefore, given Yamada's disclosure of a connection to ground, contacts/protrusions would have been well known to have been ordinarily used to form an electrical connection to ground. *See, e.g.*, PO Resp. 34, 32–34 (contending that Yamada's alleged protrusion

"permits *full* heat transfer" so that it would not be a protrusion under Patent Owner's claim construction).

Viewed another way, given Patent Owner's position that a protrusion or contact suggests a location for an electrical connection, and given Yamada's disclosure of a ground connection, skilled artisans would have formed a connection using a protrusion as a contact to ground, so that providing an extension to Yamada's ladder shapes would have rendered obvious the claimed protrusions. As noted above, during his deposition, Dr. Stewart testified that skilled artisans would have located an electrical connection anywhere: "if it were electrical . . . it wouldn't matter where it was." Ex. 1014, 189:7–8. The record shows that it would have been obvious to connect a protrusion to ground, in order to make a standard electrical connection thereto and eliminate noise, and also, to ensure reliable ACF bonding during circuit formation.

Dr. Stewart supports the above findings by contending that "ground busing would commonly be routed via the PCB" (Ex. 2021 ¶ 78) and that "the ['']053 patent teaches . . . the addition of a *contact* 'protrusion'" (*id.* ¶ 81 (emphasis added)). Dr. Stewart agrees that Yamada's bonding assist regions 5 "are connected to a ground potential, thereby functioning as an electrostatic shield in the PCB." *Id.* ¶ 84. The parties' agreement that the claimed protrusion functions as a "contact" shows that it would have been obvious to connect and add a protrusion to Yamada's bonding assist layer in order to connect it to ground. In summary, because Yamada teaches a connection to ground, where Patent Owner concedes that "[o]ne of ordinary skill in the art" would have connected the "*entire* side" of Yamada's protrusion if it is a protrusion (PO Resp. 33 (citing Ex. 2021 ¶ 94); *see also*

id. at 39)), it would have been obvious to form a connection using a protrusion of any shape, including a long, narrow extension, in order to ensure a reliable connection and eliminate noise to a ground bus situated away from the bonding assist region. *See* Tr. 45:3–14 ("the argument that's being made [in our Patent Owner Response] is this, again, goes to what Yamada would be suggesting if we were to interpret the entire edge as the protrusion"); 45:22–46:7 (similar discussion that Yamada would suggest direct contact with ground "if the entire side were the protrusion").

When asked during the Oral Hearing why a simple wire extension would not have been employed as an obvious connection to ground in Yamada, Patent Owner responded that such a wire run "still lacks the recited protrusion which is a design choice to restrict the flow in a certain way. . . . [A]nd it's not a specific trace or wire because that does not allow for any control whatsoever of the heat." Tr. 30:18–23. Notwithstanding the explanation, Patent Owner's answer shows that a typical wire extension from Yamada's bonding assist region, generally as Mr. Flasck contends, satisfies the claimed protrusion, because nothing in claims 1 or 4 requires allowing "any control of . . . the heat." *See id*. Claims 1 and 4 are product claims, not method claims. Based on the evidence of record that the experts agree upon as discussed above at length, a typical wire run or other protrusion of sufficient length and typical width would restrict heat flow and satisfy even Patent Owner's construction.

Mr. Flasck's deposition testimony corroborates and supports Petitioner's obviousness showing. For example, during his deposition, Patent Owner asked Mr. Flasck "the basis for your opinion that Yamada discloses a protrusion, Figure 5." Ex. 2020, 45:4–5. Tracking his initial

testimony, Mr. Flasck responded that Yamada discloses or suggests a protrusion as either "the downward extension" identified with respect to Figure 5 or the "ladder structure," and describes a "neck down" portion that skilled artisans would have employed to connect the bonding assist portion to ground. *Id.* at 45:11–46:25; *accord* Ex. 1015 ¶¶ 18, 34, 35, 38, 41, 44. Mr. Flasck also explained during his deposition that

> they talk about the bonding portions being grounded, and to ground that . . . you need to connect that conductive sheet with a ground line on the printed circuit board somewhere. . . . And since you don't want to waste large areas of a printed circuit board, there would at someplace be a necking down . . . [from] that big rectangle of copper . . . . I mean, it's ordinary skill in the art. It's -- if you're going to ground that, it has to neck down somewhere and go to ground.

Ex. 2020, 45:14–46:5.

Mr. Flasck's deposition testimony and Reply Declaration (*see, e.g.*, Ex. 1042 ¶¶ 18, 42), responsive to Patent Owner's contentions regarding the location of a connection as possibly restricting heat flow, makes common sense and shows another reason for providing the "necked down" contact extension (i.e., a common contact extension). Eliminating any metal in the ground contact region obviously and naturally saves circuit board areas for other circuit portions. *See Kuhle,* 526 F.2d at 555 (finding "[t]he manner in which electrical contact is made . . . would be an obvious matter of design choice within the skill of the art," and stating "[w]e further agree with the board that deletion of the switch member (and other elements) found in Smith and Sherrard, thereby deleting their function, was an obvious expedient").

In support of its argument that narrows the original claim construction of "connect" by fixing the location of the claimed protrusion so that it may

restrict heat flow (*see supra* Section II.B.2), Patent Owner stresses that the disclosed invention addresses a problem of restricting heat flow in a vertical direction. *See, e.g.*, PO Resp. 20, 24–25. Nevertheless, an electrical connection (i.e., a contact/protrusion) as Yamada discloses or suggests addresses the noise problem discussed in the '053 patent via a connection to ground, and naturally, addresses the heat problems encompassed by the claims by choking off heat due to the length and width of an implicit or obvious contact to the ground. *See* Ex. 1002 ¶¶ 79, 81; Ex. 1015 ¶¶ 18–19, 42. In any event, "[t]he problem motivating the patentee may be only one of many addressed by the patent's subject matter." *KSR*, 550 U.S. at 420. Thus, "[u]nder the correct analysis, any need or problem known in the field of endeavor at the time of invention and addressed by the patent can provide a reason for combining the elements in the manner claimed." *Id.*

With further respect to heat problems addressed by the '053 patent, we have considered fully the parties' contentions regarding lateral versus vertical heat spreading, including, but not limited to those with respect to Paper 32 (Patent Owner's Motion for Observation) and Paper 34 (Petitioner's Opposition), and find Mr. Flasck's testimony to be supported by the record and credible. *See, e.g.*, Ex. 1015 ¶¶ 12–31; Ex. 2021 ¶¶ 72–74. Whether heat flow is characterized as flowing mostly vertically or horizontally in Yamada or the '053 patent is generally a distraction from the obviousness inquiry at issue here; nonetheless, we have considered the evidence in making our determination.[10]

[10] For example, Mr. Flasck testifies that Yamada does not disclose connecting bonding assist regions 5 to terminal regions 4 via a metal

In summary, Yamada's disclosed connection to ground suggests using known wiring or contact structures in a protruding shape under both parties' claim constructions, and Petitioner establishes it would have been obvious to employ such a protrusion for the purpose of ensuring a ground connection to a ground bus to eliminate noise and to ensure reliable ACF bonding. *See KSR*, 550 U.S. at 417 (obvious to claim "the predictable use of prior art elements according to their established functions"); Pet. 19 (citing Ex. 1009 ¶¶ 8–11 for Yamada's "two purposes"); Ex. 1002 ¶ 85.

Patent Owner does not separately argue claims 3 and 6–8, but relies on its arguments presented with respect to claims 1 and 4. PO Resp. 47. We adopt Petitioner's showing with respect to claims 1, 3, 4, and 6–8. *See* Pet. 23–27, 37–43. Based on the foregoing discussion, Petitioner shows by a preponderance of the evidence that Yamada would have rendered claims 1, 3, 4, and 6–8 obvious.

2. Claim 2

Claim 2 depends from claim 1 and recites "wherein said bonding assist portion is formed of the same material as that of said internal wiring of said connecting terminal and has substantially the same height as that of said

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connection between the two regions. *See* Ex. 1015 ¶ 29; Ex. 1008, Fig. 1 (regions 4 and 5 depicted as not connected), Fig. 8. As discussed at length above, Patent Owner also contends that heat flows primarily through metal connections to ground via its protrusions (vertically). This position corroborates Mr. Flasck. Accordingly, relative to the flow of heat to ground, there would be no or minimal "lateral" heat spreading between non-connected regions 4 and 5 in Yamada, and heat would flow to ground through a connection, as Mr. Flasck generally explains. *See* Ex. 1015 ¶¶ 14, 15, 19–30 (describing balance by heat conduction (not radiation) flowing to ground from disconnected regions and reaching equilibrium temperatures via metal connections to obtain reliable ACF bonding

connecting terminal." Yamada teaches that "the [internal] wiring terminals 4 and the conductive layer 5 [bonding assist portion] are formed on the PWB 1 together." Ex. 1009 ¶ 41; *see* Pet. 19 (citing Ex. 1002 ¶ 85 and discussing Yamada). As noted above in the discussion of claims 1 and 4, Petitioner also contends that in addition to providing shielding, a purpose of Yamada includes ACF reliability. *See* Pet. 19 (citing Ex. 1009 ¶¶ 8–11); Ex. 1002 ¶ 85 (citing Ex. 1009 ¶¶ 8–11, 41).

Petitioner also contends that Yamada's Figure 1 depicts

> the terminal groups and the bonding assist portions on the same substrate. A natural reading of Yamada by one of ordinary skill in the art at the time of the '053 Patent, using common sense and normal experience, would be that the bonding assist portion and the terminal groups would be formed at the same time, made of the same material, and have the same thickness (height). . . . To do so would clearly improve the bonding efficiency by erasing issues of topography.

Pet. 19–20 (citing Ex. 1002 ¶ 85).

Petitioner adds that

> [t]his is an obvious and natural design choice because a person skilled in the art would understand that making these structures the same height would facilitate affixation through the film in a temporary bond. The illustration above, drawing 9 of Yamada, shows the elements to be of the same height, for this reason.

Id. at 22 (citing Ex. 1002 ¶¶ 85–86, 88).

In response, Patent Owner contends that "Yamada is silent as to the material of the wiring terminals -- presumably copper." PO Resp. 43. Patent Owner also asserts that Figure 9 of Yamada portrays different heights for the two regions. *Id.* at 45–46.

Contrary to Patent Owner's arguments, Figure 9 does not limit Yamada's teachings or indicate a clear intent for the layers not to have "substantially the same height," as called for in claim 2. *See* Ex. 1009, Fig. 9.[11] Petitioner persuasively explains that using the same material and process to create both wiring portions, wherein a PCB nominally begins with a wiring layer as Patent Owner admits, would have been obvious as a matter of efficiency in terms of bonding and would have simplified the process by using the same existing materials. *See* Pet. 19–20; 1002 ¶¶ 85–86, 88; Prelim. Resp. 37 ("such wirings of a printed circuit board would presumably be comprised of copper, as would be known to those of ordinary skill in the art"); Inst. Dec. 17 (discussing showing of efficiency).

Yamada uses predetermined bonding assist patterns 5 to improve bonding reliability between existing wiring layers and overcome defective bonding. *See* Ex. 1009, Abstract, ¶¶ 6, 8–11, 24, 27, 29, 31. Yamada at least suggests forming the two wiring portions using the same material and processes at the same time: "As illustrated in Fig. 1, the wiring terminals 4 and the conductive layer 5 are formed on the PWB 1 *together*." Ex. 1009 ¶ 41 (emphasis added). Notwithstanding Patent Owner's arguments about alleged "reasons . . . to have different heights" (PO Resp. 46 (citing Ex. 2021 ¶¶ 68, 69)), Patent Owner does not address the "efficiency" reasons advanced by Petitioner for suggesting substantially the same height at the side-by-side metal regions of Yamada. *See* PO Resp. 45–46.

[11] Patent Owner argues that Petitioner inconsistently relies on what Figure 5 portrays and ignores what Figure 9 portrays. *See* PO Resp. 4–5 n.1, 38. That argument overlooks that drawings must be interpreted in view of what the full disclosure portrays to artisans of ordinary skill.

Also, Yamada does not disclose adding other material or different material to wiring portions 4a-h and 5. Responding to Patent Owner's position, Petitioner relies on Mr. Flasck, who testifies that "to those of ordinary skill in the art," Yamada teaches making the bonding assist region and terminal region of the same material and thickness. Pet. Reply 13 (citing Ex. 1009 ¶ 41; Ex. 1015 ¶ 45). As noted above, at the cited paragraph of Yamada, Yamada discloses that "the wiring terminals 4 and the conductive layer 5 are formed on the PWB 1 together." Ex. 1009 ¶ 41. This at least suggests forming them of the same material—i.e., using the material of the printed circuit board. Mr. Flasck testifies that "to the average practitioner at the time, in this context, 'together' would have had the natural meaning of 'formed of the same material at the same time.'" Ex. 1015 ¶ 46.

Responding to Patent Owner's assertions that skilled artisans would have had reasons for employing different heights, Mr. Flasck testifies as follows:

> In any event, one of skill in the art would not have understood that it might have been desirable that the terminals and the bonding assist layer have different heights and surface materials, as originally suggested by Stewart. Differing thicknesses could only degrade connection reliability, due to the unequal pressures that would be applied by the heat bar to the two regions during temporary fixing. Those of skill in the art were well aware of this – Stewart acknowledged this, admitting that the inability of the heat bar to respond to "bumpiness" was known in the art, and shown in Yamada. Exhibit 1014, 134:3-135:17.

Id. ¶ 47.

At the cited passage, Mr. Stewart does acknowledge that "[t]here's some teaching in the Yamada as well" in response to the following question: "That was known as part of the prior art, even the prior art that is disclosed

or, I'm sorry, discussed in the '053 patent, to use your earlier language, it doesn't respond well to bumpiness?" Ex. 1014, 135:9–21. Mr. Stewart qualifies his answer with "Yamada is less explicit" and the "'053 patent is more explicit" regarding bumpiness. *Id.* at 135:17–20.

Based on the testimony and showing by Petitioner, Yamada at least suggests using the same materials for both portions of wiring, and sufficiently shows that it would have been obvious to use the same process and materials to form adjacent layers of "substantially the same height" in order to promote efficiency in terms of bonding and use of the same materials. *See* Pet. 18–20 (citing Ex. 1002 ¶ 85); 1009 ¶ 41; Ex. 1015 ¶¶ 45–49.

In addition, as we preliminarily found in the Institution Decision, "the '053 patent [s]pecification does not define what 'substantially the same height,' as claim 2 recites, requires as a matter of degree in terms of achieving reliable bonding or other functionality of patentable distinction." Inst. Dec. 17. Patent Owner does not address this finding and explain what "substantially the same height" encompasses. PO Resp. 43–46.

Based on the foregoing discussion, Petitioner shows by a preponderance of the evidence that Yamada would have rendered claim 2 obvious.

3. Claim 5

Claim 5 depends on independent claim 4 and recites "wherein said protrusion is provided in a position of said wiring pattern portion on a center side of said circuit board." Addressing the orientation, Petitioner contends that Yamada orients the protrusion near the center of the circuit board, or locating it as claimed is nothing more than "routine design choice" that

"would have been obvious." Pet. 36–37 (citing Ex. 1002 ¶¶ 121–124). Patent Owner relies in part on arguments presented with respect to claims 1 and 4, and maintains that "[n]o part of the lower portion of the lower horizontal wiring 5b is a protrusion." PO Resp. 47.

For reasons explained above, on this record, Yamada discloses or suggests a protrusion as called for in claim 5. Yamada also discloses that "in order to reduce electromagnetic noise radiation, a conductive layer 5 connected to a ground potential functioning as an electrostatic shield is formed in the PWB 1." Ex. 1009 ¶ 5. With circuits and consequent ground potentials near the center of Yamada's PWB 1 (*see* Ex. 1008, Figs. 1, 8), Petitioner shows that it would have been obvious to connect a protrusion as suggested by Yamaha's protrusion, as discussed above in connection with claims 1 and 4, as a matter of design choice, toward the center of the PWB, as called for in claim 5, in order to ensure a reliable electrical connection to a ground or other fixed potential in the circuits at the center of the board, using sufficient metal to make the connection and thereby form a grounded shield as Yamada teaches. The record shows that the claimed protrusion and bonding assist region amount to "the predictable use of prior art elements according to their established functions." *See KSR*, 550 U.S. at 417; *Kuhle*, 526 F.2d at 555 ("We also agree that the particular placement of the contact provides no novel or unexpected result. The manner in which electrical contact is made . . . would be an obvious matter of design choice within the skill of the art.").

Based on the foregoing discussion, including the discussion above of claims 1 and 4, Petitioner shows by a preponderance of the evidence that Yamada would have rendered claim 5 obvious.

4. Claims 9 and 10

Claims 9 and 10 depend from claim 4 and respectively recite circular and polygonal holes "to form a honeycomb configuration" in said wiring pattern portion of claim 4. Relying on the plain meaning of "honeycomb" as set forth in a dictionary, Petitioner contends that Yamada's Figure 4, which shows rectangular holes, constitutes one obvious form of a honeycomb pattern. *See* Pet. 44 (citing Ex. 1010 (defining honeycomb as "esp. in containing many small units or holes" or as a "pattern" that resembles a "structure of rows of hexagonal wax cells")). Petitioner also contends that given the wide variety of known honeycomb patterns, Yamada at least suggests any number of honeycomb patterns as a design choice that would function similarly to that of Yamada's pattern at Figure 4. *See id.* at 44–45. Yamada's patterns all promote ACF adhesion and provide electromagnetic shielding. *See* Ex. 1009 ¶¶ 8–9; Pet. 19 (citing Ex. 1009 ¶¶ 8–11); Ex. 1002 ¶ 85 (citing Ex. 1009 ¶¶ 8–11, 41).

Patent Owner contends that Yamada's conductive layer depicted in Figure 4 represents "a cross-stitch shape and *not a honeycomb configuration*, as is claimed by claims 9 and 10 of the '053 patent." PO Resp. 50. Although Patent Owner notes that, according to the '053 patent specification, "'the honeycomb wiring pattern may be circular or polygonal'" (*id.* at 49 (quoting Ex. 1001, 11:37–41)) and that Yamada's "square slits 15 in Fig. 4 are 4-sided *polygons*" (*id.* at 50 (emphasis added)), Patent Owner contends that Yamada's "squares do not form a honeycomb configuration," as claimed by claims 9 and 10 of the '053 patent (*id*.).

Therefore, Patent Owner agrees a honeycomb pattern includes polygons and Yamada discloses polygons. *Id*. at 49–50. It follows that

Petitioner shows persuasively that Yamada generally suggests any form of honeycomb pattern, including polygonal or circular holes, in order to form a bonding assist portion in a repeating pattern to promote ACF adhesion and provide electromagnetic shielding. The '053 patent does not show that using circular holes redounds to any advantage over other honeycomb shapes, such as polygonal shapes, including the "4-sided polygon[]" shapes that Patent Owner admits Yamada discloses. *See* PO Resp. 50. Rather, the '053 patent indicates that a "lattice or honeycomb wiring pattern" can "reliably restrict the contact degradation and/or the shortage of connecting strength caused by the peeling-off of the anisotropic conductive film during the temporary press-bonding, during the final press-bonding." Ex. 1001, 6:35–41. Therefore, repeating polygon shapes, such as those taught or suggested by Yamada, constitute or suggest honeycomb configurations, and would have suggested different honeycomb shapes for bonding reliability, according to the plain meaning of the term and Yamada's disclosure of using 4-sided polygon shapes for that purpose. *See* Ex. 1010; Ex. 1009 ¶¶ 8–11, Fig. 4

Based on the foregoing discussion and Petitioner's showing, Petitioner shows by a preponderance of the evidence that Yamada would have rendered claims 9 and 10 obvious.

C. *Real Parties in Interest*

Patent Owner argued in its Preliminary Response that Petitioner fails to name all real parties in interest (RPIs) in its Petition as required by 35 U.S.C. § 312(a)(2). Patent Owner does not present this argument in its Patent Owner Response and, therefore, has waived it. *See* Paper 15, 3 ("[P]atent owner is cautioned that any arguments for patentability not raised in the response will be deemed waived.). Assuming for the sake of

argument that Patent Owner did not waive the RPI issue, we rely on, and incorporate, our findings and determination in the Institution Decision. *See* Inst. Dec. 20–28.

III. PATENT OWNER'S MOTION TO EXCLUDE

Patent Owner seeks to exclude Exhibits 1011–1013, for lack of authenticity and hearsay. Paper 31, 1. Patent Owner also moves to exclude Ex. 1015, Mr. Flasck's Reply Declaration, to the extent that it relies on Exhibits 1011–1013. As movant, Patent Owner has the burden of proof to establish that it is entitled to the requested relief. *See* 37 C.F.R. § 42.20(c).

With respect to Exhibit 1011, Petitioner responds that it does not oppose the exclusion of Exhibit 1011, because there was "an error made in marking the Exhibit." Paper 33, 2 n.1. Accordingly, we grant Patent Owner's Motion to Exclude Exhibit 1011, and we also do not consider it insofar as Mr. Flasck's testimony relies upon it in his Reply Declaration.

With respect to Exhibit 1015, Patent Owner cites paragraph 29 as improperly relying on Exhibits 1011–1013, in particular, allegedly to support Mr. Flasck's "argument that '[t]he phenomenon of lateral heat spreading [is] well known in the semiconductor art and always referred to it as such, see Exhibits 1011 – 1013.'" Paper 31, 7. Patent Owner argues that "[a]t the least, the portion of Flasck's [Reply D]eclaration that relies on or cites to inadmissible exhibits should be excluded from the record." Paper 31, 7. Patent Owner cites to paragraph 29 of Exhibit 1015 in particular. We consider Patent Owner's Motion to Exclude with respect to Exhibit 1015 to be directed solely to paragraph 29 of Exhibit 1015. We decline to parse through other paragraphs of the Reply Declaration to determine if they rely upon Exhibits 1011–1013.

With respect to Exhibit 1015, Petitioner Owner responds that

> [r]egardless of the admissibility of Exhibits 1012 and 1013, the discussion of Exhibits 1012 and 1013 in the Reply Declaration of Flasck, Exhibit 1015, ¶ 29, is certainly not hearsay. PO was afforded the full opportunity to cross-examine Flasck on the contents of his Declaration and his opinions are properly admissible expert testimony. Evidence relied upon by an expert in forming his opinion need not need to be admissible.

Paper 33, 6.

Petitioner's response with respect to Exhibit 1015 is persuasive. Patent Owner fails to articulate sufficiently why Exhibit 1015 paragraph 29 should be excluded. Even if Exhibits 1012 and 1013 are inadmissible, and Mr. Flasck relies on Exhibits 1012 and 1013, Fed. R. Evid. 703 allows for such reliance. *See* Fed. R. Evid. 703 ("If experts in the particular field would reasonably rely on those kinds of facts or data in forming an opinion on the subject, they need not be admissible for the opinion to be admitted. But if the facts or data would otherwise be inadmissible, the proponent of the opinion may disclose them to the jury only if their probative value in helping the jury evaluate the opinion substantially outweighs their prejudicial effect.").

Patent Owner characterizes Exhibit 1012 as follows: "Exhibit 1012 – the five-page article "'Thermal characterization of anisotropic thin dielectric films using harmonic Joule heating' (Ju et al., *Thin Solid Films.* 1999;339(1-2):160–164)." Paper 31, 5. Patent Owner argues that it "is of no consequence in determining the instant action." *Id.*

Petitioner's responses with respect to Exhibit 1012 are persuasive. Paper 33, 2–11. Patent Owner presents no reason for doubting the authenticity of Exhibit 1012, fails to explain sufficiently why it is used for a

hearsay purpose, and fails to explain why it is irrelevant or inadmissible for any other reason. *See* Paper 31, 3–7.

As a scientific publication in a periodical, Exhibit 1012 is the type of document experts normally rely upon, Mr. Flasck relied upon it, and Petitioner cross-examined Mr. Stewart about it. *See* Fed. R. Evid. 703, 803 (18) (a statement in a periodical "may be read into evidence," but the periodical "may . . . not [be] received as an exhibit"); Paper 33, 2–3, 5–7; Ex. 1014, 10:7–14:13; Ex. 1015 ¶ 29. Exhibit 1012 is self-authenticating and also bears indicia of reliability regarding its status as an article in a periodical, with sufficient publication dates and other indicia bearing status of a well-known publication. *See* Ex. 1012 (showing author's e-mail address, author's Stanford University address, FAX number, copyright date, etc.); Fed. R. Evid. 901(b)(4), 902(6). Petitioner also generally employs it for the non-hearsay purpose of using relevant statements made that generally exhibit the state of the art including circuit board heating, in support of Mr. Flasck's opinion and to challenge Mr. Stewart's testimony. *See* Ex. 1015 ¶ 29; Paper 33, 2–6.

Accordingly, we consider Exhibit 1012 as supporting Mr. Flasck's opinion in paragraph 29 of Exhibit 1015. Even if Exhibit 1012 were deemed inadmissible, that would not be a sufficient reason by itself to exclude Mr. Flasck's Reply Declaration. *See* Paper 33, 6 ("PO was afforded the full opportunity to cross-examine Flasck on the contents of his Declaration and his opinions are properly admissible expert testimony. Evidence relied upon by an expert in forming his opinion need not need to be admissible.").

Exhibit 1013 has the following nomenclature on each page: "*IPC APEX EXPO 2014, Las Vegas, March 25-27, 2014.*" Assuming this relates

to the date of a conference in Las Vegas where the article may have been published or discussed, the effective filing date of the '053 patent pre-dates it, as Patent Owner contends. *See* Paper 31, 6 ("the [']053 patent was filed on September 27, 2002"). The document appears to have minimal probative value as it relates to an issue in this proceeding, especially where it appears to be cumulative relative to the use of Exhibit 1012. Accordingly, in an effort to simplify issues, we grant Patent Owner's Motion to Exclude Exhibit 1013. As is the case for Exhibit 1011, we do not rely on Exhibit 1013 in considering the testimony of Mr. Flasck at paragraph 29 of Exhibit 1015.

For the reasons explained above, and for other reasons advanced by Petitioner, Patent Owner's Motion to Exclude Exhibit 1012 and paragraph 29 of Exhibit 1015 is denied. Patent Owner's Motion to Exclude Exhibits 1011 and 1013 is granted.

IV. CONCLUSION

For the foregoing reasons, Petitioner shows by a preponderance of the evidence that claims 1–10 of the '053 patent would have been obvious.

V. ORDER

In consideration of the foregoing, it is hereby

ORDERED that claims 1–10 of the '053 patent are unpatentable; and

FURTHER ORDERED that Patent Owner's Motion to Exclude is *granted* with respect to Exhibits 1011 and 1013 and *denied* with respect to Exhibits 1012 and 1015;

FURTHER ORDERED that, because this Final Written Decision is final, a party 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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