

UNITED STATES PATENT AND TRADEMARK OFFICE

BEFORE THE PATENT TRIAL AND APPEAL BOARD

GLUX VISUAL EFFECTS TECH (SHENZHEN) CO.,
LEYARD OPTOELECTRONIC CO.,
SHENZHEN LIANTRONICS CO., LTD., and
UNILUMIN GROUP CO., LTD.,
Petitioner,

v.

ULTRAVISION TECHNOLOGIES, LLC,
Patent Owner.

IPR2020-01052
Patent 9,047,791 B2

Before DENISE M. POTHIER, SCOTT A. DANIELS, and
ROBERT L. KINDER, *Administrative Patent Judges*.

POTHIER, *Administrative Patent Judge*.

JUDGMENT
Final Written Decision
Determining Some Challenged Claims Unpatentable
35 U.S.C. § 318(a)

I. INTRODUCTION

A. Background

Glux Visual Effects Tech (Shenzhen) Co., Leyard Optoelectronic Co., Shenzhen Liantronics Co., Ltd., and Unilumin Group Co., Ltd. (“Petitioner”) requested *inter partes* review of claims 1, 4–6, 10–16, and 19–26 (“the challenged claims”) of U.S. Patent No. 9,047,791 B2 (Ex. 1001, “the ’791 patent”). Paper 4 (“Petition” or “Pet.”), 1. Ultravision Technologies, LLC (“Patent Owner”) filed a Preliminary Response. Paper 8. Pursuant to 35 U.S.C. § 314, we granted the request and instituted *inter partes* review as to all challenged claims on all grounds presented in the Petition. Paper 9 (“Inst. Dec.”).

After institution, Patent Owner filed a Response (Paper 17, “Resp.”), Petitioner filed a Reply (Paper 21, “Reply”), and Patent Owner filed a Sur-reply (Paper 22, “Sur-reply”). A hearing was held on August 24, 2021, and a transcript of the hearing is included in the record. Paper 26 (“Tr.”).¹

We have jurisdiction under 35 U.S.C. § 6(b). This Final Written Decision is issued pursuant to 35 U.S.C. § 318(a) as to the patentability of the claims on which we instituted trial. Petitioner bears the burden of proving unpatentability of the challenged claims, and the burden of persuasion never shifts to Patent Owner. *Dynamic Drinkware, LLC v. Nat’l Graphics, Inc.*, 800 F.3d 1375, 1378 (Fed. Cir. 2015). To prevail, Petitioner must prove unpatentability by a preponderance of the evidence. *See* 35 U.S.C. § 316(e) (2018); 37 C.F.R. § 42.1(d) (2019). Having reviewed the

¹ The hearing for this proceeding, IPR2020-01049, and IPR2020-01050 were held together. Paper 25 (Order Granting the Parties Requests for Oral Hearing), 2.

arguments and the supporting evidence, we determine that Petitioner (1) has shown, by a preponderance of the evidence, that claims 1, 10–13, 19, and 20 of the '791 patent are unpatentable and (2) has not shown, by a preponderance of the evidence, that claims 4–6, 14–16, and 21–26 are unpatentable.

B. Related Proceedings

The parties indicate various cases pending before the United States District for the Eastern District of Texas that are related matters. Pet. 2–3; Paper 6, 1–3. Petitioner further indicates some of these cases were consolidated with *Ultravision Technologies v. Govision, LLC*, Case No. 2:18-cv-00100-JRG-RSP (E.D. Tex.) and involve the '791 patent. Pet. 3.

C. Real Parties in Interest

Petitioner identifies Shenzhen Absen Optoelectronic Co., Absen, Inc., Ledman Optoelectronic Co., Ltd., Glux Visual Effects Tech (Shenzhen) Co., Leyard Optoelectronic Co., Shenzhen Liantronics Co., Ltd., and Unilumin Group Co., Ltd. as “potential real parties-in-interest.” Pet. 2.

D. Instituted Grounds of Unpatentability and Declaration Evidence

We instituted *inter partes* review of all challenged claims based on all grounds of unpatentability asserted in the Petition, which are as follows:

Claims Challenged	35 U.S.C. §	References/Basis
1, 4, 5, 10, 11	103 ²	Templeton, ³ Ordinary Skill ⁴
6, 12–16, 19–26	103	Templeton, Ordinary Skill, Kludt ⁵
1, 10–13, 19, 20	103	Kalua, ⁶ Ordinary Skill

Inst. Dec. 2, 10; Pet. 5–6. Petitioner supports its challenges with a declaration of Mr. Richard Flasck. Ex. 1002 (“Flasck Declaration”). Patent Owner supports its positions with a declaration of Mr. Thomas Credelle. Ex. 2002 (“Credelle Declaration”).

² The Leahy-Smith America Invents Act, Pub. L. No. 112–29, 125 Stat. 284 (2011) (“AIA”), amended 35 U.S.C. § 103. Changes to § 103 apply to applications filed on or after March 16, 2013. Because the earliest effective filing date of the ’791 patent is potentially March 16, 2013 (*see* Pet. 18), we refer to the AIA version of § 103.

³ US 2014/0153241 A1, published June 5, 2014 and filed December 1, 2012 (Ex. 1004).

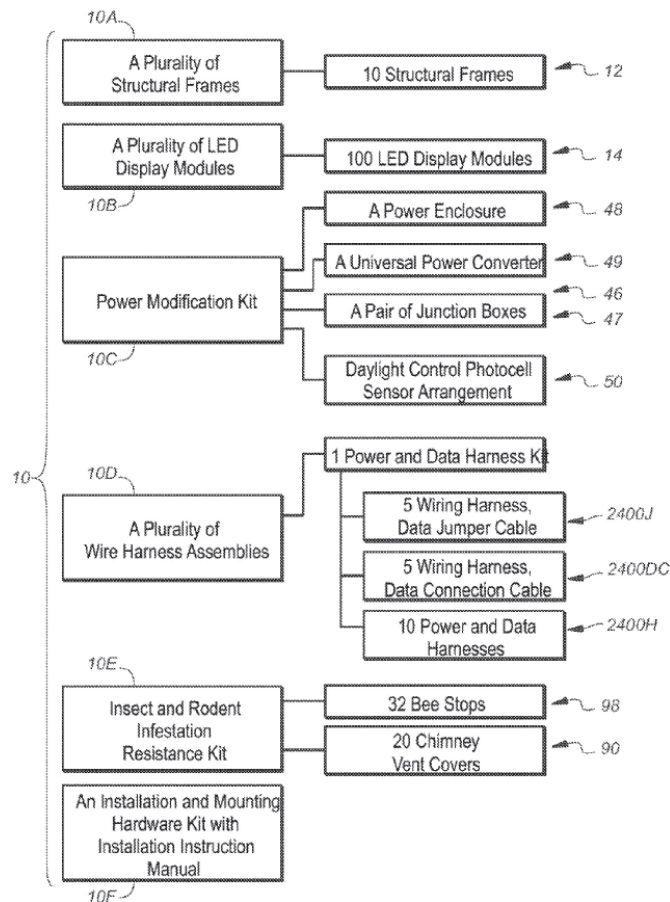
⁴ Petitioner lists four exhibits as evidence of the “Ordinary Skill in the Art” (“Ordinary Skill”): (1) watchfire, *PriceWatcherTM Gas Price Signs, Product Fact Sheet* (2012) referred to as “the Watchfire Fact Sheet” (Ex. 1005), (2) watchfire, *Watchfire Signs by Time-O-Matic, Watchfire Headed to ISA Expo 2012, New Product Showcase* (Mar. 7, 2012) referred to as “the Watchfire Showcase” (Ex. 1006), (3) Watchfire LED Signs and Electronic Message Boards, *More New Produce News* (May 2012) (Ex. 1008), and (4) Price Watcher, LED Signs, Watchfire LED Signs, *LED Signs: Price Watcher* (Ex. 1009). The latter two references referred to as “the 5/5/12 Watchfire Website,” and all four references are collectively referred to as “the ‘Watchfire’ references” or “Watchfire.” Pet. 5, 31.

⁵ US 7,448,154 B1, issued Nov. 11, 2008 (Ex. 1010).

⁶ US 2002/0122134 A1, published Sept. 5, 2002 (Ex. 1007).

E. The '791 Patent

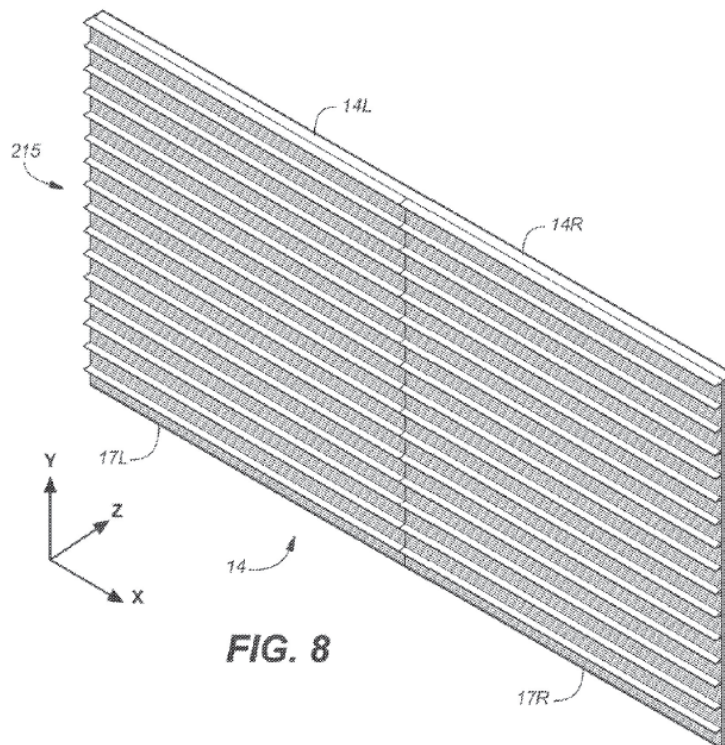
The '791 patent issued June 2, 2015, and claims priority to various applications. Ex. 1001, codes (10), (45), (60), (63). The '791 patent addresses “a retrofit kit for in field use to convert a static billboard into a dynamic electronic sign for roadside or building signage use.” *Id.* at 1:39–41. The '791 patent’s invention is directed towards a “new and improved billboard retrofit kit that can be easily and quickly installed on any structural surface, such as an existing billboard, without the need to replace or discard existing media mounting panels.” *Id.* at 1:52–56. The retrofit/modification kit for converting a non-electronic billboard sign into an electronic billboard sign includes numerous components shown below in Figure 2.



The '791 patent’s Figure 2 Showing a Field Modification Kit for Converting a Non-electronic Sign into an Electronic Sign.

Id. at 20:12–15, Fig. 2. As shown above, Figure 2’s kit includes a plurality of display modules (10B, LED Display Modules 14), a plurality of structural frames (10A, Structural Frames 12), a plurality of wire harness assemblies (10D, Harnesses 1, 10, Cables 5), and an installation and mounting hardware kit (10F). *Id.* at 24:43–57, Fig. 2.

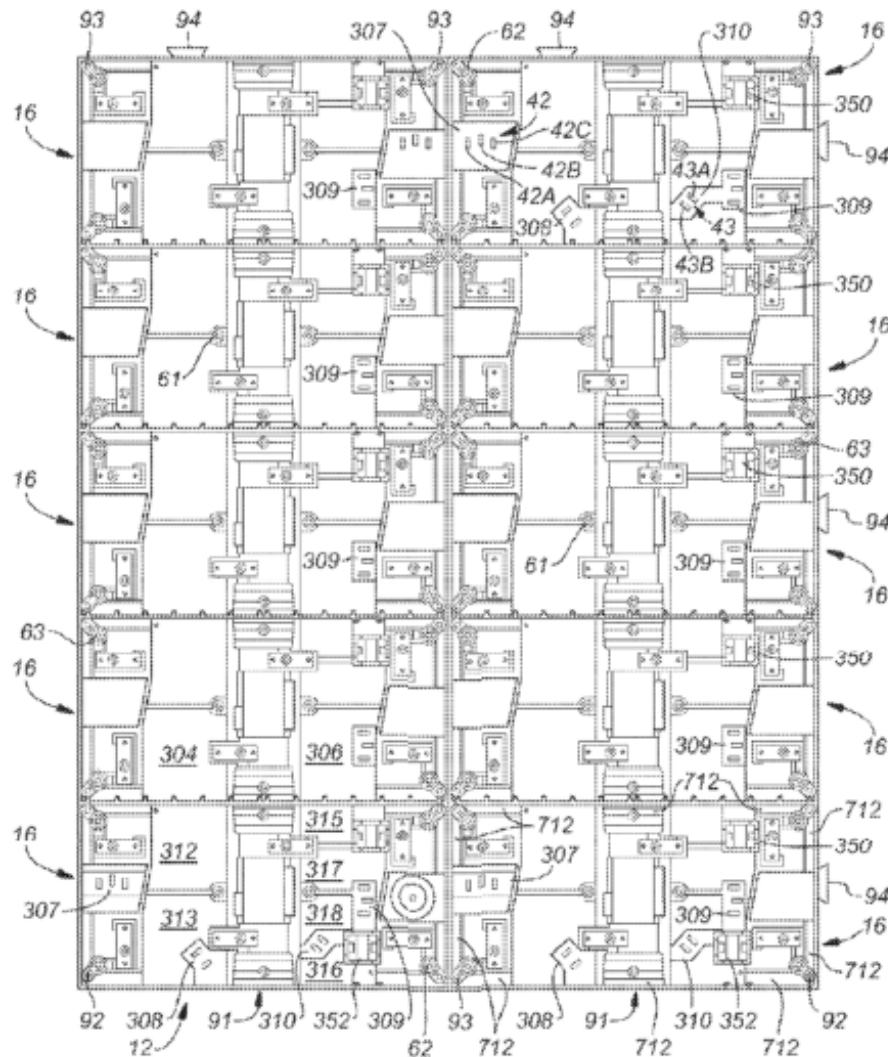
As for the display modules (e.g., 10B, 14) in the kit, the ’791 patent shows an example of a display module in Figure 8 below.



The ’791 patent’s Figure 8 Showing a Display Module.

Id. at 33:39–42, Fig. 8. Display module 14 above has side by side LED boards or panels, such as left side display panel 14L and right side display panel 14R. *Id.* at 34:1–3, Fig. 8. The ’791 patent explains display module 14 is “ready for quick and easy installment in a bay member 16 forming part of a structural frame 12.” *Id.* at 33:43–45.

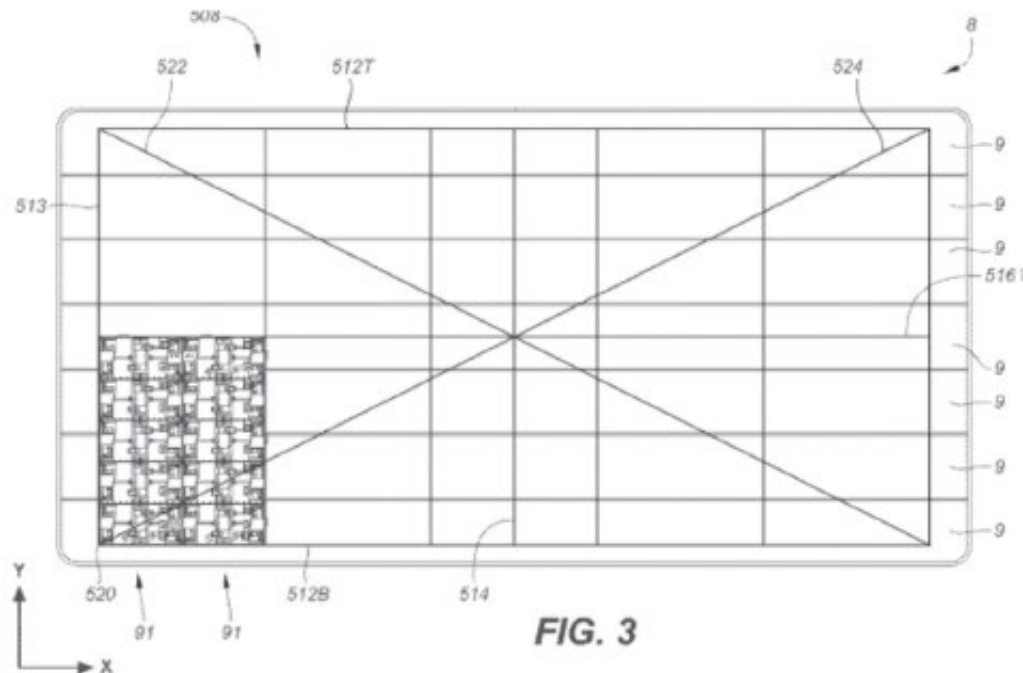
As for the structural frames (e.g., 10A, 12) in the kit, Figure 23 below shows a front plane view of structural frame 12 of the plurality of structural frames 10A.



The '791 patent's Figure 23 Showing a Structural Frame of a Retrofit Kit.

Id. at 21:12–13, Fig. 23. Structural frame 12 shown above contains multiple structural bay members 16, each of which receives and secures a display module. *Id.* at 24:60–66, 28:39–43, 28:61–63, Fig. 23. Structural frame 12 includes an array of bay members (e.g., 16) arranged in rows (e.g., 5 rows) and columns (e.g., 2 columns). *See id.* at 24:63–66, Figs. 3, 23.

Figure 3 below illustrates one structural frame (e.g., 12) installed on a non-electronic billboard sign.



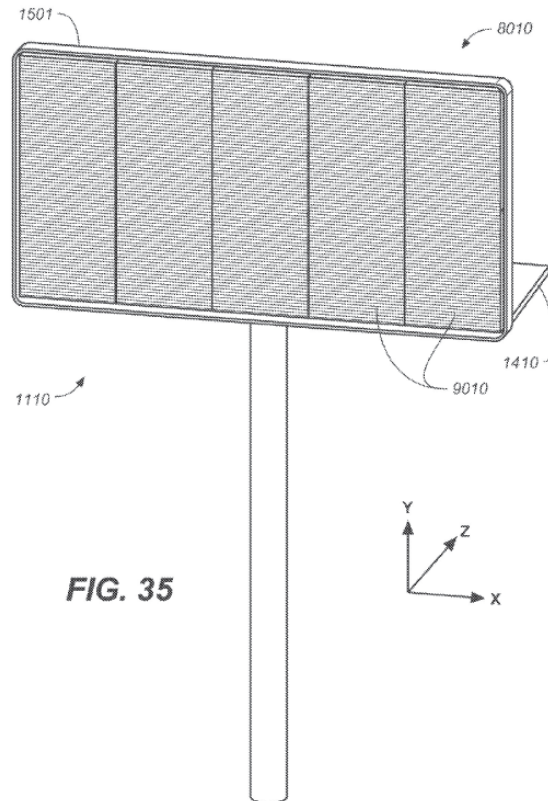
The '791 patent's Figure 3 Showing the Front Plane view of a Non-electronic Sign.

Id. at 20:16–20, 23:1–4, Fig. 3. Figure 3 above shows the structural frame installed in the lower left corner of a billboard (e.g., 8). *Id.* at 25:4–8, Figs. 3, 8, 23. Figure 3 also shows a grid layout, indicating where the other structural frames will be installed. *See id.* at 20:16–20, Fig. 3.

Although not shown in Figure 2, the kit also includes:

a plurality of substantially identical pre-wired sign section assemblies, such as an individual sign section assembly 9010 (FIG. 35) that is field ready to be loaded with display modules, such as the display module 14, and then mechanically coupled to a foundational support, such as to the poster board(s) or planar panel(s) or an existing sign support structure 1410 (FIG. 38B).

Id. at 58:17–23, Figs. 35, 38B. Figure 35 below shows sign section (e.g., 9010) of digital billboard 8010 from the front perspective view.



The '791 patent's Figure 35 Showing a Front Perspective View of a Sectional Digital Billboard with Sign Section Assembly Units.

Id. at 21:47–49, 57:26–29, 58:14–19, Fig. 35.

Regarding the wire harness assemblies (e.g., 10D, Harnesses 1, 10, Cables 5) in the kit, each sign assembly discussed above also includes wiring harness assembly (e.g., 1500) with first portion 1500A, installed in a compound structural frame, having power extension ends for coupling to a power source derived from second portion 1500B to display modules 14. *Id.* at 58:16–19, 58:54–57, 62:20–26, 63:43–52, 64:1–39, Figs. 36–37. Each power extension end is coupled to a satellite hub (e.g., 1710). *Id.* at 64:7–14, Fig. 36.

F. Claimed Subject Matter

Of the challenged claims, claims 1, 12, and 21 are independent claims. Claims 4–6, 10, and 11 ultimately depend from claim 1; claims 13–16, 19, and 20 depend from claim 12; claims 22–26 depend from claim 21. Independent claim 1 illustrates the claimed subject matter with Petitioner’s bracketing (*see* Pet. 14–16) added for reference.

1. A modification kit for converting an existing signage mounting structure to an electronic sign comprising:

[a] a plurality of display modules;

[b] a plurality of sign sections each having a front-facing portion and a rear-facing portion, [c] the front facing portion defining a two dimensional array of bays arranged in a plurality of rows along a vertical direction and a plurality of columns along a horizontal direction, each bay configured to receive one of the display modules, [d] the rear-facing portion for mounting to a surface of the existing signage mounting structure; and

[e] a plurality of power routing systems, each power routing system having a power input for coupling to a power source and a plurality of power extensions, each power extension for coupling the power source to one of the plurality of display modules.

Ex. 1001, 87:11–26 (bracketing and spacing added).

G. Level of Ordinary Skill in the Art

Petitioner asserts:

A person of ordinary skill in the art (*i.e.*, a skilled artisan, or “POSITA”) at the time of the ‘791 patent’s alleged invention would have: (i) a bachelor’s degree in mechanical engineering, electrical engineering, or physics, or undergraduate training in an equivalent field, and (ii) at least two years of experience in the design and/or implementation of LED panels . . . Additional graduate education could substitute for professional experience, and significant work experience could substitute for formal education.

Pet. 17–18 (citing Ex. 1002 ¶¶ 41–44).

Patent Owner does not set forth an ordinary artisan’s skill level.

See generally Resp. Mr. Credelle, Patent Owner’s expert, states that he

do[es] not disagree with Mr. Flasck’s proposed level of ordinary skill in the art, which he lists as (i) a bachelor’s degree in mechanical engineering, electrical engineering, or physics, or undergraduate training in an equivalent field, and (ii) at least two years of experience in the design and/or implementation of LED panels.

Ex. 2002 ¶ 33. Mr. Credelle further states, similar to Petitioner, “[a]dditional graduate education could substitute for professional experience, and significant work experience could substitute for formal education.” *Id.*

In the Institution Decision, we preliminarily adopted Petitioner’s explanation and assessment of the ordinary skill level, determining the position was consistent with the ’791 patent and the asserted prior art. Inst. Dec. 15–16 (citing *Okajima v. Bourdeau*, 261 F.3d 1350, 1355 (Fed. Cir. 2001)). As neither party challenges our preliminary finding regarding the level of ordinary skill in the art, we see no reason to disturb this finding.

Accordingly, we maintain and reaffirm that one of ordinary skill in the art at the time of the invention would have (1) a bachelor's degree in mechanical engineering, electrical engineering, or physics, or undergraduate training in an equivalent field, and (2) at least two years of experience in the design and/or implementation of LED panels. Also, additional graduate education could substitute for professional experience, and significant work experience could substitute for formal education. *See id.* at 16 (setting forth and adopting Petitioner's position as to the level of ordinary skill in the art).

II. CLAIM CONSTRUCTION

In this *inter partes* review, claims are “construed using the same claim construction standard that would be used to construe the claim[s] in a civil action under 35 U.S.C. § 282(b).” 37 C.F.R. § 42.100(b) (2019). The claim construction standard includes construing claims “in accordance with the ordinary and customary meaning of such claim[s] as understood by one of ordinary skill in the art and the prosecution history pertaining to the patent.” *Id.*; *see Phillips v. AWH Corp.*, 415 F.3d 1303, 1312–14 (Fed. Cir. 2005).

Petitioner proposes a claim construction for the following terms in the challenged claims: (1) “a modification kit for converting an existing signage mounting structure to an electronic sign” found in independent claims 1, 12, and 21 and (2) “existing signage mounting structure” found in claims 1, 4, and 21 or “existing signage structure” found in claim 12.⁷ Pet. 18–22. For “any term not expressly discussed,” Petitioner states the claims’ terms “should be given its ordinary and customary meaning to a person of skill in

⁷ Petitioner states the language “existing signage structure” is found in claim 21. Pet. 19, 21. We however located this claim language in claim 12.

the art ('POSITA') as of the filing date of the '791 patent.” *Id.* at 18.

Patent Owner states that Petitioner does not explain what the ordinary meaning of the “display modules” would be. Resp. 25–26. Patent Owner also argues “the power routing system of the '791 patent . . . requires each power routing system to have a power input or node, with a plurality of power extensions each going to a single module.” *Id.* at 53–54; *see also* Sur-reply 11.

A. “*A modification kit for converting an existing signage mounting structure to an electronic sign*”

The preamble of independent claims 1, 12, and 21 recites “[a] modification kit for converting an existing signage mounting structure to an electronic sign.” Ex. 1001, 87:11–12, 88:1–2, 88:51–52. Petitioner asserts the “preamble is limiting” because the phrase provides antecedent basis for (1) “the existing signage mounting structure” recited in the body of claims 1, 4, and 21 or (2) “the existing signage structure” recited in body of claim 12. Pet. 19. Petitioner further asserts that the preamble breathes, life, and meaning into claims 1, 12, and 21, namely the retrofitting of an existing non-electric sign into a digital sign. *Id.* at 19–20 (citing *Catalina Mktg. Int’l, Inc. v. Coolsavings.com, Inc.*, 289 F.3d 801, 808 (Fed. Cir. 2002); Ex. 1001, 1:38–41, 1:45–46, 1:52–54, 18:48–52, 23:1–6, 24:1–11, Fig. 3). For these reasons, Petitioner asserts the preamble “should be construed to require ‘a self-contained retrofit kit for on-site use to convert an existing static non-electronic sign into an electronic sign.’” *Id.* at 19; *see id.* at 21.

Patent Owner provides no claim construction for this phrase. *See generally* Resp. and Sur-reply. Petitioner presented no further discussion related to how to construe this limitation in the Reply. *See generally* Reply.

In the District Court, Petitioner proposed that the preamble of claim

12 should be construed as “[a] self-contained retrofit kit for on-site use to convert an existing static non-electronic sign structure into an electronic sign.” Ex. 1013, 14. In that same proceeding, Patent Owner asserted that the “preamble [of claim 12 is] not limiting” and should have its “plain and ordinary meaning.” Ex. 1014, 17 (emphasis omitted). In its final claim construction, the District Court found the above recitation in the preamble should have its plain and ordinary meaning. Ex. 2006, 5.

In the Institution Decision, we found the preamble of claims 1, 12, and 21 “is limiting” because it “breathes life and meaning into the claims given that the recited ‘existing signage mounting structure’^[8] is found in each of these claims’ bodies.” Inst. Dec. 18 (footnote renumbered for this Decision). “However, we decline[d] to limit the preamble to a ‘self-contained retrofit’ kit ‘for on-site use.’” *Id.*

Having reviewed the arguments and evidence in the full record, we maintain and reaffirm our preliminary construction of the preamble that “[a] modification kit for converting an existing signage mounting structure to an electronic sign’ in claims 1, 12, and 21 is limiting and should be given its plain and ordinary meaning.” *See id.* at 18.

B. “[E]xisting signage mounting structure”/
“[E]xisting signage structure”

Independent claims 1, 12, and 21 recite “an existing signage mounting structure” (claims 1, 12, and 21) and “existing signage structure” (claim 12). Ex. 1001, 87:11–12, 87:20–21, 88:1–2, 88:9, 88:51–52, 88:62. Petitioner asserts these terms “should be construed as ‘an existing non-electronic sign

⁸ Claim 12 recites “‘the existing signage structure’ (Ex. 1001, 88:9), not the ‘existing signage mounting structure’ (*id.* at 88:1–2) found in its preamble.” Inst. Dec. 18 n.9.

[mounting] structure.” Pet. 21 (bracketing in original). Petitioner asserts the ’791 patent repeatedly and consistently describes retrofitting a non-digital sign into a digital sign as well as converting a static billboard into a dynamic electronic sign. *Id.* at 21–22 (citing Ex. 1001, 1:36–41, 18:20–25, 18:48–19:17, 19:47–62, 23:25–30, 23:35–39, 27:25–30, 74:56–75:8; Ex. 1014). Patent Owner provides no claim construction for this phrase. *See generally* Resp. and Sur-reply.

In the District Court, Petitioner stated that the recited “existing signage structure” should be construed as an “existing non-electronic sign structure.” Ex. 1013, 16. In that same proceeding, Patent Owner asserted that the phrase “existing signage structure” should have its “plain and ordinary meaning.” Ex. 1014, 27 (emphasis omitted). In its final claim construction, the District Court found the “existing signage [mounting] structure” should be given its plain and ordinary meaning. Ex. 2006, 5.

In the Institution Decision,

we determine that the term “existing signage mounting structure” and “existing signage structure” in claims 1, 12, and 21 should be given their plain and ordinary meaning, which include a signage structure that already exists and is used for mounting in the case of the “existing signage mounting structure.”

Inst. Dec. 19.

Having reviewed the arguments and evidence in the full record, we maintain and reaffirm our preliminary construction of the “an existing signage mounting structure” (claims 1, 12, and 21) and “existing signage structure” (claim 12) as having “their plain and ordinary meaning, which include a signage structure that already exists and is used for mounting in the case of the existing signage mounting structure.” Inst. Dec. 19.

C. “[D]isplay modules”

Petitioner does not propose a claim construction for the term “display modules” other than stating “any term not expressly discussed should be given its ordinary and customary meaning to a person of skill in the art.” Pet. 18; *see id.* at 18–22; *see also* Reply 4 (stating “display module” should be given its plain meaning).

Patent Owner states that Petitioner does not explain what the ordinary meaning of the “display modules” would be, including whether a module requires a pair of LED display panels and whether the LED display panel(s) are operatively coupled to a daughter board similar to the District Court construction. Resp. 25–26 (citing Ex. 1029; Ex. 2005). Referring to the District Court’s construction and the instant proceeding, Patent Owner further contends “allow[ing] two different constructions in two different proceedings” “would be manifestly unjust.” *Id.* at 26. When discussing the prior art, Patent Owner asserts Petitioner does not identify the number of panels or whether the panels are coupled to a daughter board. *Id.* at 28.

In the Reply, Petitioner notes that Patent Owner proposed that the term “display module” should have its plain and ordinary meaning in the District Court. Reply 4–5 (citing Ex. 2002 ¶ 75; Ex. 1025, 63). Petitioner also contends Mr. Credelle, Patent Owner’s expert, previously testified that an ordinarily skilled artisan would have understood the meaning of “display module” without further elaboration. *Id.* at 5 (citing Ex. 1030 ¶ 91; Ex. 1031, 75:1–77:8). Petitioner then argues that using a claim construction that Patent Owner previously advocated for “cannot be unjust.” *Id.*

In the Sur-reply, Patent Owner argues that Petitioner’s citations do not support a plain and ordinary meaning for a “display module.” Sur-reply

5. Patent Owner discusses Petitioner’s position advocated in the District Court, which was that a display module is a “module having a pair of LED display panels operatively coupled to a daughter board.” *Id.* (citing Ex. 2003, 3; Exs. 2005–2006). Patent Owner asserts allowing Petitioner to have a different, broader claim construction in this proceeding would be “unjust.” *Id.* at 6.

In the District Court, Petitioner proposed that a “display module” should be construed as “a sealed display module protected against weather including extreme cold and heat and having a pair of LED panels operatively coupled to a daughter board.” Ex. 1013, 15. In that same proceeding, Patent Owner proposed that the same phrase should have its “plain and ordinary meaning.” *See* Ex. 1014, 18 (emphasis omitted). In its final claim construction, the District Court determined that a “display module” means a “module having a pair of LED display panels operatively coupled to a daughter board.” Ex. 2006, 5.

In the Institution Decision, we determined the term “display modules” “should be given its plain and ordinary meaning, which includes modules that display information.” Inst. Dec. 21.

Having reviewed the arguments and evidence in the full record, we maintain and reaffirm our preliminary construction of the “display modules.” In arriving at our claim construction, we also have taken into account the language in claims 1, 12, and 21, the Specification of the ’791 patent (Ex. 1001), the parties proposed constructions in the District Court (*see* Exs. 1013–1014, 2003, 2005), the District Court’s claim construction (*see* Ex. 1025, 2006), the parties’ positions in this proceeding, and the supporting evidence (*see* Exs. 1002, 1030–31, 2002, 2004).

Claims 1, 12, and 21 recite “a plurality of display modules.” *See* Ex. 1001, 87:13 (claim 1), 88:3 (claim 12), 88:53 (claim 21). Thus, claims 1, 12, and 21 do not explicitly recite each display module of the “plurality of display modules” includes a pair of LED panels or the panels are operatively coupled to a daughter board.

Phillips indicates that the specification “is always highly relevant to the claim construction analysis” and “is the single best guide to the meaning of a disputed term.” *Phillips*, 415 F.3d at 1315 (citation omitted). Therefore, turning to the ’791 patent, the Specification discusses and shows display module 14 includes two side-by-side display panel assemblies (e.g., 14L, 14R) having pixels that emit different color lights and a daughter board (e.g., 20). *See* Ex. 1001, 33:39–34:63, Figs. 8–11. The ’791 patent also discusses other features of display module 14, including but not limited to the daughter board being centrally disposed between panel assemblies. *See id.* at 34:45–58, Fig. 10; *see also id.* at 33:39–34:63, Figs. 8–11. Yet, these other features (e.g., the daughter board being centrally disposed between panel assemblies) are not part of either parties or the District Court’s claim construction of “display modules” found in claims 1, 12, and 21.

As *Phillips* also states,

the line between construing terms and importing limitations can be discerned with reasonable certainty and predictability if the court’s focus remains on understanding how a person of ordinary skill in the art would understand the claim terms. For instance, although the specification often describes very specific embodiments of the invention, we have repeatedly warned against confining the claims to those embodiments.

Phillips, 415 F.3d at 1323 (citations omitted). Thus, to the extent that the ’791 patent describes an embodiment where the display modules include, for

example, a pair of LED display panels operatively coupled to a daughter board as the District Court found (*see* Ex. 1025, 65–67; Ex. 2006, 5), we do not import these features into each display module of the recited “plurality of display modules” in claims 1, 12, and 21 of the ’791 patent.

When considering how a person of ordinary skill in the art would understand a display module of the recited “plurality of display modules” in the claims, we similarly determine the evidence supports that an ordinarily skilled artisan would have understood the plain and ordinary meaning of “a plurality of modules” to include modules that display information. For example, Mr. Flasck finds that a video block, such as those in Templeton, which displays information, “constitutes a display module.” Ex. 1002 ¶ 101. In a deposition, in response to a question as what “the correct construction . . . of the term ‘display module’” is (Ex. 2007, 125:8–9⁹), Mr. Flasck further stated that he “believe[d]” a “display module . . . is a module for display. And in the context of the - - the ’791 [patent], it should be replaceable.” *Id.* at 125:10–13. Thus, this testimony and explanation supports that an ordinarily skilled artisan would have understood a display module of the recited “plurality of display modules” to mean a module for displaying information.

On the other hand, Mr. Credelle does not explicitly offer a construction of the phrase “display module” in this proceeding. *See* Ex. 2002 ¶¶ 75–76 (discussing the District Court’s final claim construction).

⁹ Notably, Exhibit 2004 cited by Patent Owner (*see, e.g.*, Resp. 53 (citing Ex. 2004, 122:22–125:5) was a “rough draft transcript” that has “not” been “certified.” Ex. 2004, 1:9. During the hearing, the panel requested a certified transcript be made of record. *See* Tr. 5:22–6:16. For this opinion, we refer to the certified transcript. *See* Ex. 2007, 161.

Mr. Credelle argues that “[n]one of the references cited by Petitioners disclose ‘a plurality of display modules’ where a display module has a pair of LED display panels operative coupled to a daughter board.” *Id.* ¶ 77. Thus, as Mr. Credelle states, “the main construction [he] used” in this proceeding was “the pair of LED panels operatively coupled to a daughterboard” similar to the District Court. Ex. 1031, 76:20–77:3; *see id.* at 75:11–12 (stating his “discussion in the report is primarily concerning the court’s construction”). Yet, Mr. Credelle also testified “the construction of display module terms . . . could be considered plain and ordinary meaning, which is basically a modular display panel as the basis of his - - many of these claims.” Ex. 1031, 75:14–18; *see also* Ex. 1030 ¶ 91 (declaring in the District Court proceeding that “a person of ordinary skill in the art would be [sic] understand the scope and meaning of the term[, ‘display module,’] without further elaboration”). Thus, some of Mr. Credelle’s testimony also supports that an ordinarily skilled artisan would have understood the plain and ordinary meaning of “display module” includes a modular display or a module that displays information.

Granted, there are differences between our claim construction of the phrase “plurality of display modules” (i.e., plain and ordinary meaning (*see* Inst. Dec. 20)) and that in the District Court (i.e., a module having a pair of LED display panels operatively coupled to a daughterboard) (Ex. 2006, 5; *see also* Ex. 2002 ¶¶ 75–76; Resp. 25–26). We have carefully considered and weighed the District Court’s construction and respectfully arrive at different construction for the recited “plurality of display modules” in claims 1, 12, and 21.

We additionally acknowledge that the claims of the '791 patent “shall be construed using the same claim construction standard that would be used to construe the claim[s] in a civil action under 35 U.S.C. § 282(b).” 37 C.F.R. § 42.100(b) (2019). Above, we have applied *Phillip* in construing the phrase “a plurality of display modules” and thus have applied the same claim construction standard used in a civil action. Thus, for the reasons discussed above, we are persuaded that Petitioner’s claim construction is the most correct.

In sum, we maintain and reaffirm that the term “display modules” in claims 1, 12, and 21 “should be given its plain and ordinary meaning, which includes modules that display information.” Inst. Dec. 21.

D. “[P]lurality of power routing systems”

1. Claim 1

Claim 1 recites “a plurality of power routing systems, each power routing system having a power input for coupling to a power source and a plurality of power extensions, each power extension for coupling the power source to one of the plurality of display modules” (element [1e] or “the ‘plurality of power routing systems’ limitation”). Ex. 1001, 87:22–26. Petitioner does not address this limitation in the Petition (*see generally* Pet. 18–22), indicating that “any term not expressly discussed should be given its ordinary and customary meaning to a person of skill in the art” (*id.* at 18).

Patent Owner argues that the above recitation, consistent with the '791 patent, requires “each power routing system has a ‘power input for coupling to a power source’” or a “node associated with each sign section.” Resp. 49–51 (citing Ex. 1001, 21:50–52, 64:29–34, Fig. 36). When

addressing the prior art, Patent Owner further contends that each power routing system has “a plurality of power extensions.” *Id.* at 53 (bolding omitted), 54 (arguing the same for Kalua), 53–54 (stating “the power routing system of the ’791 patent . . . requires each power routing system to have a power input or node, with a plurality of power extensions each going to a single module.”). In the Sur-reply, Patent Owner explains the claims “require that *each* power routing system *include* a plurality of power extensions.” Sur-reply 11.

In the Reply, Petitioner asserts that:

[t]he plain meaning of the claims thus requires a plurality of power routing systems that have or include: (a) a power input, or a node associated with a sign section; and (2) [sic] a plurality of power extensions, each of which must connect the power input or node to one of the display modules or bays.

Reply 14–15. Petitioner further states “[t]he claims do not require that each power input or node themselves include a plurality of power extensions. Rather, only the power routing system must include a plurality of power extensions.” *Id.* at 15.

The final claim construction of the District Court found the “plurality of power routing systems” limitation should have its plain and ordinary meaning. Ex. 2006, p. 6; *see also* Ex. 1025, 73 (same).

We did not construe the “plurality of power routing systems” limitation in the Institution Decision. *See generally* Inst. Dec.

Upon consideration, we determine that the “plurality of power routing systems” limitation in claim 1 should have a meaning that is consistent with Patent Owner’s interpretation and more specifically, adopt Patent Owner’s interpretation of the “each power routing system” phrase as our own. In arriving at our claim construction, we have taken into account the claim

language, the Specification of the '791 patent, the District Court's claim construction, the parties' positions in this proceeding, and any supporting evidence.

The language in claim 1, reciting “a plurality of power routing systems, each power routing system having a power input for coupling to a power source and a plurality of power extensions, each power extension for coupling the power source to one of the plurality of display modules” (Ex. 1001, 87:22–26), has two commas. The first comma is located after the phrase “plurality of power routing systems,” and the second comma is located after the clause “each power routing system having a power input for coupling to a power source and a plurality of power extensions.” After the second comma, claim 1 functionally recites “each power extension for coupling the power source to one of the plurality of display modules.” Thus, a plain reading of “plurality of power routing systems” includes “each power routing system having a power input for coupling to a power source *and* a plurality of power extensions.” Ex. 1001, 87:22–24.

During oral hearing, Petitioner was asked how the “plurality of power routing systems” limitations should be construed. A relevant portion of the hearing follows:

JUDGE POTHIER: . . .

I do have another question about the power routing system. In Templeton, the Petitioner^[10] seems to take the position that there are a plurality of these power extensions as the claim requires. Is your position that each routing system requires a plurality of power extensions as well as an input?

MS. CIPRIANO: No, Your Honor, that's my understanding of Patent Owner's position. If you look on Slide

¹⁰ APJ Pothier mistakenly referred to Patent Owner in this context as “Petitioner.”

54 of Petitioner's demonstratives, I put the claim language on this slide and I think it's helpful.

JUDGE POTHIER: Right, and I do see the second line there says ["each power routing system having a power input["] and ["a plurality of power extensions[."] That seems to be what it says, but how are you construing --

(Simultaneous speaking.)

JUDGE POTHIER: -- or how is Petitioner construing that?

MS. CIPRIANO: So, I agree that that is one reading of this claim, but if you look at the structure of this sentence, I think it can be read a different way, and it's Petitioner's position that it should be read a different way so that the two elements of this claim are parallel.

So, here it says a plurality of power routing systems, each power routing system having a power input for coupling to a power source, so that's a clause modifying the plurality of power routing systems, and separately, a plurality of power extensions, each power extension for coupling the power source to one of the plurality of display modules.

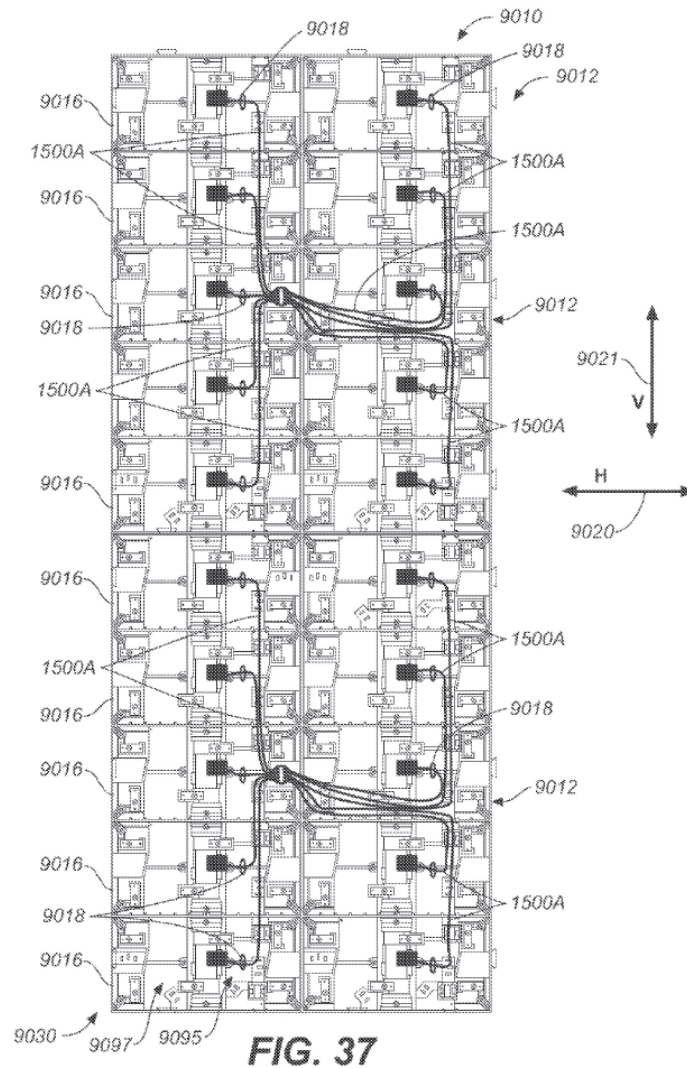
Tr. 69:4–70:2.

If a comma was located after the phrase "a power input for coupling to a power source" in claim 1, we might agree with Petitioner's proposed interpretation. However, as explained above, the evidence on balance supports a plain reading of the sentence and that our construction of the "plurality of power routing systems" limitation in claim 1 is supported by the explanation of "each power routing system having a power input for coupling to a power source and a plurality of power extensions," due to the placement of the commas within the complete "plurality of power routing system" limitation.

Turning to the Specification, it uses the exact same or a similar phrase to that found in claim 1 (i.e., "a plurality of power routing systems, each power routing system having a power input for coupling to a power source

and a plurality of power extensions, each power extension for coupling the power source to one of the plurality of display modules”) numerous times in the Specification. Ex. 1001, 15:16–19, 16:9–14, 18:33–37, code (57). The Specification also discusses each power routing system includes a hub (Ex. 1001, 16:38–39), a wiring harness (*id.* at 16:48–49), and at least one node (*id.* at 17:4–6, 17:66–67), which according to the ’760 patent is a power junction end (*see id.* at 64:11–12 (stating “the plurality of power junctions ends (nodes)”). The Specification further describes “the power input is an end of the [wiring] harness that couples to a DC power source.” *Id.* at 16:49–50. Thus, the Specification describes each power routing system as having a hub, a wiring harness having a power input at one end that couples to a DC power source, and at least one node, which is a power junction end.

The Specification further describes wire harness assembly 1500, which as noted above is part of each power routing system. *Id.* at 63:44–45, Fig. 36. The disclosure states wire harness assembly 1500 includes first portion 1500A, which is a prewired portion shown in Figure 37 (*id.* at 63:45–48, 64:1–3, 64:40, Fig. 37), and second portion 1500B, which includes hubs 1710 and 1810 shown in Figure 36 (*id.* at 63:48–52, 64:15–39, Fig. 36). First portion 1500A is illustrated below.



Above, Figure 37 shows first portion 1500A includes various wiring, including (a) “a plurality of power extension ends for coupling a DC power source derived from the second portion 1500B to the plurality of display modules 14” and (b) a “power junction end for coupling the power extension end to DC power source.” *Id.* at 64:4–10, 64:12, Fig. 37.

We also have reviewed other passages in the Specification related to the power routing systems. *See id.* at 16:38–42, 16:47–54, 73:18–22, 87:44–49 (claim 7), 87:53–62 (claim 9). These passages do not change our understanding of the recited “each power routing system” clause found in claim 1.

As such, construing the phrase, “a plurality of power routing systems, each power routing system having a power input for coupling to a power source and a plurality of power extensions, each power extension for coupling the power source to one of the plurality of display modules” (*id.* at 87:22–26), in light of the above passages in the Specification, supports that the clause “each power routing system having a power input for coupling to a power source and a plurality of power extensions” within the “plurality of power routing systems” limitation should be read such that “each power routing system” has (1) a power input and (2) a plurality of power extensions.

Ms. Flasck offers no testimony related to the “plurality of power routing systems” or how a person of ordinary skilled in the art would understand the phrase “each power routing system” in the claim 1. *See generally* Ex. 1002. Mr. Credelle merely reiterates what claims 1, 12, and 21 recite with no further explanation. *See generally* Ex. 2002 ¶ 101.

Having reviewed the arguments and evidence in the full record, the weight of the evidence on balance supports that “each power routing system” phrase within the limitation, “a plurality of power routing systems, each power routing system having a power input for coupling to a power source and a plurality of power extensions, each power extension for coupling the power source to one of the plurality of display modules” in claim 1 (Ex. 1001, 87:22–26), means that each power routing system has (1) a power input and (2) a plurality of power extensions.

2. Claims 12 and 21

Claims 12 and 21 both recite “a plurality of power routing systems each including at least one node associated with each sign section with a

plurality of individual power extensions each extending from one node to one of the bays” (element [12e], element [21f] or the “plurality of power routing systems” limitation). Ex. 1001, 88:13–16, 89:4–7. Petitioner does not address this limitation in its claim construction (Pet. 18–22), indicating “any term not expressly discussed should be given its ordinary and customary meaning to a person of skill in the art” (*id.* at 18).

Patent Owner presents no explicit claim construction for elements [12e] and element [21f]. *See generally* Resp. When addressing the grounds and the cited prior art, Patent Owner states that the prior art’s (e.g., Kalua’s) “power routing systems” does not “have *a plurality of power extensions.*” Resp. 54 (first italics added). But, Patent Owner also contends the prior art only teaches the “power routing system” has “a single power extension from the node” (*id.*), which implicitly argues for a proposed claim construction of the “plurality of power routing systems” limitation in claims 12 and 21 where *each* power routing system has “a plurality of individual power extensions.” *See id.*; *see also id.* at 53 (asserting the prior art does not teach the “plurality of power routing system” because “each power routing system serves one module, and has only one power extension – not a plurality of power extensions”) (bolding omitted).

The District Court construed claim 12’s and 21’s “power routing systems” limitation in the ’791 patent. In that proceeding, Patent Owner proposed this limitation have the plain and ordinary meaning, whereas Petitioner proposed “each power-routing system including at least one node associated with each sign section [assembly],” “each sign section [assembly] including a plurality of individual power cables,” and “each power cable extending from one node to one of the bays.” Ex. 1025, 71. The District

Court found the “plurality of power routing systems” limitation in claims 12 and 21 “should be given its plain and ordinary meaning.” *Id.* at 72. The court also found the claims require “the plurality of power routing systems include the claimed plurality of individual power extensions” but found that each sign section assembly including a plurality of individual power cables was “not found in the claim.” *Id.*

Upon review, we give the “plurality of power routing systems” limitation in claims 12 and 21 a similar meaning to claim 1. Notably, unlike claim 1, the above limitations in claims 12 and 21 do not include any commas. *See* Ex. 1001, 88:13–16, 89:4–7. Even so, similar to claim 1, the phrase “each including at least one node associated with each sign section with a plurality of individual power extensions” follow the recitation “a plurality of power routing system.” Also, similar to claim 1, the phrase “each extending from one node to one of the bays” follows the phrase “each including at least one node associated with each sign section with a plurality of individual power extensions.” *Id.* Thus, the plain reading of “a plurality of power routing systems each including at least one node associated with each sign section with a plurality of individual power extensions each extending from one node to one of the bays” is that the phrase “each including at least one node associated with each sign section with a plurality of individual power extensions” describes “each” power routing system of the “plurality of power routing systems.”

The Specification states *each* power routing system includes at least one node (*id.* at 73:22–23) and that “a plurality of individual power extensions radiate or extend from the node to one of the bay members.” *Id.* at 73:23–25. As previously discussed, the Specification also states hubs

1710 and 1810 define the plurality of the power routing system as shown in Figure 36. *Id.* at 73:18–22. Additionally, when addressing claim 1 above and how to construe the recited “each” power routing system, we noted that Figures 36 and 37 of the ’791 patent show the power distribution arrangement that includes a wiring harness and support that each power routing system includes at least one node and a plurality of power extensions. We refer above for more explanation. *See, e.g., id.* at 16:38–39, 16:48–50, 63:44–52, 64:1–40, Figs. 36–37. Thus, consistent with the ’791 patent’s Specification, we determine the phrase “each including at least one node associated with each sign section with a plurality of individual power extensions” means “each” power routing system “includ[es] at least one node associated with each sign section” and “with a plurality of individual power extensions.”

Also, as discussed above, the District Court found the “plurality of power routing systems” limitation in claims 12 and 21 requires “the plurality of power routing systems include the claimed plurality of individual power extensions.” Ex. 1025, 72. This claim construction does not address directly whether the “plurality of individual power extension” phrase also modifies the “each including” clause within the “plurality of power routing systems” limitation that follows the recited “a plurality of power routing systems” clause. *See id.* at 71–73. Instead, the court only construes the “plurality of power routing system” limitation in its entirety in arriving at its claim construction.

To the extent our claim construction differs from the District Court’s, we have carefully considered the court’s construction in arriving at our claim interpretation. Similar to the District Court, we agree that the “plurality of

power routing systems” limitation does not require “each sign section” in claims 12 and 21 to include “a plurality of individual power extensions.” Ex. 1025, 72. Additionally, we explain above how we determined the phrase “each including at least one node associated with each sign section with a plurality of individual power extensions” in the “plurality of power routing systems” limitation means “each” power routing system “includ[es] at least one node associated with each sign section” and “a plurality of individual power extensions” consistent with the Specification of the ’791 patent.

Having reviewed the arguments and evidence in the full record, we determine “each including at least one node associated with each sign section with a plurality of individual power extensions” within the “plurality of power routing systems” limitation of claims 12 and 21 means “each” power routing system “includ[es] at least one node associated with each sign section” and also is “with a plurality of individual power extensions.”

E. Remaining Terms

For purposes of this Final Written Decision, we determine that we need not provide an express construction for any other claim terms in the ’791 patent. *Vivid Techs., Inc. v. Am. Sci. & Eng’g, Inc.*, 200 F.3d 795, 803 (Fed. Cir. 1999); *see also Nidec Motor Corp. v. Zhongshan Broad Ocean Motor Co.*, 868 F.3d 1013, 1017 (Fed. Cir. 2017) (citing *Vivid Techs.* in the context of an *inter partes* review).

III. DISCUSSION

A. Principles of Law

A patent claim is unpatentable under 35 U.S.C. § 103(a) if the

differences between the claimed subject matter and the prior art are such that the subject matter, as a whole, “would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains.” *KSR Int’l Co. v. Teleflex Inc.*, 550 U.S. 398, 406 (2007). The question of obviousness is resolved on the basis of underlying factual determinations including: (1) the scope and content of the prior art; (2) any differences between the claimed subject matter and the prior art; (3) the level of ordinary skill in the art; and (4) when in evidence, objective evidence of nonobviousness. *Graham v. John Deere Co.*, 383 U.S. 1, 17–18 (1966).

“In an [*inter partes* review], the petitioner has the burden from the onset to show with particularity why the patent it challenges is unpatentable.” *Harmonic Inc. v. Avid Tech., Inc.*, 815 F.3d 1356, 1363 (Fed. Cir. 2016) (citing 35 U.S.C. § 312(a)(3) (requiring *inter partes* review petitions to identify “with particularity . . . the evidence that supports the grounds for the challenge to each claim”)). This burden of persuasion never shifts to Patent Owner. *See Dynamic Drinkware*, 800 F.3d at 1378 (discussing the burden of proof in *inter partes* review).

B. Contentions Related to 37 C.F.R. § 42.104

Patent Owner contends that Petitioner does not explain the plain and ordinary meaning of the recited “display modules.” Resp. 27 (contending Petitioner does not explain how Templeton’s video blocks meet the ordinary construction of “display modules”), 30 (contending Petitioner does not explain how Kalua’s video image units meet the plain and ordinary construction of “display modules.”). Patent Owner argues that Petitioner has not identified how the phrase “display module” in the challenged claims are

to be construed as required by 37 C.F.R. § 42.104(b)(3). *Id.* at 25 (citing 37 C.F.R. § 42.104(b)(3)), 30–31 (same). For this reason, Patent Owner contends that Petitioner has not met its burden to show by a preponderance of the evidence that the challenged claims are obvious. Patent Owner presents a similar argument contending Petitioner does not explain the plain and ordinary meaning of the recited “compound structural frames” found in claims 4, 5, 14, 15, and 24. *See id.* at 40, 43–44.

As indicated above in Section II, we effectively determined that Petitioner complies with the applicable provisions of our rules by sufficiently identifying the claim construction it proposes as the basis for requesting review of the challenged claims. *See Western Digital Corp. v. Spex Techs, Inc.*, IPR2018-00084, Paper 14 at 10–12 (PTAB April 25, 2018) (distinguishing *Toyota Motor Corp. v. Blitzsafe Texas LLC*, IPR2016-00422, Paper 12 (PTAB July 6, 2016)). *Western Digital* states, and we agree, that “37 C.F.R. § 104(b)(3) does not require [a p]etitioner to express its subjective agreement regarding correctness of its proffered claim constructions or to take ownership of those constructions,” such as in a district court proceeding. *Id.* at 11.

Under Rule 42.104(b)(3), a Petition must identify:

How the challenged claim is to be construed. Where the claim to be construed contains a means-plus-function or step-plus-function limitation as permitted under 35 U.S.C. 112(f), the construction of the claim must identify the specific portions of the specification that describe the structure, material, or acts corresponding to each claimed function[.]

37 C.F.R. § 42.104(b)(3) (2019).

Here, the Petition complies with the requirements set forth in 37 C.F.R. § 42.104(b)(3) because the Petition identifies that, for the

purposes of this proceeding, any claim term not expressly discussed should be interpreted under their ordinary and customary meaning as understood by one of ordinary skill in the art. Pet. 18. Petitioner also identifies where each element of the claims is alleged to be found in the prior art. *See id.* at 34 (addressing “display modules” for Ground 1), 41–42 (addressing “compound structural frame” for Ground 1), 51–53 (referring to Ground 1 for claims 12, 14, 15, 21, and 24 when addressing Ground 2), and 59 (addressing “display module” for Ground 3). By addressing how the prior art reads on the recited “display modules” and “compound structural frames” in the challenged claims, Petitioner implicitly provides Patent Owner with further notice of how Petitioner construes these recited terms. *See id.* Our rules do not require more than this.

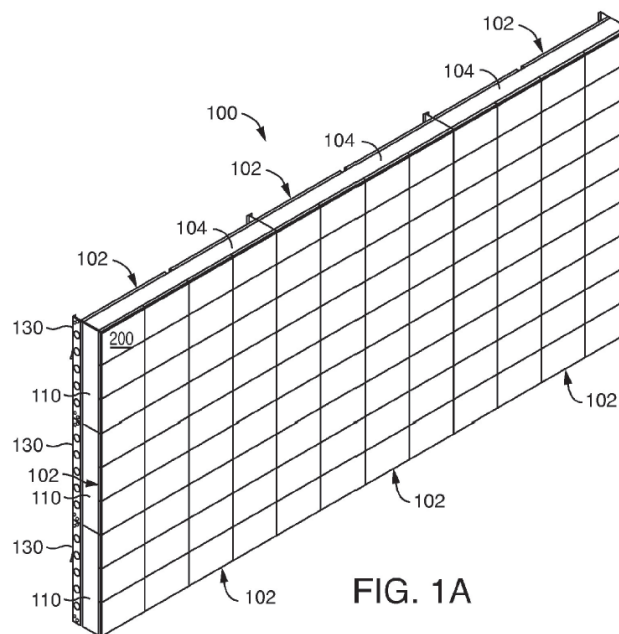
The challenged claims of the ’791 patent also do not contain a means-plus-function or step-plus-function limitation as permitted under 35 U.S.C. § 112(f). Thus, our interpretation of the rules is consistent with its regulatory history, which indicates that the goal for setting forth claim construction is to provide sufficient notice to Patent Owner, which has been adequately accomplished here. *See* 77 Fed. Reg. 48,688; Fed. Reg. 48,699–700.

On this basis, we disagree that Petitioner has not met its burden to show by a preponderance of the evidence that the challenged claims are obvious.

C. Obviousness of Claims 1, 4, 5, 10, and 11 over Templeton in view of Ordinary Skill (the Watchfire references) (Ground 1)

1. Templeton (Ex. 1004)

Templeton describes a display board for displaying images using light emitting diodes (LEDs) as pixels. Ex. 1004, code (57). Templeton's Figure 1A, below, shows the front side of video board 100.



Templeton's Figure 1A Showing a Video Board's Front Side.

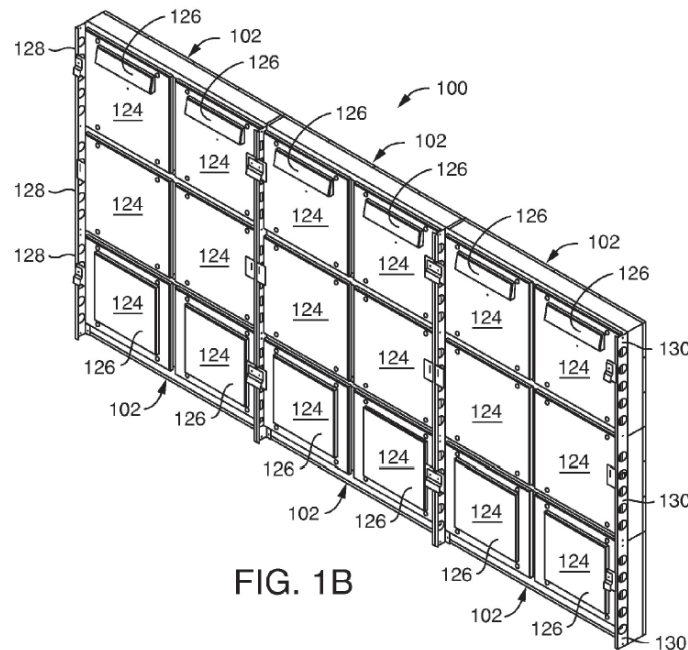
Id. ¶¶ 9, 55, Fig. 1A. Figure 1A above shows “nine modular cabinets 102, each populated with twelve video blocks 200.” *Id.* ¶ 55, Fig. 1A.

Templeton discloses an exemplary video block (i.e., 200) includes frame 202 made “from a polymer capable of supplying sufficient strength and rigidity” (*id.* ¶ 75) printed circuit board (PCB) 300 with LEDs 304, each constituting pixel 306 of video board 100. *Id.* ¶¶ 60–61, 75–77, Figs. 2A–F, 3D.

Templeton states “video blocks 200 [can be] arranged in different configurations,” including “four columns of three video blocks 200.” *Id.*

¶ 59.

Templeton's Figure 1B, below, shows the rear side of video board 100.



Templeton's Figure 1B Showing a Video Board's Rear Side.

Id. ¶¶ 10, 56, Fig. 1B. Figure 1B above shows cabinet 102's rear face having access panels 124 covering access openings 120 and mounting beams 128 and 130. *Id.* ¶¶ 56–57, Fig. 1B.

Templeton also discloses its display board has a power supply case with power supply unit (e.g., 706) that provides power to run PCB 300 that drives a video block's LEDs 304, which produce images on video board 100. *Id.* ¶¶ 109, 113–114, code (57), Figs. 9A–E.

Templeton discusses the cabinet's modular nature “facilitate[s] video boards with greater or fewer cabinets 102” (*id.* ¶ 59) and “allows a video board of any size to be transported from a factory to an installation site” (*id.* ¶ 60). Templeton teaches video board 100 might be installed in a location

where viewers might be above (e.g., a sport stadium) or below board 100.
Id. ¶¶ 87–88.

2. Watchfire (Exs. 1005, 1006, 1008, 1009)

Watchfire or the Watchfire references are four publications related to outdoor LED price displays. Exs. 1005–1006, 1008–1009. Watchfire discloses its signs serve a growing market such as outdoor LED sign solutions for gas stations and convenience stores. Ex. 1005, 1. Watchfire indicates its signs are “easy to install, maintain and operate” as well as its “fully assembled unit is a ‘plug and play’ sign solution. It makes installation or retrofit quick, easy and affordable.” *Id.*; *see* Ex. 1006, 1 (stating Watchfire signs are “designed for simplified, economical installation.”); *see* Ex. 1008, 1 (stating its sign “simplifies installation and features user-friendly operation.”); *see* Ex. 1009, 1 (stating its “signs were designed to help our sign dealers serve a growing market”). Watchfire also discusses its “signs are outdoor LED gas price displays” and “are self-contained units that are designed to fit new structures and easily retrofit into existing signs.” Ex. 1006, 1; *see* Ex. 1009, 1 (stating the Watchfire sign “is a complete, self-contained unit for simplified installation”).

3. Analysis

Petitioner contends claims 1, 4, 5, 10, and 11 are unpatentable under 35 U.S.C. § 103(a) as obvious over Templeton in view of Ordinary Skill as evidenced by Watchfire. Pet. 31–47 (citing Ex. 1002 ¶¶ 120–161).

(a) Claim 1

For consistency, we use nomenclature for the limitations of claim 1 similar to those presented in the Petition in this Opinion. *Id.* at 14–16. Because we determine that Petitioner has not shown by a preponderance of

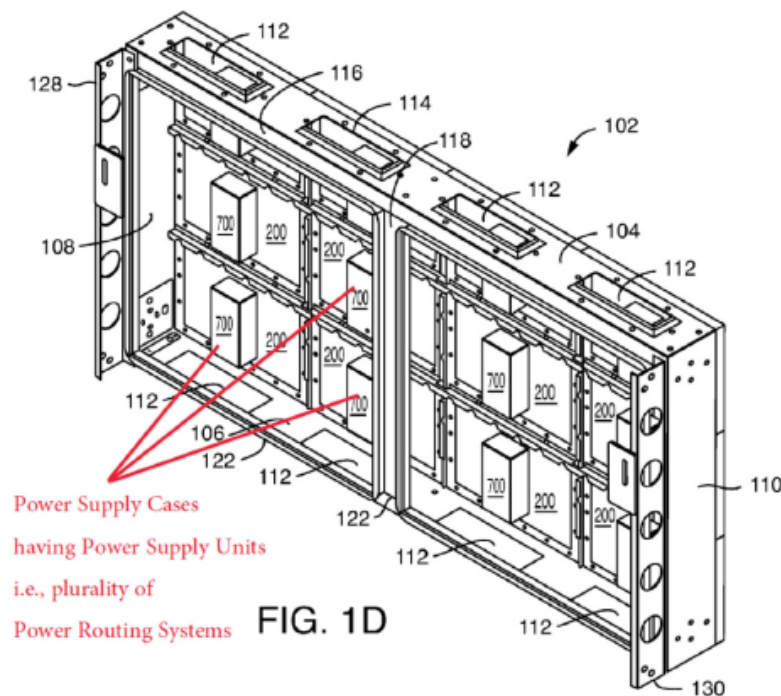
the evidence that the combination of prior art teaches element [1e], we focus our analysis below on this limitation.

(i) “a plurality of power routing systems” – element [1e]

Claim 1 recites “a plurality of power routing systems, each power routing system having a power input for coupling to a power source and a plurality of power extensions, each power extension for coupling the power source to one of the plurality of display modules” (“element [1e]”).

Ex. 1001, 87:22–26. Petitioner contends Templeton with Ordinary Skill teach or suggest this claimed element. Pet. 39–41 (citing Ex. 1002 ¶¶ 141–144).

Petitioner argues Templeton’s Figure 1D discloses multiple video blocks having “a plurality of power routing systems” as shown below:



Templeton’s Figure 1D (Annotated) Showing the Modular Cabinet’s Rear Side Populated With Video Blocks.

Id. at 40 (reproducing annotated Templeton’s Figure 1D) (citing Ex. 1004, Fig. 1D; Ex. 1002 ¶¶ 142–143); *see also* Reply 16 (same). The above annotated Figure 1D shows three red lines labeled “Power Supply Cases having Power Supply Units[,] i.e., plurality of Power Routing Systems” and pointing to elements 700. Pet. 40. Petitioner further contends that the above configuration in Templeton “also discloses a plurality of power extensions, each power extension for coupling a power source to a display module.” *Id.* (citing Ex. 1002 ¶ 144).

Petitioner further asserts Templeton discloses each video block 200 has power supply case 700 and power supply unit 706 that provides the power to run PCB 300, which in turn drives LEDs 304 and produce images on video board 100. *Id.* (citing Ex. 1004 ¶¶ 61, 109, 113, Figs. 2B, 9A–E). Petitioner also states Templeton’s “video board has a 1:1 ratio of power supply units 706 to video blocks 200,” such that several power supply units correspond to nodes associated with cabinet 102. *Id.* at 41 (quoting Ex. 1004 ¶ 114) (citing Ex. 1004, Fig. 1D; Ex. 1002 ¶ 144).

Patent Owner contests Petitioner’s showing as to element [1e]. *See* Resp. 49–53. Patent Owner argues that Templeton does not disclose “a plurality of power routing systems like that claimed in the ’791 patent.” *Id.* at 51 (citing Pet. 40); *see id.* at 52 (reproducing Ex. 1004, Fig. 1D (annotated); Ex. 1002 ¶ 144). More specifically, Patent Owner contends Mr. Flasck testifies that “each video block has its own power supply,” which is a power routing system, and Figure 1D in Templeton discloses 12 power routing systems. *Id.* at 53 (citing Ex. 2004¹¹, 122:22–125:5). Patent Owner

¹¹ As previously noted, this exhibit is a “rough draft” of Mr. Flask’s deposition transcript, and we will refer to Exhibit 2007.

further argues that Petitioner “omits the ‘plurality of power extensions’ required by the claims” because “each power routing system serves one module, and has only one power extension – not a plurality of power extensions.” *Id.* (bolding omitted); *see also* Sur-reply 11–12 (stating “Each power routing system of Templeton serves one module and has only *one* power extension.”).

In the Reply, Petitioner contends Patent Owner’s interpretation of claims 1, 12, and 21 to require “a plurality of power extensions each going to a single module” (Resp. 53–54) is not consistent with the “plurality of power routing systems” limitation’s plain meaning. Reply 14. Rather, Petitioner contends the “plurality of power routing systems” limitation requires each power extension is “for coupling the power source to one of the plurality of display modules” in claim 1 or is “extending from one node to one of the bays” in claims 12 and 21. *Id.* (bolding and emphasis omitted).

Whether or not Petitioner is correct, this response does not address Patent Owner’s arguments related to the “each power routing system” phrase within the “power routing systems” limitation. As previously explained, we found Patent Owner’s arguments persuasive and interpreted “each power routing system” phrase in element [1e] to require each power routing system has (1) a power input and (2) a plurality of power extensions based on the intrinsic evidence and plain and ordinary meaning of the term.

Turning to Templeton, Petitioner maps each power routing system to a power case (e.g., 700) with a power supply unit (e.g., 706). *See* Pet. 40 (citing Ex. 1004 ¶¶ 61, 109, 113, Figs. 2B, 9A–9E; Ex. 1002 ¶¶ 142–44) (reproducing Ex. 1004, Fig. 1D (annotated)); *see id.* at 39–41 (further citing Ex. 1002 ¶ 141; Ex. 1004 ¶ 114, Fig. 1D). Templeton discloses power case

700 in Figures 1D, 2B and 9A–D containing power base plate 702, enclosure 704, and power supply unit 706. Ex. 1004 ¶¶ 61, 109, Figs. 2B, 9A–D. Templeton further discloses power supply units 706 provide power and drive LEDs 304 and more specifically, each power supply unit 706 drives LEDs 304 for a single video block 200. *Id.* ¶¶ 113–14; *see also* Ex. 1002 ¶ 142 (quoting Ex. 1004 ¶ 113); *see also* Reply 15 (same). Thus, as explained in the Petition, Templeton teaches or suggests “each power routing system” (e.g., 700) has “a power input for coupling to a power source” (e.g., 706) as claim 1 recites.

As for the requirement to have “a plurality of power extensions,” we determine that Petitioner’s evidence and argument related to Templeton fall short. Templeton, as explained in the Petition, only suggests one power extension. Templeton states “the video board has a 1:1 ratio of power supply units 706 to video blocks 200, as depicted in FIG. 1D.” Ex. 1004 ¶ 114; *see also* Ex. 1002 ¶ 144 (quoting Ex. 1004 ¶ 114); Reply 16. That is, the disclosed “1:1 ratio” between power supply units (e.g., 706) and video blocks (e.g., 200) in Templeton (*id.*) suggests to one skilled in the art that each “power routing system” has a power extension “for coupling to a power sources to one of the plurality of display modules.”

Thus, the above-discussed passages in Templeton fail to suggest “a plurality of extensions” as we construed element [1e] above consistent with Patent Owner’s interpretation of the “each power routing system” clause in claim 1. This passage at best suggests to an ordinarily skilled artisan that each of its power routing system has one power extension to create the disclosed 1:1 ratio between a power supply unit and a video block. *See* Ex. 1004 ¶ 114. Thus, although Templeton’s teaching suggests “each power

extension for coupling the power source to one of the plurality of display modules” as claim 1 further recites, Templeton does not teach or suggest the recited “each power routing system” clause within element [1e], which requires “each power routing system” has “a plurality of power extensions.”

Mr. Flasck, Petitioner’s expert, testimony is similar to the Petition. *See* Ex. 1002 ¶¶ 141–144 (citing Ex. 1004 ¶¶ 61, 109, Figs. 1D, 2B, 9A–9E) (quoting Ex. 1004 ¶¶ 113–14) (reproducing Ex. 1004, Fig. 1D (annotated)). For example, in his declaration, Mr. Flasck does not elaborate on or explain how Templeton’s disclosed “1:1 ratio” teaching between power supply units and video blocks would have taught or suggested that “each power routing system” has “a plurality of power extensions” as we construed this limitation consistent with Patent Owner’s interpretation. *See id.* Also, when questioned whether “there’s a 1 to 1 correlation between the number of power supplies and the number of display modules” (Ex. 2007, 129:21–23), Mr. Flask states “Yeah. In Figure 2E, you can see 200, which is a display module and it shows one power supply 700. So, in this embodiment, in any event, there’s -- there seems to be one.” *Id.* at 130:2–6.

Additionally, when asking Mr. Flask whether he has “rendered an opinion about how the power supply on each display module is connected to the display module itself” (*id.* at 131:4–7), Mr. Flask answered:

Yes, in Paragraph 143 [of Ex. 1002] I say it’s reflected and annotated Figure 1D, Templeton discloses a multi-video block configuration would include a plurality of power routing systems on -- I’ve annotated that. And such a configuration, in my opinion, Templeton also discloses a plurality of power extensions, each power extension for coupling a power source to a display module/bays, to a display module/bays. Templeton indicates that the video board has a 1 to 1 ratio of power supply

units 706 to video blocks 200 and that they have a reference in there for that.

So, yes, I'm saying that -- that it appears to have one power supply per modular display and it has -- it has a power routing system that is a way to give power to each of those power supplies.

Id. at 131:9–132:3; *see also* Reply 17 (citing Ex. 2004, 122:22–127:25¹²).

Thus, although addressing how the “each power extension” is “for coupling the power source to one of the plurality of display modules” clause in element [1e], Mr. Flasck does not provide any further explanation how Templeton’s “1:1 ratio between power supply units and video blocks” teaches or suggests the “each power routing system” clause, which we have construed to require “a plurality of power extensions” as previously discussed. *See* Sur-reply 12 (stating “Petitioners’ argument again fails to identify the *plurality* of power extensions for *each* power routing system as required by the claims, and instead identified only a *single* power extension for each power routing system.”). We thus are not persuaded that Templeton teaches “a plurality of power extensions” (*see* Reply 17) as presented in the Petition and as we construed this phrase in claim 1.

Furthermore, Petitioner was asked during oral hearing how Petitioner construes the “each power routing system” within the “plurality of power routing systems” limitation of claim 1 and whether the Petition addresses alternative constructions of this limitation. The relevant portion of the hearing follows:

JUDGE POTHIER: . . . I do see the second line there says each power routing system having a power input and a plurality

¹² As previously explained, Exhibit 2004 is a rough draft and not the certified transcript.

of power extensions. That seems to be what it says, but how are you construing –

. . .

or how is Petitioner construing that?

MS. CIPRIANO: So, I agree that that is one reading of this claim, but if you look at the structure of this sentence, I think it can be read a different way, and it's Petitioner's position that it should be read a different way so that the two elements of this claim are parallel.

So, here it says a plurality of power routing systems, each power routing system having a power input for coupling to a power source, so that's a clause modifying the plurality of power routing systems, and separately, a plurality of power extensions, each power extension for coupling the power source to one of the plurality of display modules.

JUDGE POTHIER: Okay, so if we construe it the way you're taking it, I understand your position, but if we construe it to require that each system have a plurality of power extensions, does the [P]etition explain that position? Because it seems -- no, it does not? Is that what you're saying?

MS. CIPRIANO: No, it does not. We don't -- we have not presented any arguments along that claim construction. . . . We have not made any arguments that Templeton describes the power routing system as you have just described it.

Tr. 69:11–70:11.

Given that the Petition does not address how Templeton teaches or suggests “each power routing system” has “a plurality of power extensions” as we have construed the “plurality of power routing systems” limitation consistent with Patent Owner’s interpretation, the Petition has not shown by a preponderance of the evidence that Templeton teaches or suggests element [1e] under this ground. Additionally, the Petition does not rely on the knowledge and level of ordinary skill in the art as evidenced by Watchfire to supplement Templeton in this regard and thus fails to teach or suggest the “plurality of power routing systems” limitation. *See* Pet. 39–41 (discussing

only Templeton when addressing element [1e]), 43–47 (discussing rationales to combine Templeton with Watchfire).

Having reviewed the arguments and evidence in the full record, we are not persuaded Petitioner has demonstrated by a preponderance of the evidence that Templeton in view of the knowledge and level of ordinary skill in the art as shown by Watchfire teach or suggest element [1e].

(ii) Remaining Limitations – Preamble and elements [1a]–[1d]

As for the remaining limitations in claim 1 (e.g., preamble and elements [1b]–[1d]), Petitioner contends that Templeton in view of Ordinary Skill as evidenced by Watchfire disclose or render obvious these recitations. Pet. 31–34 (preamble) (citing Ex. 1002 ¶¶ 121–126; Ex. 1004, code (57), ¶¶ 55, 57, 60, 87–88, Figs. 1A–C (annotated); Ex. 1005, 1; Ex. 1006, 1), 34 (element [1a]) (citing Ex. 1002 ¶¶ 127–128; Ex. 1004 ¶ 55, Figs. 1 A–B), 34–36 (element [1b]) (citing Ex. 1002 ¶¶ 129–131; Ex. 1004 ¶¶ 55–56, 58, Figs. 1A–B (annotated)), 36–37 (element [1c]) (citing Ex. 1002 ¶¶ 132–133; Ex. 1004, Figs. 1A (annotated), 1E), 37–39 (element [1d]) (citing Ex. 1002 ¶¶ 134–140; Ex. 1004 ¶¶ 57, Figs. 1B–C (annotated); Ex. 1005, 1; Ex. 1006, 1; Ex. 1008, 1; Ex. 1009, 1); *see also* Reply 6–9 (citing Ex. 1004 ¶¶ 4, 6, 55, Figs. 1A–1B; Ex. 1002 ¶¶ 127–28; Ex. 1031, 75:1–20; Ex. 2002 ¶¶ 63–87).

Patent Owner does not contest Petitioner’s showing as to the preamble and elements [1b]–[1d]. *See generally* Resp. 23–40, 49–54, 57–64. For element [1a], Patent Owner contests Petitioner’s showing. *Id.* at 26–28 (citing Ex. 2004, 118:9–12, 118:18–21). Specifically, Patent Owner argues Petitioner has not explained or supported how Templeton’s video blocks meet the ordinary construction of “display module,” including failing to “identify the number of panels, the connections to those panels, or whether

the panel(s) are coupled to a daughter board.” *Id.* at 28. However, as discussed above, we have construed the phrase “display module” to have its plain and ordinary meaning, which includes a module that displays information.

Petitioner has addressed how Templeton in view of the knowledge and level of ordinary skill in the art as shown by Watchfire teach or suggest the preamble and elements [1a]–[1d]. *See* Pet. 31–39. Regardless, even if we were to accept Petitioner’s analysis of claim 1’s preamble and elements [1a]–[1d], we determine Petitioner has not provided by a preponderance of the evidence that Templeton teaches or suggests element [1e] and thus does not support sufficiently its challenge of claim 1 as unpatentable over Templeton in view of the knowledge and level of ordinary skill in the art as evidenced by Watchfire when reviewing the entire record.

(b) Claims 4, 5, 10, and 11

Petitioner contends Templeton in view of Ordinary Skill teach or suggest claims 4, 5, 10, and 11. Pet. 41–43 (citing Ex. 1002 ¶¶ 145–153; Ex. 1004 ¶¶ 55–56, 75, 78, code (57), Figs. 1A, 1C, 1E (annotated)). Claims 4, 5, 10, and 11 ultimately depend from claim 1 (Ex. 1001, 87:31–37, 87:63–67) and, therefore, include element [1e] as discussed above. Also, the discussion of claims 4, 5, 10, and 11 in the Petition do not further address the “plurality of power routing systems” limitation (i.e., element [1e]). *See* Pet. 41–43. Accordingly, Petitioner’s analyses of these claims suffers from the same problems we discussed above when addressing claim 1.

(c) Petitioner’s Reasons to Combine the Prior Art

Petitioner articulates a rationale for combining Templeton with Ordinary Skill as evidenced by Watchfire and argues a POSITA would have

combined their teachings with a “reasonable expectation of success.” Pet. 43 (citing Ex. 1002 ¶¶ 154–160), 46 (citing *Hoffmann LaRoche v. Apotex*, 748 F.3d 1326, 1329, 1331 (Fed. Cir. 2014)). Petitioner states Templeton teaches constructing a digital sign using easily accessible LED panels, and its design can be used in many environments, including sports stadiums and locations where viewers are below the sign (e.g., roadside billboards and stores). *Id.* at 43–44 (citing Ex. 1004 ¶¶ 87–88; Ex. 1002 ¶¶ 155, 157). Petitioner contends a POSITA would retrofit Templeton based on “aesthetics,” including a POSITA would have recognized electronic billboards are “more eye-catching to consumers than static billboards” and the “convenience store market was ‘asking for’ LED sign solution.” *Id.* at 45 (citing Ex. 1002 ¶¶ 61–73, 157; Ex. 1018, 3¹³; Ex. 1019¹⁴).

Petitioner additionally contends that applying Templeton’s teachings, which do not require any specific type of installation to retrofit an existing, non-digital sign structure (e.g., existing roadside billboards) as evidenced by the Watchfire references, to retrofit an existing sign structure would result in cost and other savings. *Id.* at 44 (quoting *DyStar Textilfarben GmbH & Co. Deutschland KG v. C.H. Patrick Co.*, 464 F.3d 1356, 1368 (Fed. Cir. 2006)) (citing Ex. 1002 ¶ 155; Ex. 1001, 1:46–52¹⁵; *In re O’Farrell*, 853 F.2d 894,

¹³ Abbey Klaassen, 15 *Digital technologies put time on side of outdoor advertising*, ADVERTISING AGE (April 11, 2005). Petitioner mistakenly refers to page “10.” Pet. 45. Exhibit 1019 refers to this article as being on page 24. Ex. 1019, 1. We refer to the page numbering found on the bottom right of each page.

¹⁴ Declaration of Rachel J. Watters on Authentication of Publication.

¹⁵ Noting, “billboard panels represent substantial capital outlays making it financially difficult, if not impossible, to discard such panels arbitrarily for replacement with digital panels.” Ex. 1001, 1:49–52.

903 (Fed. Cir. 1988)), 46–47 (citing Ex. 1005, 1; Ex. 1006, 1; Ex. 1008, 1; Ex. 1009, 1; Ex. 1002 ¶¶ 155, 159–162; *Perfect Web Tech., Inc. v. InfoUSA, Inc.*, 587 F.3d 1324, 1328–29 (Fed. Cir. 2009)). Petitioner also argues applying retrofitting to Templeton would have been a simple substitution of one known technique (e.g., retrofit installation as evidenced by Watchfire) for another (e.g., Templeton’s installation) in order to obtain predictable results, and the combination would have applied a known technique (e.g., retrofitting) to an existing device ready for improvement. *Id.* at 45–46 (citing Manual of Patent Examining Procedure (MPEP) §§ 2143(I)(B), (D); Ex. 1002 ¶¶ 157–160; *KSR*, 550 U.S. at 417; *Ruiz v. AB Chance Co.*, 357 F.3d 1270, 1276 (Fed. Cir. 2004)). Petitioner further states a POSITA would have known to secure the retrofit sign to appropriate load bearing members. *Id.* at 47 (citing Ex. 1002 ¶¶ 160–61).

Patent Owner contends that a person of ordinary skill in the art would not have modified Templeton in view of the ordinary skill as evidenced by the Watchfire references. Resp. 58–64. We do not address these assertions because, as explained above, we are not persuaded Petitioner has demonstrated by a preponderance of the evidence that Templeton in view of the knowledge and level of ordinary skill in the art as shown by Watchfire teach or suggest element [1e], which is part of claims 1, 4, 5, 10, and 11.

(d) Conclusion – Claims 1, 4, 5, 10, and 11

We have reviewed the arguments and evidence in the full record, including weighing of the fact findings to conclude whether or not the claimed combination would have been obvious to an ordinarily skilled artisan. On balance, Petitioner has not shown, by a preponderance of the evidence, that the combined teachings of Templeton in view of Ordinary

Skill as evidenced by Watchfire would have rendered the subject matter of claims 1, 4, 5, 10, and 11 obvious to one of ordinary skill in the art at the time of the invention.

D. Obviousness of Claims 6, 12–16, and 19–26 Over Templeton in view of Ordinary Skill, and further in view of Kludt (Ground 2)

1. Kludt (Ex. 1010)

Kludt addresses a sign system (e.g., 10) with multiple components distanced from the general support structure for mounting a plurality of display panels (e.g., 14a–14n). Ex. 1010, 4:63–67, Fig. 2. One component includes “internal walkway 13 . . . for access.” *Id.* at 5:28–29, Fig. 2. Sign system 10 is “versatile for purposes of construction and for purposes of change-out,” such as display panels 14a–14n “can be readily removed and replaced from the interior of the enclosure cabinet 12.” *Id.* at 10:1–5, Fig. 2.

2. Analysis

(a) Claim 6

Petitioner contends Templeton in view of Ordinary Skill as evidenced by Watchfire and Kludt teach or suggest claim 6. Pet. 47–51 (citing Ex. 1002 ¶¶ 196–201; Ex. 1004 ¶ 56, Figs. 1A–C (annotated); Ex. 1010, 5:28–29, 10:1–5, Fig. 2 (annotated)). The discussion of claim 6 in the Petition does not further address the “plurality of power routing systems” limitation (i.e., element [1e]) previously discussed or rely on Kludt to teach this limitation. *See id.* Claim 6 depends from claim 1 (Ex. 1001, 87:38–43) and, therefore, includes element [1e] as discussed above. Accordingly, for the same reasons discussed with respect to claim 1, Petitioner’s analysis of this claim suffers from the same problem as claim 1.

(b) Claims 12 and 21

For independent claims 12 and 21, Petitioner refers to its discussion of “Ground 1 element [1-preamble-1c]” for “claim limitations [12-preamble-12c] and [21-preamble-21c]” and “Ground 1 element [1e]” for “claim limitations [12e and 21f].” Pet. 51–53 (citing Ex. 1002 ¶¶ 164–176, 192–195); *see also id.* at 14–16 (identifying elements of claims 1, 12, and 21). As to “[e]lements 12d and 21d,” Petitioner states “Templeton would be attached to a beam surface to support structural integrity as explained in Ground 1 element [1d]” (*id.* at 52 (citing Ex. 1002 ¶¶ 134–149, 177)) and refers to “Ground 2 claim 6 above” to address “Templeton’s modified retrofit design” in view of Kludt to “allow rear access for servicing” (*id.* (citing Ex. 1002 ¶¶ 178–188, 196–200)). Finally, as for element 21e (*id.*), Petitioner states Templeton in view of Ordinary Skill as evidenced by Watchfire and Kludt teach or suggest this element “[f]or the same reasons the combination shows that the rear portion of the sign section can be attached to a sign structure to allow most of the rear surface of the rear portion to be exposed for servicing” and refers to “Ground 2, claim [6] above.” *Id.* (citing Ex. 1002 ¶¶ 189–191).

Patent Owner argues element [1e] together with elements [12e] and [21f]. *See* Resp. 49 (stating elements [12e] and [21f] are similar to element [1e]), 53 (arguing “Templeton’s power routing configuration” differs “from the ‘power routing system’ of the ’791 patent as it omits the ‘plurality of power extensions’ required by the claims”); *see also* Sur-reply 11 (same). As such, Patent Owner’s arguments for elements [12e] and [21f] are similar to those for element [1e], including that “Petitioners’ argument again fails to

identify the *plurality* of power extensions for *each* power routing system as required by the claims.” Sur-reply 12; *see also* Resp. 49, 53.

Above, we construe elements [12e] and [21f] similar to element [1e] to mean “each” power routing system “includ[es] at least one node associated with each sign section” and also “with a plurality of individual power extensions.” Additionally, as noted above, Petitioner refers to its discussion of “Ground 1 element [1e]” for “claim limitations [12e and 21f].” Pet. 53 (citing Ex. 1002 ¶¶ 192–195). Petitioner also does not rely on Kludt to teach elements [12e] and [21f]. *See id.* Thus, for similar reasons to those discussed above when addressing element [1e], we conclude that Petitioner has not demonstrated by a preponderance of the evidence that Templeton in view of the Ordinary Skill as evidenced by Watchfire and Kludt teach or suggest elements [12e] and [21f].

(c) Claims 13–16, 19, 20, and 22–26

As for claims 13–16, 19, 20, and 22–26, Petitioner refers to previous explanations of other claims. Pet. 53–54. For claims 13–15 and 22–24, Petitioner discusses Templeton discloses sign sections with multiple columns of bays and refers to claims 4 and 5 under Ground 1 (*id.* at 53 (citing Ex. 1002 ¶¶ 129–133, 171–176, 203–208)); for claim 16, Petitioner refers to claim 6 under Ground 1 (*id.* (citing Ex. 1002 ¶¶ 196–201)); for claims 19 and 25, Petitioner refers to claim 10 under Ground 1 (*id.* at 53 (citing Ex. 1002 ¶¶ 209–210)); for claims 20 and 26, Petitioner refers to claim 11 under Ground 1 (*id.* at 54 (citing Ex. 1002 ¶¶ 211–212)). The discussions of claims 13–16, 19, 20, and 22–26 in the Petition do not further address the “plurality of power routing systems” limitation (e.g., elements [12e] and [21f]) or Kludt in this regard. *See* Pet. 54.

Claims 13–16, 19, and 20 depend from claim 12, and claims 22–26 depend from claim 21. Ex. 1001, 88:16–33, 88:46–50, 89:8–89:20. Therefore, claims 13–16, 19, 20, and 22–26 include either element [12e] or [21f]. Accordingly, Petitioner’s analyses of these claims suffer from the same problem as claims 12 and 21 previously discussed.

(d) Petitioner’s Reasons to Combine the Prior Art

Petitioner provides evidence to support that Templeton, Ordinary Skill as evidenced by Watchfire, and Kludt teach or suggest the claims’ limitations. Pet. 48–51 (citing Ex. 1004 ¶ 56, Figs. 1B–C; Ex. 1010, 5:28–29, 10:1–5, Fig. 2; Ex. 1002 ¶¶ 185, 196–201) (reproducing Ex. 1004, Fig. 1B (highlighting two elements 124 (upper left) in orange); Ex. 1010, Fig. 2 (highlighting elements [12d], [12f] in yellow and element 13 in red)); *see also* Ex. 1002 ¶¶ 197–198 (discussing Ex. 1004 ¶ 57), 198–200 (discussing Ex. 1010, 1:11–14, 1:55–2:6, 3:1–3, 4:47–50, 4:67–5:44, 5:64–6:2, 6:20–7:3, 10:1–5, code (57), Figs. 1–3, 6–7, 11) (reproducing Ex. 1010, Figs. 1–2 (annotated))). Additionally, Petitioner articulates reasoning that an ordinarily skilled artisan would have been motivated to combine Templeton’s teachings with Kludt, including Kludt’s type of mounting in Templeton would have provided access to Templeton’s rear access panels after installation by extending Templeton’s outside mounting structures to provide sufficient room behind the display and existing structure for rear-side servicing and replacement. Pet. 50–51 (citing Ex. 1010, 5:28–29, Fig. 2; Ex. 1002 ¶¶ 185, 199–201) (reproducing Ex. 1004, Figs. 1B–C (annotated); Ex. 1010, Fig. 2 (annotated))).

Patent Owner presents the same contentions for Ground 2 as that for Ground 1. *See* Resp. 58–64. We do not address these assertions because, as

explained above, (1) we are not persuaded Petitioner has demonstrated by a preponderance of the evidence that Templeton in view of the knowledge and level of ordinary skill in the art as shown by Watchfire teach or suggest elements [1e], [12e], and [21f], and (2) claims 6, 12–16, and 19–26 include one of these elements.

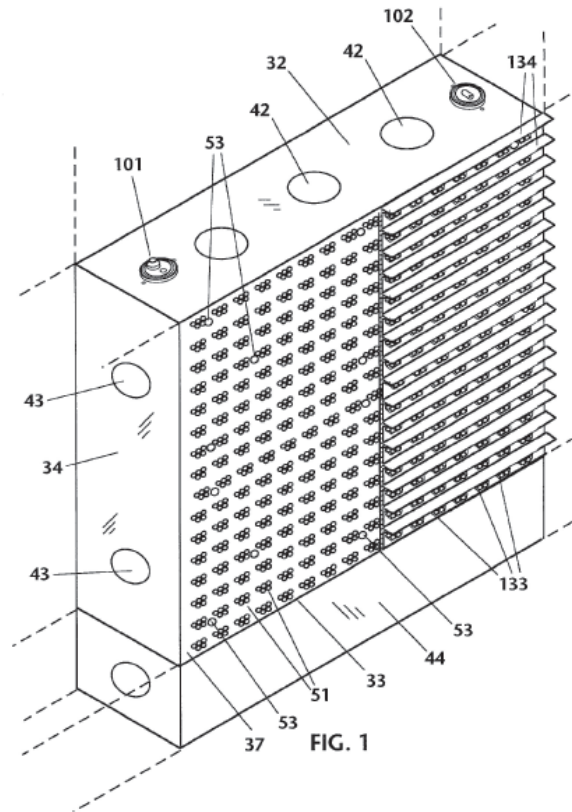
(e) Conclusion – Claims 6, 12–16 and 19–26

We have reviewed the arguments and evidence in the full record, including weighing of the fact findings to conclude whether the claimed combination would have been obvious to an ordinarily skilled artisan. On balance, Petitioner has not shown, by a preponderance of the evidence, that the combined teachings of Templeton in view of Ordinary Skill as evidenced by Watchfire and Kludt would have rendered the subject matter of claims 6, 12–16, and 19–26 obvious to one of ordinary skill in the art at the time of the invention.

*E. Obviousness of Claims 1, 10–13, 19, and 20 Over Kalua
in view of Ordinary Skill (Ground 3)*

1. Kalua (Ex. 1007)

Kalua describes a modular video display with multiple video image units. *Id.* at code (57). Below, Kalua’s Figure 1 shows the front perspective view of basic modular video output unit 31 (reference character not shown).



Id. ¶¶ 16, 43, Fig. 1. Figure 1, above, shows that each video unit (e.g., 31) has a housing, a front panel (e.g., 37), rear panel (e.g., 38) that can be opened for access, and LED circuit board having a LEDs supported in pixel array. *Id.* ¶¶ 8, 43, 49, code (57), Figs. 1–2. Each unit also includes access holes (e.g., 43) for power cables. *Id.* ¶¶ 13, 43, Fig. 1.

The video display “is highly modular in construction and adaptable to a variety of uses and installations,” “yet may be disassembled for repair and replacement of damaged components.” *Id.* ¶¶ 7, 42. Each housing includes opposed top and bottom panels (e.g., 32–33), which permit vertical stacking of multiple units. *Id.* ¶¶ 12, 54. Also, image units can be arrayed in columns and rows. *Id.* ¶ 13.

2. Analysis

Petitioner contends claims 1, 10–13, 19, and 20 are unpatentable under 35 U.S.C. § 103(a) as obvious over Kalua in view of Ordinary Skill as evidenced by Watchfire. Pet. 58–66 (citing Ex. 1002 ¶¶ 228–252). For consistency, we use nomenclature for the limitations of claims 1 and 12 similar to those presented in the Petition. *Id.* at 14–16.

(a) Claims 1 and 12

(i) Preamble

Claims 1’s and 12’s preamble recite “[a] modification kit for converting an existing signage mounting structure to an electronic sign.” Ex. 1001, 87:11–12, 88:1–2. Petitioner contends that Kalua in view of Ordinary Skill as evidenced by Watchfire teach or suggest the preamble’s limitations. Pet. 58–59 (citing Ex. 1002 ¶ 228).

Petitioner asserts Kalua discloses a large format and modular electronic video display that can be easily adapted for various types of uses and installation. *Id.* (citing Ex. 1007 ¶¶ 2, 7, 42; Ex. 1002 ¶¶ 230–231). Petitioner further discusses the Watchfire references, contending that these references teach LED displays that include “self-contained units . . . designed to fit new structures and easily retrofit into existing signs.” *Id.* at 59 (quoting Ex. 1006, 1) (citing Ex. 1005, 1; Ex. 1008, 1; Ex. 1009, 1; Ex. 1002 ¶ 231). Petitioner concludes that a POSITA would have found it obvious that both Kalua’s display and Watchfire’s LED displays “could be easily adapted to mount to and retrofit existing signage.” *Id.* (citing Ex. 1002 ¶ 231).

Other than the motivation to modify Kalua based on the ordinary skill as evidenced by Watchfire to arrive at the claimed “modification kit” (*see*

Resp. 58–64), which we address below, Patent Owner does not contest Petitioner’s showing as to claim 1’s and 12’s preamble.

Having considered each of the parties’ arguments and evidence related to the uncontested findings, we determine Petitioner has proven, by a preponderance of the evidence, that Kalua in view of the knowledge and level of ordinary skill in the art as evidenced by Watchfire teach or suggest the preamble of claims 1 and 12.

(ii) “*a plurality of display modules*” – *elements [1a], [12a]*

Claims 1 and 12 recite “a plurality of display modules.” Ex. 1001, 87:13, 88:3. Petitioner contends Kalua in view of Ordinary Skill teach or suggest these claimed elements. Pet. 59 (citing Ex. 1002 ¶ 232). Petitioner argues Kalua “describes a modular video display including a plurality of video image units.” *Id.* (citing Ex. 1007 ¶¶ 7, 42, code (57)).

Patent Owner argues that the Petition does not explain whether Kalua’s video image meet the plain and ordinary construction of “display modules” consistent with the ’791 patent. Resp. 29–31. Specifically, Patent Owner argues Petitioner and Mr. Flasck do not explain what the “video image units” are and do not identify panels, the connection to the panels, and whether the panels are coupled to a daughter board, which are all “necessary . . . to show how the *construed claim* is obvious.” *Id.* at 30, 35. Patent Owner disputes that Kalua describes “a plurality of display modules” as recited in claim 1 and as construed by the District Court,¹⁶ namely because the reference does not disclose whether its PCB is coupled to a daughter

¹⁶ As we previously discussed, the District Court construed a “display module” to mean a “module having a pair of LED display panels operatively coupled to a daughter board.” Ex. 2006, 5.

board or whether its video image unit teaches two display panels connected to a daughter board. *See id.* at 35–38 (citing Ex. 1007 ¶¶ 43, 47, Figs. 1, 3; Ex. 2002 ¶ 83); *see also* Sur-reply 6 (asserting that “Petitioners failed to argue that the claimed ‘plurality of display modules’ are found in the prior art under the District Court’s final construction.”).

In the Reply, Petitioner states Kalua discloses the “plurality of display modules” under the “plain meaning construction” in the Decision to Institute. Reply 8 (citing Inst. Dec. 19–21). Petitioner states Kalua describes a “modular video display” that includes a “plurality of video image units.” *Id.* (citing Ex. 1007 ¶¶ 7, 42, code (57)). Petitioner further explains a “video image” displays images and the “units” are “modules.” *Id.* Referring to Mr. Credelle’s testimony (Ex. 2002), Petitioner contends Mr. Credelle did not apply the plain meaning construction as set forth in the Decision to Institute, but rather only the District Court’s construction, when analyzing the prior art. *Id.* at 8–9 (citing Ex. 1031, 75:1–20; Ex. 2002 ¶¶ 63–87).

As discussed above in Section II.C, after giving the court’s construction its due consideration, we respectfully have not adopted the District Court’s claim construction of the phrase “plurality of display modules.” As explained, we give this phrase its plain and ordinary meaning, which includes modules that display information. Based on our claim construction, we disagree with Patent Owner’s (*see* Resp. 35–38) and Mr. Credelle’s position (*see* Ex. 2002 ¶¶ 81–83) related to what Kalua must disclose in order to teach or suggest elements [1a] and [12a].

Kalua teaches or suggests elements [1a] and [12a] based on our claim construction of “display modules.” Kalua discloses “a large format video

display that is highly modular in construction” and the “modular arrangement includes a *plurality* of video image units.” Ex. 1007 ¶¶ 7, 42 (emphasis added); *see also id.* at code (57); Ex 1002 ¶ 231. Kalua discusses the details of each video image unit or “a basic modular video output unit 31.” Ex. 1007 ¶ 43, Figs. 1–2. Kalua describes each unit 31 has (1) “LED holes in their pixel groupings are formed a regular matrix, such as a 16x16 array (shown) or any other layout that is consonant with a video display format” (*id.* ¶ 44) and (2) “an LED circuit board 81,” which “supports a plurality of LEDs 83, the LEDs being grouped in a pixel array” (*id.* ¶ 47, *cited in* Ex. 2002 ¶ 83). Based on Kalua’s teachings, an ordinary skilled artisan would have recognized that Kalua’s video image units display information and are modules or “a plurality of display modules” as claims 1 and 12 recite.

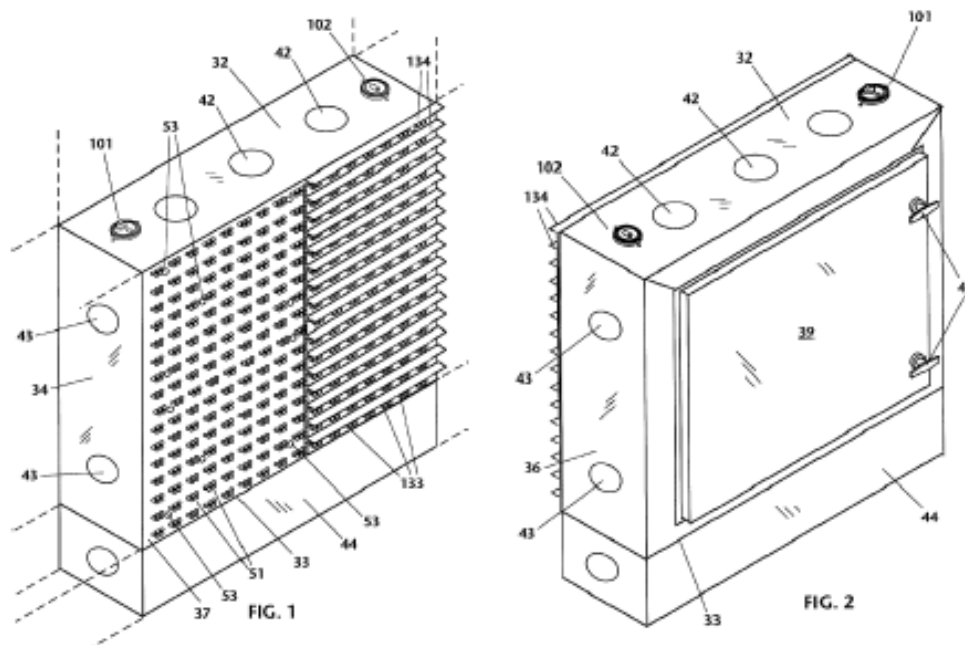
Having considered each of the parties’ arguments and evidence, we determine Petitioner has proven, by a preponderance of the evidence, that Kalua in view of the knowledge and level of ordinary skill in the art as evidenced by Watchfire teach or suggest elements [1a] and [12a].

(iii) “*a plurality of sign sections*” – elements [1b], [12b]; “*the front*” portion – elements [1c], [12c]

Claims 1 and 12 further recites “a plurality of sign sections each having a front” portion and “a rear” portion. Ex. 1001, 87:14–15, 88:4–5. Claim 1 further recites “the front[-]facing portion defining a two dimensional array of bays arranged in a plurality of rows along a vertical direction and a plurality of columns along a horizontal direction, each bay configured to receive one of the display modules.” Ex. 1001, 87:15–19. Claim 12 recites similar limitations. *Id.* at 88:4–

8. Petitioner contends Kalua with Ordinary Skill teach or suggest these claimed elements. Pet. 59–60 (citing Ex. 1002 ¶¶ 233–34).

Petitioner asserts Kalua teaches its video imaging units are adapted to be “arrayed in columns and rows,” where each column is a “sign section” as recited. *Id.* at 59 (quoting Ex. 1007 ¶ 13) (citing Ex. 1002 ¶ 233). Petitioner states Kalua’s video imaging units are “stacked” and enclosed in a rectangular housing (e.g., a bay) with front and rear access panels. *Id.* at 59–60 (citing Ex. 1007 ¶¶ 8, 43, 45, 49, Figs. 1–2; Ex. 1002 ¶¶ 233); *see also* Ex. 1007 ¶¶ 12, 54. Petitioner reproduces Kalua’s front (Figure 1) and rear (Figure 2) of a video module below:



Kalua’s Figure 1 (left) and Figure 2 (right) Showing the Video Module’s Front and Rear Perspective Views Respectively.

Pet. 60, Figs. 1–2. Above, Kalua shows a front perspective view of a video module on the left and a rear perspective view of a video module on the right. Ex. 1007 ¶¶ 16–17.

Petitioner further contends Kalua's bays "are arrayed in columns and rows." Pet. 60 (citing Ex. 1007 ¶¶ 12–13). Petitioner also argues that Kalua "teaches complimentary male and female guides to assure proper alignment of the arrayed bays." *Id.* (citing Ex. 1007 ¶ 54).

Patent Owner contest Petitioner's showing as to elements [1b]–[1c] and [12b]–[12c]. *See* Resp. 54–57. Patent Owner contends, as recited, these elements require that "each sign section has multiple bays in the vertical direction and multiple bays in the horizontal direction, and each bay receives a display module." *Id.* at 55. Patent Owner argues Kalua discloses "sign sections having only a single bay and single display module." *Id.*; *see id.* at 55–57. Referring back to the "display modules' term," Patent Owner asserts Kalua only depicts "a sign section with a single PCB, which is a single module." *Id.* at 56 (citing Ex. 1007 ¶ 47, Fig. 1) (reproducing Ex. 1007, Fig. 1). Although recognizing Petitioner contends Kalua teaches its video imaging units are arrayed in columns and rows (*id.* at 56–57 (citing Pet. 59)), Patent Owner argues that "this configuration still does not satisfy the claims, which require multiple bays in both the vertical direction and the horizontal direction." *Id.* at 57. Patent Owner argues that a single column of Kalua's video image units would not have a plurality of columns along a horizontal direction, and if each video imaging unit is a display module, Kalua does not disclose the sign sections or the bays because Kalua "discloses self-contained modules that can be stacked with no sign section assemblies." *Id.* at 57.

In the Reply, Petitioner reasserts that Kalua teaches the "plurality of sign sections." Reply 18–20. Petitioner argues that Patent Owner's

arguments are rooted in the “argument that Kalua’s video image do not satisfy the District Court’s construction for ‘display modules.’” *Id.* at 18–19. Petitioner contends “[e]ach of Kalua’s columns of video display units is a sign section” and the “units are stacked and arrayed within a rectangular housing (*i.e.*, a bay).” *Id.* at 19 (citing Pet. 59–60; Ex. 1002 ¶ 232–34; Ex. 1007 ¶¶ 8, 13, 43, 45, 49, Figs. 1–2).

Patent Owner responds, asserting that “stacking multiple modules in a column” does not satisfy the claims, which requires “defining [a] two-dimensional array of bays” that “are configured to receive display modules.” Sur-reply 13.

On balance, we determine the evidence of record supports that Kalua teaches or suggests the recited “sign sections” in claims 1 and 12. Elements [1b]–[1c] require “a plurality of sign sections” and “each [sign section] having a front-facing portion . . . , the front-facing portion defining a two-dimensional array of bays arranged in a plurality of rows along a vertical direction and a plurality of columns along a horizontal direction.” Ex. 1001, 87:14–18. Neither party provides us with an explicit claim construction of this phrase. *See generally* Pet.; Resp. Additionally, the District Court does not discuss these limitations when addressing claim terms in the ’791. *See* Ex. 1025, 53–85; *see also* Ex. 2006, 2–8. Upon review of the record, each sign section in claim 1 has “[a] front-facing portion defining a two-dimensional array of bays” that the “two-dimensional array” is “arranged in” more than one row and more than one column (*i.e.*, “a plurality of rows along a vertical direction” and “a plurality of columns along a horizontal direction”).

When viewing this ground in its entirety, there is sufficient evidence in the record that each of Kalua’s sign sections, as recited in elements [1b]–[1c] and as mapped in the Petition, includes more than a single bay/display module or a single column of video imaging units stacked upon each other as Patent Owner asserts. *See* Resp. 55–57; Sur-reply 13. Granted, in addressing element [1b], Petitioner states “[e]ach column would be a sign section of the claim.” Pet. 59 (citing Ex. 1002 ¶ 233¹⁷). However, Petitioner further indicates that Kalua’s imaging units can be “arrayed in columns and rows.” *Id.* (quoting Ex. 1007 ¶ 13). Additionally, in addressing the “bays” and “front-facing portion” of the “each” *sign section* or element [1c], Petitioner indicates Kalua’s bays are arranged in rows and columns. *Id.* at 59–60 (citing Ex. 1007 ¶¶ 12–13; Ex. 1002 ¶ 233). Mr. Flask presents similar testimony for elements [1b]–[1c] and [12b]–[12c]. *See* Ex. 1002 ¶¶ 232, 234 (citing Ex. 1007 ¶¶ 8, 12–13, 43, 45, 49, 54, Figs. 1–2). Thus, when mapping Kalua to a more specific limitation of each of the “plurality of sign sections” and thus when viewing the ground in its entirety, the Petition indicates that “each” includes more than a single bay/display module or a single, stacked column of video imaging units. *See* Pet. 59–60.

The cited passages of Kalua in the Petition also support that its video imaging units can be stacked *as well as* arranged in both in columns and rows. Kalua discloses a modular video output unit 31 in Figures 1 and 2. *See* Ex. 1007 ¶ 43, Figs. 1–2. Kalua further explains that “image units are stacked top to bottom” (*id.* ¶ 12) and that “[e]ach unit 31 further includes external features that facilitate properly aligned stacking of multiple units in

¹⁷ Mr. Flasck testifies “[e]ach column would be a sign section of the claim” in Paragraph 232. Ex. 1002 ¶ 232.

true vertical relationship” (*id.* ¶ 54). But, Kalua is not limited to vertical stacking the video imaging units, which would form a single column of video imaging units. For example, one cited passage of Kalua teaches “[t]he image units are arrayed in columns and rows.” *Id.* ¶ 13, *cited in* Pet. 59–60. Such a teaching at minimum suggests to an ordinarily skilled artisan that the imaging units can be arranged to form a two-dimensional array. To illustrate, this teaching in Kalua suggests to an ordinarily skilled artisan that its image units can be arrayed into multiple columns and rows (e.g., four columns and two rows). *See id.* These arrayed imaging units also can be viewed as having two “sign sections” (e.g., each arrayed into two columns and two rows). When viewing the ground in its entirety, Kalua thus suggests “a plurality of sign sections” as claim 1 recites, where “each” sign section has “a plurality of columns [of bays] along a horizontal direction” as element [1c] recites.

Moreover, Kalua teaches “a basic modular video output unit 31 . . . includes top and bottom panels 32 and 33 and laterally opposed side panels 34 and 36 joined in a rectangular assembly.” Ex. 1007 ¶ 43, *cited in* Pet. 60. Kalua similarly indicates each imaging unit has a rectangular housing with top, bottom, and side panels for stacking using a guide feature. *See id.* ¶¶ 8, 12, 54, *each cited in* Pet. 60. The Petition further explains “[t]hese housing units each provide a defined structure to receive one display module, and hence are bays.” Pet. 29 (citing Ex. 1007 ¶¶ 12, 54; Ex. 1002 ¶ 109). Thus, because the Petition indicates each imaging unit’s housing is a bay (*see* Pet. 29, 59), Kalua further teaches and suggests each sign section has a “front facing portion defining a two dimensional array of bays arranged into a plurality of rows along a vertical direction” and “a plurality of columns

along a horizontal direction” (e.g., an array of imaging units having two columns of housing units and two rows of housing units) as element [1c] recites.

For the above reasons, we disagree with Patent Owner that Kalua fails to teach or suggests the recited “sign sections” and “bays.” *See* Resp. 57. Also, regardless of whether Kalua’s modules are “self-contained” (*id.*), an ordinarily skilled artisan would have recognized that arraying Kalua’s imaging units into columns and rows as taught by Kalua (Ex. 1007 ¶ 13) forms “each” sign section recited in claim 1 as previously explained. Indeed, the language of element [1c] merely requires “each bay” to be “configured to receive one of the display modules” and does not exclude the display modules from being self-contained. *See* Ex. 1001, 87:13–19. Thus, as explained above, Kalua teaches or suggests more than one array that collectively form the recited “plurality of sign sections” as elements [1b]–[1c] recite.

To the extent that Patent Owner asserts the sign sections must have multiple modules with multiple PCB (*see* Resp. 56), this argument is unavailing. In Section II.C, we construed a “display module” to have its plain and ordinary meaning, which includes a module that displays information. Thus, Kalua need not teach or suggests its “plurality of display modules” to have a PCB or daughter board as this argument implies.

The claim language of elements [12b]–[12c] differs from that in elements [1b]–[1c]. Elements [12b]–[12c] recite “a plurality of sign sections, each having a front portion . . . , the front portion defining at least two vertical columns of bays.” Ex. 1001, 88:4–6. Because we determine that each sign section in Kalua can include a plurality of columns as well as

a plurality of vertical columns of bays (e.g., imaging units' housings) for receiving display modules as previously explained, we similarly determine Kalua teaches or suggests elements [12b]–[12c].

Having considered each of the parties' arguments and evidence, we determine Petitioner has proven, by a preponderance of the evidence, that Kalua in view of the knowledge and level of ordinary skill in the art as evidenced by Watchfire teach or suggest elements [1b]–[1c] and [12b]–[12c].

(iv) “the rear” portion – elements [1d], [12d]

Claim 1 further recites “the rear-facing portion for mounting to a surface of the existing signage mounting structure.” Ex. 1001, 87:19–21. Claim 12 recites a similar limitation of “the rear portion configured to be attached to a beam surface of the existing signage structure to allow most of the rear surface of the rear portion to be exposed for servicing.” Ex. 1001, 88:8–11. Petitioner contends Kalua in view of Ordinary Skill as evidenced by Watchfire teach or suggest these claimed elements. Pet. 61 (citing Ex. 1002 ¶¶ 235–239).

Petitioner contends Kalua does not disclose an installation mechanism but does state its video display is “adaptable to a variety of uses and installation.” *Id.* (quoting Ex. 1007 ¶ 7). Based on this teaching, Petitioner contends Kalua “is open to any number of installations, including the retrofitting contemplated by the ordinary skill exemplified by the Watchfire references.” *Id.* (citing Ex. 1002 ¶ 237). Petitioner argues the Watchfire references explain that LED signage, like Kalua's, can “easily retrofit into existing signs” and this retrofit can be “quick, easy, and affordable.” *Id.* (quoting Ex. 1005, 1; Ex. 1006, 1) (citing Ex. 1002 ¶ 238; Ex. 1008, 1; Ex. 1009, 1). Petitioner concludes that a POSITA would have found it

obvious, using ordinary skill as evidenced by the Watchfire references, to modify Kalua easily and readily to use existing signage and mounting surfaces of a non-digital sign as an attachment or mounting. *Id.* (citing Ex. 1002 ¶ 239).

In the Response, Patent Owner does not dispute the Petition’s mapping of elements [1d] or [12d]. *See, e.g.*, Resp. 54–57 (addressing the “plurality of sign sections” limitation). For the first time in the Sur-reply, Patent Owner contends Petitioner does not “attempt to show that the stacked video units of Kalua have a rear-facing portion for mounting to a surface of the existing signage mounting structure.” Sur-reply 14. We disagree as the Petition explains how Kalua and Watchfire collectively teach this claimed feature. *See* Pet. 61 (citing Ex. 1002 ¶ 7; Ex. 1005, 1; Ex. 1006, 1; Ex. 1008, 1; Ex. 1009, 1; Ex. 1002 ¶¶ 237–39). In any event, as a sur-reply should only respond to arguments made in the reply brief (*see* 37 C.F.R. § 42.23(b)) and the reply did not include an argument related to elements [1d] and [12d], this response in the Sur-reply is inappropriate. *See id.* To the extent this argument addresses the disputed reasons for combining Watchfire with Kalua discussed in the Response (*see* Resp. 58–64), we address these contentions below.

Having considered each of the parties’ arguments and evidence, we determine Petitioner has proven, by a preponderance of the evidence, that Kalua in view of the knowledge and level of ordinary skill in the art as evidenced by Watchfire teach or suggest elements [1d] and [12d].

(v) “*a plurality of power routing systems*” – elements [1e], [12e]

Claim 1 further recites “a plurality of power routing systems, each power routing system having a power input for coupling to a power source

and a plurality of power extensions, each power extension for coupling the power source to one of the plurality of display modules.” Ex. 1001, 87:22–26. Claim 12 recites a similar limitation. *Id.* at 88:12–16. Petitioner contends Kalua with Ordinary Skill teach or suggest these claimed elements. Pet. 62 (citing Ex. 1002 ¶ 240).

Petitioner argues Kalua’s unit “includes ‘at least one access hole in each side panel, whereby power cables and signal cables may be connected and run throughout the image units of each row in the array.’” *Id.* (quoting Ex. 1007 ¶ 13) (citing Ex. 1007 ¶ 43). Petitioner also contends Kalua teaches “a power system that routes power through multiple extension cables to a plurality of modules” in Kalua’s stacked array of video imaging units and “[t]he power source on the other end of the power cables is a power node associated with a sign section.” *Id.* (citing Ex. 1002 ¶ 241).

Patent Owner contests Petitioner’s showing as to elements [1e] and [12e]. *See* Resp. 49, 53–54. Patent Owner argues Kalua does not disclose a power routing system that requires each power routing system to have a power input or node with a plurality of power extensions each going to a single module. *Id.* at 53–54. Specifically, Patent Owner asserts each of Kalua’s sign sections “has a single module” (*id.* at 54 (citing Pet. 115–16; Ex. 1007 ¶ 47) and, thus, its “power routing system . . . can only have a single power extension from the node (not present) to the one module” (*id.*). Patent Owner concludes Kalua does not disclose “*a plurality of power extensions.*” *Id.*

In the Reply, Petitioner disagrees, repeating that Kalua teaches “at least one access hole in each side panel, whereby power cables and signal cables may be connected and run throughout the image units of each row in

the array.” Reply 17 (citing Ex. 1007 ¶¶ 13, 43). Petitioner further repeats that “[i]n a stacked array of video imaging units, there is a power system that routes power through multiple extension cables to a plurality of modules” and that “[t]he power source on the other end of the power cables is a power node associated with a sign section.” *Id.* (citing Ex. 1002 ¶ 240).

In the Sur-reply, Patent Owner argues that Petitioner fails to address that Kalua includes a “node associated with each sign section” as claim 12 recites and Petitioner does not contest that Kalua discloses each sign section has a single module or the power routing system of each sign section can only have a single power extension. Sur-reply 12.

Upon consideration of the entire record, we determine Kalua teaches or suggests elements [1e] and [12e]. First, we disagree that each of Kalua’s sign sections as explained in the Petition only has a single module. *See* Pet. 59–60 (citing Ex. 1007 ¶¶ 8, 12–13 43, 45, 54, Figs. 1–2). As explained above when addressing elements [1d] and [12d], Kalua discloses its video imaging units are arranged in columns and rows (*see* Pet. 29, 59) and their housings define bays (*see id.*), each for receiving a display module. Thus, as previously explained, each sign section in Kalua arranged in columns and rows defines “a two dimensional array of bays arranged in a plurality of rows along a vertical direction and a plurality of columns along a horizontal direction, each bay configured to receive one of the display modules” as claim 1 recites. Moreover, unlike element [12e], element [1e] does not associate “a node” to the recited “sign sections.” *Compare* Ex. 1001, 87:22–26, *with id.* at 88:12–15.

Second, we disagree with Patent Owner that Kalua’s sign section only has a single power extension. Kalua’s Figures 1 and 2 show at least two

access holes in the image unit's housing side panels. Ex. 1007, Figs. 1–2. Kalua teaches each of the imaging unit's side panel has an access hole, “whereby power cables and signal cables may be connected and run through the image units of each row in an array.” *Id.* ¶ 13. Kalua further describes at least one access hole 43 used to “accommodate power cables, signal wires, and the like to extend laterally through adjacent units 31.” *Id.* ¶ 43, Figs. 1–2. Because Kalua teaches both power cables and signal cables may be connected to the image units and provide power to the imaging units (*see* Ex 1007 ¶¶ 13, 43), each cable is a “power extension” of the “plurality of power extensions,” and each “power extension” is “for coupling the power source to one of the plurality of display modules” as element [1e] further recites. Mr. Flasck persuasively testifies that “in a stacked array of video imaging units [of Kalua], there is a power system that routes power through a multiplicity of extension cables to a plurality of modules.” Ex. 1002 ¶ 240. Thus, as construed in Section II.D, Kalua teaches and suggest “a plurality of power routing systems” and “each power routing system has . . . a plurality of power extensions” (e.g., multiple power cables, signal cables/wires, and the like) recited in element [1e]¹⁸ or element [12e].

Third as for Patent Owner's reference to “the node (not present)” in Kalua (Resp. 54) or “the at least one node” element [12e],¹⁹ Petitioner indicates how Kalua teaches or suggests each power routing system has “at least one node.” Pet. 62. When addressing this element in Kalua, the

¹⁸ Notably, element [1e] requires “each power extension for coupling the power source to one of the plurality of display modules” (Ex. 1001, 87:24–26) rather than each power extension “go[es] to a single module” as Patent Owner argues. Resp. 54.

¹⁹ Notably, element [1e] recites “a power input,” not “at least one node.”

Petition indicates a stacked array of video imaging units has a power system “routes power through multiple extension cables to a plurality of modules” and “[t]he power source on the other end of the power cables is a power node associated with a sign section.” Pet. 62 (citing Ex. 1007 ¶¶ 13, 43; Ex. 1002 ¶ 241²⁰); Reply 17 (same). Thus, we disagree with Patent Owner that Petitioner fails to address that Kalua includes “at least one node” as claim 12 recites. Nor has Patent Owner contested these specific findings by Petitioner. *See* Sur-reply 12.

For the first time in the Sur-reply, Patent Owner argues that Petitioner fails to address that Kalua includes a “node *associated with each sign section*” as claim 12. Sur-reply 12 (emphasis added). As a sur-reply should only respond to arguments made in the reply brief (*see* 37 C.F.R. § 42.23(b)) and the reply did not include an argument related to this aspect of element [12e], this response is inappropriate. *See id.* In any event, we disagree as the Petition explains how Kalua teaches and suggests the claimed features of the “sign sections” and “at least one node.” *See* Pet. 59–60, 62 (citing Ex. 1002 ¶¶ 233, 240–41; Ex. 1007 ¶¶ 8, 13, 43, 45, 49, Figs. 1–2). Notably, the ’791 patent explains a “node” includes a power junction end. *See* Ex. 1001, 64:12. Similarly, Kalua suggests its power cables and signal cables have power junction ends (*see* Ex. 1007 ¶¶ 13, 43, *cited in both* Pet. 29, 59) and therefore, teaches or suggests each “power routing system” has “at least one node” as element [12e] recites. Additionally, because the cables discussed in Kalua (e.g., power extensions) are fed through imaging units’ housing as

²⁰ The testimony of Mr. Flask that “[t]he power source on the other end of the power cables is a power node associated with a sign section” is found in Paragraph 240. Ex. 1002 ¶ 240.

explained above, the “at least one node” is “associated with each sign section” as element [12e] further recites.

Having considered each of the parties’ arguments and evidence, we determine Petitioner has proven, by a preponderance of the evidence, that Kalua in view of the knowledge and level of ordinary skill in the art as evidenced by Watchfire teach elements [1e] and [12e].

(vi) Petitioner’s Reasons to Combine the Prior Art

Petitioner articulates a rationale for combining Kalua with Ordinary Skill as evidenced by Watchfire and argues a POSITA would have combined their teachings with reasonable expectation of success using the knowledge of and ordinary skilled artisan to obtain the “modification kit” (i.e., claim 1’s and 12’s preamble) and for attaching each sign section’s rear portion to the existing signage mounting structure’s surface (i.e., elements [1d], [12d]) as the claims recite. Pet. 61 (citing Ex. 1002 ¶¶ 235–39), 64 (citing *Hoffmann LaRoche*, 748 F.3d at 1329, 1331), 65–66 (citing Ex. 1002 ¶¶ 250–252). Petitioner states Kalua teaches an aesthetically pleasing digital sign using LED panels that can be easily accessed for servicing, Kalua’s sign is open to multiple types of installation, and Kalua suggests a combination with other structures for retrofitting. *Id.* at 58 (citing Ex. 1007 ¶¶ 7, 42; Ex. 1002 ¶¶ 230–31), 64 (citing Ex. 1002 ¶ 246; *In re O’Farrell*, 853 F.2d at 903). Petitioner notes the Watchfire references teach using an existing non-digital display as one such surface for retrofitting. *Id.* at 59 (citing Ex. 1005, 1; Ex. 1006, 1; Ex. 1008, 1; Ex. 1009, 1; Ex. 1002 ¶ 231), 64 (citing Ex. 1002 ¶ 248), 66 (citing Ex. 1002 ¶ 251). Petitioner contends nature of the problem to be solved related to converting a non-electric sign into a digital display and attaching the digital display to a non-electric sign would have

led a POSITA to select an appropriate load bearing member on and attachment (e.g., Kalua’s) for the existing signage. *Id.* at 64 (citing Ex. 1002 ¶ 248). Petitioner argues Kalua’s “advantageous features” (*id.* (citing Ex. 1002 ¶ 248)) would have allowed attachment to and retrofitting the existing signage “with little cost” (*id.* at 61 (citing Ex. Ex. 1005, 1; Ex. 1006, 1; 1008, 1; Ex. 1009, 1; Ex. 1002 ¶¶ 238–39), 65 (citing Ex. 1002 ¶ 248; *DyStar*, 464 F.3d at 1368)).

Patent Owner argues that an ordinarily skilled artisan would not have attempted or understood how to modify Kalua in view of the ordinary skill as evidenced by Watchfire to arrive at the claimed “modification kit for converting an existing signage mounting structure to an electronic sign.” Resp. 59 (italics omitted); *see also id.* at 58–59; Sur-reply 17. When addressing Watchfire, Patent Owner states each unit has one module and is individually installed and is not compatible with module displays like Kalua “because Kalua units have large rear doors that would get in the way of the existing mounting structure used for Watchfire.” Resp. 61; *see id.* at 60–61 (citing Ex. 2002 ¶¶ 56, 120). Patent Owner argues (1) “the Kalua sign blocks are specifically designed for stacking assembly, not for attachment to rear signage structures as in Watchfire,” (2) “Kalua sign blocks also sit atop a cooling unit,” and (3) Watchfire does not explain how such “cooling units could be mounted to existing signage structure.” *Id.* at 61.

Patent Owner also contends the Watchfire signs are small (e.g., 64” x 33”) and weigh only 20–50 pounds (*id.* at 61–62), whereas Kalua’s displays are “large and extremely heavy” (*id.* at 62 (citing Ex. 2002 ¶ 121; Ex. 1005, 2)). For this reason, Patent Owner argues there is no reasonable expectation of success for combining Kalua and the ordinary skill evidenced by

Watchfire. *See id.* Patent Owner further argues that the provided motivation for combining the ordinary skill with Kalua in the Petition is “merely hindsight bias” and “provide[s] no explanation of why a POSITA would have had a reasonable expectation of success combining the retrofit design of small Price Watcher signs with the large heavy video blocks of Kalua.” *Id.* at 64; *see id.* at 63–64.

Petitioner replies, asserting Patent Owner has not address what Watchfire “teach[es] about the state of ordinary skill in the art” and instead argues that Watchfire’s signs are “physically incompatible with the prior art due to [the] differences in size and weight.” Reply 20 (italics omitted). Petitioner contends “the Watchfire references are not necessarily the specific prior art that would have been combined with . . . Kalua.” *Id.* at 20 (citing Pet. 43–47, 54–58, 64–66; Ex. 1002 ¶¶ 154–62, 212–226, 245–251). Petitioner asserts what “is critical to [the] obviousness arguments” is “the knowledge of a POSITA represented by those references.” *Id.* at 20–21 (italics and bolding omitted). Petitioner also argues Patent Owner’s and Mr. Credelle’s arguments related to Watchfire’s retrofitting being incompatible with Kalua “are rooted in speculation” (*id.* at 23) and “are misplaced” (*id.* at 24). *See id.* at 23–24 (citing Ex. 2002 ¶ 56; Ex. 1031, 92:1–23, 94:5–22, 95:9–97:18), 27 (asserting certain arguments are “entirely predicated upon Mr. Credelle’s admitted speculation as to how specific retrofitted Watchfire signs were mounted and constructed.”).

Petitioner contends an ordinarily skilled artisan would have been motivated to combine Kalua with the knowledge in the art “because it was well-known to a POSITA by March 2013 that an existing non-electronic sign display could be retrofitted into a digital display, as the Watchfire

references teach.” *Id.* at 22 (citing Ex. 1002 ¶¶ 66–68, 70–72, 114–116; Exs. 1005–06, 1008–09; Ex. 1015 ¶¶ 1–17 & Exs. A–D; Ex. 1016, ¶¶ 1–7 & Exs. A–C; Ex. 1018; Ex. 1019 & Ex. A; Ex. 1020, 5; Ex. 1021, 6, 97; Ex. 1022, 3, 5); *see id.* at 22 n.3 (discussing Mr. Flask’s testimony) (citing Ex. 2004, 104:7–107:9). Petitioner asserts Watchfire demonstrates that an ordinary skilled artisan would have known of retrofitting techniques (*id.* at 24–25 (citing Pet. 43–47, 54–58, 64–66; Ex. 1002 ¶¶ 154–62, 212–26, 245–51)) and would have been motivated to apply them to Kalua, such as to yield cost savings and reduce the inconvenience of purchasing new infrastructure (*id.* at 24–26 (citing Pet. 44–45, 64–65; Ex. 1002 ¶¶ 155, 246, 248–49; Ex. 1001, 1:46–52)). Petitioner further argues that an ordinarily skilled artisan “would have understood how to choose an appropriate load bearing member in the existing signage structure and a compatible attachment suggested by Kalua to convert the non-electrical display into a digital one.” *Id.* at 25 (citing Ex. 1002 ¶ 247). Petitioner further asserts that “[a]esthetics” or providing an “eye-catching” sign is “yet another motivation to combine” Kalua with Watchfire. *Id.* at 26 (citing Ex. 1002 ¶¶ 61–73, 157, 246; Ex. 1018, 10; Ex. 1019). Petitioner even further notes Kalua “leave[s] open all types of installation” and an ordinary “would have known that retrofitting was one available method of installing . . . Kalua’s more eye-catching signs.” *Id.* (citing Ex. 1002 ¶¶ 155, 160–62).

In the Sur-reply, Patent Owner argues that Petitioner’s argument related to motivation to combine misrepresented Patent Owner’s argument in the Response. Sur-reply 15. Patent Owner contends its argument was that Watchfire’s *installation* method is not compatible with Kalua and not that the references are physically incompatible. *Id.* (citing Resp. 62). Patent

Owner further argues that Petitioner provides no prior art or knowledge of an ordinarily skilled artisan other than Watchfire to teach the recited “modification kit.” *Id.* Patent Owner further asserts Watchfire’s construction and installation are relevant because Petitioner relies on them “for the retrofit installation type” in the Petition. *Id.* at 16 (citing Pet. 21, 33). Patent Owner also contends:

For motivation to combine, the Watchfire references need to teach that an existing signage mounting structure can be converted into an electronic sign with “a plurality of display modules” and “a plurality of sign sections, each having an array of bays that are each configured to receive display modules.” Petitioners have only shown that the Watchfire references teach that a single module can be placed in a gas station sign structure, which is not analogous art to the claimed inventions.

Id. at 16.

Upon consideration of all the evidence in the record, we determine that Petitioner provides a sufficient rationale for combining Kalua with Ordinary Skill as evidenced by Watchfire to arrive at the claimed “modification kit” and “rear-facing portion for mounting to a surface of the existing signage mounting structure” in element [1d] and similar recitations in element [12d].

Notably,

“The test for obviousness is not whether the features of a secondary reference may be bodily incorporated into the structure of the primary reference,” *In re Keller*, 642 F.2d 413, 425 (CCPA 1981). *See also In re Mouttet*, 686 F.3d 1322, 1332 (Fed. Cir. 2012) (citing *In re Keller*, 642 F.2d at 425), but rather whether “a skilled artisan would have been motivated to combine the teachings of the prior art references to achieve the claimed invention,” *Pfizer, Inc. v. Apotex, Inc.*, 480 F.3d 1348, 1361 (Fed. Cir. 2007).

Allied Erecting & Dismantling Co. v. Genesis Attachments, LLC, 825 F.3d 1373, 1381 (Fed. Cir. 2016). As such, even if Watchfire teaches (1) retrofitting one module individually (*see* Resp. 60–61) or (2) a particular existing signage mounting structure, these purported differences do not demonstrate incompatibility between Watchfire and Kalua’s modular displays having multiple sections as argued. *See id.* at 61 (citing Ex. 2002 ¶ 120). Also, the alleged, physical features of the prior art (e.g., Watchfire having only module or Watchfire’s existing mounting structure) do not have to be bodily incorporated into Kalua in order to demonstrate obviousness.

Nor does Petitioner proposed such a bodily incorporation. *See* Pet. 26–27, 64–66; *see also* Reply 20 (citing Pet. 64–66; Ex. 1002 ¶¶ 245–51). For example, the Petition indicates “it was well-known to a POSITA that an existing non-electronic sign display could be retrofitted into a digital display.” *Id.* at 26 (citing Ex. 1002 ¶¶ 66–68, 70–72, 114–116; Exs. 1005–06, 1008–09; Ex. 1015 ¶¶ 1–17 & Exs. A–D; Ex. 1016 ¶¶ 1–7 & Exs. A–C; Ex. 1018; Ex. 1019 & Ex. A; Ex. 1020, 5; Ex. 1021, 6, 97; Ex. 1022, 3, 5). Mr. Flasck similarly testifies that he was “aware that multiple examples of such retrofitting existed as publications before March 16, 2012”²¹ (Ex. 1002 ¶ 114 (citing the same)) and that “it was well-known that an LED digital display could be used for retrofitting and easily be mounted to or attached to an existing non-electronic sign or billboard LED sign structure” (*id.* at ¶ 116). *See also id.* at ¶ 162 (stating “ordinary skill in the art as evidenced by the Watchfire references, would have been among the sources consulted by a POSITA in considering how to retrofit an existing non-electronic display

²¹ Given the presumed “March 16, 2013” effective filing date for the ’791 patent (*see* Pet. 18), Mr. Flask probably intended to refer to March 16, 2013.

into a digital one”), ¶ 251 (stating “[a] POSITA would be aware that many systems reflecting ordinary skill in the art, including those exemplified by Watchfire, already permitted the a [sic] digital display such as Kalua to be used to retrofit an existing non-electronic sign.”).

Thus, although Petitioner turns to the Watchfire references to demonstrate that retrofitting an existing non-digital display to a digital display was known (*see* Pet. 59, 61 (citing Ex. 1005, 1; Ex. 1006, 1; Ex. 1008, 1; Ex. 1009, 1; Ex. 1002 ¶¶ 231, 238–39), 64–66 (citing Ex. 1002 ¶¶ 248–51)), Petitioner also more broadly asserts “Kalua is open to any number of installations” and “one could readily and easily modify Kalua to use the existing signage and mounting surface of the non-digital sign for such attachment or mounting.” *Id.* at 61 (citing Ex. 1007 ¶ 7; Ex. 1002 ¶ 239); *see also id.* at 65–66 (stating “[a] POSITA would have looked to references reflecting ordinary skill such as the Watchfire references to inform the POSITA how to optimize all the existing advantages of Kalua’s digital display.”).

In any event, some of Patent Owner’s contentions that Watchfire’s teachings cannot be combined with Kalua (e.g., Watchfire’s has one module and is individually installed, Kalua’s large rear doors would get in the way of Watchfire’s existing mounting structure, Kalua is not designed for attachment to rear signage structure, and Kalua’s displays are large and extremely heavy) are not supported by sufficient evidence. *See* Resp. 61–62 (citing Ex. 2002 ¶¶ 56, 120–21; Ex. 1005, 1). For example, Patent Owner relies almost exclusively on Mr. Credelle’s testimony in arguing these contentions (*see id.*), and Mr. Credelle mostly repeats the statements made by Patent Owner without additional support. *See* Ex. 2002 ¶¶ 56 (stating

“each of the units [in Watchfire] has one module” and “is self-contained with cooling, power, and other functional components included in the unit” without support) (discussing the weight of Watchfire’s displays only), 120 (asserting Watchfire is “self-contained,” Kalua’s doors are large and would get in the way of Watchfire’s existing mounting structure without support), 121 (asserting Kalua’s displays are large and extremely heavy without support). Furthermore, Mr. Credelle acknowledges, when discussing “[t]he Price Watcher materials” (i.e., the Watchfire references) (Ex. 1031, 96:8–9), that its installation process “is not described” (*id.* at 94:1). As other examples, Kalua teaches that its display units “are arrayed in columns and rows” (Ex. 1007 ¶ 13) rather than being “specifically designed for stacking assembly” as asserted by Patent Owner. *See* Resp. 61; *see also* Ex. 2002 ¶ 120. Furthermore, regardless of whether the Watchfire references teach a “plug and play” solution (*see* Resp. 60) or how Kalua’s cooling units can be mounted to existing signage as Patent owner asserts (*see id.* at 61), this evidence itself does not demonstrate that Kalua’s system, including its cooling system, cannot be combined with Watchfire’s retrofitting technique.

Also, the Watchfire references show its retrofitting technique can be applied to more than a single module/display and to different types of existing signage mounting structure as argued by Patent Owner. *See* Resp. 26, 60–61. Various images in Watchfire show the retrofitting technique is used on a sign having multiple displays/sections and different types of existing signage mounting structures. *See* Ex. 1005, 1 (showing a sign with two display sections (e.g., Chevron sign with red and green (*see also* Resp. 60 (replicating this sign)) and Ayerco sign with amber and green) (both also showing an existing mounting structure to house the display modules and

sign sections); *see id.* at 2 (showing Clarks – Elon Oil sign with three display sections (e.g., two red, one green)) (also showing an existing structure to house the sign sections); Ex. 1009, 1 (showing a sign with three sections, one red, one amber, one green) (also showing an existing mounting to house the sign sections); *see also* Ex. 2007, 117:3–18 (discussing the “Ayerco” sign having two bays and two modules). Even Petitioner’s expert, Mr. Credelle, testified that “there are a number of different ways these Price Watcher signs could be mounted” is “a fair statement” in response to counsel’s inquiry. Ex. 1031, 96:4–7 (discussing Exhibit 1006, 3 (Watchfire)). Mr. Credelle further testifies that there are different ways to mount the Price Watcher signs, including using posts, a stand, or a hook (*see id.* at 93:14–94:1) when discussing “[t]he Price Watcher materials” (*id.* at 96:8–9). Indeed, Kalua teaches its display is “highly modular” and is “adaptable to a variety of uses and installations” (Ex. 1007 ¶¶ 7, 42), further suggesting to an ordinarily skilled artisan that Kalua is adaptable and mountable to various known existing signage structures, including, but not limited to, those existing signage mounting structures shown in Watchfire and to the existing mounting structure’s rear surface.

Additionally, even assuming Kalua rear panels are included in the combination as Petitioner proposes and as Patent Owner appears to assert (*see* Resp. 61), Mr. Credelle acknowledges, when discussing “[t]he Price Watcher materials” (Ex. 1031, 96:8–9), that “they typically don’t take pictures of the back in their promotional materials” (*id.* at 96:16–17) and that its installation process “is not described” (*id.* at 94:1). Regardless, as best understood, Kalua’s rear panels would not interfere with at least some of the above-discussed Watchfire reference’s existing signage mounting structures.

As one example, Kalua's rear-facing portion has clearance on each rear side surrounding door 39 on all its edges (*see* Kalua, Fig. 2), and Exhibits 1005 and 1006's existing signage mounting structure include vertical and horizontal beams, which suggests that Kalua's rear panels would still be accessible. *See* Ex. 1005, 1–2. Exhibit 1009 shows another existing signage mounting structure that appears to permit significantly rear access. *See* Ex. 1009, 1. As yet another example, the BRICK[®] catalog includes various known and existing signage mounting structures where retrofitting can be applied, some of which would not block the rear portion of its sign sections that receive display modules. *See* Ex. 1020, 9 (showing various existing signage mounting structures), *cited in both* Pet. 26 and Ex. 1002 ¶¶ 114–15.

Petitioner similarly contends that the Watchfire references reflect ordinary skill and a POSITA would have looked to the Watchfire references to inform a POSITA how to optimize Kalua's digital display because there are only a finite number of identifiable and predictable ways to retrofit a non-digital sign. *See* Pet. 65–66 (citing Ex.1002 ¶ 250; *KSR*, 550 U.S. at 421). We agree and add that using a sign section's rear portion, like Kalua's, for mounting to an existing signage structure is one identifiable and predictable way to retrofit a sign to an ordinarily skilled artisan. Similarly, Mr. Flask testifies “there were only a finite number of identifiable, and predictable ways to retrofit a non-digital sign” and “the combination [of Kalua and Watchfire] produces an obvious improvement in both cost and design.” Ex. 1002 ¶ 249; *see also id.* ¶¶ 159 (indicating “there were only a finite number of identifiable, and predictable, ways to retrofit the non-digital sign” and “the Watchfire references make clear that it was well known that a designer could build new installation equipment for a digital sign or use the

existing infrastructure to retrofit.”) (citing Ex. 1006, 1; Ex. 1009, 1), 161 (“there were only a finite number of identifiable, and predictable, ways to retrofit, [to] service, and to mount the bays to a non-digital sign.”).

Also, adapting Kalua’s displays to Watchfire’s retrofitting technique and replicating this technique so that Kalua’s displays are arranged in multiple columns and rows as previously discussed would have been within the skill of an ordinary artisan and would have been an improved technique over others because the retrofitting provides an economic solution as taught by Watchfire. *See* Pet. 64–65 (noting “Kalua’s design is open to multiple forms of installation” and Watchfire’s retrofitting techniques can be achieved “with little cost”) (citing Ex. 1002 ¶¶ 246, 248–49); *see also KSR*, 550 U.S. at 417 (“if a technique has been used to improve one device, and a person of ordinary skill in the art would recognize that it would improve similar devices in the same way, using the technique is obvious unless its actual application is beyond his or her skill.”). For example, Watchfire teaches its installation is “quick, easy and affordable.” Ex. 1005, 1, *quoted in* Pet. 26; *see also* Ex. 1002 ¶ 116 (quoting Ex. 1005, 1). Thus, combining Watchfire’s teachings with Kalua’s system would have resulted in a modification kit that converts a non-digital sign and its existing signage mounting structure to a digital sign in cost savings manner. Ex. 1002 ¶¶ 246 (noting Watchfire’s retrofitting “produces cost savings”), 249 (noting “the combination produces an obvious improvement in both cost and design.”). Also, we agree with Petitioner that this combination yields a predictable result of retrofitting a non-digital sign and its existing signage mounting structure to a digital sign in cost savings manner and thus, the results are predictable. Pet. 65 (citing Ex. 1002 ¶ 248; *KSR*, 550 U.S. at 417).

As for Patent Owner’s contentions that the rationales for combining Kalua and the Watchfire references in the Petition “are merely hindsight bias” (Resp. 64), we disagree. Petitioner asserts combining Kalua in view of Ordinary Skill, as evidenced by the Watchfire references, would have been obvious “to retrofit non-static displays could yield economic benefits as compared to constructing an entirely new sign” that can be “achieved with little cost or effort.” Pet. 64–65 (citing Ex. 1002 ¶¶ 248–49; *DyStar*, 464 F.3d at 1368 (stating “an implicit motivation to combine exists not only when a suggestion may be gleaned from the prior art as a whole, but when the ‘improvement’ is technology-independent and the combination of references results in a product or process that is more desirable, for example because it is stronger, cheaper, cleaner, faster, lighter, smaller, more durable, or more efficient.”); *id.* at 66 (citing Ex. 1002 ¶ 251). Watchfire supports this reasoning by teaching its “installation or retrofit” is “quick, easy, and affordable.” Ex. 1005, 1. As such, an ordinarily skilled artisan would have recognized that using Watchfire’s teachings when retrofitting Kalua to an existing signage mounting structure would provide time and cost savings, and the proposed ground does not rely the ’791 patent or impermissible hindsight to support this rationale for combining Watchfire’s teachings with Kalua.

Patent Owner further asserts that Petitioner “provide[d] no explanation of why a POSITA would have had a reasonable expectation of success combining the retrofit design of small Price Watcher signs with the large heavy video blocks of Kalua.” Resp. 64. When addressing the combination of Templeton and Watchfire, Patent Owner further argues that the signs in Watchfire are small (Resp. 61) and Kalua’s displays “are large

and extremely heavy” (*id.* at 62). *Id.* at 62 (citing Ex. 1005, 2; Ex. 2002 ¶ 121). Yet, similar to the above-discussed arguments, Patent Owner fails to provide persuasive evidence that Kalua’s video blocks are large and extremely heavy. *See id.* at 61–62. Nor does Mr. Credelle bolster this contention with additional evidence. *See* Ex. 2002 ¶ 121 (stating “the displays of . . . Kalua are large and extremely heavy” with no supporting evidence).

On the other, Mr. Flask testifies, and we find persuasive, that

The nature of the problem to be solved – converting the non-electronic sign into a digital display – as well as the need to attach the digital display to the non-electronic sign to accomplish this goal, would have led a POSITA to choose an appropriate load bearing member and a compatible attachment such as is suggested by Kalua to convert the non-electrical display into a digital one.

Ex. 1002 ¶ 247. In addition, although testifying in the context of a different combination of references, Mr. Flask persuasively testifies that “[w]hile retrofitting an existing, non-digital signage structure with an LED display would require a POSITA to ensure the structural integrity of the retrofit billboard sign, overcoming any such challenges was well within the grasp of a POSITA.” *See also id.* ¶ 161.

We thus disagree that there is no reasonable expectation of success of combining Kalua and Watchfire as Patent Owner asserts. *See* Resp. 64. In any event, the Petition provides an explanation why an ordinarily skilled artisan would have had a reasonable expectation of success in combining Watchfire with Kalua. *See* Pet. 66 (stating retrofitting techniques existed and were known and retrofitting could be accomplished by an ordinarily skilled artisan with “ease and simplicity”) (citing Ex. 1002 ¶¶ 251–52).

Indeed, as previously stated, Kalua is “highly modular” and “adaptable to a variety of uses and installations” (Ex. 1007 ¶¶ 7, 42), which suggests Kalua is designed to succeed reasonably with various retrofitting installation designs.

Having considered each of the parties’ arguments and evidence, we determine Petitioner provides sufficient evidence and articulates sufficient reasoning, by a preponderance of the evidence, to support its challenge of claims 1 and 12 as unpatentable over Kalua in view of the knowledge and level of ordinary skill in the art as evidenced by Watchfire.

(b) Claims 10, 11, 13, 19, and 20

Claims 10, 11, 13, 19, and 20 depend from independent claims 1 or 12 and further limit either claims 1 or 12. Ex. 1001, 87:63–67, 88:17–18, 88:46–50. We have reviewed the record. Based on the evidence and argument presented, Petitioner has sufficiently shown that Kalua in view of Ordinary Skill teach and suggest each limitation in claims 10, 11, 13, 19, and 20, and has articulated sufficient reasoning, with rational underpinning, that an ordinarily skilled artisan would have combined Kalua with Ordinary Skill in the manner Petitioner proposes. Pet. 63 (citing Ex. 1007 ¶¶ 2, 7, 13, 42, 54; Ex. 1002 ¶¶ 241–244). Patent Owner does not separately challenge Petitioner’s ground for claims 10, 11, 13, 19, and 20. *See generally* Resp. Accordingly, having considered each of the parties’ arguments and evidence, we determine Petitioner provides by a preponderance of the evidence and articulates sufficient reasoning to support its challenge of claims 10, 11, 13, 19, and 20 as unpatentable over Kalua in view of the knowledge and level of ordinary skill in the art as evidenced by Watchfire.

(c) Conclusion – Claims 1, 10–13, 19, and 20

Having considered each of the parties’ arguments and evidence, we determine Petitioner has proven, by a preponderance of the evidence, that Kalua in view of the knowledge and level of ordinary skill in the art as evidenced by Watchfire teach or suggest claims 1, 10–13, 19, and 20.

IV. CONCLUSION²²

For the foregoing reasons, we determine Petitioner has demonstrated by a preponderance of the evidence that claims 1, 10–13, 19, and 20 of the ’791 patent are unpatentable.

For the foregoing reasons, we determine Petitioner has not demonstrated by a preponderance of the evidence that claims 4–6, 14–16, and 21–26 of the ’791 patent are unpatentable.

V. ORDER

Accordingly, it is

ORDERED that claims 1, 10–13, 19, and 20 of U.S. Patent No. 9,047,791 B2 are held unpatentable under 35 U.S.C. § 103 as obvious;

²² Should Patent Owner wish to pursue amendment of the challenged claims in a reissue or reexamination proceeding subsequent to the issuance of this Decision, we draw Patent Owner’s attention to the April 2019 *Notice Regarding Options for Amendments by Patent Owner Through Reissue or Reexamination During a Pending AIA Trial Proceeding*. See 84 Fed. Reg. 16,654 (Apr. 22, 2019). If Patent Owner chooses to file a reissue application or a request for reexamination of the challenged patent, we remind Patent Owner of its continuing obligation to notify the Board of any such related matters in updated mandatory notices. See 37 C.F.R. §§ 42.8(a)(3), (b)(2).

FURTHER ORDERED that claims 4–6, 14–16, and 21–26 of U.S. Patent No. 9,047,791 B2 are not held unpatentable under 35 U.S.C. § 103 as obvious;

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

Claims	35 U.S.C. §	Reference(s)/Basis	Claims Shown Unpatentable	Claims Not shown Unpatentable
1, 4, 5, 10, 11	103	Templeton, Ordinary Skill in the Art		1, 4, 5, 10, 11
6, 12–16, 19–26	103	Templeton, Ordinary Skill in the Art, Kludt		6, 12–16, 19– 26
1, 10–13, 19, 20	103	Kalua, Ordinary Skill in the Art	1, 10–13, 19, 20	
Overall Outcome			1, 10–13, 19, 20	4–6, 14–16, 21–26

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