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Paper 29
Entered: June 12, 2017

UNITED STATES PATENT AND TRADEMARK OFFICE

BEFORE THE PATENT TRIAL AND APPEAL BOARD

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

v.

GOLD CHARM LTD.,
Patent Owner.

Case IPR2016-00462
Patent 6,456,352 B1

Before KARL D. EASTHOM, MICHAEL R. ZECHER, and CHARLES J. BOUDREAU, *Administrative Patent Judges*.

EASTHOM, *Administrative Patent Judge*.

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

I. INTRODUCTION

Toshiba Corp., Samsung Display Co., Ltd., and Funai Electric Co., Ltd. (collectively, "Petitioner") filed a Petition (Paper 1, "Pet.") requesting an *inter partes* review of claims 5 and 6 of U.S. Patent No. 6,456,352 B1 (Ex. 1001, the "'352 patent").[1] Pet. 1, 4. In response, Gold Charm Ltd. ("Patent Owner") filed a Preliminary Response. Paper 6 ("Prelim. Resp.").

We instituted trial for claims 5 and 6 (the "challenged claims"). Paper 7 ("Institution Decision" or "Inst. Dec."). Patent Owner then filed a Response. Paper 12 ("PO Resp."). Petitioner followed with a Reply. Paper 16 ("Pet. Reply"). The record includes a transcript of the Oral Hearing, which occurred on November 21, 2016. Paper 28 ("Tr.").

We have jurisdiction under 35 U.S.C. § 6. This Final Written Decision issues pursuant to 35 U.S.C. § 318(a). For the reasons discussed below, Petitioner has shown by a preponderance of the evidence that claims 5 and 6 of the '352 patent are unpatentable.

A. Related Proceedings

Petitioner states that Patent Owner "asserted the [c]hallenged [c]laims of the '352 [p]atent against Toshiba, Toshiba America Information Systems, Inc., Toshiba America, Inc., Funai, P&F USA Inc., Funai Corporation, Inc., and other defendants" in the following "Related District Court Actions" ("RDCAs"): *MiiCs & Partners America, Inc. v. Toshiba Corp.*, No. 1:14-cv-00803-RGA (complaint entered Apr. 1, 2015, D. Del.) (stayed);

[1] In addition to the above-listed parties in the caption, Petitioner lists "the following . . . real parties-in-interest: Toshiba America Information Systems, Inc., Toshiba America, Inc., P&F USA Inc., and Funai Corporation, Inc." Pet. 1.

MiiCs & Partners America, Inc. v. Funai Electric Co., No. 1:14-cv-00804-RGA (complaint entered Apr. 1, 2015, D. Del.) (stayed). Pet. 1–2 & n.1; Paper 5, 2–3.

B. The '352 Patent

The '352 patent discloses an electrode and wiring structure for a liquid crystal display ("LCD") device. Ex. 1001, Abstract, 4:5–11. The wiring structure includes a control electrode that controls the orientation of liquid crystal molecules in the display: "[A]n arbitrary voltage can be applied to the control electrode so that the diagonal electrical field" optimally orients liquid crystal molecules to be different in different regions, thereby overcoming a tint problem that otherwise exists when the crystal molecules align uniformly. *See id.* at Abstract, 1:21–26.

A reproduction of Figure 1 of the '352 patent, labeled as "prior art," follows:

FIG. 1
(PRIOR ART)

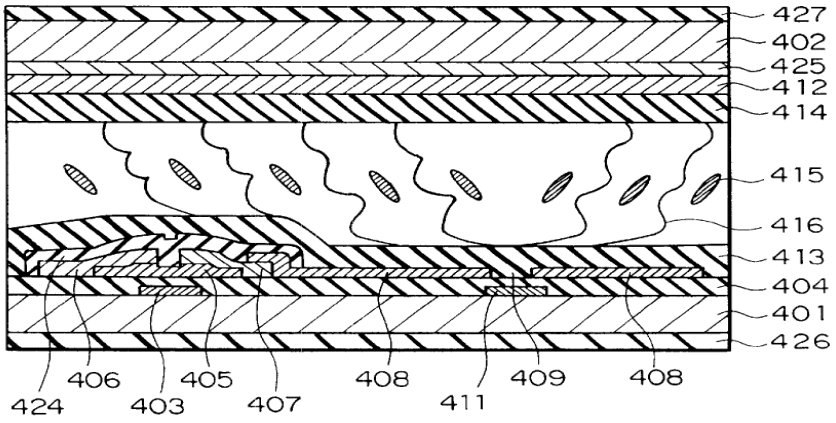

Figure 1 (above) is a sectional view of an LCD device according to a prior art "conventional example," showing "a switching element" having gate electrode 403, gate insulation film 404, semiconductor layer 405, drain

electrode 406, and source electrode 407, arranged on substrate 401. *Id.* at 1:28–38. Control electrode 411 extends under opening 409 in pixel electrode 408 (which is connected to source electrode 407). *Id.* at 1:38–42. In both the prior art conventional example and the disclosed invention, by providing a voltage between control electrode 411 and common electrode 412, a diagonal electric field between the latter two electrodes advantageously orients liquid crystal molecules 415. *See id.* at 1:49–55, 2:63–3:31.

The ’352 patent describes a central feature of the disclosed invention: The control electrode does not connect to gate wiring on the LCD substrate. *See id.* at 3:66–4:32. This terminal structure allows voltage to be applied to the control electrode independently of the gate wiring. *See id.* at 3:66–4:32, 5:4–17, 5:50–59, 6:46–53. The ’352 patent acknowledges that, similar to the disclosed invention, the prior art discloses employing a control electrode and common electrode at different potentials (*id.* at 2:63–66), but represents that “there is no description with respect to the connection structure” in the prior art structures that do this (*id.* at 3:2–3).

C. Challenged Claims

Claims 5 and 6 follow:

> 5. A liquid crystal display device comprising:
>
> a first substrate panel and a second substrate panel;
>
> a liquid crystal layer held between said substrate panels;
>
> a gate terminal, a gate wiring, a plurality of control electrodes, and a drain terminal being disposed on said first substrate panel;
>
> a terminal part including a plurality of control electrode terminals, said gate terminal, and said drain terminal, said

> terminal part being arranged on at least first and second side portions of a surface of said first substrate panel; and
>
> wherein a separate control electrode terminal, in a condition independent of said gate wiring, is provided for each of a plurality of rows of said control electrodes on said first side portion of the terminal part, and wherein the gate terminal is arranged on either said first side portion or said second side portion of the terminal part.

Ex. 1001, 9:25–10:12.

> 6. A liquid crystal display device according to claim 5, wherein said control electrode terminals are provided in a layer which is the same as the layer where the gate wiring and/or the gate terminal are arranged.

Id. at 10:13–16.

D. Evidence of Record

Petitioner relies on the Declaration of Dr. Aris Silzars ("Silzars Declaration") (Ex. 1002), the Rebuttal Declaration of Dr. Aris Silzars (Ex. 1012, the "Silzars Rebuttal Declaration") (Ex. 1012), and following patents (including certified English translations):

Japanese Patent App. Pub. No. H10-206890 (Aug. 7, 1998) ("Hebiguchi") (Ex. 1004);

Japanese Patent App. Pub. No. H11-002835 (Jan. 6, 1999) ("Fujikawa") (Ex. 1005); and

U.S. Patent No. 5,608,556 (Mar. 4, 1997) ("Koma") (Ex. 1006).

See Pet. iii.

Patent Owner relies on the Declaration of Michael P.C. Watts, Ph.D., ("Watts Declaration") (Ex. 2011).

E. Instituted Grounds of Unpatentability

We instituted trial of the challenged claims on the following grounds:

Claim(s) Challenged	Basis	Reference(s)
5	35 U.S.C. § 102(b)	Hebiguchi
5 and 6	35 U.S.C. § 102(b)	Fujikawa
5 and 6	35 U.S.C. § 103(a)	Hebiguchi and Fujikawa
5 and 6	35 U.S.C. § 103(a)	Koma and Fujikawa

See Inst. Dec. 26.

II. ANALYSIS

A. Claim Construction

The claims of an unexpired patent are interpreted using the broadest reasonable interpretation in light of the specification of the patent in which they appear. 37 C.F.R. § 42.100(b); *Cuozzo Speed Techs., LLC v. Lee*, 136 S. Ct. 2131, 2144–46 (2016) (upholding the use of the broadest reasonable interpretation standard under 37 C.F.R. § 42.100(b)). Under this standard, absent any special definitions or disavowals, claim terms or phrases carry their ordinary and customary meaning, as would be understood by one of ordinary skill in the art, in the context of the entire disclosure. *In re Translogic Tech., Inc.*, 504 F.3d 1249, 1257 (Fed. Cir. 2007).

Most of the claim terms do not require express construction because they do not raise a controversy. *See Vivid Techs., Inc. v. Am. Sci. & Eng'g, Inc.*, 200 F.3d 795, 803 (Fed. Cir. 1999) (holding that "only those terms need be construed that are in controversy, and only to the extent necessary to resolve the controversy," and noting that "the stage at which the claims are construed may vary with the issues, their complexity, the potentially dispositive nature of the construction, and other considerations of the particular case").

1. "wherein a separate control electrode terminal, in a condition independent of said gate wiring, is provided"

Claim 5 recites the above-listed phrase. Ex. 1001, 10:6–7. In the Institution Decision, we construed the phrase to mean "unconnected control electrode terminal and gate wiring such that a [direct current ('DC')] voltage applied to the control electrode terminal does not appear inherently on the gate wiring and vice versa." Inst. Dec. 9. The parties do not dispute the construction. *See* PO Resp. 22 (asserting that the "control electrode" is "[t]he sole remaining term in dispute for purposes of the present proceeding"); Pet. Reply 9 (similar assertion). Based on the record, we maintain the original construction.

2. "control electrode(s)"

Claim 5 recites "a plurality of control electrodes." Ex. 1001, 9:28–29. In its Petition and Reply, Petitioner contends, under a first alternative claim construction, that the term "control electrode" means "a conductive element, other than pixel electrodes, that affects the orientation of the LCD's liquid crystal molecules when a voltage is applied to it." Pet. 19 (citing Ex. 1002 ¶ 52); Pet. Reply 9. Patent Owner disagrees, contending instead that the term "control electrode" means "a conductive element, other than a pixel electrode *and common electrode*, that affects the orientation of the LCD's liquid crystal molecules when a voltage is applied thereto." PO Resp. 23 (emphasis added). More particularly, Patent Owner contends, "[t]he broadest reasonable construction of 'control electrode' must also necessarily exclude common electrodes in addition to excluding pixel electrodes, as these are necessary and inherent elements of all LCDs – a common

electrode, just like a pixel electrode, must already be present." *Id.* at (citing Ex. 2011 ¶ 31).

Under a second, broader, alternative claim construction, Petitioner agrees with one of our preliminary claim constructions as set forth in the Institution Decision, wherein a "control electrode" means an "electrical conductor, other than a gate or drain electrode, which may be used to provide a type of control." Pet. Reply 9 (citing Inst.; Dec. 13). Tracking this second alternative to some extent, the Petition asserts that Patent Owner proposed the following broad construction for "control electrode" in the RDCAs: "electrical conductors located in the display area (not directly or indirectly connected to the gate wiring)." Pet. 19 (citing Ex. 1002 ¶ 53; Ex. 1008); Ex. 1008, 4. Patent Owner contends here that the second alternative is "unreasonably broad." PO Resp. 23. In context, the Petition only raises this broader construction under the contingency that the panel adopts something similar to what Patent Owner raised in the RDCAs as discussed further below. *See* Pet. 20.

Notwithstanding our initial claim construction in the Institution Decision that adopts the second claim construction alternative outlined above, as noted above and in the Institution Decision, the parties largely originally agreed as to what a control electrode means according to the first alternative claim construction—i.e., with the only disagreement per that alternative being whether a control electrode excludes a common electrode. *See* Inst. Dec. 9 (noting that "Patent Owner disagrees slightly" with Petitioner's construction under the first alternative). Other than that disagreement about the common electrode, no need exists to resolve other claim construction issues as explained further below. *See Vivid Techs.*, 200

F.3d at 803 (claim construction must be addressed only to the extent necessary to resolve a controversy); *see also Asyst Techs. Inc. v. Empak, Inc.*, 268 F.3d 1364, 1369 (Fed. Cir. 2001) ("[W]e see no reason to depart from the position consistently taken on this issue by the parties and the district court.").

As noted in the Institution Decision, the Petition urges the panel not to adopt the second alternative—a broader construction that "does not associate 'control electrodes' with their function as disclosed in the '352 [p]atent, which Petitioner[] respectfully submit[s] it should not." Pet. 54 (arguing "the Board . . . . should not" adopt the broader construction), 19–20; Inst. Dec. 9–10 & n.2. Although, as noted, we adopted the second alternative for institution, we decline to maintain this construction in the Final Written Decision as it is not necessary to resolve a dispute. *See Vivid Techs.*, 200 F.3d at 803 (resolving controversies in claim construction).

Regarding the dispute involving the first alternative (i.e., whether a control electrode excludes a common electrode), Petitioner contends that "[t]he term 'control electrode' did not have an applicable plain meaning as of the invention date." Pet. 19 (citing Ex. 1002 ¶ 51). Patent Owner does not contend that the term "control electrode" has a plain meaning. *See generally* PO Resp. 23–32.

Petitioner notes that during prosecution, the Examiner rejected certain claims by reading the recited "control electrodes" on "counter electrodes" as disclosed in a prior art reference to Ohta (Ex. 1007). *See* Pet. 12–14, 27 (citing Ex. 1002 ¶ 72) & n.6. Patent Owner concedes that Ohta's "counter electrodes" represent "another term . . . for common electrodes." Prelim. Resp. 23 n.4. Petitioner adds that the Examiner's Notice of Allowance relies

on the finding that the prior art does not disclose or suggest the specific "separate control electrode terminal" *structural* arrangement as now set forth in the "wherein" clause recited in challenged claim 5. *See* Pet. 14 (citing Ex. 1003, 105).[2]

According to the prosecution history, Patent Owner (as Applicant) cancelled the rejected claims in response to the Examiner's rejection based on Ohta: Applicant canceled claims 1, 4, and 10, which "stand rejected . . . as being anticipated by" Ohta. Ex. 1003, 99. In response to the Petition's reliance on the prosecution history, Patent Owner contends that the prosecution history reveals little, if anything, about the scope of the disputed term, because "the only thing that is clear from the record, is that nothing was said and that no specific intent can be assumed." *See* PO Resp. 30 (citing Ex. 2011 ¶¶ 38, 40).

Notwithstanding the arguments regarding clarity and intent, which pertain to whether or not disclaimer or disavowal occurred, the prosecution history informs the meaning and breadth of a "control electrode." *See D'Agostino v. MasterCard Int'l Inc.*, 844 F.3d 945, 949 (Fed. Cir. 2016) ("In the present appeal, this [prosecution history] material is relevant as reinforcing the evident meaning of the claim language at issue, *whether or not it would meet standards for disclaimer or disavowal*." (Emphasis added)). Petitioner does not advance a disavowal or lexicography theory, which typically serves to narrow the claims and always requires exacting standards of clarity. *GE Lighting Sols., LLC v. AgiLight, Inc.*, 750 F.3d

[2] All references to the page numbers in the prosecution history of the '352 patent refer to the page numbers inserted by Petitioner in the bottom, middle portion of each page in Exhibit 1003.

1304, 1309 (Fed. Cir. 2014) ("The standards for finding lexicography and disavowal are exacting."); *Omega Eng'g, Inc. v. Raytek Corp.*, 334 F.3d 1314, 1325–26 (Fed. Cir. 2003) ("[F]or prosecution disclaimer to attach, our precedent requires that the alleged disavowing actions or statements made during prosecution be both clear and unmistakable.").[3] Petitioner contends, and Patent Owner does not dispute persuasively, that the record shows that Patent Owner did not narrow the claims with respect to excluding a common electrode from the scope of the recited "control electrode." *See* Pet. 12–14.

Petitioner persuasively shows that a skilled artisan reading the prosecution history, the claims in view of the Specification, and Patent Owner's proposed construction in the RDCAs (*see* Ex. 1008) would ascertain a meaning that does not limit a "control electrode" by excluding a common electrode. *See Vivid Techs.*, 200 F.3d at 804 ("The construction of a patent claim *starts with the claim itself, read in light of the specification. . . . The prosecution history is often helpful in understanding the intended meaning as well as the scope of technical terms*, and to establish whether any aspect thereof was restricted for purposes of patentability." (citation omitted, emphasis added)).

Patent Owner argues that "[t]he person of ordinary skill in the art would not confuse the *counter* electrodes of Ohta with the claimed control electrodes." PO Resp. 29 (emphasis added). Patent Owner explains that "[a] skilled

[3] Absent lexicography or disavowal, the plain meaning of the term governs. *See Thorner v. Sony Comput. Entm't Am. LLC*, 669 F.3d 1362, 1365 (Fed. Cir. 2012).

artisan would clearly understand that the 'counter electrodes' in an [in-plane switching] LCD such as Ohta perform the same function as common electrodes in conventional LCD and in orientation division type LCDs." *Id.* (citing Ex. 2011 ¶ 46; *accord* Prelim. Resp. 23 n. 4 (asserting "[s]imilar to Hebiguchi, counter electrodes in the context of Ohta (Ex. 1007) are another term for . . . common electrodes").

A review of the prosecution history shows it is consistent with Patent Owner's contention about a counter electrode functioning as or being "another term for" a common electrode. *See* PO Resp. 29; Prelim. Resp. 23 n.4. The prosecution history also shows that the claimed "control electrode" and Ohta's counter electrode serve the same function of orienting crystals. *See* Ex. 1003, 88 (explaining that counter electrode "CT in the [Ohta] reference has the same function with control electrode[s] in this application, they both [are] use[d] to rotate the liquid crystal molecules"). Patent Owner did not argue during prosecution that a control electrode does not cover Ohta's counter electrode or equivalently, a common electrode.

Rather, during prosecution, as Petitioner argues, Patent Owner amended claims to include specific terminal structure (including location thereof), instead of including anything related to distinguishing a control electrode over a common or counter electrode. The amended claims and prosecution history in general coalesce with statements in the Specification describing the invention as directed to specific terminal part structure. *See* Pet. Reply 20 (arguing that "[r]ather than state that 'control electrodes' cannot be counter electrodes, as Patent Owner now alleges, the inventors amended the claims" (citing Ex. 1012 ¶ 32)), 25 (noting that the Specification lists the same components as claim 5 in describing "[a] liquid

crystal display device according to the present invention" (citing Ex. 1001, 3:37–48)); Ex. 1003, 88 (allowable subject matter related to the "terminal part"), 104–05 (similar statements in reasons for allowance including that Ohta does not teach "a separate control electrode terminal, in a condition independent of said gate wiring, provided for each of a plurality of rows of said control electrodes on said first side portion of the terminal part, and wherein the gate terminal is arranged on either said first side portion or said second side portion of the terminal part" (emphasis omitted)).

The prosecution history reinforces the evident meaning of a control electrode as not excluding a common/counter electrode that performs the same crystal orientation function as the parties attribute to the claimed "control electrode." *See D'Agostino*, 844 F.3d at 949 ("In the present appeal, this [prosecution history] material is relevant as reinforcing the evident meaning of the claim language at issue, *whether or not it would meet standards for disclaimer or disavowal*." (emphasis added)). It also shows, contrary to other arguments by Patent Owner, that Patent Owner intended to capture devices that include counter electrodes like that of Ohta, albeit with the specific terminal part structure as recited in the claims pursuant to the Examiner's statement of allowable subject matter and consistent reasons for allowance. *See* Ex. 1003, 88, 104–105.

To support its claim construction, Petitioner also relies on claim constructions exchanged by Patent Owner with Petitioner pursuant to an order in the RDCAs. *See* Pet. 19 (citing Ex. 1008, Ex. 1002 ¶ 53); Ex. 1008 (Plaintiff's Initial List of Proposed Constructions for Exchanged Claim Term(s)/Phrase(s)). There, as noted above, Patent Owner initially proposed that "control electrodes" means "electrical conductors located in the display

area (not directly or indirectly connected to the gate wiring)." Ex. 1008, 4; *see* Pet. 19 (describing the construction as unreasonably broad because, *inter alia*, it does not include the "function" of orientation control). This claim construction tracks the prosecution history, because it does not exclude a common electrode, which like Ohta's counter electrode, performs the same function as the claimed "control electrode," according to the Examiner and Dr. Silzars. *See* Pet. 27 (citing Ex. 1003, 88; Ex. 1002 ¶ 71 (reading the claimed control electrode onto Hebiguchi's common electrode, reasoning that it, like Ohta's counter electrode, "affect[s] the orientation of liquid crystal molecules contained in the LCD device")); Ex. 1003 ¶¶ 40–43 (discussing prosecution history including the orientation function of Ohta's counter electrode). Moreover, Patent Owner agrees that common electrodes control liquid crystal orientation: "Hebiguchi . . . teaches . . . common and pixel electrodes disposed on the same substrate *for controlling liquid crystal orientation*." PO Resp. 44 (emphasis added).

Patent Owner contends that the preliminary claim constructions in the RDCAs, "submitted well before the Petition in this proceeding," have no bearing on claim construction in an *inter partes* review. PO Resp. 31 (citing *Garmin Int'l, Inc. v. Cuozzo Speed Techs. LLC*, IPR2012-00001, Paper 15, 7–8 ("The meaning of claim terms is not governed by what the Patent Owner says they mean in filing an infringement suit based on" the patent considered in the petition). Patent Owner also contends that it eventually altered its preliminary claim constructions to be "identical and nearly verbatim to the construction set forth herein." PO Resp. 31 (citing Ex. 2008, 77–83).[4]

[4] All references to the page numbers in the "Joint Claim Construction Brief"

As Petitioner notes, Patent Owner's latest claim constructions in the RDCAs were filed after Patent Owner had the opportunity to see the Petition. *See* Pet. Reply 21. Petitioner argues that *Garmin* only stands for the proposition that a Petitioner cannot "simply rely upon a proffered [district court] claim construction"—i.e., cannot rely solely on that evidence. *See* Pet. Reply 21 n.2. Although Patent Owner contends it did not *file* its preliminary claim construction in the RDCAs,[5] Petitioner points out that 35 U.S.C. § 301 states "any person . . . may cite to the Office in writing . . . statements of the patent owner filed in a proceeding before a Federal court . . . in which the patent owner took a position." Pet. Reply 21–22 (also arguing that the legislative history shows that the Leahy-Smith America Invents Act ("AIA") amended 35 U.S.C. § 301 to prevent patent owners from arguing a narrower claim construction at the Patent and Trademark Office while arguing a broader construction in infringement actions at a District Court) (citing Joe Matal, *A Guide to the Legislative History of the American Invents Act: Part II of II*, 21 Fed. Cir. B.J. 539, 593–94).

Petitioner's position that the exchange of claim constructions in the RDCA should be considered as relevant is persuasive. Patent Owner at least deemed the constructions to be a reasonable response to a District Court order after having knowledge of the prosecution history, which indicates that Patent Owner deemed it reasonable not to preclude the recited "control

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refer to the page numbers inserted by Petitioner in the bottom, middle portion of each page in Exhibit 2008.

[5] *See* Paper 21, 3 (arguing the preliminary claim constructions "were simply exchanged between parties"). The title of Exhibit 1008 supports Patent Owner's contention that the parties exchanged the claim constructions (pursuant to a court order). *See* Ex. 1008, 1.

electrode" from including a common electrode. *See Hewlett-Packard Co. v. MPHJ Tech. Inv., LLC*, Case IPR2013-00309, slip op. at 20–22 (PTAB Nov. 19, 2014) (Paper 35) (using patent owner's demand letter as an aid in construing certain claim phrases), *aff'd sub nom., HP Inc. v. MPHJ Tech. Inv., LLC*, 817 F.3d 1339 (Fed. Cir. 2016).

Responding to Petitioner's reliance on the Specification, Patent Owner counters that it "*repeatedly and consistently* distinguish[es] the 'control electrode' from not only the pixel electrodes, but also from the common electrodes." PO Resp. 24. According to Patent Owner, "[i]n every instance in the Specification of the '352 patent, the invention is described in terms of an LCD device that has a pixel electrode and a common electrode, and additionally, a control electrode." PO Resp. 25.

The '352 patent Specification contradicts Patent Owner's argument. As Petitioner points out, in the '352 patent Specification,

> the Summary of the Invention begins, "[a] liquid crystal display device according to the present invention comprises." Ex. 1001, 3:37–48. It then proceeds to list the same elements as recited in claim 5 (i.e., two substrates of glass with liquid crystal between, gate terminal, gate wiring, control electrode, drain terminal, control electrode terminal, and terminal part). Thus, "liquid crystal display device <u>*according to the present invention*</u>" is comprised of the elements recited in claim 5 which is a *portion* of an LCD.

Pet. Reply 25 (emphases by Petitioner) (quoting Ex. 1001, 3:37–38).

The relied-upon portion of the Specification directly supports Petitioner's quoted argument, as it states the following:

> A liquid crystal display device *according to the present invention* comprises two substrates of glass or the like, a liquid crystal layer sandwiched between said substrates and a gate terminal (105), a gate wiring (104), a control electrode (101) and

> a drain terminal (107) arranged on the liquid crystal layer. The liquid crystal display device further comprise a control electrode terminal of the control electrode in a condition independent of the gate wiring so that the configuration is characterized in that the terminal part including this control electrode terminal, the gate terminal and the drain terminal is arranged on the outer side of the substrate panel.

Ex. 1001, 3:37–48 (emphasis added).

In other words, this passage directly tracks claim 5. *See* Pet. Reply 25. Contrary to Patent Owner's arguments, the passage also proves that the Specification does not "*consistently* distinguish the 'control electrode' from . . . the common electrodes." PO Resp. 24. The passage does not even mention common electrodes or terminals, but like claim 5, it recites a gate terminal, gate wiring, a control electrode, and a drain terminal, and describes a specific "configuration . . . characterized in that the terminal part including this control electrode terminal, the gate terminal and the drain terminal . . . arranged on the outer side of the substrate panel." The record shows that this generic embodiment also tracks the reasons for allowance. *See* Ex. 1003, 104–105 and discussion *supra*.

In other words, describing common, pixel, and control electrodes in the context of specific *embodiments* fails to limit the broader description of the disclosed invention in the more generic embodiment (as quoted above). Furthermore, "'[i]t is . . . not enough that the only embodiments, or all of the embodiments, contain a particular limitation' to limit a claim term beyond its ordinary meaning." *Aventis Pharma S.A. v. Hospira, Inc.*, 675 F.3d 1324, 1330 (Fed. Cir. 2012) (internal citation omitted); *SuperGuide Corp. v. DirecTV Enters., Inc.*, 358 F.3d 870, 875 (Fed. Cir. 2004) ("a particular embodiment appearing in the written description may not be read into a

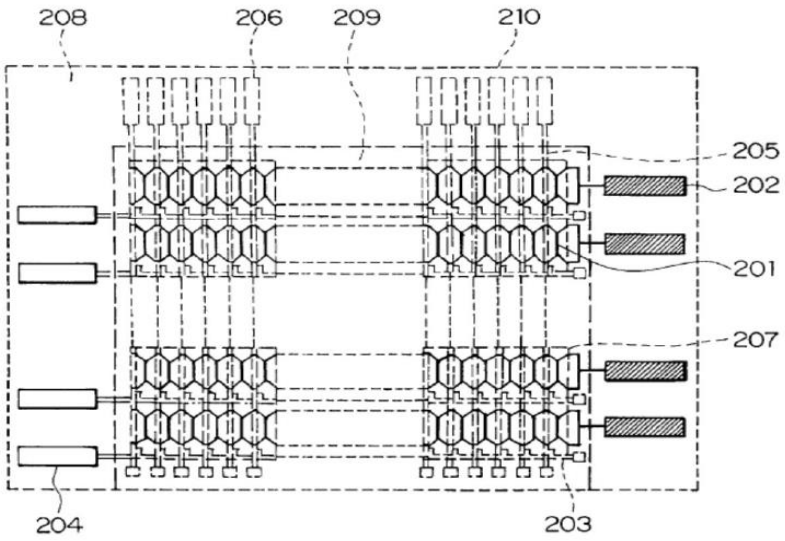
claim when the claim language is broader than the embodiment").

As Petitioner also points out, the '352 patent specifies that it is not limited to the described preferred embodiments, and the claims do not recite common electrodes (which then would exclude a common electrode and terminal from the ambit respectively of a control electrode and terminal). *See* Pet. 12 (citing Ex. 1001, 8:49–53). Patent Owner's embodiment-based arguments improperly attempt to narrow "control electrodes," contrary to the clear description of the broader disclosed *invention* as quoted above, contrary to its proposed broader construction of the term in the RDCA, and contrary to what the prosecution history reveals.

In addition, as Petitioner points out, "[i]t is important to remember that the '352 [p]atent characterizes the invention as 'a wiring structure in the case when an independent potential is set for the control electrode, *in particular a drawn out terminal structure*.'" Pet. Reply 10 (quoting Ex. 1001, 5:15–17; citing Ex. 1002 ¶ 30) (emphasis added); *see also* Pet. 8 (similar argument). Supporting Petitioner's showing, the Specification refers to the quoted feature as "technology disclosed for the first time in *the present invention*, and is a characteristic of the *present invention*." Ex. 1001, 5:13–15 (emphases added). Petitioner also persuasively annotates the drawn out terminal structure in Figures 5 and 6 of the '352 patent to show how it relates to claim 5. *See* Pet. Reply 10–11 (describing how claim 5 tracks the claimed terminal structure of annotated Figures 6 and 7); Pet. 10 (citing Ex. 1002 ¶ 34).

Figure 6 of the ’352 patent follows:

FIG. 6



Pet. 18. Figure 6 shows an embodiment of the “terminal part” recited in claim 5, including “drain terminal[s]” 206 and “a separate control electrode terminal” 202 “independent of . . . gate wiring” 203 “provided for each row of a plurality of rows of . . . control electrodes” 201, with “the gate terminal” 204 “arranged on either the first or second side portion of the terminal part.” *See* Pet. Reply 11; Pet. 17–18. As Petitioner argues, and as discussed above, the Specification describes this “terminal part” as the “technology disclosed for the first time in the *present invention*, and is the characteristic of the *present invention*.” Ex. 1001, 5:13–15 (emphases added); Pet. Reply 10–11.

Patent Owner also contends that the preamble recited in claim 5, “the liquid crystal display device,” “necessarily contains at least the essential elements of an LCD: gate bus lines, signal (drain) bus lines; [thin-film transistors (“TFTs”)] (which include source/drain electrodes and gate electrodes), pixel electrodes, common electrode(s) and a liquid crystal

layer." PO Resp. 27 (citing Ex. 2011 ¶ 44). This argument lacks support because the body of claim 5 itself also recites a liquid crystal layer, drain and gate terminals, and gate wiring, all of which also would be necessary. These elements would not need to be recited if they were "necessarily contain[ed]" as "essential elements of an LCD." *See* Ex. 1012 ¶ 36 (noting other unclaimed elements).[6] And as noted above, the Specification specifically characterizes the claimed invention as including the features recited in claim 5.

Furthermore, during the Oral Hearing, Patent Owner unequivocally stated it does not rely on the preamble (or an orientation division type of LCD) as limiting claim 5. *See, e.g.*, Tr. 18:11–12 (Patent Owner stating that it "did not advance a reliance on the preamble"), 25:12–13 (Patent Owner reiterating that "[it]'s not arguing that the preamble, liquid crystal display device, is limited"), 80:2–4 (Petitioner stating "I'm going to assume that argument is withdrawn and not address that, that the preamble is not limiting"). Similarly, Patent Owner relied on "the claim as a whole" and not the "preamble" or a specific claim term that would require limiting a control electrode by excluding a common electrode. *See* Tr. 27:21, 27:6–20. In addition, Petitioner points out that Patent Owner does not allege infringement of an accused device with respect to any claim elements not

[6] In contrast to claim 5 of the '352 patent, claim 1 of Koma specifically recites a number of "liquid crystal display" features that Patent Owner indicates are "inherent," including a "common electrode," "a liquid crystal layer," "display[/pixel] electrodes," "switching elements," etc., with "the improvement comprising: orientation control electrodes formed on said first substrate," among other things. *See* Ex. 1005, 11:6–30.

recited specifically in claim 5. Pet. Reply 26 (citing Ex. 1015). Exhibit 1015 supports Petitioner's infringement-based argument.

"[I]f the claim preamble is necessary to give life, meaning, and vitality to the claim, then the claim preamble should be construed as if in the balance of the claim." *Pitney Bowes, Inc. v. Hewlett-Packard Co.*, 182 F.3d 1298, 1305 (Fed. Cir. 1999) (citations omitted). Even in the absence of Patent Owner's remarks during the Oral Hearing, the record supports Petitioner's argument that the preamble does not limit claim 5 under the principle of law in *Pitney Bowes* identified above, because the body of claim 5 defines a structurally complete invention, and the preamble does not provide antecedent basis for any claim term at issue. *See* Pet. Reply 23 (quoting *Pitney Bowes*, 182 F.3d at 1305).

In addition, the '352 patent describes a prior art "orientation control electrode," signifying a "control electrode" embraces broader subject matter, including a common electrode that functions in the same manner. *See* Ex. 1001, 2:44–46. Claim 5 does not define any structural characteristics of a control electrode other than with respect to its terminal independence relative to gate wiring and location (as addressed above). Referring to specific embodiments, as noted above, the Specification lists and refers to various electrodes, including gate electrodes, drain electrodes, source electrodes, control electrodes, common electrodes, and pixel electrodes. *See* Ex. 1001, 1:33–53. In contrast, other than the control electrode terminal, as also noted above, claim 5 only recites two terminal types (gate and drain), tracking a broader description of a generic embodiment "*according to the present invention*" as set forth in the Specification. *Id.* at 3:37–48 (emphasis added). By reciting only a subset of the disclosed electrodes or terminals

relative to preferred embodiments, and not reciting a common electrode or terminal "according to the present invention" with respect to the generic embodiment, claim 5 does not demarcate a sufficient distinction between a common electrode or terminal, on the one hand, and a control electrode or terminal, on the other hand.

In addition to agreeing that a control electrode does not include a pixel electrode, the parties agree that a pixel electrode does not include its own terminal. PO Resp. 28 ("To be clear, pixel electrodes have no terminal – they are electrically connected to and receive a voltage from the source electrode.") (citing Ex. 2011 ¶¶ 43–44); Tr. 5:1–2 (Petitioner arguing "it's undisputed that pixel electrodes have no terminal"). Given the parties' essential agreement regarding pixel electrodes, reciting a "control electrode terminal" and control electrodes reasonably implies the exclusion of a pixel electrode—because a pixel electrode normally does not have its own terminal.

On the other hand, a common electrode typically includes its own terminal, further supporting a construction wherein a control electrode terminal does not preclude a common electrode terminal. *See, e.g.*, Ex. 1006, 6:33–36 (describing common electrode with silver paste at four terminal parts connected to input terminal); Ex. 2011 ¶ 42 (referring to a common electrode "voltage connection" in the context of other terminals and contrasting that with a pixel electrode). Although Patent Owner contends that all of its embodiments disclose common electrode terminals ("voltage connection") on an "opposite substrate" from the disclosed substrate carrying the gate and drain terminals, the disclosed embodiments do not limit claim 5 in terms of a substrate location for an unclaimed

element—i.e., claim 5 does not specify any common terminal, let alone preclude a common electrode terminal from being on the same substrate as the other claimed terminals. *See* PO Resp. 28.

Finally, the parties agree that an LCD device requires at least two electrodes—for example, (1) a common (or counter) electrode and (2) a pixel electrode—in order to apply voltage across the liquid crystal. In other words, "[t]hese two electrodes are a basic requirement." PO Resp. 25 ("One of ordinary skill in the art would [have understood], as Patent Owner's expert explains and Petitioner's expert confirms, every LCD device has both pixel electrodes and a common or counter electrode(s)." (citing Ex. 2011 ¶¶ 30–31, 38)); Pet. Reply 24. Contrary to Patent Owner's arguments that claim 5 requires three basic electrodes to function (i.e., common, pixel, and control electrodes, *see* PO Resp. 24–28), claim 5 reasonably only requires the following two basic electrodes: (1) the recited "control electrode" (which may be a common electrode), and 2) the implied pixel electrode (as agreed upon by the parties). *See* Pet. Reply 24 ("[T]he 'essential elements of an LCD' ***do not*** require a common electrode; it could have a counter electrode (i.e., there is no requirement that all the pixels have a common voltage). . . . Also, most LCD's do not require three electrodes; they generally employ only two." (citing Ex. 1012 ¶ 38)).

Based on the foregoing discussion, the record supports Petitioner's proposed first alternative construction. Accordingly, for purposes of this Decision, the term "control electrode" means "a conductive element, other than a pixel electrode, that affects the orientation of the LCD's liquid crystal molecules when a voltage is applied thereto." *Compare* Pet. 19 (proposing

the construction), *with* PO Resp. 23 (agreeing in part with the construction proposed by Petitioner).

3. "terminal(s)"

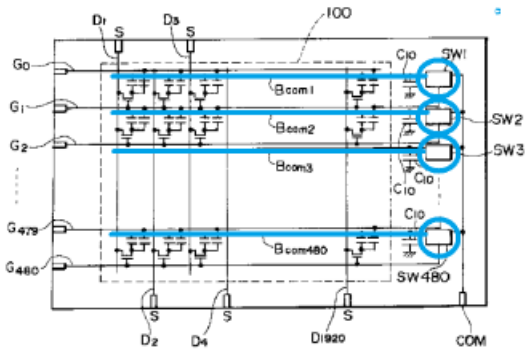
Claim 5 recites various types of terminals. *See* Ex. 1001, 9:28–10:5. Citing the Specification, the Silzars Declaration, and a trade dictionary, Petitioner contends that the broadest reasonable construction of a "terminal," consistent with the Specification, is "an electrical connection point through which a voltage can be applied." Pet. 18 & n.4 (citing Ex. 1001, 5:29–35, 59–65, Figs. 5–7; Ex. 1002 ¶ 50; Ex. 1010, 2187). Patent Owner does not contest this construction, which we adopted in the Institution Decision. The record supports Petitioner's construction as the broadest reasonable construction.

B. Anticipation

1. Hebiguchi—Claim 5

Contending that Hebiguchi anticipates claim 5, Petitioner relies on the Silzars Declaration and sets forth a detailed mapping of each claim element to the disclosure of Hebiguchi. Pet. 22–35; Ex. 1002 ¶¶ 59–85. To support its showing, Petitioner provides the following annotated figure:

【図5】



Id. at 32. Hebiguchi's Figure 5, reproduced above as annotated by Petitioner, shows gate terminals G_0, G_1, and G_2, etc., and separate switches

SW1, SW2, and SW3, etc., connected at the recited "control electrode terminals" respectively to bus lines B_{com1}, B_{com2}, B_{com3}, etc. *See id.* (citing Ex. 1004 ¶¶ 44–45; Ex. 1002 ¶ 80).

Addressing the "wherein" clause of claim 5, with respect to Hebiguchi's Figure 5, i.e., "wherein a separate control electrode terminal, in a condition independent of said gate wiring, is provided," Petitioner contends that the points of connection between Hebiguchi's bus lines B_{com} "and the corresponding switch[es] (SW) meet the claimed 'control electrode terminal' limitation." Pet. 32 (citing Ex. 1002 ¶ 80; Ex. 1004 ¶¶ 44–45, Fig. 5). Petitioner explains that

> [t]he point of connection between the end of each "bus line" B_{com} and the corresponding switch (i.e., the "control electrode terminal") meets the "in a condition independent of said gate wiring" limitation, because one of ordinary skill would have understood that this point of connection is separate from (*i.e.*, not connected to) the "gate wires" (G) such that the voltage of the "gate wires" (G) is not applied to the control electrodes.

Pet. 32–33 (citing Ex. 1002 ¶ 81); *see also id.* at 30 & n.8 (citing Ex. 1002 ¶ 75 (explaining that a switch must have a "terminal" or point of connection)). Petitioner also explains that Hebiguchi's gates supply voltages to control switches SW to allow common electrodes connected to each B_{com} line to operate in the same fashion as the disclosed control electrodes of the '352 patent (i.e., to create a voltage generated electric field to orient liquid crystals in a display). *See* Pet. 26–28 (citing Ex. 1004 ¶¶ 21–23, Fig. 10) & n.8 (arguing that Ohta's counter electrode and Hebiguchi's common electrode each satisfy the crystal orientation function of the control electrode), 33 (citing Ex. 1002 ¶¶ 81–82; Ex. 1004 ¶¶ 44–45, Fig. 5).

Regarding the claimed "terminal part," Petitioner contends that "Hebiguchi discloses that terminals are arranged *on all four side portions* of the active matrix substrate panel." Pet. 31 (annotating Ex. 1004, Fig. 5, citing Ex. 1002 ¶ 79) (emphasis added). Therefore, according to Petitioner, that disclosed structure satisfies the recited "terminal part is arranged *on at least first and second side* portions of a surface of said first substrate panel," as recited in claim 5. *Id.* (emphasis altered).

In its Response at one section, Patent Owner does not dispute that Hebiguchi anticipates claim 5 under Petitioner's first alternative claim construction, a construction we adopt as noted above. *See* PO Resp. 44–45 (arguing that the "'control electrode' recited in claim 5 is properly construed as a conductive element, ***other than a*** pixel electrode and ***common electrode***"). As summarized above, Petitioner shows that Hebiguchi's common electrodes perform the recited crystal orientation required under the adopted claim construction. Pet. 26–28 (citing Ex. 1004 ¶¶ 21–23, Fig. 10), 33 (citing Ex. 1002 ¶¶ 81–82; Ex.1004 ¶¶ 44–45, Fig. 5). Patent Owner does not dispute this finding. Rather, Patent Owner *agrees* that "Hebiguchi . . . teaches . . . common and pixel electrodes disposed on the same substrate *for controlling liquid crystal orientation*." PO Resp. 44 (emphasis added).

On the other hand, in another section, arguing that the *combination* of Hebiguchi and Fujikawa fails to show the *obviousness* of claim 5, Patent Owner contends that "Petitioner[] recognized that Hebiguchi fails to teach separate terminals for each row of control electrodes." PO Resp. 47 (Section Heading: "**C. Ground III—The Combination of Hebiguchi and Fujikawa . . .**"). As indicated above, Patent Owner does not make this

argument in addressing anticipation by Hebiguchi, and it is not clear if Patent Owner relies on it for that purpose. *See id.* The argument fails to allege what claim 5 element Hebiguchi does not disclose, for example, control electrodes, separate control terminals, separate terminals for each row, etc. Also, contrary to Patent Owner's argument, the record does not show that Petitioner recognizes the asserted shortcoming in Hebiguchi's disclosure, and Patent Owner does not provide a citation that shows Petitioner admits any alleged shortcoming.[7] *See id.*

In any event, the limitation in claim 5 that may be relevant to Patent Owner's argument recites "wherein a separate control electrode terminal . . . is provided for each of a plurality of rows of said control electrodes." The argument is not persuasive. In the Figure 5 embodiment relied upon by Petitioner (which "build[s] on the teachings of prior art depicted in Figures 6–11," Pet. 22), Hebiguchi discloses 480 switches SW connected at 480 gates G via the 480 control electrode terminals between the switches SW and 480 B_{com} lines. *See* Pet. 24, 32; Ex. 1004, Fig. 5. Each B_{com} line connects to a control electrode terminal (at switches SW) each of which connects to control electrodes in each pixel on the respective row. *See* Pet.

[7] Patent Owner's argument may be premised on the fact that Petitioner alleges an alternative ground based on the combination of Hebiguchi and Fujikawa, and that ground includes Fujikawa's explicit terminal structure to supplement Hebiguchi. *See* Pet. 35–45. In other words, Petitioner apparently advances the obviousness ground based on the combined teachings as a contingency—i.e., in the event that Hebiguchi's alleged control electrode terminal structure does not anticipate claim 5. *See* Pet. 35. Petitioner's claim 5 obviousness challenge also constitutes a necessary vehicle to set up Petitioner's obviousness challenge to claim 6, as claim 6 depends from claim 5, but Petitioner does not allege that Hebiguchi anticipates claim 6. *See id.* at 35, 44–45.

24, 32; Ex. 1004, Fig. 5; Ex. 1002 ¶¶ 69–72. Petitioner points to these control electrode terminals and control electrodes (i.e., respectively common terminals and common electrodes in Hebiguchi), with common electrodes (represented as the upper plate of each "left-hand" capacitor B_{com} in each pixel of a row, Ex. 1002 ¶ 69), and with each common electrode located opposite each pixel electrode of a row. *See* Pet. 24, 26–27, 32; Ex. 1002 ¶¶ 69–72.

As noted in the Claim Construction section above, the parties agree that all LCD devices require at least two electrodes per pixel, in this case common and pixel electrodes. *See* Section II.A.2; Ex. 1004 ¶ 6, Figs. 9–11. Hebiguchi verifies this understanding and supports Petitioner's showing: "Common electrodes 35 that correspond to each pixel . . . connect[ ] to common wires." Ex. 1004 ¶ 18, Figs. 9–11; *see* Pet. 26 ("Hebiguchi's 'common electrodes' satisfy the 'control electrodes' limitation because Hebiguchi's 'common electrodes' are conducting elements, other than the pixel electrodes, that affect that orientation of liquid crystal molecules contained in the LCD device."); Ex. 1002 ¶¶ 69–72 (testimony showing that the control electrodes recited in claim 5 read on Hebiguchi's common electrodes under the first alternative claim construction).

Patent Owner's arguments, either relying on claim construction or lacking a clear explanation, do not rebut Petitioner's showing of anticipation. Based on the foregoing discussion and the record, Petitioner has shown by a preponderance of evidence that Hebiguchi anticipates claim 5.

2. Fujikawa—Claims 5 and 6

Petitioner challenges claims 5 and 6 under the (broader) second alternative claim construction of "control electrode" (Pet. 19–20, 54), which we decline to maintain, as discussed above (*supra* Section II.A.2). We determine that claims 5 and 6 are unpatentable on other grounds, under the (narrower) first alternative claim construction of "control electrode" and also under Patent Owner's proposed construction of that term, as set forth in this Final Written Description. Accordingly, exercising our discretion, we decline to determine if Petitioner has shown by a preponderance of evidence that Fujikawa anticipates claims 5 and 6.

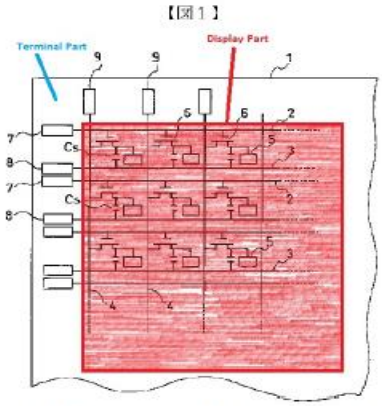
C. Obviousness

1. Hebiguchi in view of Fujikawa—Claims 5 and 6

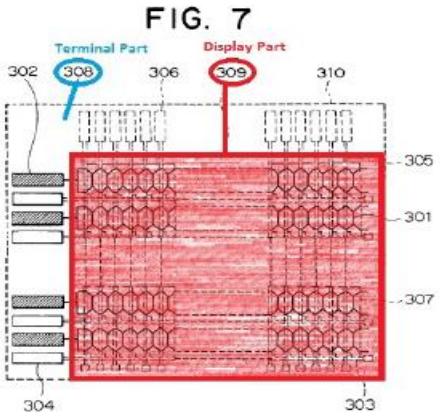
Petitioner contends that the combination of Hebiguchi and Fujikawa would have rendered claims 5 and 6 obvious. Pet. 35–45; Ex. 1002 ¶¶ 86–103. According to Petitioner, "[o]ne of ordinary skill would have found it obvious to replace the switches (SW), capacitors on 'bus lines' (C_{10}), and terminal (COM) disclosed in Hebiguchi's second embodiment with 'additional capacitance common line terminals' 8 disclosed in Fujikawa, and this combination would satisfy each element of claims 5 and 6." Pet. 35 (citing Ex. 1002 ¶ 86), 36 (relying on a side-by-side comparison of annotated versions of Fujikawa's Figure 1 terminal structure and the '352 patent's Figure 7 as reproduced above); *see* annotated Fig. 5 of Hebiguchi reproduced above, and another modified version below.

To illustrate the similarities of Fujikawa's wiring structures with the disclosed invention, Petitioner and Dr. Silzars provide a side-by-side comparison of annotated versions of Fujikawa's Figure 2 and the '352

patent's Figure 1, as follows:



Fujikawa Figure 1 (annotated)

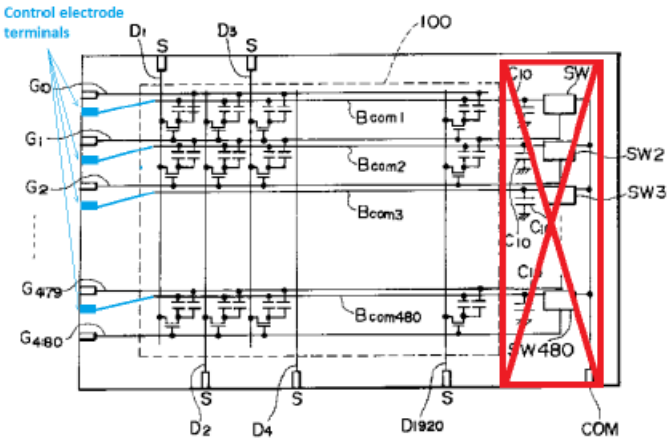


'352 Patent Figure 7 (annotated)

Pet. 36, 56; Ex. 1002 ¶¶ 88, 144–147. The annotated figures above represent Dr. Silzars' side-by-side comparison of Fujikawa and the disclosed invention. *See* Ex. 1002 ¶¶ 88, 144–147. Dr. Silzars persuasively describes the respective terminals around the periphery of active (red) areas of the two disclosed wiring structures as "nearly identical." *See id.*

To illustrate the proposed combination of Hebiguchi as modified by Fujikawa's disclosed terminal structure, Petitioner provides the following annotated figure:

【図5】



The annotated figure above represents Hebiguchi's Figure 5 as modified by Petitioner to represent a removal of Hebiguchi's switch structure on the right-hand side of an active matrix, and a corresponding addition of Fujikawa's terminals 8. *See* Pet. 37–38. According to Petitioner, "[t]he 'plurality of control electrode terminals' in this configuration are the plurality of 'additional capacitance common line terminals' (8) disclosed in Fujikawa connected to the ends of 'bus lines' (B_{com}) [in Hebiguchi] extended out between the gate terminals, as shown here in annotated Figure 5 in blue." Pet. 37 (citing Ex. 1002 ¶ 94). Petitioner also contends "[a]s set forth above, Hebiguchi discloses a terminal part including a gate terminal and said drain terminal that is arranged on at least first and second side portions of a surface of the active matrix substrate panel." Pet. 38 n.9.[8]

According to Petitioner, substituting Fujikawa's terminal configuration in place of Hebiguchi's switching arrangement would have provided a more effective use of the area on the substrate already dedicated

[8] Petitioner's showing with respect to other elements of claim 5 is summarized above in the anticipation challenge based on Hebiguchi. *See also* Pet. 22–35, 36–37.

to Hebiguchi's gate terminals (*see supra* annotated Fig. 5), while also realizing Hebiguchi's benefit of power reduction by providing separate control and gate voltages and applying voltage inversion and synchronization. *See* Pet. 38–41 (citing Ex. 1002 ¶¶ 95–96; Ex. 1004 ¶¶ 41–45, Fig. 5). Petitioner also contends that employing terminals according to Fujikawa would have been simpler than using switches, would have minimized manufacturing defects, and would have required a minimal change to the circuit pattern of Hebiguchi, which already provides similar gate terminal structure on the left-hand side. *See id.* at 40–41 (Ex. 1002 ¶¶ 97–102). Petitioner alternatively contends that it would have been obvious to one of ordinary skill in the art to relocate the switches off the LCD matrix substrate and to use terminals according to Fujikawa's scheme, in order to free space on the matrix substrate. *See id.* at 40 (citing Ex. 1002 ¶ 98). Petitioner adds that Hebiguchi's bus lines and Fujikawa's additional capacitance lines provide similar functionality of storage capacitance vis-à-vis pixel electrodes, with Hebiguchi's capacitors also providing an orientation function. *Id.* at 42 & n.10. Finally, Petitioner adds that "both references teach that these components extend in parallel to, and are kept separate from, the gate lines." *Id.* at 42.

Tracking its claim construction argument with respect to the alleged anticipation challenge of claim 5 based on Hebiguchi, Patent Owner responds that Fujikawa does not cure Hebiguchi's failure to teach or suggest common electrodes. PO Resp. 48–49. For the reasons addressed above, this claim construction argument is not persuasive. In other words, contrary to Patent Owner's argument, the broadest reasonable construction of a control electrode does not exclude Hebiguchi's common electrodes—which as

Petitioner shows and Patent Owner does not dispute, operate materially the same as Ohta's counter electrodes (the prior art applied during prosecution). *See supra* Section II.A.2 (claim construction); PO Resp. 44 (conceding "Hebiguchi . . . teaches . . . common and pixel electrodes disposed on the same substrate *for controlling liquid crystal orientation via creation of a lateral electric field*" (emphasis added)), 49 (relying on claim construction); Pet. 27 (citing Ex. 1002 ¶ 72); Ex. 1003, 88 (Examiner characterizing Ohta's counter electrode CT as having "the same function with [the] control electrode in this invention").

Patent Owner also contends that the proposed combination would frustrate "Moore's law." PO Resp. 49–50 (citing Ex. 2004, 2; Ex. 2005, 1–2; Ex. 2011 ¶¶ 55–56). According to Patent Owner, Moore's law dictates "that higher levels of transistor integration lead to increased device reliability." *Id.* at 50. Therefore, according to Patent Owner, a skilled artisan would not have been "motivated to move the hundreds of switches in Hebiguchi off of the TFT substrate to external circuitry, replace those switches with terminals, and then connect those terminals to the external circuitry on which the switches then reside." *Id.* at 49–50 (responding to Pet. 37–42; Ex. 1002 ¶¶93–103; citing Ex. 2011 ¶ 55).

These arguments presented by Patent Owner are not persuasive. Implementing another location for Hebiguchi's switches (transistors) according to Fujikawa's design during manufacture of the active and driving matrices does not require physically moving existing switches. In other words, Petitioner proposes not forming Hebiguchi's switches on an active matrix and providing terminals at the peripheries of Hebiguchi's active matrix per Fujikawa's design. *See* Pet. 37–42; Ex. 1005, Fig. 9 (showing

terminals 7–9 at the periphery of an active matrix LCD substrate). Under a further modification, Petitioner proposes implementing Hebiguchi's switches SW on a driving substrate instead of on the LCD matrix, as Fujikawa suggests. *See id.* at 40 ("one of ordinary skill would have known that they could have implemented switches separately from (off of) the active matrix substrate and could have connected the switches to the separate terminals at the end of each Hebiguchi 'bus line'") (citing Ex. 1002 ¶ 98); Ex. 1005, Fig. 9 (showing terminals 7–9 at the periphery of an active matrix LCD substrate, and describing or suggesting driving circuitry on another substrate), ¶ 4 (describing terminals 7 and 9 "for inputting" signals, and terminals 8 for common capacitor lines).

Petitioner also responds persuasively that Patent Owner misapplies Moore's law. For example, Petitioner points out that cited Exhibits 2004 and 2005 do not "mention[ ] Moore's Law, by name or implication," and the two cited references each state "[i]n almost every case, integrated electronics has demonstrated high reliability." Pet. Reply 29 (quoting Ex. 2004, 2; citing Ex. 2005, 2 (for its "identical statement"); Ex. 1013 (recognizing "Moore" as predicting "that the number of transistors on a microprocessor would double periodically"); Ex. 1016 (Science dictionary similarly describing "Moore's law"); Ex. 1012 ¶ 46 (testifying "[i]f anything, these articles suggest that more integration leads to reliability concerns")).

To support Patent Owner's arguments, Dr. Watts testifies that skilled artisans would have kept functionality in the display, including "polysilicon" transistor switches and "on board drivers." *See* Ex. 2011 ¶ 56; PO Resp. 55–56 (arguing "additional drivers . . . increase cost," "manufacturing complexity reduction would be negligible," and "reliability loss would be

significant" (PO Resp. 49–40 (citing Ex. 2011 ¶¶ 55–56)). Petitioner responds that "drivers cannot be readily integrated into the TFT process" for most LCD applications. Pet. Reply 30–31 (citing Ex. 1012 ¶ 47).

Supporting Petitioner, Dr. Silzars explains persuasively that in most LCD panels (including larger panels), TFTs for controlling pixels on the display typically were made using inexpensive amorphous silicon. Ex. 1012 ¶ 47; Pet. Reply 30 (citing Ex. 1012 ¶ 47). According to Dr. Silzars, amorphous silicon "is inadequate for other circuitry such as the drivers that provide the input signals to the gate and data lines." Ex. 1012 ¶ 47. Dr. Silzars also testifies that one trend involved reducing the width of the peripheral region in active displays, and as a result, an industry-wide trend to higher levels of integration onto LCD panels did not exist. *Id.* ¶ 48. Responding to related testimony by Dr. Watts regarding the additional cost of external drive circuits, Dr. Silzars testifies that the cost of the glass (amorphous silicon) for LCD panels typically exceeded and rendered negligible the cost of drivers and other circuitry. *Id.* ¶ 49 (addressing Ex. 2011 ¶ 59).

Dr. Watts also testifies that relative to TFTs on each pixel, skilled artisans would have recognized that row switches "only add .05 % more transistors" and moving these switches off board would have rendered "complexity reduction . . . negligible and the reliability loss . . . significant." Ex. 2011 ¶¶ 57–58. Dr. Watts, however, does not address how implementing merely 0.05% switches (transistors) off board would have had much effect on total system reliability, i.e., the modified system would keep that minute amount (0.05%) of the switches (with the drivers), albeit off board, with the large remainder of switches remaining on board.

In addition, as indicated above, Fujiyama does not support Dr. Watts's testimony, but instead supports Dr. Silzars' testimony, because Fujiyama's embodiments include standard LCD panels devoid of driver and other circuitry. Therefore, Fujiyama constitutes evidence that skilled artisans would have considered off board drivers and other functionality for driving the relied-upon terminals located at the periphery of the active matrix display to be beneficial. *See* Ex. 1005, Figs. 1, 9 (showing terminals 7–9 at the periphery of an active matrix LCD substrate, and describing or suggesting driving circuitry on another substrate), ¶ 4 (describing terminals 7 and 9 "for inputting" signals, and terminals 8 for common capacitor lines); Pet. 35–39; Ex. 1012 ¶ 54 ("as the Board noted Fujikawa indicates that the provision of extra drivers and/or synchronization could be carried out without undue complications or costs"). Similarly, even Hebiguchi's Figure 5 on board switch embodiment shows an LCD substrate devoid of driver circuitry (i.e., implying off board drivers), and Hebiguchi's Figure 1 embodiment shows an LCD substrate devoid of switches and driver circuitry (i.e., implying off board drivers and switches), which further supports Dr. Silzars' testimony and the proposed combination. *See* Ex. 1004, Fig. 1, Fig. 5.[9]

[9] In Observation 10, Patent Owner contends that Dr. Silzars' deposition testimony shows that a certain subset of his Reply Declaration paragraphs (i.e. "Ex. 1012 at paragraphs 43–55, and paragraph 47 in particular") is premised on the wrong time frame, i.e., "the last number of years" and "current manufacturing," instead of prior to the "time of the invention"—"June of 1999"). Paper 22, 7 (Observation 10). Patent Owner's reliance on the deposition statement fails to show that Dr. Silzars based his Reply Declaration testimony on the wrong time frame. *See* Ex. 1012 ¶ 47 (relying

Patent Owner also argues that the proposed combination that involves not using Hebiguchi's switches would frustrate Hebiguchi's purpose by "strip[ping] Hebiguchi of one of its inventive concepts, which is the use of simple switches to apply the common voltage one row at a time under the control of the gate lines." PO Resp. 48. Patent Owner explains further that removing Hebiguchi's switches would "ignore[] one of the primary goals of Hebiguchi, which is to reduce power consumption" or "another method for reducing power consumption would be required." *Id.* at 50–51. According to Patent Owner, "[w]hile a functionality could be built into the driver of these new terminals [i.e., Fujikawa's separate terminals], it could not be accomplished without synchronization with the gate driver. This is a much more complex arrangement than the simple switches that are activated directly by the associated gate lines." *Id.* at 51.

These arguments presented by Patent Owner are not persuasive for several reasons. First, Hebiguchi's system primarily serves to "drive[ ] liquid crystal molecules to implement a display. . . [and] to generate an electric potential that is substantially parallel to the transparent substrate in cooperation with the pixel electrodes." Ex. 1004 ¶ 28. Using Fujikawa's terminals does not frustrate that primary purpose because Fujikawa discloses driving the terminals. Ex. 1005 ¶ 4. Second, claims 5 and 6 do not require

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partly on "the Moore articles cited" and responding to Dr. Watts's testimony about "the decades long, industry-wide trend" (citing Ex. 2011 ¶ 7)). Furthermore, as noted, Fujiyama and Hebiguchi support the thrust of the testimony, because they relate to the correct time frame and show standard active matrices without drivers. *See also* Paper 24, 7 (Petitioner explaining that in context, Dr. Silzars' testimony shows that "the point is that even at the time of the invention what Dr. Watts is suggesting [integrating drivers on amorphous silicon] was not practical nor practiced").

any type of driving mechanism or switches, so the breadth of the claims includes obvious features that Fujikawa suggests—namely, a terminal structure driven by conventional means. *See id.* Third, skilled artisans would have recognized that Hebiguchi provides advantageous driving means for power savings as Patent Owner's arguments imply, but Fujikawa suggests that typical (i.e., off board) driving means suffice when power is not a concern. *See id.*

Fourth, even if "one of the primary goals of Hebiguchi" involves saving power (PO Resp. 51), Patent Owner's arguments turn on "removing the switches SW" (*id.*) and do not apply to implementing Hebiguchi's switches off board. Pet. Reply 32. That is, implementing switches off board would not have required increased power, because Hebiguchi's disclosed switches and circuitry would still be employed in the proposed modification. *See* Pet. Reply 32 (citing Ex. 1012 ¶¶ 54–56); Ex. 1012 ¶¶ 52–55. As Petitioner also argues, Patent Owner does not provide sufficient or credible evidence that extra driver circuitry and increased synchronization would have been required in a design of a circuit based on relocated switches. *See* Pet. Reply 32 (arguing Patent Owner provides "attorney argument" "without evidentiary support"); PO Resp. 50–52 (agreeing "*functionality could be built into the driver of these new terminals*" (emphasis added)).

Furthermore, as indicated above, even if extra driver and other synchronization circuitry would have been required to implement the terminal arrangement of Fujikawa, by disclosing its standard terminal arrangement, Fujikawa suggests to ordinarily skilled artisans that it could have been implemented without unnecessary complications or costs. *See* Pet. Reply 32; Ex. 1012 ¶¶ 43–55; Ex. 1004 ¶ 4. Dr. Silzars also testifies

that little or no additional cost or complexity would have been required to implement such a design and other benefits would have accrued (e.g., driving flexibility and space saving). Ex. 1012 ¶¶ 53–55.

Additional reasons exist to support obviousness. As also indicated above with respect to the side-by-side comparison of respective figures in Fujikawa and the '352 patent, the respective terminal arrangements are similar, and the '352 patent does not disclose any special circuitry beyond what Fujikawa or other prior art references of record disclose as necessary to implement the known terminal arrangement. Petitioner also argues that additional benefits resulting from Fujikawa's suggested separate terminal arrangement involve "better use of substrate space" (with gate terminals already located on one side of Hebiguchi's LCD substrate), and the increased flexibility of separate terminals for each B_{com} line would allow a designer to implement "polarity inversion from row to row." *See* Pet. 39–42 (citing Ex. 1002 ¶¶ 96–102; Ex. 1004 ¶¶ 44, 46); Ex. 1012 ¶ 55; Pet. Reply 28. Patent Owner does not challenge these benefits. The record supports these reasons and other reasons noted (for example, extra capacitance in each reference provides similar functionality of additional charge storage on pixel electrodes) for making the combination proposed by Petitioner. *See* Pet. 38–43; Ex. 1002 ¶¶ 96–103; Ex. 1004 ¶¶ 11–17, 28, 43–50, Abstract; Ex. 1005 ¶¶ 28–29, Figs. 1–3, Abstract; Ex. 1012 ¶¶ 53–55.

Similar to its showing for claim 5, Petitioner makes detailed showings outlining how the combination of Hebiguchi and Fujikawa would have rendered claim 6 obvious. Pet. 44–45 (citing Ex. 1004 ¶¶ 17–18, 30–31; Ex. 1005 ¶¶ 43–46; Figs. 9, 11; Ex. 1002 ¶ 110–112). Claim 6 requires the control electrode terminals to be on the same layer as "the gate wiring and/or

terminal." Fujikawa discloses each terminal, including gate terminal 7 and capacitance (i.e., asserted control) terminal 8, as being formed with tantalum 22 and with "the same structure." *See* Ex. 1005 ¶¶ 43–44; Pet. 44–45, 59 (citing Ex. 1002 ¶¶ 153–54; Ex. 1005 ¶¶ 43–44); Inst Dec. 18 (addressing claim 6). Petitioner contends that Fujikawa's process would have required minor modifications to the photolithography pattern, simplified the manufacturing process, and rendered defects less likely. Pet. 40–41. Petitioner points to additional teachings in Hebiguchi and Fujikawa that suggest the claimed combination, reasoning that the similar structures suggest Fujikawa's technique. *See* Pet. 44–45.

Fujikawa supports Petitioner's showing in this regard. That is, Fujikawa discloses that creating the same structure for the gate, source, and common terminals, thereby suggesting providing terminals on the same layer, would have standardized the manufacturing process and/or rendered it more efficient. *See* Ex. 1005 ¶¶ 19–24 (overcoming problems), 56 (effect of the invention: "shorten the manufacturing time" and "greatly reduce costs"). More efficiency and reduced cost constitute "implicit motivation." *DyStar Textilfarben GmbH & Co. Deutschland KG v. C.H. Patrick Co.*, 464 F.3d 1356, 1367 (Fed. Cir. 2006) ("Indeed, we have repeatedly held that 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.").

A final review of the record supports Petitioner's showing with respect to claims 5 and 6. With further respect to claim 6, Patent Owner

relies on its arguments presented with respect to claim 5 and does not contest Petitioner's showing. *See* PO Resp. 45; Paper 8, 3 (informing Patent Owner that "any arguments for patentability not raised in the [R]esponse will be deemed waived").

Based on a review of the record, Petitioner has established that the combination of Hebiguchi and Fujikawa would have rendered claims 5 and 6 obvious.

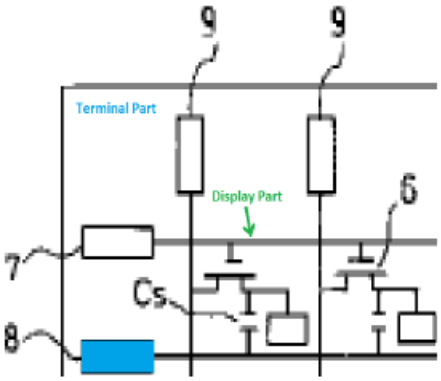
2. Koma in view of Fujikawa—Claims 5 and 6

Petitioner notes that the '352 patent discusses Koma as background prior art. Pet. 46 & n.11; Ex. 1001, 2:32–33 (citing Koma as "the U.S. counterpart of Japanese Laid-open Patent Publication No. Hei-7-199190"). Petitioner shows that prior art Figure 3 of the '352 patent is similar in material respects to Koma's Figure 3. *Id.* at 46 (citing Ex. 1001, 2:27–3:5; Ex. 1002 ¶ 114); *compare* Ex. 1001, Fig. 3, *with* Ex. 1006, Fig. 3.

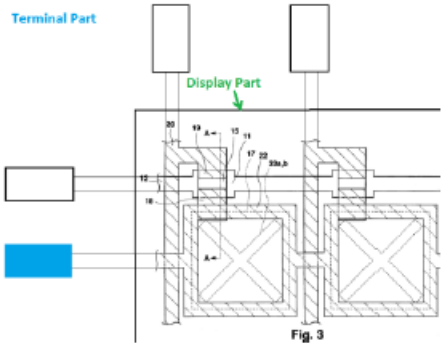
Given that the '352 patent "comprise[s] the technology already disclosed," including the prior art structure of Koma discussed above (*see* Ex. 1001, 5:5), Petitioner contends that, with the exception of the specific terminal locations as recited with respect to "terminal part" in claim 5, Koma's Figure 8 (second embodiment) and accompanying description, which includes aspects of Figure 3, disclose all of the limitations of claim 5—even under Patent Owner's proposed claim construction in this proceeding. *See* Pet. 45–48 (citing Ex. 1002 ¶¶ 115–117, 125–127; Ex. 1006, 1:24–31, 3:19–24, 8:1–33, 42–56); *supra* Section II.A.2. Petitioner explains that, because Koma does not specify the terminal arrangement with respect to its disclosed embodiments, one of ordinary skill in the art would have understood that Koma's disclosed LCD structure

would have benefitted from a terminal arrangement like that of Fujikawa's similar display, for the simple purpose of providing respective voltages to the various display electrodes. *See* Pet. 48–53 (citations omitted).

To illustrate the proposed combination, Petitioner provides side-by-side annotations of Fujikawa's Figure 1 and Koma's Figure 3, as follows:



Fujikawa Figure 1
(Upper left corner, annotated)



Koma Figure 3
(annotated)

Pet. 49. These annotated versions of Fujikawa's Figure 1 and Koma's Figure 3 pictorially represent Petitioner's proposed modification of extending Koma's existing control electrode 22 lines, gate electrode lines 12, and drain lines 20, respectively, to gate terminals 7, control/common terminals 8, and source/drain terminals 9, as suggested by Fujikawa's similar terminal layout structure depicted in Fujikawa's Figure 1. *See* Pet. 46–49, 52–53 (citing Ex. 1002 ¶¶ 125, 130–132; Ex. 1006, Fig. 3).

Petitioner provides several additional reasons to support its proposed modification. For example, Petitioner contends that Koma's second embodiment (*see* Ex. 1006, Figs. 3 and 8) requires independent voltages on separate terminals, and that combining Fujikawa's terminal teachings to extend terminals to a circuit board side with Koma's structure would have allowed for voltages on control electrodes 22 to be independent of voltages

imposed on other electrodes, including Koma's pixel and common electrodes. *See* Pet. 49–50 (citing Ex. 1002 ¶ 126); Ex. 1006, 8:9–19 (Koma's second embodiment employs a larger potential difference between common 32 and control electrodes 22 as compared to the potential difference between pixel/display 17 and common 22 electrodes.).[10]

Similar to its contentions regarding Hebiguchi, Petitioner adds that Fujikawa's capacitance lines connected to terminals 8 "would have been applicable to Koma's rows of 'control electrodes'" 22 to provide overlapping functionality: "[T]hey both create capacitance vis-à-vis pixel electrodes (to store video signals provided to a pixel for an extended period of time after the TFT that supplies the video signal to the pixel is turned off)." Pet. 51 (citing Ex. 1002 ¶ 119; Ex. 1005 ¶¶ 28–29 ("additional capacitance common line terminal 8"); Ex. 1006, 7:52–55 (control electrode 22 provides "substorage capacitance" with respect to pixel/display electrode 17)). Petitioner also contends that Koma and Fujikawa "both . . . teach that [conductor line] components extend in parallel to, and separate from, the gate lines." *Id.* (citing Ex. 1002 ¶ 119; Ex 1005 ¶¶ 28–29, Figs. 1–3; Ex. 1006, 5:31–35, 8:1–3). Petitioner explains further that locating control electrode terminals (8) near gate terminals (7), as Fujikawa and Koma each suggest, would have allowed a simpler manufacturing process by, *inter alia*, using the same process to provide different terminals at one central location,

[10] Claim 5 does not require a common terminal; consequently, the parties do not address specifically connecting Koma's disclosed common electrodes to a terminal. Koma discloses terminal connections for at least some electrodes. *See* Ex. 1006, 6:33–38 (describing a first embodiment including a silver paste connection to an input terminal connected to corners of the LCD substrate).

thereby beneficially also saving space—i.e., by locating gate and control terminals together in space occupied by gate terminals on one side of the LCD. *See id*. at 50–51 (citing Ex. 1002 ¶ 128; Ex. 1005 ¶¶ 43–46, Fig. 7). Finally, citing Hebiguchi as relevant background knowledge to skilled artisans, Petitioner contends that "[o]ne of ordinary skill would have understood that in this [row-by-row separate terminal] configuration [suggested by Fujikawa] the voltage provided to each row of control electrodes could, for example, be optimized for row-by-row polarity inversion driving schemes, as discussed in Hebiguchi." Pet. 50 (citing Ex. 1004 ¶¶ 40–45), Fig. 5; Ex. 1002 ¶ 127).

Specifically addressing claim 5, Patent Owner contends that the combination would not have been obvious, because "Petitioner's arguments directly contradict the explicit teachings of Koma." PO Resp. 54. According to Patent Owner, in line with "the spirit of" Koma's first embodiment, a skilled artisan seeking to implement terminals in Koma's second embodiment (*see* Ex. 1006, Fig. 8) should "attempt to avoid the need for a driver circuit, which would drive up manufacturing complexity and cost." *Id.* at 55 (citing Ex. 1006, 7:36–39). According further to Patent Owner, a simple and obvious way to avoid an additional driver circuit would have been to connect Koma's single control electrode terminal "to an already supplied voltage source, similar to the common electrode connection in the first embodiment. One obvious candidate is the gate voltage, particularly since the gate lines run closely near the orientation control electrode lines." *Id.* (citing Ex. 1006, Fig. 3). Patent Owner adds that "the elimination of a driver" means "[s]etting a voltage at a constant fixed value," because this "is what eliminates the need for a driver." *Id.* at 54 (Ex. 2011

¶ 78). Patent Owner also contends that implementing Fujikawa's separate terminals unnecessarily would increase the size, cost, and number of integrated circuit pins of Koma's LCD display device. *Id.* at 55. With respect to claim 6, Patent Owner relies on its arguments presented with respect to claim 5 and does not present any separate argument. *Id.* at 56.

The "wherein" clause of claim 5 requires "a separate control electrode terminal" to be "independent of said gate wiring." *See supra* Section II.A.1. By stressing "elimination of a driver," the premise of Patent Owner's arguments (as Patent Owner verified during the Oral Hearing) is that connecting Koma's control and gate electrodes together to form a single terminal (so as to be driven by a single gate driver) would result in the combination not satisfying the last clause of claim 5 (the "wherein" clause). *See* Tr. 62:8–11 (Patent Owner arguing that in order to meet claim 5, "you can't . . . have a driver that is driving the gate lines and *you tie the control electrode into the gate lines physically on the display*") (emphasis added); Tr. 62:12–16 (JUDGE EASTHOM: Well, that will not satisfy your claim. I understand that. But you're saying that that's what you would do if you had one driver. Is that what your argument is? MR. ETTELMAN: Yes); Tr. 73:10–15 (similar).

Stated differently, viewed in light of Patent Owner's arguments during Oral Hearing, Patent Owner appears to contend that keeping with the spirit of Koma's first embodiment (which allegedly connects a control electrode to a common electrode physically on board the LCD matrix and eliminates a driver) also requires, in the context of Koma's second embodiment, physically connecting Koma's control and gate electrodes (and/or terminals) together on the LCD matrix as one terminal to be driven by a single driver.

See PO Resp. 53–56. These arguments imply claim 5 requires a single driver or somehow precludes multiple drivers. To the contrary, claim 5 neither requires a single driver nor precludes any greater number of drivers. These arguments also incorrectly imply that the only way to use a single driver is to connect control and gate terminals together physically on the LCD substrate before connecting a single driver. Patent Owner provides no evidence that claim 5 requires this type of connection and, at best, obliquely makes these arguments through a clarification during the Oral Hearing.

Nevertheless, as Petitioner stresses, claim 5 relies on LCD terminal structure to distinguish the prior art. *See* Pet. Reply 10 (characterizing the Specification as describing the invention as "in particular a drawn out terminal structure" (quoting Ex. 1001, 5:12–17)); *supra* Section II.A.2 (Claim Construction). Unchallenged claim 8, which depends from claim 5, further shows that claim 5 does not require a driver, let alone independent drivers: Claim 8 recites "*wherein a voltage* independent from . . . the gate terminal . . . *is applied* to said control electrode terminals at the time of manufacture . . . and/or at the time of *driving*." Ex. 1001, 10:22–27 (emphasis added).[11] Even if Koma teaches driving an LCD gate (and eliminates *a control electrode driver*) *in the first* embodiment (*see* Ex. 1006, 7:35–42), Koma does not discuss terminal structure for driving the gate and control electrodes *in the second* embodiment. *See* Ex. 1006, 6:33–38 (describing the first embodiment without discussing gate control, stating "the same signal as the common electrode is input" to the control

[11] Because claim 8 is a product claim, it cannot require a process step of driving, unless it implies a product-by-process step (which orients the crystals during manufacturing).

electrodes), 8:9–23 (describing the second embodiment without discussing gate control or terminals).

Regarding Patent Owner's reading of a suggestion or mandate in Koma for a non-varying voltage connection "applied to the orientation control electrodes" in the first embodiment, this obfuscates or contradicts Patent Owner's other argument that "an obvious candidate" for supplying Koma's control electrodes in the second embodiment would be "an already supplied voltage source"—namely, the "gate voltage." *Compare* PO Resp. 55 ("gate [driver] voltage" as an "obvious candidate"), *with id.* at 54 ("Setting a voltage at a constant fixed value is what eliminates the need for a driver."). In other words, Patent Owner does not characterize the "already supplied [gate] voltage source" as a fixed DC voltage. *See id.* at 55. In any event, Dr. Silzars verifies that a driver supplies a time-varying voltage. *See* Ex. 1012 ¶ 63 (stating "a 'driver' circuit is needed. In an LCD (other than a common terminal), all voltages that are applied to the display will vary in time."); *see also* Pet. Reply 35 (citing Ex. 1012 ¶¶ 61–66); Ex. 1012 ¶ 60 (applying constant/non-time varying voltages would result in "the liquid crystal molecules . . . not return[ing] to their quiescent state"——a known "image sticking" or "image retention" problem known to be "solved by periodically inverting the voltages that are applied to the rows and columns").

Furthermore, tracking Dr. Silzars' testimony, as indicated above, even Koma's first embodiment employs a driver, and in line with Dr. Silzars' testimony, Koma implies that drivers also typically drive prior art *control electrodes*. *See* Ex. 1006, 7:35–38 ("To *drive* the liquid crystal display in the embodiment, the orientation control electrode 22 is electrically

connected to the common electrodes 32, thereby eliminating the need *for the driver circuit for the orientation control electrode* 22." (emphasis added)). Therefore, Koma, and Patent Owner's argument that the "obvious candidate" for a control terminal voltage "is the gate voltage" (PO Resp. 55), support Petitioner's assertion and Dr. Silzars' testimony that Patent Owner and Dr. Watts mischaracterize Koma as requiring a fixed (DC—"non-time varying") voltage connection at gate and control electrodes in order to eliminate a driver. *See* Pet. Reply 35 (citing Ex. 1012 ¶¶ 61–66); PO Resp. 54 ("To be clear, the elimination of a driver as explicitly taught by Koma signifies a singular, fixed voltage applied to the orientation control electrodes."); Ex. 2011 ¶ 78.

Although Patent Owner shifts focus away from the terminal structure that claim 5 requires by attempting to read in single driver or DC voltage limitations, Koma simply does not describe physically connecting the control and gate lines together with respect to either the first or the second embodiment of Koma (i.e., the only two embodiments at issue as discussed by the parties). In the first embodiment of Koma, as indicated above, the "control electrode . . . electrically connect[s] to the common electrodes 32, thereby eliminating the need for the driver circuit for the orientation control electrode." Ex. 1006, 7:35–41. On the other hand, in the second embodiment of Koma, Koma does not describe eliminating a driver or specify how many drivers drive gate and/or control electrode terminals. *See* Ex. 1006, 6:33–39, 8:1–25. Unlike Koma's first embodiment, Koma's second embodiment teaches keeping the potential between control electrode 22 and common electrode 23 higher than the potential between the pixel electrode 17 and common electrode 23. Ex. 1006, 8:1–23.

Therefore, even if the driver arguments pertain to suggested terminal structure disclosed by Koma, Koma suggests the capability of using a driver for the gate electrode and another driver for the control electrode—where as noted above, Koma indicates that, with respect to eliminating a prior art control driver in the first embodiment, the prior art typically employed a control driver. *See* Ex. 1006, 7:35–38; Ex. 1012 ¶¶ 60–63 (describing drivers as known to be "needed" in LCD devices for image quality via periodic inversion, with "all voltages" time varying in order to avoid image sticking, and disagreeing with Dr. Watts's "assump[tion] that voltages will be held constant or that the control electrode can be held at a constant voltage").

Therefore, as discussed above, a natural reading of Koma suggests that, by explicitly disclosing the elimination of a driver as a feature for the first embodiment, Koma implies that its second embodiment does not require that feature. Patent Owner's arguments, at best, may show that Koma's first embodiment suggests *the alternative* of not using an additional driver with respect to the second embodiment. *See* PO Resp. 56 (citing Ex. 2011 ¶¶ 79–80). Contrary to any such showing, our reviewing court noted that "[it] has . . . explained that just because *better alternatives* exist in the prior art does not mean that an inferior combination is inapt for obviousness purposes." *In re Mouttet*, 686 F.3d 1322, 1334 (Fed. Cir. 2012) (citing *In re Gurley*, 27 F.3d 551, 553 (Fed. Cir. 1994)) (emphasis added).

Teaching that a driver in Koma's first embodiment "can be eliminated" (PO Resp. 56) fails to rebut Petitioner's showing of obviousness with respect to Koma's second embodiment, where Petitioner advances multiple persuasive reasons for employing Fujikawa's terminal structure in

that second embodiment. Patent Owner implicitly sets up a teaching away argument without satisfying the requirements for it. For example, Patent Owner argues that "elimination of a driver for the control electrodes is a significant advantage *that one of ordinary skill in the art would not concede*." PO Resp. 54 (citing Ex. 2011 ¶¶ 62–80) (emphasis added). This argument reduces to the tenuous assertion that skilled artisans only would have pursued advantageous driver elimination teachings per Koma's first embodiment, and would have been led away from pursuing the second embodiment as an LCD device capable of being driven by one or more drivers. Patent Owner's arguments unpersuasively constrain Koma's teachings relative to the second embodiment by unduly limiting it to be driven by a single driver connected to a single terminal.

In addition, as indicated above, claims 5 and 6 do not specify how many (unclaimed) drivers must drive the claimed LCD device, so the thrust of Patent Owner's arguments is not commensurate in scope with the claims. Furthermore, even if the arguments relate to the obviousness inquiry, Koma does not teach away from using independent terminals, let alone teach away from using multiple drivers because, as noted above, the second embodiment does not even mention terminals or drivers (or a number thereof). "A reference teaches away 'when a person of ordinary skill, upon reading the reference, would be discouraged from following the path *set out in the reference*, or would be led in a direction divergent from the path that was taken' *in the claim*." *Meiresonne v. Google, Inc.*, 849 F.3d 1379, 1382 (Fed. Cir. 2017) (quoting *Galderma Labs., L.P. v. Tolmar, Inc.*, 737 F.3d 731, 738 (Fed. Cir. 2013)) (emphasis added). Using two drivers and Fujikawa's independent terminal structure do not "diverg[e] from the path set out" in

Koma's description of its second embodiment or "taken in the claim," *see id.*, because Koma's second embodiment, like claim 5, is silent about the number of drivers, and at least suggests independent terminals. "A reference that 'merely expresses a general preference for an alternative invention but does not criticize, discredit, or otherwise discourage investigation into' the claimed invention does not teach away." *Id.* at 1383 (quoting *Galderma Labs*, 737 F.3d at 738) ("Finseth does not say or imply that text descriptions are 'unreliable,' 'misleading,' 'wrong,' or 'inaccurate,' which might lead one of ordinary skill in the art to discard text descriptions completely."). The "mere disclosure of alternative designs does not teach away." *In re Fulton*, 391 F.3d 1195, 1201 (Fed. Cir. 2004).

On the other hand, Petitioner provides persuasive evidence that drivers easily could have been implemented in a cost effective manner to provide multiple benefits as suggested using Fujikawa's separate independent terminals in Koma's second embodiment. *See* Pet. Reply 36 (citing Ex. 1012 ¶ 69); Ex. 1012 ¶¶ 66–67 (addressing Patent Owner's arguments, testifying that "[t]he addition of a driver circuit is a trivial matter both in terms of cost and added complexity"), 69 (testifying that benefits in flexibility of Fujikawa's structure, including row inversion and other driving schemes, would outweigh any costs).

Under analogous facts, *In re Urbanski*, 809 F.3d 1327 (Fed. Cir. 2016) reasons that foregoing one benefit in a claim that does not even require the benefit (e.g., an alleged single driver), in order to pursue another benefit (flexibility and/or standardization of terminal structure as suggested by Fujikawa), constitutes a proper motivation:

> As the Board properly found, one of ordinary skill would have been motivated to pursue the desirable properties taught by Wong, even if that meant foregoing the benefit taught by Gross. And Urbanski's claims do not require Gross's benefit that is arguably lost by combination with Wong. The Board therefore did not err in rejecting Urbanski's inoperability argument.
>
> . . . .
>
> Although Gross generally discloses a relatively longer reaction time that results in fiber capable of forming stable dispersions, Gross does not criticize or discredit the use of a shorter reaction time.

Id. at 1244.

Furthermore, the combination does not even "mean[ ] foregoing the benefit taught by" Koma (i.e., elimination of a driver). *See id.* That is, even if Koma suggests a benefit of using a single driver for both embodiments (i.e., by eliminating a driver and using a gate driver for example), Koma does not disclose or suggest that this necessitates connecting a gate electrode terminal to a control electrode terminal on the "first substrate panel" of the LCD device in a manner that precludes driving independent terminals with a single driver.[12] As a primary example mentioned in the Institution Decision, the '352 patent discloses using one gate driver *without connecting the gate and control lines together*. *See* Inst. Dec. 24 (citing Ex. 1001, 4:26–30 (describing the "possible" use of one driver without connecting the gate and control electrodes "on the same side" together—i.e., to drive the gate and

[12] As quoted below and otherwise, *Urbanski* treats "inoperability" arguments as related to teaching away arguments. *See, e.g.*, *Urbanski*, 809 F.3d at 1243–44 (discussing *In re Gordon*, 733 F.2d 900, 902 (Fed. Cir. 1984)). The record shows that *Koma's* LCD device in the second embodiment would not have been rendered inoperable for its intended purpose of providing LCD control by using two or more drivers.

control electrodes "when using a driver which has the output for the gate electrode and the output for the control electrode together")).[13] During the Oral Hearing, Patent Owner verified two independent electrode terminals (which claim 5 requires) need not be connected together physically on the LCD active substrate (which claim 5 precludes) prior to connecting the driver in order to employ a single driver to drive the two independent terminals. *See* Tr. 63:3–13 (Patent Owner candidly explaining that "if you had a display with independent control electrode terminals as claimed, then, yes, you could drive it with one specialized driver that controls both separately or you could have two drivers on the board").

Therefore, contrary to Patent Owner's arguments, implementing Fujikawa's scheme would not have been contrary to any express or implied teaching in Koma relative to the second embodiment. *See* Pet. Reply 34–35 (arguing extra drivers would be trivial and that the combination of Koma and Fujikawa suggests a driver to overcome image sticking). Rather, Fujikawa's terminal scheme could have been implemented using one or

[13] As noted above, the parties agree with the construction of the "wherein" clause recited in claim 5: "wherein a separate control electrode terminal, in a condition independent of said gate wiring, is provided," which we construed to mean "unconnected control electrode terminal and gate wiring such that a DC voltage applied to the control electrode terminal does not appear *inherently* on the gate wiring and vice versa." Inst. Dec. 9 (emphasis added). This construction, as the Specification shows, does not preclude a single gate driver (or multiple drivers) capable of driving separate control electrode terminals and gate electrode terminals on Koma's LCD substrate as Fujikawa suggests, provided the gate and control terminals remain independent prior to any driver connection. *See* Ex. 1001, 4:26–30. Claim 5 tracks the Specification (*see id.*) but it does not require any specific number of drivers.

more drivers as a trivial matter in terms of cost and complexity, without physically connecting the control and gate terminals together on the LCD panel, which would have created more flexibility by keeping the driven terminals separate, as Fujikawa suggests and as Petitioner argues. *See* Pet. Reply 34–36 (arguing separate terminals as Fujikawa suggests provides flexibility, including various driving schemes, such as row inversion to enhance image quality); Ex. 1012 ¶¶ 60–70 (testimony supporting the argument); Ex. 1005 ¶ 4 (describing separate gate 7, capacitance common 8, and source 9, terminals "[a]t a periphery of an active matrix substrate" for "inputting" different signals).

Even assuming an additional driver (which claim 5 does not preclude) may add cost relative to a single driver (as asserted by Patent Owner), "[t]hat a given combination would not be made by businessmen for economic reasons does not mean that persons skilled in the art would not make the combination because of some technological incompatibility. Only the latter fact would be relevant." *In re Farrenkopf*, 713 F.2d 714, 718 (Fed. Cir. 1983) (citing *Orthopedic Equip. Co. v. United States*, 702 F.2d 1005, 1013 (Fed. Cir. 1983)); *see also Muniauction, Inc. v. Thomson Corp.*, 532 F.3d 1318, 1328 (Fed. Cir. 2008) ("market forced skepticism also lacks the requisite nexus to the claimed invention" and therefore does not show non-obviousness).

Petitioner persuasively notes that Patent Owner does not dispute "a number of rationales" in the Petition proffered to support modifying Koma's second embodiment according to suggestions per Fujikawa's terminal scheme. *See* Pet. Reply 33–34 (listing reasons). As one simple example mentioned above, Petitioner notes that the "[c]ombination would place the

control electrode terminals on the same side of the display as the gate terminals, thus not taking up any extra space." Pet. Reply 34 (citing Pet. 50–52). In other words, placing control terminals between existing gate terminals, where the control lines in Koma extend similarly (i.e., parallel to and separate from gate lines) to those of Fujikawa on one side of a substrate saves display space. *See id.* (citing Pet. 51). Petitioner also notes that Fujikawa teaches making the terminals the same way, thereby minimizing manufacturing complexity. *Id.* (citing Pet. 51). Petitioner adds that Koma's second embodiment requires the control electrode voltages to be independent of other electrodes. *Id.* Petitioner also contends that the combination would allow for independent voltage application to separate rows as both Koma and Fujikawa suggest, for various driving schemes. *See id.* Petitioner points out that "Fujikawa's capacitance line terminals 8 and Koma's control electrodes 22 both function to create capacitance

vis-à-vis pixel electrodes"—i.e., suggesting adding Fujikawa's terminal 8 structure to Koma's control electrode lines in order to provide a mechanism to enhance capacitor-type control by supplying a terminal to connect to the capacitors. *Id.* at 34 (citing Pet. 51); Ex. 1005 ¶ 4. The record, including original citations provided in the Petition, shows requisite support for these reasons. *See* Pet. 49–53 (citations to Koma, Fujikawa, and the Silzars Declaration omitted).

Petitioner persuasively establishes that the proposed modification would have involved, at most, providing or rearranging a terminal layout structure in Koma based on Fujikawa's terminal structure with multiple benefits or reasons for doing so. Contrary to Patent Owner's arguments, the simple modification would not have required overly complicated driver

circuitry or cost that would have outweighed the benefits advanced by Petitioner, including providing a simple manufacturing terminal arrangement to create terminals in the same way near the same place, in order to provide separate voltages for the terminals, as Fujikawa suggests. Koma at least suggests that voltage independence and control would have been worth at least some additional cost, in order to provide the desired voltages to operate the display device and also to provide the desired orientation control. *See* Ex. 1006, 3:19–24, 3:58–63.

In summary, Fujikawa's terminal structure would have suggested adding terminals to, or relocating terminals of, Koma's existing electrodes in order to provide a natural place at the periphery of the LCD substrate for driving the terminals using different driving schemes, where Fujikawa explicitly teaches using such terminals for driving electrodes. *See* Ex. 1005 ¶ 4. To address the question of obviousness via an improvement to Koma's structure, "a court must ask whether the improvement is more than the predictable use of prior art elements according to their established functions." *KSR*, 550 U.S. at 417. For the reasons discussed above, we answer this question in the negative.

Petitioner sets forth evidence and argument showing that claim 6 would have been rendered obvious by the combined teachings of Koma and Fujikawa. *See* Pet. 53–54. We agree with and adopt Petitioner's showing. *Id.* One of the reasons advanced for modifying Koma relative to claim 5 pertains particularly to claim 6, which requires terminals to be formed on the same layer: Forming each of the terminals the same way as Fujikawa teaches "would be beneficial because it would minimize manufacturing complexity." Pet. 51 (citing Ex. 1005 ¶¶ 43–46; Ex. 1002 ¶ 128). As

indicated above, Patent Owner does not contest Petitioner's showing with respect to claim 6. For the foregoing reasons, Petitioner has established by a preponderance of evidence that the combination of Koma and Fujikawa would have rendered claims 5 and 6 obvious.

III. MOTION TO EXCLUDE

Patent Owner moves to exclude Exhibits 1002, 1008, 1009, and 1015. Paper 21 ("Motion"). Petitioner opposes the Motion. Paper 23 ("Opposition" or "Opp."). Patent Owner replies to the Opposition. Paper 25. As movant, Patent Owner has the burden of proof to establish that it is entitled to the requested relief. *See* 37 C.F.R. § 42.20(c).

In its Motion, Patent Owner contends that

> Exhibits 1008, 1009 and 1015 should be excluded under FRE 401 and 402 as irrelevant, and under FRE 403 because their non-probative nature is outweighed by the possible confusion of the issues they create. Moreover, Exhibit 1002 should be excluded to the extent it relies on the inadmissible Exhibits 1008-1009.

Motion 2.[14]

According to Patent Owner, because "Exhibits 1008, 1009 and 1015 were not filed in a [prior] proceeding before a Federal court or the Office," Patent Owner asserts this renders them irrelevant. *Id.* at 3 (quoting 35 U.S.C. § 301(a)(2) ("Any person at any time may cite to the Office in writing . . . statements of the patent owner filed in a proceeding before a Federal court or the Office in which the patent owner took a position on the scope any claim of a particular patent.").

[14] "FRE" refers to Federal Rules of Evidence.

According further to Patent Owner,

> Exhibits 1008 and 1009 are Patent Owner's (Plaintiffs') and Petitioners' (Defendants') "Proposed Claim Constructions," respectively, which were exchanged between the parties in Case No. 1:14-cv-00803-RGA (D. Del.) ("the Related District Court Action") on August 3, 2015. Neither of these documents was ever filed in a Federal court. They were simply exchanged between the parties. Exhibit 1015 is "Plaintiffs' Initial Claim Chart, Toshiba LCD Tablet, Excite 10SE-AT305SET16, in Case No. 1:14-cv-00803-RGA (D. Del.)," which was served on Petitioner Toshiba on March 31, 2015. This document was never filed in a Federal court.

Motion 3.

Even though Exhibits 1008, 1009, and 1015 do not fall in the ambit of 35 U.S.C. § 301(a)(2) because they were not filed previously in a Federal court, the statute is permissive, not restrictive. Exhibits 1008 and 1015 form part of the history of the evolving claim construction dispute as to the meaning of a "control electrode." *See supra* Section II.A.2 (addressing Exhibits 1008 and 1015 pursuant to Petitioner's arguments as an aid in determining the scope of "control electrode"). Similar to the prosecution history, Patent Owner's view of the scope and meaning of the claims at various times is relevant in this case as part of an evolving story that guides the claim construction of this term. *See Hewlett-Packard Co. v. MPHJ Tech. Inv., LLC*, Case IPR2013-00309, slip op. at 20–21 (PTAB Nov. 19, 2014) (using patent owner's demand letter as an aid in construing certain claim phrases), *aff'd sub nom., HP Inc. v. MPHJ Tech. Inv., LLC*, 817 F.3d 1339 (Fed. Cir. 2016) (not addressing the demand letter).

Patent Owner does not assert that its initial claim construction proposals (*see* Exhibit 1008) or its infringement contentions (*see* Ex. 1015) in the RDCAs were unreasonable or mistaken. *See* Opp. 5–6 (arguing Patent

Owner "never denies that its [District Court] constructions were broader than its [Board] constructions" and "never attempts to explain the inconsistency"). Patent Owner explains that its claim construction contentions were "revised, updated or dropped entirely from the Related District Court Action" and its infringement contentions "were dismissed from the Related District Court Action after institution of this proceeding." Motion 4–5. Nevertheless, these arguments fail to explain persuasively why Exhibits 1008 and 1015 are now irrelevant to the evolving claim construction history. *See* Motion 4.

Contrary to Patent Owner's assertion of irrelevance, it is more probable than not that the claim terms (including "control electrode") mean something related to what Patent Owner stated or implied that they mean at one point of time or another. *See* Ex. 1008 (preliminary claim constructions); Ex. 1015 (infringement contentions); *supra* Section II.A.2. It is also more probable than not that the claim construction story is more complete with Exhibits 1008 and 1015 than without them.

Patent Owner also argues that "[t]o allow [Exhibits 1008, 1009, and 1015] into the record would merely confuse the issues and mislead the Board." Motion 5 (citing Fed. R. Evid. 403). To the contrary, we did not adopt any claim construction proposals from the RDCAs and were not confused while considering the probative nature of Exhibits 1008 and 1015 in their roles of serving as part of the evolving claim construction history. Exhibits 1008 and 1015 played minor roles in our claim construction analysis above, serving only to corroborate other findings or to provide context. *See supra* Section II.A.2.

Therefore, Patent Owner does not meet its burden of showing that Exhibits 1008 and 1015 are irrelevant or prejudicial. *See* Fed. R. Evid. 401–403. We have not cited or relied upon Exhibit 1009 in this Final Written Decision. Patent Owner's Motion seeks to exclude paragraphs 49, 53, and 76 of the Silzars Declaration (Exhibit 1002) as inadmissible based on Dr. Silzars' reliance on Exhibit 1008. Motion 6. Because Patent Owner has not meet it burden of showing that Exhibit 1008 is irrelevant or prejudicial, it follows that Patent Owner has not met its burden of showing that paragraphs 49, 53, and 76 of the Silzars Declaration are inadmissible. Accordingly, we *dismiss* as moot Patent Owner's Motion with respect to excluding Exhibit 1009, and *deny* the Motion with respect to excluding Exhibits 1002, 1008, and 1015.[15]

IV. CONCLUSION

On this record, Petitioner has shown by a preponderance of the evidence that Hebiguchi anticipates claim 5 of the '352 patent, and that claims 5 and 6 of the '352 patent would have been obvious both over the combination of Hebiguchi and Fujikawa and over the combination of Koma and Fujikawa. We, however, decline to determine if Petitioner has shown by a preponderance of evidence that Fujikawa anticipates claims 5 and 6.

V. ORDER

In consideration of the foregoing, it is hereby

ORDERED that claims 5 and 6 of the '352 patent are unpatentable;

[15] Given our Decision on the Motion, we need not decide Petitioner's contention that Patent Owner failed to file an objection to Exhibit 1015. *See* Opp. 4–5; *see also* Paper 25 (Patent Owner replying to the Opposition).

FURTHER ORDERED that Patent Owner's Motion to exclude is *denied* with respect to Exhibits 1002, 1008, and 1015, and *dismissed* with respect to Exhibit 1009; and

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

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