

UNITED STATES PATENT AND TRADEMARK OFFICE

BEFORE THE PATENT TRIAL AND APPEAL BOARD

Hisense USA Corporation
Petitioner

v.

Brightplus Ventures LLC
Patent Owner

Patent No. 8,330,710
Filing Date: October 11, 2011
Issue Date: December 11, 2012
Title: Systems and Methods for Controlling a Solid State Lighting Panel

Inter Partes Review No. IPR2023-01412

PETITIONER'S REPLY TO PATENT OWNER'S RESPONSE

TABLE OF CONTENTS

I.	Introduction.....	1
II.	Claim Construction.....	2
A.	“Plurality of On-State Drive Currents” [Claim 1]	2
B.	“Display Performance Information” [Claim 12].....	3
III.	Ground 1: Claims 1–2, 5, 12, and 16–17 Are Obvious Over the Combination of Shteynberg, Arai, and Zhang.....	4
A.	Motivation to Combine	4
B.	Shteynberg Alone or In View of Arai Renders Obvious “A Plurality of Strings of Solid State Lighting Devices ... Positioned At Intervals In At Least One Second Direction” [Claim 1A].....	6
C.	Shteynberg Discloses a “Current Circuit Supply Configured to Selectively Supply a Plurality of On-State Drive Currents ...” [Claim 1B]	8
D.	Shteynberg Discloses or Renders Obvious a “Control System Configured to Receive a User Input ...” [Claim 1C]	10
E.	Shteynberg Alone or In View of Zhang Renders Obvious a “Control System Further Including Firing Logic Configured to Determine a Firing Order of the Plurality of Strings” [Claim 1D]	11
F.	Shteynberg In View of Zhang Renders Obvious Renders Obvious Claim 2.....	14
G.	Shteynberg In View of Arai Renders Obvious Claim 5.....	14
H.	Shteynberg Discloses or Renders Obvious Claim 12	14
I.	Shteynberg Alone or In View of Arai Renders Obvious Claim 16	15

J.	Shteynberg Alone or In View of Arai and Zhang Renders Obvious Claim 17.....	16
IV.	Ground 2: Claim 11 Is Obvious Over the Combination of Shteynberg, Arai, Zhang, and Kobori	17
V.	Ground 3: Claims 47–48 Are Obvious Over the Combination of Shteynberg, Arai, and Lee	17
VI.	Ground 4: Claims 1–2, 5, 12, and 16–17 Are Obvious Over the Combination of Shteynberg, Arai, and Kawabata.....	19
VII.	Ground 5: Claim 11 Is Obvious Over the Combination of Shteynberg, Arai, Kawabata, and Kobori.....	21
VIII.	Ground 6: Claim 13 Is Obvious Over the Combination of Shteynberg, Arai, Kawabata, and Lee	22
IX.	Conclusion	24

LIST OF EXHIBITS

EXHIBIT	DESCRIPTION
1001	U.S. Patent No. 8,330,710 (“the ’710 Patent”)
1002	Prosecution History of U.S. Patent No. 8,330,710
1003	U.S. Patent No. 8,049,709 (“the ’709 Patent”)
1004	Prosecution History of U.S. Patent No. 8,049,709
1005	Declaration of Rafael Betancourt
1006	Curriculum Vitae of Rafael Betancourt
1007	U.S. 2008/0116818 to Shteynberg (“Shteynberg”)
1008	U.S. 2007/0121320 to Arai (“Arai”)
1009	CN 1750732 to Zhang (“Zhang”)
1010	Certified Translation of Zhang
1011	U.S. 2006/0139954 to Kobori (“Kobori”)
1012	U.S. 2003/0016205 to Kawabata (“Kawabata”)
1013	U.S. 2007/0013647 to Lee (“Lee”)
1014	Counterclaim filed by Patent Owner in <i>Hisense USA Corp. v. Brightplus Ventures LLC</i> , No. 1:22-cv-02774, Dkt. 9 (N.D. Ga. Sep. 16, 2022)
1015	Scheduling Order in <i>Hisense USA Corp. v. Brightplus Ventures LLC</i> , No. 1:22-cv-02774, Dkt. 35 (N.D. Ga.)
1016	Judicial Caseload Profile for the Northern District of Georgia
1017	Cover Pleading to Patent Owner’s Infringement Contentions in <i>Hisense USA Corp. v. Brightplus Ventures LLC</i> , No. 1:22-cv-02774 (N.D. Ga.)
1018	Cover Pleading to Patent Owner’s Supplemental Infringement Contentions in <i>Hisense USA Corp. v. Brightplus Ventures LLC</i> , No. 1:22-cv-02774 (N.D. Ga.) served June 21, 2023
1019	Deposition Transcript of William Bohannon (Oct. 8, 2024)
1020	Declaration of Rafael Betancourt in Response to Patent Owner’s Contingent Motion to Amend

I. Introduction

Each of the Challenged Claims of the '710 Patent is obvious over the prior art, as set forth in the Petition. Indeed, the single independent claim recites little more than selectively supplying current to a plurality of light sources to achieve a desired “firing order” of the light sources—a concept well-known in the art before the effective filing date of the '710 Patent. Faced with this fact, Patent Owner’s Response largely attempts to limit the Challenged Claims to only specific embodiments described in the '710 Patent. But that is, of course, improper. The proper focus is on the language of the claims, which plainly does not include the requirements Patent Owner newly suggests.

Moreover, Patent Owner’s arguments in its Response simply repeat the exact same arguments from its Preliminary Response—each of which the Board already found unavailing. Further, Patent Owner submits no new credible expert testimony in support of its Response. Rather, Patent Owner relies on the exact same expert declaration submitted with its Preliminary Response,¹ which largely just parrots the Preliminary Response (and thus Response)—and thus is entitled little to no weight.

For all these reasons, each of the Challenged Claims of the '710 Patent should be cancelled as obvious.

¹ The Declaration of William Bohannon (Ex. 2003) submitted in support of Patent Owner’s Response is a copy of the Declaration of William Bohannon submitted as Exhibit 2001 with Patent Owner’s Preliminary Response. Ex. 1019, at 5:18–7:18.

II. Claim Construction

A. “Plurality of On-State Drive Currents” [Claim 1]

Patent Owner’s proposed rewrite of the phrase “plurality of on-state drive currents” (Response at 4–5) has no foundation in either the intrinsic or extrinsic record. There is no basis to introduce the new word “different” into the claim language. As noted by the Board, “there is nothing in the claim language that requires different current values for the plurality of currents.” Paper 7 at 15. And the Board should not rewrite the claim to add such narrowing language. *See K-2 Corp. v. Salomon S.A.*, 191 F.3d 1356, 1364–65 (Fed. Cir. 1999).

Nothing in specification of the ’710 Patent compels the rewrite Patent Owner seeks. The lone portion cited by Patent Owner simply states that, “*in some embodiments*,” strings may be “controlled independent of one another” “by selectively controlling the amount and/or duty cycle of current supplied to each string.” ’710 Patent, 9:12–47 (emphasis added). The fact that the current supplied to each respective string may be “selectively controll[ed]” does not mean that each current is necessarily “different,” contrary to Patent Owner’s suggestion. Response at 5. Moreover, in any event, “particular embodiments appearing in the written description will not be used to limit claim language that has broader effect”—as is the case here. *Innova/Pure Water, Inc. v. Safari Water Filtration Sys., Inc.*, 381 F.3d 1111, 1117 (Fed. Cir. 2004).

B. “Display Performance Information” [Claim 12]

The word “display” in the phrase “display performance information” in claim 12 should not be rewritten to be limited to only an “LCD display.” *See* Response at 5–6. Patent Owner’s suggestion that the specification of the ’710 Patent compels such a construction fails. *See id.*

Patent Owner’s representation that “[t]he ’710 Patent makes no reference that its invention is operable with any displays other than LCD displays” is incorrect. Response at 5. The patent states that its invention is directed to a “solid state lighting panel.” ’710 Patent, 1:14–15. While the patent notes that such panels are “commonly used as backlights for [] LCD display screens” (*id.*, 1:32–33), the patent states that such panels can be used for other “lighting applications,” including “architectural and/or accent lighting.” *Id.*, 1:19–23. The patent also states that, “[a]lthough some embodiments are described in connection with LCD backlights, embodiments of the invention may be used for other purposes, such as general lighting.” *Id.*, 17:42–44.

That the “figures in the ’710 Patent” may only depict an LCD display is insufficient to justify the narrowing rewrite Patent Owner seeks. *See* Response at 5. “[A] court may not import limitations from the written description into the claims.” *Laitram Corp. v. NEC Corp.*, 163 F.3d 1342, 1347 (Fed. Cir. 1998). Further, the patent makes clear that its figures only “illustrate certain embodiment(s) of the invention.” ’710 Patent, 5:15–18. Such exemplary figures thus do not narrow the

claims, especially in light of other portions of specification that demonstrate the invention is not limited to LCD displays, as noted. *See, e.g., Liquid Dynamics Corp. v. Vaughan Co.*, 355 F.3d 1361, 1366, 1369 (Fed. Cir. 2004); *Electro Sci. Indus., Inc. v. Dynamic Details, Inc.*, 307 F.3d 1343, 1349 (Fed. Cir. 2002).

III. Ground 1: Claims 1–2, 5, 12, and 16–17 Are Obvious Over the Combination of Shteynberg, Arai, and Zhang

A. Motivation to Combine

A POSITA would have been motivated to combine Shteynberg, Arai, and Zhang. *See* Petition at 23–24; Paper 7 at 21–24. Patent Owner’s suggestion otherwise, because “Shteynberg relates to providing ambient lighting for a building and the like, not providing backlighting for an LCD panel as in Arai or Zhang,” is incorrect. Response at 11. Shteynberg discloses that one of the “functional purposes” of its lighting system is “backlighting.” Ex. 1007, [0079]. And Patent Owner’s expert conceded that a POSITA would have understood the term “backlighting” to refer to “providing a lighting source for an LCD panel.” Ex. 1019, at 16:11–18:3.

In such applications, Arai teaches that arranging LEDs two-dimensionally (as illustrated in Arai) permits high luminance on large-sized displays. Ex. 1008, [0006], Figs. 1, 5. Arranging Shteynberg’s “parallel array” of LED “strings” (Ex. 1007, [0044], Fig. 3) in such two-dimensional rows and columns would likewise allow for high luminance in larger arrays. Ex. 1005, ¶¶105–106. “Moreover, there are a finite number of ways to design a plurality of LED series to cover a large area, such as

employing columns and rows.” Paper 7 at 22. Thus, a POSITA would have found it obvious to combine these teachings of Shteynberg and Arai. Ex. 1005, ¶106.

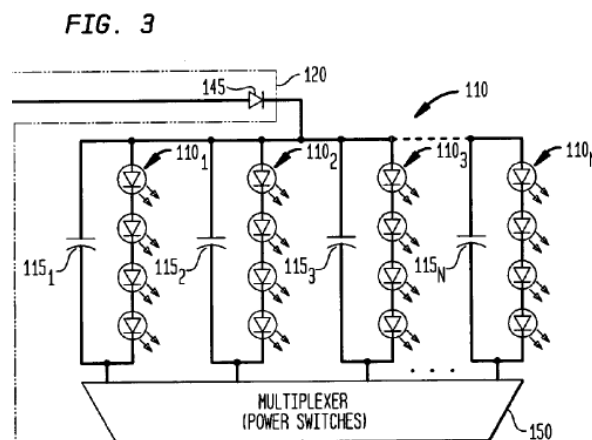
Additionally, Zhang teaches that changing the lighting sequence of backlight modules may “improve the phenomenon of uneven brightness of the picture.” Ex. 1010, 2:8–12. A POSITA would thus have been motivated to apply Zhang’s teachings with respect to lighting sequence(s) to Shteynberg’s system to improve brightness uniformity. Ex. 1005, ¶¶105–106. That Arai also seeks to improve brightness uniformity does not detract from a POSITA’s motivation to also consider and apply Zhang’s teachings, contrary to Patent Owner’s suggestion (Response at 11–12). *See Intel Corp. v. PACT XPP Schweiz AG*, 61 F.4th 1373, 1380 (Fed. Cir. 2023) (holding the Board erred by concluding there was no reason to combine in part because the base reference “already addresses” the problem); *see also* Paper 7 at 24.

Patent Owner’s argument that the systems of Shteynberg, Arai, and Zhang purportedly cannot readily be physically combined misses the mark. *See* Response at 12–14. In already rejecting this exact same argument from Patent Owner (Preliminary Response at 11–14), the Board correctly held that Patent Owner’s argument “is an improper focus for determining whether the claim would have been rendered obvious by the prior art as a whole.” Paper 7 at 23 (citing, *inter alia*, *In re Etter*, 756 F.2d 852, 859 (Fed. Cir. 1985) (*en banc*) (“Etter’s assertions that Azure cannot be incorporated in Ambrosio are basically irrelevant, the criterion being not

whether the references could be physically combined but whether the claimed inventions are rendered obvious by the teachings of the prior art as a whole.”)); *see also KSR Int’l Co. v. Teleflex Inc.*, 550 U.S. 398, 421 (2007). Additionally, Patent Owner’s claim that the references cannot be combined because Zhang “is focused on CCFL Lamps,” as opposed to LEDs, is incorrect. Zhang expressly states that teachings may be applied to “light-emitting diodes.” Ex. 1010, 5:1–7.

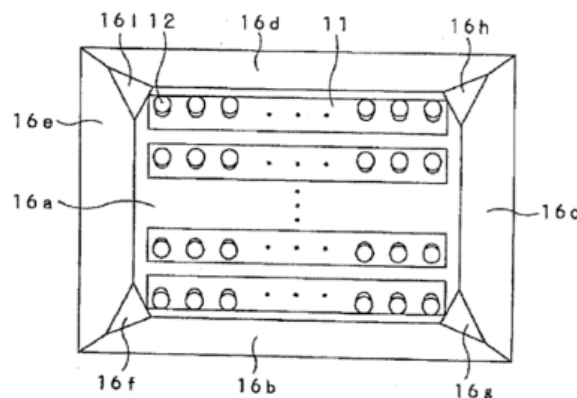
B. Shteynberg Alone or In View of Arai Renders Obvious “A Plurality of Strings of Solid State Lighting Devices ... Positioned At Intervals In At Least One Second Direction” [Claim 1A]

Shteynberg expressly discloses a lighting system having a “parallel array” of “strings” of LEDs (*i.e.*, LEDs 110₁, 110₂, 110₃, ..., 110_N). Ex. 1007, [0044], [0082], [0084], Figs. 3 & 7; *see* Paper 7 at 10–12. Petitioner’s expert, Mr. Betancourt, testified that, because “the LEDs are organized in an ‘array,’ the LEDs are organized in columns (each column corresponding to one LED string) and rows (multiple LED strings are distributed to form a row, *i.e.*, positioned at intervals),” as shown, in Figure 3 of Shteynberg (reproduced below). Ex. 1005, ¶60; *see* Ex. 1007, Fig. 3.



The Board already found Mr. Betancourt’s testimony “persuasive” on this point. Paper 7 at 12. In contrast, the conclusory assertion by Petitioner’s expert, Mr. Bohannon, that “[i]t would not be obvious to a POSITA how to orient and design a lighting panel simply based on the diagram in Figure 3 [of Shteynberg]” (Ex. 2003, ¶56), is unavailing. Mr. Bohannon fails to account for Shteynberg’s disclosure that the LED strings may be arranged in a “parallel array.” Ex. 1007, [0044]; *see* Paper 7 at 12. Patent Owner’s argument that “Shteynberg does not disclose the physical orientation of the LED strings” because Figure 3 is a “circuit/block diagram” (Response at 15) fails for the same reason—as already found by the Board. Paper 7 at 12. Shteynberg thus alone discloses (or, at minimum, renders obvious) this limitation. Paper 7 at 10–12.

Additionally, Arai also teaches this limitation, as found by the Board. Paper 7 at 12–13. Arai teaches a lighting system having LEDs 12 that are “two-dimensionally arranged” and thereby positioned at intervals, as illustrated in Figure 5 of Arai (reproduced below). Ex. 1008, [0006], [0029], Fig. 5; Ex. 1005, ¶61.



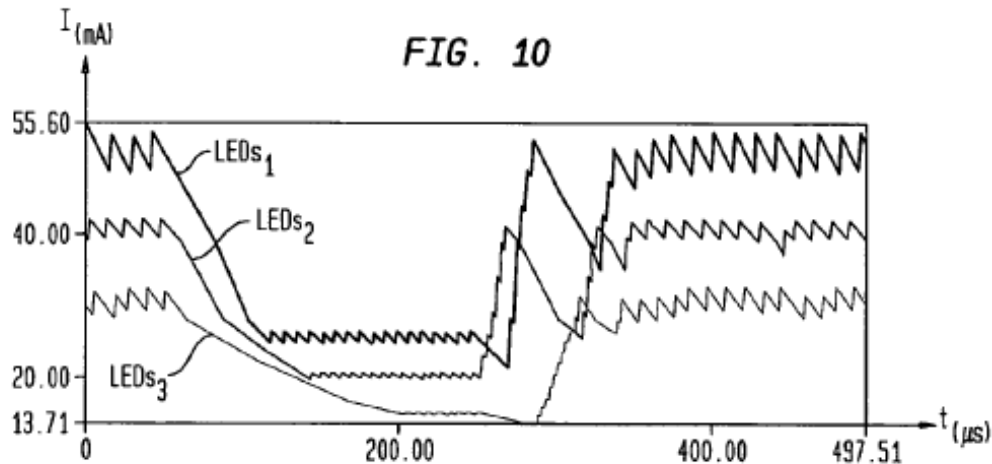
That Arai does not use the precise word “interval” is irrelevant, contrary to Patent Owner’s suggestion (Response at 17). *See In re Gleave*, 560 F.3d 1331, 1334 (Fed. Cir. 2009) (a reference does not have to satisfy an *ipsis verbis* test); *In re Aslanian*, 590 F.2d 911, 914 (CCPA 1979); *see also* Paper 7 at 13.

C. Shteynberg Discloses a “Current Circuit Supply Configured to Selectively Supply a Plurality of On-State Drive Currents ...” [Claim 1B]

Shteynberg discloses a “LED array driver circuit 100” that selectively supplies on-state drive currents to the LED strings 110₁, 110₂, 110₃, through 110_N. Ex. 1007, [0043], [0044], [0047], [0048], [0051]; Ex. 1005, ¶¶62–64; *see* Paper 7 at 15. Patent Owner’s argument (repeated from its Preliminary Response) that Shteynberg does not disclose this limitation because it “supplies one current to all the LED strings”—as opposed to “*different* on-state drive currents”—fails. Response at 18–19 (emphasis added). As noted by the Board, “there is nothing in the claim language that requires different current values for the plurality of currents, or making individual determinations.” Paper 7 at 15. And, as discussed, there is no legitimate basis for rewriting the claim limitation to newly recite “different” on-state drive currents. *Surpa* Section II.A.

Furthermore, Patent Owner’s representation that Shteynberg “discloses providing the *same* drive current ... to any or all of its strings” is incorrect. Response at 19. Shteynberg discloses that “each” string of LEDs 110₁, 110₂, 110₃, through

110_N is “provided with a selected and *independent current level*.” Ex. 1007, [0054] (emphasis added). The independent and varied nature of such current levels across the LED strings over time is illustrated in Figure 10 of Shteynberg, for example:



Ex. 1007, Fig. 10; *see id.*, [0037], [0104]. Patent Owner’s suggestion that Shteynberg provides the same “averaged current” to each string is likewise incorrect. Response at 18–19. Shteynberg simply notes that an “average current” supplied to each individual LED string can be calculated over a selected time period. Ex. 1007, [0055].

Patent Owner’s argument that Shteynberg’s “multiplexer 150 doesn’t ‘drive’ the [LED] strings” in Shteynberg because it allegedly only “allows current to flow through the strings for a certain amount of time” (Response at 18) also fails, as already held by the Board. Paper 7 at 16. Despite the Board’s holding, Patent Owner and its expert, Mr. Bohannon, still “fail[] to explain what meaning [they] ascribe[] to ‘drive’ and what ... is the technical difference between drive and current flow in this context.” Paper 7 at 16; *see* Response at 18–19; Ex. 2003, ¶¶59–62. Moreover,

Patent Owner only singles out “multiplexer 150” from Shteynberg’s disclosed “LED array *driver* circuit 100” (which also includes other components, such as power converter 120 and controller 125) and fails to explain why Shteynberg’s “LED array *driver* circuit 100” does not meet this limitation. Ex. 1007, [0043] (emphasis added).

D. Shteynberg Discloses or Renders Obvious a “Control System Configured to Receive a User Input ...” [Claim 1C]

Shteynberg discloses that its controller 125 “may receive input from a wide variety of sources,” such as from “a larger system,” and selectively provide control signals to the power converter 120 and the multiplexer 150 (within LED array driver circuit 100) responsive to the input to selectively on-state drive LED strings 110₁, 110₂, 110₃, through 110_N. Ex. 1007, [0043], [0047], [0049]; *see* Ex. 1005, ¶¶65–67; *see also* Paper 7 at 16–18. Petitioner’s expert, Mr. Betancourt, testified that, “a person of ordinary skill in the art would understand that *user input* is one possible input coming from a larger system,” including because “[i]t is the user who ultimately decides on various operating settings such as brightness or color temperature of an LED array.” Ex. 1005, ¶65.

The Board already found Mr. Betancourt’s testimony “persuasive” on this point. Paper 7 at 17. In contrast, the conclusory assertion by Petitioner’s expert, Mr. Bohannon, that “Shteynberg does not disclose ... user input as per the ‘710 patent” because “nothing in Shteynberg describes *user* input or feedback” (Ex. 2003, ¶64) is unavailing. As noted, a reference does not have to satisfy an *ipsis verbis* test to

disclose a claimed element. *Gleave*, 560 F.3d at 1334. And unlike Mr. Betancourt, Mr. Bohannon fails to consider how a POSITA would understand Shteynberg's teachings regarding inputs from a "wide variety of sources," such as from "a larger system." Ex. 1007, [0049]; Ex. 1005, ¶65; *see KSR*, 550 U.S. at 421.

Patent Owner's contention that Shteynberg does not teach this limitation because "there is no mention of 'user input'" in Shteynberg fails for the same reason. Response at 22; *see Gleave*, 560 F.3d at 1334; *see also KSR*, 550 U.S. at 421. Patent Owner's criticism of Shteynberg as "being a system for providing lighting to a building" fares no better. Response at 21. Shteynberg discloses that "functional purposes" of its lighting system include "residential illumination, architectural, signage, automative lighting, backlighting," etc. Ex. 1007, [0079]. And testimony from Mr. Betancourt demonstrates that a POSITA would understand that "[i]t is the user who ultimately decides on various operating settings such as brightness or color temperature" in such lighting applications. Ex. 1005, ¶65.

E. Shteynberg Alone or In View of Zhang Renders Obvious a "Control System Further Including Firing Logic Configured to Determine a Firing Order of the Plurality of Strings" [Claim 1D]

Shteynberg discloses that multiplexer 150 is configured to "allow current through one or more of the series of LEDs 110₁, 110₂, 110₃, through 110_N in any combination, and for any selected duration" under the control of the controller 125, by which each of the LED strings is provided with a "selected and independent

current level, through control (by controller 125) of the switching state of each channel (via multiplexer 150), for a selected time period (or duration).” Ex. 1007, [0047], [0054], Fig. 4. Shteynberg teaches that each such “energizing time period may be provided in any order or combination.” *Id.*, [0054]. Thus, the controller 125 (via the multiplexer 150) determines the “order” of such “energizing time periods,” which is equivalent to the claimed “firing order.” Ex. 1005, ¶¶68–72; *see* Paper 7 at 19; *see also* ’710 Patent, 10:30–33 (describing “firing order” as “an order in which individual strings of solid state lighting devices and/or groups of strings of solid state lighting devices are supplied current”). And, as testified by Mr. Betancourt, a POSITA would have understood that Shteynberg’s controller 125 includes logic configured to determine such firing order. Ex. 1005, ¶73; *see* Paper 7 at 19; *see also* Ex. 1007, [0051] (describing various arrangements of controllers).

Patent Owner’s conclusory assertion (repeated from its Preliminary Response) that Shteynberg’s “energizing time periods are not equivalent to the firing logic as described in in the ‘710 Patent” (Response at 23; Ex. 2003, ¶65) is unavailing, as already found by the Board. Paper 7 at 19. In effect, Patent Owner attempts to limit “firing logic” to the specific embodiment described in “Fig. 8 of the ‘710 Patent.” Response at 24. This is fundamentally improper. *See Laitram*, 163 F.3d at 1347. The ’710 Patent makes clear that its figures only “illustrate certain embodiment(s) of the invention.” ’710 Patent, 5:15–18. And “particular

embodiments appearing in the written description will not be used to limit claim language that has broader effect”—as is the case here. *Innova*, 381 F.3d at 1117; *see, e.g., Electro*, 307 F.3d at 1349. Patent Owner’s expert also testified that the claim term “firing logic” is “pretty broad.” Ex. 1019, at 80:3–19; *see also id.* at 82:19–19 (Mr. Bohannon testifying “firing logic” is just a “box” and “you have to use your imagination if you want to know how it’s implemented”).

Moreover, as the Board observed, Patent Owner incorrectly conflates Shteynberg’s “energizing time periods” with the claimed “firing logic.” Paper 7 at 19–20. As discussed, the “energizing time periods” are equivalent to the claimed “firing *order*”—not the “firing logic”—which renders Patent Owner’s argument meritless. Ex. 1005, ¶¶68–72; *also* ’710 Patent, 10:30–33; *see* Paper 7 at 19–20.

Additionally, Zhang also teaches this limitation, as found by the Board. Paper 7 at 20–21. Zhang discloses a lighting sequence (“firing order”) for various backlight modules, which is determined by a step-by-step process (“firing logic”). Ex. 1010, 5:8–42, 7:1–33, Figs. 1A, 1B, 5, 6; *see* Paper 7 at 20. Patent Owner’s argument that “Zhang’s method of only activating one lighting module at a time is not the same as the firing logic or firing order contemplated by the ’710 Patent” (Response at 25) is once again unavailing, as already found by the Board. Paper 7 at 21. Nothing in the claim language requires that the “plurality of strings” be supplied on-state drive current at the same time. Paper 7 at 21 (citing *In re Hiniker Co.*, 150 F.3d 1362, 1369

(Fed. Cir. 1998) (stating “the name of the game is the claim”)); *see also* ’710 Patent, 10:30–33 (describing “firing order” as “an order in which individual strings of solid state lighting devices and/or groups of strings of solid state lighting devices are supplied current”).

F. Shteynberg In View of Zhang Renders Obvious Renders Obvious Claim 2

Patent Owner does not dispute that the additional limitations in dependent claim 2 (*e.g.*, “non-spatially sequentially firing order”) are rendered obvious by Shteynberg in view of Zhang. Response at 26. Rather, Patent Owner argues only that dependent claim 2 is not rendered obvious by Shteynberg in view of Zhang “[f]or the reasons described above regarding element D of Claim 1.” *Id.* Patent Owner’s arguments with respect to element D of Claim 1 fail for the reasons discussed above.

G. Shteynberg In View of Arai Renders Obvious Claim 5

Patent Owner’s argument that Shteynberg in view of Arai does not render obvious dependent claim 5 because the combination “would not create a backlight for an LCD panel” (Response at 26) is misguided. Nothing in either independent claim 1 or dependent claim 5 limits the claim to “a backlight for an LCD panel.” Rather, each claim recites only a “lighting system.” *See supra* Section II.B.

H. Shteynberg Discloses or Renders Obvious Claim 12

Shteynberg discloses that controller 125 may receive input from “open or closed-loop feedback of various signals and measurements from within the LED

array driver circuit 100,” including, for example, a “sensor 185” that measures the “output voltage across each series of LEDs 110₁, 110₂, 110₃, through 110_N.” Ex. 1007, [0049], [0072], [0080]. Patent Owner’s argument that these disclosures do not render claim 12 obvious because “Shteynberg does not teach an LCD display” is again misguided. Response at 27–29. Nothing in either independent claim 1 or dependent claim 12 limits the claim to an “LCD display.” And as discussed, the word “display” in the phrase “display performance information” in claim 12 should not be rewritten to be limited to only an “LCD display.” *Supra* Section II.B.

Patent Owner’s related argument that Shteynberg’s feedback sensor measurements with respect to each series of LEDs 110₁, 110₂, 110₃, through 110_N “is not equivalent” to the “display performance” recited in claim 12 (Response at 27) likewise fails. The claimed “display performance information” relates to the performance of the “lighting system” recited in claim 1, which includes “strings of solid state lighting devices.” ’710 Patent, 19:1–3, 17:52–55; *see* Paper 7 at 26. Additionally, Shteynberg discloses that its “sensor 185” may provide input to controller 125 “related to the functional purposes of the system,” such as “backlighting.” Ex. 1007, [0079]; *see* Ex. 1019, at 16:11–18:3

I. Shteynberg Alone or In View of Arai Renders Obvious Claim 16

Patent Owner does not dispute that the additional limitation in dependent claim 16 is rendered obvious by Shteynberg, whether alone or in view of Arai.

Response at 29. Rather, Patent Owner argues only that dependent claim 16 is not rendered obvious by Shteynberg in view of Arai “[f]or the reasons discussed above regarding element A of Claim 1.” *Id.* Patent Owner’s arguments with respect to element A of Claim 1 fail for the reasons discussed above.

J. Shteynberg Alone or In View of Arai and Zhang Renders Obvious Claim 17

Patent Owner primarily argues that the limitations of independent claim 17 are not rendered obvious by Shteynberg, whether alone or in combination with Arai and/or Zhang, for the same reasons Patent Owner sets forth with respect to independent claim 1 and dependent claim 2. Response at 29–31. Patent Owner’s arguments with respect to those claims fail for the reasons discussed above.

Patent Owner’s lone new argument—that “the currents supplied to the strings of LEDs in Shteynberg are constant, not pulsed drive currents” (Response at 30)—also fails. Shteynberg discloses that current is supplied to one or more of the LED strings 110₁, 110₂, 110₃, through 110_N “in any combination, and for any selected duration.” Ex. 1007, [0047]. As found by the Board, “[t]his varying time duration supplies pulses of current to the strings.” Paper 7 at 14. Indeed, Shteynberg expressly describes the current supplied to LED strings 110₁, 110₂, 110₃, through 110_N as “current *pulses*.” Ex. 1007, [0107] (emphasis added).

IV. Ground 2: Claim 11 Is Obvious Over the Combination of Shteynberg, Arai, Zhang, and Kobori

Patent Owner does not dispute that the additional limitation in dependent claim 11 is disclosed by Kobori. *See* Response at 31–32. Rather, Patent Owner simply argues a POSITA would not have been motivated to combine Kobori with Shteynberg and Zhang because (i) “Kobori is directed to a display panel and Shteynberg is directed to ambient lighting for a building”; and (ii) “Kobori is directed to LEDs” and “Zhang is directed to CCFLs.” *Id.* These arguments fail. As discussed (*supra* Section III.A), Shteynberg discloses that one of the “functional purposes” of its lighting system is “backlighting” (Ex. 1007, [0079]), and Zhang states that teachings may be applied to “light-emitting diodes” (Ex. 1010, 5:1–7).

V. Ground 3: Claims 47–48 Are Obvious Over the Combination of Shteynberg, Arai, and Lee

Patent Owner primarily argues that claims 47–48 are not rendered obvious by the Shteynberg-Arai-Lee combination for the same reasons Patent Owner sets forth with respect to the Shteynberg-Arai combination relative to independent claim 17 in Ground 1. Response at 32–38. Patent Owner’s arguments with respect to that claim relative to the Shteynberg-Arai combination fail for the reasons discussed above.

Petitioner only relies on Lee in this Ground for Lee’s teachings regarding the “plurality of *groups* of the plurality of strings.” *See* Petition at 53, 56–57. And Patent Owner concedes that “Lee discloses ... ‘groups’ of LED strings.” Response at 37.

Thus, Patent Owner’s lone new arguments with respect to claims 47–48 are that (i) “Lee ... does not disclose supplying a plurality of pulsed currents to a plurality of groups of the plurality of strings”; and (ii) “there would be no benefit in combining Lee and Shteynberg.” Response at 32–38. Each argument fails.

Patent Owner concedes that each “driving circuit” in Lee “supplies current to one group of the [LED] strings,” respectively. Response at 37, 38. Patent Owner’s claim that “Lee does not contemplate the operation of each driving circuit, nor how that circuit supplies current” is, even if accepted as true, immaterial. Response at 36–37. Shteynberg describes its “LED array driver circuit 100” in detail, as discussed herein. *Supra* Section III. And relevant to claims 47–48, Shteynberg expressly describes the current supplied to its LED strings (via LED array driver circuit 100) as “current pulses.” Ex. 1007, [0107]. And Mr. Betancourt testified a POSITA would have been motivated to modify Shteynberg’s lighting system to incorporate Lee’s groups of LED strings. Ex. 1005, ¶¶113–117.

The fact that Shteynberg’s LED array driver circuit 100 may be an improvement to the “separate LED driving circuits” of Lee, as argued by Patent Owner (Response at 33–36), does not counsel otherwise. As noted by the Board, “Petitioner relies on Lee’s teachings of string groups, not Lee’s driving circuit.” Paper 7 at 29; *see* Petition at 53, 56–57. And Lee expressly teaches that its grouping of LED strings allows for “the red, green and blue lights [to] be mixed,” such that

“uniform white light without reddish or bluish light can be emitted from the edge portions” (Ex. 1013, [0040])—a goal of Shteynberg (*e.g.*, Ex. 1007, [0002]).

VI. Ground 4: Claims 1–2, 5, 12, and 16–17 Are Obvious Over the Combination of Shteynberg, Arai, and Kawabata

Patent Owner primarily argues that claims 1–2, 5, 12, and 16–17 are not rendered obvious by the Shteynberg-Arai-Kawabata combination for the same reasons Patent Owner sets forth with respect to the Shteynberg-Arai combination relative to these same claims in Ground 1. Response at 39–50. Patent Owner’s arguments with respect to those claims relative to the Shteynberg-Arai combination fail for the reasons discussed above.

Petitioner only relies on Kawabata in this Ground for its teachings regarding the claimed “[non-spatially-sequential] firing order.” *See* Petition at 61, 64–72. And Patent Owner’s lone arguments in response are that (i) Kawabata discloses simply turning lights “on or off” “at different times”; (ii) the sequence of Kawabata is “spatially sequential”; (iii) Kawabata does not use the words “logic” or “rule”; and (iv) a POSITA would not be motivated to combine Shteynberg with Kawabata. Response at 39–42, 43–49, 54–56. Each argument fails.

Patent Owner’s argument that Kawabata’s method of turning lights “on or off” “at different times” is not the same as the “firing order” contemplated by the ’710 Patent (Response at 46–48) misses the mark. Nothing in the claim language requires that the “plurality of strings” be supplied on-state drive current at the same

time. *See Hiniker*, 150 F.3d at 1369; *see also* '710 Patent, 10:30–33 (describing “firing order” as “an order in which individual strings of solid state lighting devices and/or groups of strings of solid state lighting devices are supplied current”).

Patent Owner’s argument that the lighting sequence of Kawabata is “spatially sequential” (Response at 54–56) is incorrect. *E.g.*, Ex. 1012, Fig. 7; *see* Petition at 67–69. Patent Owner concedes that “in Figure 7 of Kawabata, element 6 is fired before element 5.” Response at 56. Patent Owner’s argument that the sequence is nonetheless “spatially sequential” because element 6 “still turns off after element 5 turns off” and thus may result in a “sweeping effect” (Response at 56) is premised on an impermissible rewrite of the claim language. The claim recites only a “**firing** order” and is silent about any order in which current must be unsupplied from the plurality of strings. The claim language is also devoid of any requirement with respect to preventing “sweeping effect.” *See Hiniker*, 150 F.3d at 1369.

That Kawabata does not use the precise words “logic” or “rule” in its disclosure is irrelevant, contrary to Patent Owner’s suggestion (Response at 48). A reference does not have to satisfy an *ipsis verbis* test to disclose a claimed element. *Gleave*, 560 F.3d at 1334; *see* Paper 7 at 33. And as testified by Mr. Betancourt, a POSITA would understand that the timing processes (*i.e.*, rules) described in Kawabata with respect to turning various light-emitting elements on and off (*e.g.*,

Ex. 1012, [0070], Figs. 5–8) determine a “firing order,” as claimed. Ex. 1005, ¶¶82–87; *see also* ’710 Patent, 10:30–33.

As to motivation to combine, Patent Owner’s claim that “Shteynberg relates to providing ambient lighting for a building and the like, not providing backlighting for an LCD Panel as in ... Kawabata (Response at 39) is incorrect. Shteynberg discloses that one of the “functional purposes” of its lighting system is “backlighting.” Ex. 1007, [0079]; *see* Ex. 1019, at 16:11–18:4.

Patent Owner’s related claim that the combination of Shteynberg and Kawabata “would not be functional” (Response at 40) misses the mark. In already rejecting this exact same argument from Patent Owner (Preliminary Response at 40), the Board correctly held that Patent Owner’s argument “is the incorrect focus.” Paper 7 at 31; *see Etter*, 756 F.2d at 859. Additionally, Patent Owner’s claim that the references cannot be combined because Kawabata is focused on “cold cathode tubes,” as opposed to LEDs, is incorrect. Kawabata simply provides a cold cathode tubes as an example of its described “light-emitting element 2” in one embodiment. Ex. 1012, [0060]. And Kawabata makes clear that its teachings are not limited to cold cathode tubes. Ex. 1012, [0122].

VII. Ground 5: Claim 11 Is Obvious Over the Combination of Shteynberg, Arai, Kawabata, and Kobori

Patent Owner’s lone unique response to Ground 5—that “a POSITA would not be motivated to combine Kobori and Kawabata since Kawabata is directed to a

CCFL lighting system” (Response at 51)—fails. Kawabata’s teachings expressly relate to any “lighting unit for use as a backlight in a liquid crystal display device.” Ex. 1012, [0001]. Relatedly, and as noted immediately above, Kawabata makes clear that its teachings are not limited to a single embodiment wherein cold cathode tubes are used as “light-emitting element 2.” Ex. 1012, [0060], [0122].

VIII. Ground 6: Claim 13 Is Obvious Over the Combination of Shteynberg, Arai, Kawabata, and Lee

The only limitation in dependent claim 13 Patent Owner identifies as allegedly not disclosed in or rendered obvious by the asserted prior art is “wherein the current supply circuit comprises a plurality of phase drivers configured to supply a plurality of on-state drive currents at a plurality of times in a firing cycle.” Response at 57–61. And, at bottom, Patent Owner disputes only whether the asserted prior art combination discloses a “plurality of phase drivers.” *See id.*

Kawabata discloses such “phase drivers.” Ex. 1012, [0070]; Ex. 1005, ¶97; *see* Petition at 78–79; *see also* Paper 7 at 35–36. Patent Owner concedes that Kawabata teaches controllers “phase shifting” drive signals supplied to light-emitting elements. Response at 58 (citing Ex. 1012, [0070]). To evade Kawabata, Patent Owner argues that Kawabata’s “phase shifting” is “not the same as the action of the phase drivers” disclosed in the embodiments of the ’710 Patent illustrated in Figures 1 and 10—which involve actions and intended purposes not recited in the claim, such as, “receiv[ing] information from the performance feedback sensors, the

color management unit and user input to determine the appropriate behavior of the phase drivers” to “allow for a dynamic response to the behavior of the display on the part of the lighting panel.” Response at 58–61 (citing ’710 Patent, Figs. 1, 10). Patent Owner’s argument fails because “the name of the game is the claim.” *Hiniker*, 150 F.3d at 1369; *see Laitram*, 163 F.3d at 1347.

Patent Owner’s argument that a POSITA would not have been motivated to modify the Shteynberg-Arai-Kawabata lighting system to introduce the multiple driving circuits described by Lee (Response at 51–57) also fails. While Shteynberg discloses that its “multistring LED driver which utilizes a single power converter and controller for an entire LED array” is advantageous over “prior art with multi-output or separate power converters and controllers for each LED string of an LED array” (Ex. 1007, [0010]), Shteynberg also teaches that “controller 125” of its LED array driver circuit 100 “may be embodied as one or more controllers” adapted to perform the functionality taught by Shteynberg. Ex. 1007, [0051]; *see Galderma Lab’ys, L.P. v. Tolmar, Inc.*, 737 F.3d 731, 738 (Fed. Cir. 2013) (“A reference does not teach away, however, if it merely expresses a general preference for an alternative invention but does not criticize, discredit, or otherwise discourage investigation into the invention claimed.”).

IX. Conclusion

For all the reasons set forth in the Petition and herein, each of the Challenged Claims of the '710 Patent should be cancelled as obvious.

Respectfully submitted,

By: /s/ *Matias Ferrario*
Matias Ferrario
Registration No. 51,082

CERTIFICATE OF WORD COUNT

The undersigned certifies pursuant to 37 C.F.R. § 42.24(d) that the foregoing **PETITIONER’S REPLY TO PATENT OWNER’S RESPONSE** excluding any table of contents, mandatory notices, certificates of service or word count, or appendix of exhibits or claim listing, contains 5,593 words according to the word-processing program used to prepare this paper (Microsoft Word). The foregoing word count complies with the 5,600 word type-volume limit specified by 37 C.F.R. § 42.24(c)(1).

Dated: October 17, 2024

By: /s/ Matias Ferrario
Matias Ferrario
Registration No. 51,082

CERTIFICATE OF SERVICE

The undersigned hereby certifies that on the date below a copy of this
PETITIONER'S REPLY TO PATENT OWNER'S RESPONSE has been
served via email on the following:

hni@nilawfirm.com
twang@nilawfirm.com
nmassand@nilawfirm.com

Dated: October 17, 2024

By: /s/ Matias Ferrario
Matias Ferrario
Registration No. 51,082