

UNITED STATES PATENT AND TRADEMARK OFFICE

BEFORE THE PATENT TRIAL AND APPEAL BOARD

LG ELECTRONICS, INC. and HISENSE CO. LTD,
Petitioners,

v.

POLARIS POWERLED TECHNOLOGIES, LLC,
Patent Owner.

Case: IPR2020-001283
U.S. Patent No. 8,223,117

**PETITION FOR *INTER PARTES* REVIEW OF CLAIMS
1-2, 4-7, 9, 15-16 OF U.S. PATENT NO. 8,223,177**

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PETITIONER’S EXHIBIT LIST

Exhibit No.	Description
1001	U.S. Patent No. 8,223,117 B2 to Ferguson (the “117 patent”)
1002	Declaration of Mr. Ralph V. Wilhelm, Jr., Ph.D.
1003	English Translation of Japanese Patent Publication No. H11-316364 A (“Yanagiuchi”) and Declaration of Frank McGee
1004	Japanese Patent Publication No. H11-316364 A to Yanagiuchi
1005	RESERVED
1006	U.S. Patent No. 6,337,675 B1 (“Toffolo”)
1007	RESERVED
1008	EP 1 217 598 A2
1009	English Translation of Japanese Patent Application Publication No. P2000-208281 A to Fujimaki et al. (“Fujimaki”) and Declaration of Frank McGee
1010	Japanese Patent Application Publication No. P2000-208281 A
1011	RESERVED
1012	U.S. Patent No. 5,270,818 A to Ottenstein (“Ottenstein”)
1013	U.S. Patent Publication No. 2002/0118182 A1 to Weindorf et al.
1014	U.S. Patent No. 7,236,154
1015	U.S. Patent No. 6,388,388
1016	U.S. Patent No. 5,105,127
1017	U.S. Patent No. 5,202,668
1018	U.S. Patent No. 5,617,112

Exhibit No.	Description
1019	Petition For <i>Inter Partes</i> Review of U.S. Patent No. 8,223,117 Under 35 U.S.C. §§ 311-319 and 37 C.F.R. § 42.100 <i>et seq</i> in IPR 2018-01262 (filed Jun. 15, 2018).
1020	RESERVED
1021	Patent Owner Preliminary Response, <i>VIZIO, Inc. v. Polaris PowerLED Technologies, LLC</i> , IPR2020-00043 (filed Feb. 6, 2020)
1022	File History for U.S. Patent Application No. 12/336,990 (as obtained from PAIR)
1023	File History for U.S. Patent Application No. 11/023,295 (as obtained from PAIR)
1024	File History for U.S. Provisional Application No. 60/543,094 (as obtained from PAIR)
1025	Declaration of Dr. Ravin Balakrishnan in Support of Plaintiff's Opening Claim Construction Brief, <i>Polaris PowerLED Techs., LLC v. VIZIO, Inc.</i> , No. 8:18-cv-01571-JVS (DFMx), Dkt. 106-1 (Filed Sept. 13, 2019).
1026	Plaintiff Polaris PowerLED Techs., LLC's Responsive Claim Construction Brief, <i>Polaris PowerLED Technologies, LLC v. VIZIO, Inc.</i> , No. 8:18-cv-01571-JVS (DFMx), Dkt. 140 (Filed Oct. 3, 2019)
1027	Plaintiff Polaris PowerLED Technologies, LLC's Opening Claim Construction Brief, <i>Polaris PowerLED Technologies, LLC v. VIZIO, Inc.</i> , No. 8:18-cv-01571 (DFMx), Dkt. 106 (Filed Sept. 13, 2019).
1028	Declaration of Ravin Balakrishnan in Support of Plaintiff's Supplemental Claim Construction Brief, <i>Polaris PowerLED Technologies, LLC v. VIZIO, Inc.</i> , No. 8:18-cv-01571-JVS (DFMx), Dkt. 237-1 (filed Dec. 9, 2019).

Exhibit No.	Description
1029	Plaintiff Polaris Power LED Technologies, LLC’s Supplemental Claim Construction Brief, <i>Polaris PowerLED Technologies, LLC v. VIZIO, Inc.</i> , No. 8:18-cv-01571-JVS (DFMx), Dkt. 237 (filed Dec. 9, 2019).
1030	U.S. Patent No. 7,202,458 to Park
1031	U.S. Patent No. 5,406,305 to Shimomura et al.
1032	U.S. Patent No. 4,386,345 to Narveson et al.
1033	Decision Denying Institution of <i>Inter Partes</i> Review 37 C.F.R. § 42.108, <i>Samsung Electronics Co., Ltd., et al. v. Polaris PowerLED Techs., LLC</i> , IPR2018-01262 (PTAB Jan. 17, 2019).
1034	Patent Owner Preliminary Response, <i>Samsung Electronics Co., Ltd., et al. v. Polaris PowerLED Techs., LLC</i> , IPR2018-01262 (filed Oct. 26, 2018)
1035	Order re Claim Construction, <i>Polaris PowerLED Technologies, LLC v. VIZIO, Inc.</i> , No. 8:18-cv-01571-JVS (DFMx), Dkt. 212 (Nov. 26, 2019)
1036	Plaintiff’s Reply Claim Construction Brief Pursuant to Local P.R. 4-5(C), <i>Polaris Power LED Techs., LLC v. Samsung Elecs. Am., Inc.</i> , No. 2:17-cv-00715, Dkt. 123 (E.D. Tex., filed Oct. 26, 2018).
1037	Claim Construction Memorandum Opinion and Order, <i>Polaris Power LED Techs., LLC v. Samsung Elecs. Am., Inc.</i> , No. 2:17-cv-00715, Dkt. 138 (E.D. Tex., filed Jan. 7, 2019).
1038	Order re Supplemental Claim Construction Disputes, <i>Polaris PowerLED Technologies, LLC v. VIZIO, Inc.</i> , No. 8:18-cv-01571 (DFMx), Dkt. 264 (Filed Dec. 23, 2019).
1039	U.S. Patent No. 6,198,234 to Henry (“Henry”)
1040	Cases Filed Involving U.S. Patent No. 8,223,117 from DocketNavigator.

Exhibit No.	Description
1041	U.S. Patent No. 4,514,727
1042	Forward Citation Report from Espacenet for JP H11316364A
1043	Order re Scheduling Dates, <i>Polaris PowerLED Techs., LLC v. LG Electronics Inc., et al.</i> , No. SACV 20-00125JVS(DFMx), Dkt. 27 (Apr. 2, 2020)
1044	Joint Rule 26(f) Report, <i>Polaris PowerLED Techs., LLC v. LG Electronics Inc., et al.</i> , No. SACV 20-00125JVS(DFMx), Dkt. 25 (March 30, 2020)
1045	Order re Scheduling Dates, <i>Polaris PowerLED Techs., LLC v. Hisense Electronics Manufacturing Company of Am. Corp., et al.</i> , No. SACV 20-00123JVS(DFMx), Dkt. 22 (Apr. 1, 2020)
1046	Joint Rule 26(f) Report, <i>Polaris PowerLED Techs., LLC v. Hisense Electronics Manufacturing Company of Am. Corp., et al.</i> , No. SACV 20-00123JVS(DFMx), Dkt. 22 (March 30, 2020)
1047	Plaintiff's Disclosure of Asserted Claims and Infringement Contentions to LG Electronics, Inc., et al. (Patent L.R. 3-1) (served Apr. 20, 2020)
1048	Plaintiff's Disclosure of Asserted Claims and Infringement Contentions to Hisense, et al. (Patent L.R. 3-1) (served Apr. 20, 2020)
1049	Lex Machina, Motions Metrics Report (Generated Jul. 14, 2020) for Central District of California for September 2012-July 14, 2020
1050	DocketNavigator Search Results for Judge Selna Stay Decisions Pending <i>Inter Partes</i> Review
1051	"China Judicial Assistance Information," U.S. Department of State, Bureau of Consular Affairs, at https://travel.state.gov/content/travel/en/legal/Judicial-Assistance-Country-Information/China.html , last accessed

Exhibit No.	Description
	7/13/20
1052	U.S. Department of State: China Travel Advisory, https://travel.state.gov/content/travel/en/traveladvisories/traveladvisories/china-travel-advisory.html , last visited 7/13/20
1053	U.S. Embassy & Consulate in the Republic of Korea, COVID-19 Information, https://kr.usembassy.gov/022420-covid-19-information/ , last visited 7/13/20
1054	“Chapter 599C, Compulsory Quarantine of Certain Persons Arriving at Hong Kong Regulation,” Hong Kong e-Legislation, Feb. 8, 2020, at https://www.elegislation.gov.hk/hk/cap599C , last accessed 7/13/20
1055	Proclamation Suspending Entry of Aliens Who Present a Risk to the U.S. Labor Market Following the Coronavirus Outbreak, https://www.whitehouse.gov/presidential-actions/proclamation-suspending-entry-aliens-present-risk-u-s-labor-market-following-coronavirus-outbreak/ , last visited 7/13/20
1056	Order re Scheduling Dates, <i>Polaris PowerLED Techs., LLC v. TCL Corporation, et al.</i> , No. SACV 20-00127JVS(DFMx), Dkt. 217 (Apr. 2, 2020)
1057	Contingent Election Regarding Invalidity Defenses, <i>Polaris PowerLED Techs., LLC v. LG Electronics Inc., et al.</i> , No. SACV 20-00125JVS(DFMx), Dkt. 35 (filed Jul. 16, 2020)
1058	Contingent Election Regarding Invalidity Defenses and Counterclaims, <i>Polaris PowerLED Techs., LLC v. Hisense Electronics Manufacturing Company of Am. Corp., et al.</i> , No. SACV 20-00123JVS(DFMx) (filed Jul. 16, 2020)

CLAIM LISTING

<u>Claim 1</u>	
[1.Pre]	A brightness control circuit with selective ambient light correction comprising:
[1A]	a first input configured to receive a user signal indicative of a user selectable brightness setting;
[1B]	a light sensor configured to sense ambient light and to output a sensing signal indicative of the ambient light level;
[1C]	a multiplier configured to selectively generate a combined signal based on both the user signal and the sensing signal; and
[1D]	a dark level bias configured to adjust the combined signal to generate a brightness control signal that is used to control a brightness level of a visible display such that the brightness control signal is maintained above a predetermined level when the ambient light level decreases to approximately zero.
<u>Claim 2</u>	
	The brightness control circuit of claim 1, wherein the dark level bias is provided to the multiplier such that the amount of adjustment to the

	combined signal is dependent on the user selectable brightness setting.
<u>Claim 4</u>	
	The brightness control circuit of claim 1, wherein the dark level bias is added to the combined signal such that the amount of adjustment to the combined signal is independent of the user selectable brightness setting.
<u>Claim 5</u>	
	The brightness control circuit of claim 4, wherein the dark level bias is added to an output of the multiplier.
<u>Claim 6</u>	
	The brightness control circuit of claim 1, further comprising an overdrive clamp circuit coupled to the brightness control signal to limit its amplitude to a predefined range.
<u>Claim 7</u>	
	The brightness control circuit of claim 1, wherein the brightness control signal is provided to a display driver to control backlight illumination of a liquid crystal display.

<u>Claim 9</u>	
	The brightness control circuit of claim 1, further comprising a second input configured to receive a selection signal to selectively operate the brightness control circuit in an auto mode or a manual mode, wherein the selection signal enables the light sensor in the auto mode and disables the light sensor in the manual mode.
<u>Claim 15</u>	
[15.Pre]	A method to selectively provide ambient light correction, said method comprising:
[15A]	receiving a user input signal indicative of a user selectable brightness setting;
[15B]	selectively multiplying the input signal with a sense signal to generate a combined signal, wherein the sense signal indicates an ambient light level; and
[15C]	adjusting the combined signal with a dark level bias to generate a brightness control signal for controlling brightness of a visible display such that the brightness control signal is maintained above a predetermined level when the ambient light level decreases to approximately zero.

<u>Claim 16</u>	
	The method of claim 15, wherein the step of selectively multiplying the input signal with the sense signal is performed by a software algorithm, an analog circuit, or a mixed-signal circuit.

LG Electronics, Inc. and Hisense Co., Ltd. hereby petition for *inter partes* review of claims 1-2, 4-7, 9, and 15-16 of U.S. Patent No. 8,223,117.

I. OVERVIEW

The '117 patent describes a way of controlling a display backlight which performs mathematical operations on a user signal, a signal reflecting ambient light levels, and something called a “dark level bias,” which avoids the display going completely dark when the ambient light level is “approximately zero.” This was no invention.

Before the alleged invention, those skilled in the art had known for years that displays needed to be adjusted to accommodate for ambient light conditions. Ex. 1032, 1:56-2:5. By the 1980’s backlit displays were increasingly prevalent in aircraft and vehicles. *Id.*, Ex. 1041, 1:19-45; Ex. 1016, 1:10-22. Under high ambient light conditions, brighter backlighting was needed for a user to see the display. Ex. 1016, 1:18-22; Ex. 1008, ¶ [0006]; Ex. 1013, ¶ [0006]; Ex. 1014, Fig. 2; Ex. 1015, 1:28-42. Users could see the display with dimmer backlighting in a dark environment. Ex. 1008, ¶ [0006].

Some early backlit displays allowed manual adjustment of the backlight brightness. Ex. 1016, 2:50-59; Ex. 1017, 1:23-29, 4:44-55. These manual systems were inconvenient and could lead to the user overdriving the display. Ex. 1006, 1:9-17; Ex. 1017, 4:66-5:2.

Automatic systems using ambient light sensors to detect ambient light levels were also used to automatically adjust backlight brightness. Ex. 10018, Ex. 1017, Ex. 1041; Ex. 1032. The concept of a dark level bias was known to be important for these systems to avoid having the display going dark when ambient light levels dropped to zero. Ex. 1041, 8:14-16; Ex. 1008, ¶ [0036].

Complete manual control and completely automatic control also had drawbacks as there were limits on customization to accommodate user preferences. Ex. 1003, ¶ [0003]. To give the user more flexibility, systems were devised which automatically controlled backlight brightness based on user settings and ambient light levels. Ex. 1003, ¶¶ [0004]-[0008]; Ex. 1017, Fig. 12, 8:12-41; Ex. 1008, ¶¶ [0046]-[0059]; Ex. 1032, Abst.

Such solutions included systems which performed certain mathematical operations on signals representing ambient light levels, user preferences, and settings which kept the backlight display at a certain minimum level of brightness even under dark conditions. The references relied upon in this petition, such as Yanagiuchi, Fujimaki, Toffolo, and Ottenstein, reflect old technologies. These references describe and render obvious the claimed signals, values, circuits, and mathematics as explained in detail in this Petition.

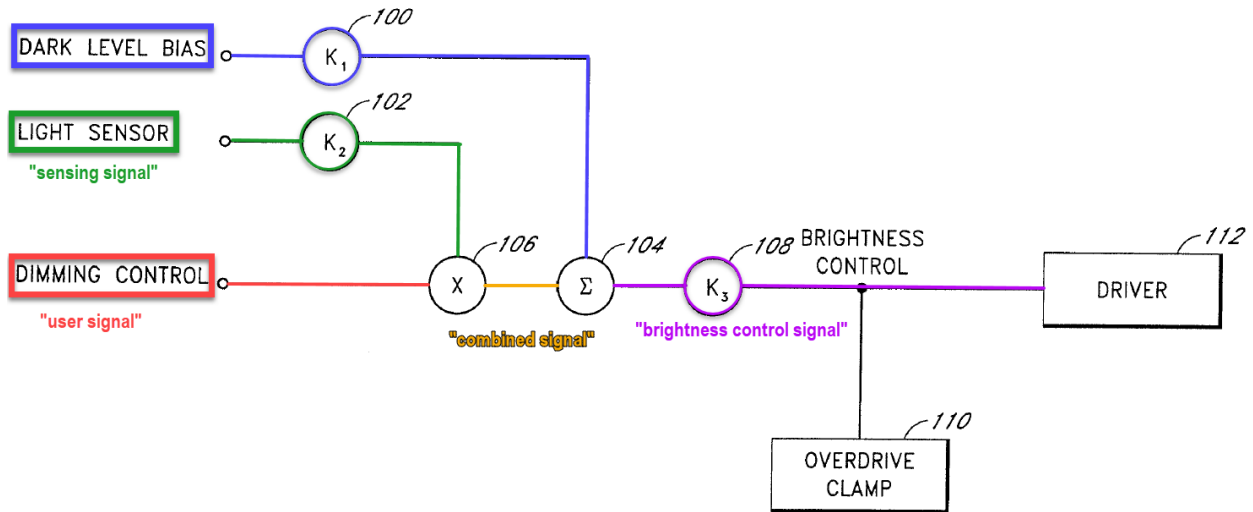
The grounds presented in this Petition have never been seen by the Office before and are based on Japanese language references that have been overlooked

during examination as well as earlier litigation over the '117 patent. Therefore, Petitioner submits that it has satisfied its burden to show institution is appropriate, and the Board should exercise its discretion and institute trial on this Petition and, ultimately, cancel all challenged claims.

II. U.S. PATENT NO. 8,223,117

The alleged invention includes “a light sensor control system that” allows “a fully automatic and fully adaptable method of adjusting display brightness in response to varying ambient lighting conditions in combination with various user preferences.” Ex. 1001, 1:60-64. The alleged invention manipulates, through operations including multiplication, (1) a user signal, (2) a sensing signal from an ambient light sensor, and (3) a “dark level bias” to generate a signal for controlling the backlight of a display. Ex. 1001, Figs. 1, 2, Abstract, 1:64-67, 2:54-61.

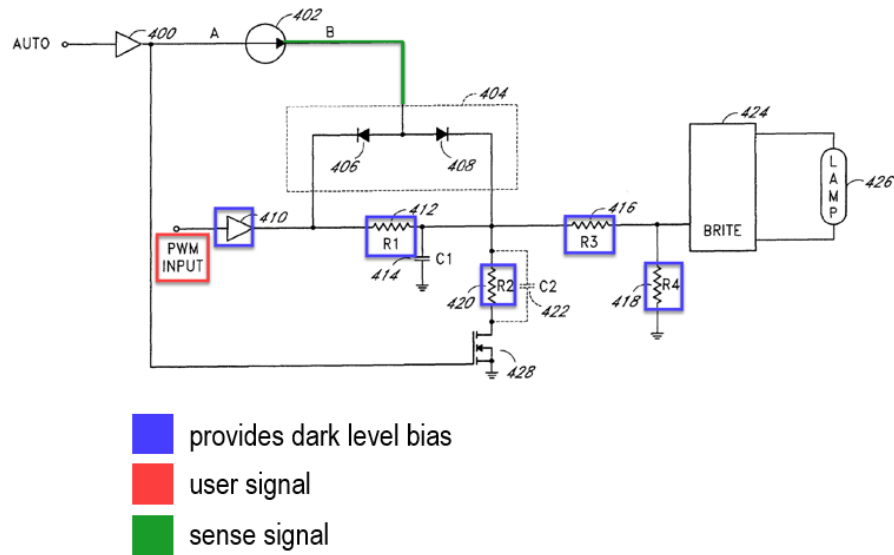
In one embodiment a “brightness control signal” is created “using dark level bias, a sensing signal from the light sensor, and a user signal indicative of a user selectable brightness setting (called ‘dimming control’).” Ex. 1025, ¶ 16 (citing Ex. 1001, 5:15-43). This embodiment is illustrated below.



Ex. 1001, Fig. 2 (annotated). A sensing signal (“LIGHT SENSOR”) may be adjusted (K_2) and is input into multiplier circuit (106) along with user signal (“DIMMING CONTROL”). *Id.*, 5:16-20. “The multiplier circuit 106 outputs a signal that is the product of the user input and scaled light sensor output.” *Id.*, 5:20-22; Ex. 1021, pp.52-53. “A summing circuit 104 adds the product to a dark level bias (DARK LEVEL BIAS),” which may also be adjusted (K_1). The summing circuit produces a “brightness control signal (BRIGHTNESS CONTROL) for a display driver 112.” Ex. 1001, 5:24-27.

Polaris has described embodiments of the '117 patent. For example, the following annotated version of Figure 4 and its corresponding equation shows how Polaris and its expert find certain signals and values in the '117 patent.

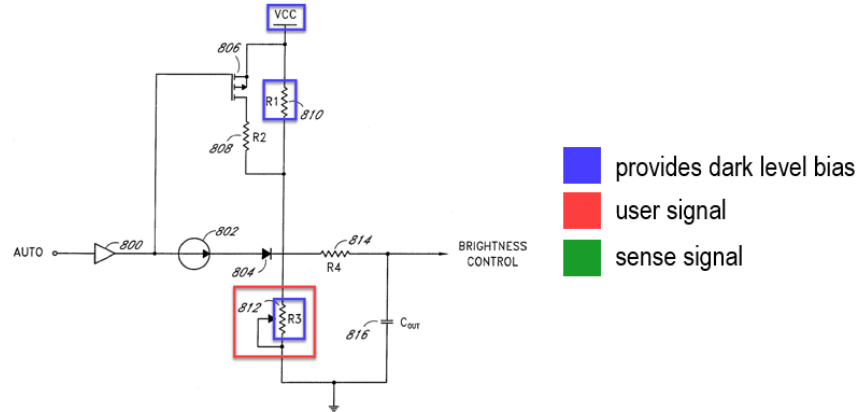
$$BCS1 = \text{duty cycle} \times \left[\left(\frac{VCC \times R2 \times R4}{[(R1 + R2) \times (R3 + R4)] + (R1 \times R2)} \right) + \left(\frac{ISRC \times R1 \times R2 \times R4}{[(R1 + R2) \times (R3 + R4)] + (R1 \times R2)} \right) \right]$$



Ex. 1001, Fig. 4 (annotated), 7:3-24; Ex. 1021, p.60 (annotating Ex. 1001, 7:17-24); Ex. 1026, pp.10-11; Ex. 1027, p.5, Ex. 1029, p.1 (correlating “PWM input” to “user signal”).

Another example is found in Figure 8 and its corresponding equation, which Polaris explains includes a combination of the sensing signal, user signal, and dark level bias.

$$BCS3 = \left[VCC \times \frac{R3}{(R1 + R3)} \right] + \left[ISRC \times \frac{(R1 \times R3)}{(R1 + R3)} \right]$$

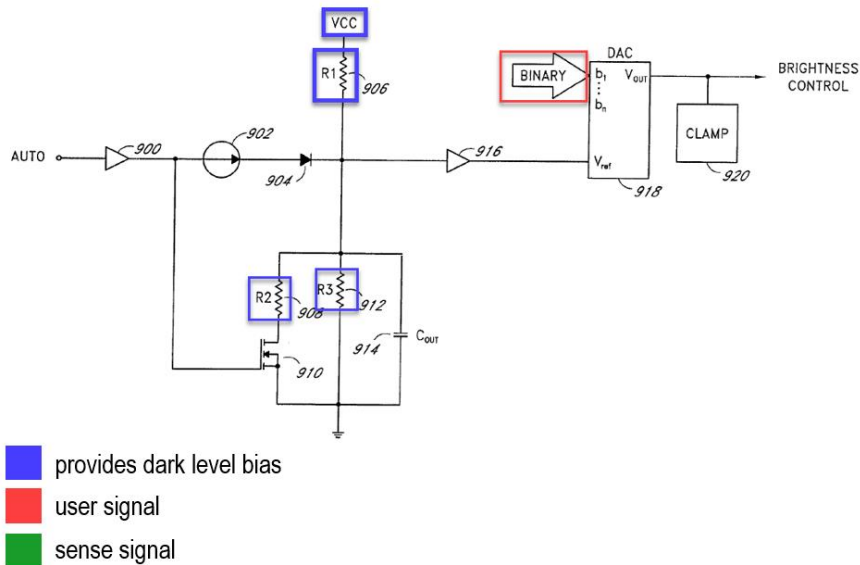


Ex. 1001, Fig. 8 (annotated), 9:38-10:19; Ex. 1021, pp.60-61; Ex. 1026, p.12; Ex. 1027, p.16. In this example, “a user adjustable potentiometer (R3)” provides the user selectable brightness setting. Ex. 1001, 3:28-30, 9:38-42. As can be seen from Polaris’s annotations (re-colored, and reproduced here), the user setting impacts the dark level bias by the inclusion of the R3 term.

Another example is shown in Figure 9 and the equation for signal “BCS5.” Ex. 1001, Fig. 9, 11:10-15. Based on Polaris’s description and annotations of the figure and equation, they show the combination of a user signal, sense signal, and dark level bias.

BCS5 =

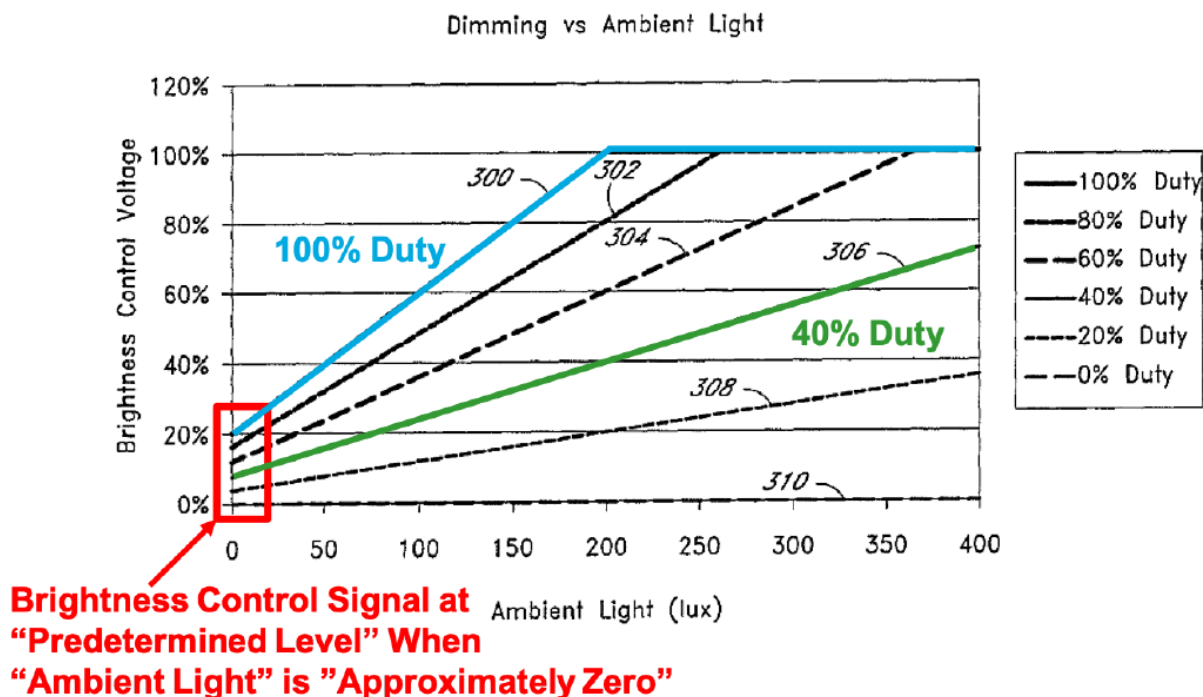
$$\text{binary \% fullscale} \times \left[\frac{[VCC \times (R2 \times R3)] + [ISRC \times R1 \times R2 \times R3]}{(R1 \times R2) + (R1 \times R3) + (R2 \times R3)} \right]$$



Ex. 1001, Fig. 9, 11:10-15; Ex. 1021, pp.45, 51, 61, 70; Ex. 1026, pp.11-12 (“‘dark level bias’ is a signal value generated by the brightness control circuit involving the supply voltage (VCC)” and resistors R1, R2, and R3); Ex. 1027, pp.6, 16; Ex. 1028, ¶ 13; Ex. 1029, pp.4-5.

Each of the examples shown in Figures 4, 8, and 9 “can operate in an automatic or manual mode,” depending on the state of the “AUTO” signal. Ex. 1025, ¶¶ 18, 20, 22 (citing Ex. 1001, 7:3-8:90 [sic 9], 9:28-10:32, 10:33-11:26); Ex. 1001, 6:38-42. The equations for generating BCS1, BCS3, and BCS5 are used in the “auto” mode. Ex. 1025, ¶¶ 18, 20, 22. In the manual mode, the sense signal from the ambient light sensor is not used to adjust the brightness. Ex. 1001, 6:38-42, 9:61-64.

The effect of a dark level bias is illustrated in Figure 3. As shown in the graph, as ambient light levels reach approximately zero, the display is still driven by a signal such that the display does not go completely dark. Ex. 1001, Fig. 3, 2:57-61, 5:44-67. This annotated version of Figure 3 was created by Polaris:



Ex. 1026, p.24 (annotating Ex. 1001, Fig. 3).

III. PROSECUTION HISTORY

The '117 patent is a continuation of Application No. 11/023,295 and claims the benefit of Provisional Application No. 60/543,094. The '295 application's original claims were rejected over, *inter alia*, a reference related to U.S. Patent No. 7,202,458 to Park, Ex. 1023-431 to -433, which shows a system in which a user can select whether to adjust brightness of a display backlight based on ambient light or

“brightness distribution data of an inputted video signal” using “selector 20.” Ex. 1030, 3:64-4:21, Fig. 1.

In response, Applicant amended the claims to require a “dimming control input signal” that “indicate[s] a desired brightness level for one or more light sources” and a multiplier circuit that generates the brightness control signal “based on a mathematical product of” the sensor signal and input signal. Ex. 1023-186. Applicant contended that the claimed multiplier was not found in Park because “[t]he output of the environmental sensor 22 is not multiplied with a dimming control input signal used by a user to indicate a desired brightness level.” Ex. 1023-190.

The examiner disagreed, maintained the rejection, and also rejected the claims over U.S. Patent No. 5,406,305 to Shimomura et al. as a primary reference. Ex. 1023-142 to -164. Shimomura teaches a system for adjusting a backlight using a signal from an ambient light sensor and a “desired luminance level” input by the user. Ex. 1031, 2:40-55; Ex. 1022-151. In response Applicant further limited the multiplier to include a “pair of current steering diodes,” “a network of resistors,” and “at least one capacitor.” Ex. 1023-55. The claims were then allowed. Ex. 1023-39 to -42.

In the continuation application resulting in the ’117 patent, the Applicant broadened aspects of the multiplier and added the requirement for the dark level bias to independent claim 21 (issued claim 1). Ex. 1022-172. The claims were rejected

over U.S. Patent No. 4,386,345 to Narveson (among others), which disclosed a CRT display for an airplane cockpit that automatically adjusted the brightness setting of the display based on ambient light, light levels from outside of the cockpit, and other considerations. Ex. 1032, Abstract, 1:56-2:5, 6:25-38. Applicant amended each independent claim to recite that the dark level bias adjusted the brightness control signal to be “maintained above a minimum level when the ambient light level decreases to approximately zero.” Ex. 1022-70. According to Applicant, Narveson did not “disclose, teach or suggest the use of [such] a dark level bias,” which the applicant characterized as “ensur[ing] a predefined (or minimum) brightness in total ambient darkness.” *Id.* The ’117 claims were allowed without further comment. Ex. 1022-60.

IV. PRIOR PETITIONS FOR IPR

Two petitions for IPR have been filed against the ’117 patent. One of them was considered on the merits under the “reasonable likelihood” standard.¹ 35 U.S.C. §314(a). IPR2018-01262 (“the -1262 IPR”) challenged certain claims of the ’117

¹ IPR2020-00043 was denied based on an exercise of discretion under §314(a) in light of an upcoming trial date. A rehearing request was filed, but, at time of this filing, has not been acted upon. The arguments presented in that petition were not evaluated on the merits.

patent on three grounds, all involving U.S. Patent No. 5,554,912 (“Thayer”) and EP0570037 (“Godwin”). The Board denied institution because the petition failed to explain how Thayer and Godwin taught the “dark level bias” limitation. Ex. 1033, p.12. The petition relied on an “adjusted look-up table value” as the claimed “combined signal” and a “minimum brightness setting” as the “dark level bias.” *Id.* The problem was that Thayer did not use the minimum brightness setting to adjust the look-up table value, but instead “the minimum brightness level adjusts the instrument display intensity” *Id.*, p.13. And, the petition failed to articulate how the combination rendered the claimed features obvious. *Id.*, p.14.

V. DENIAL UNDER § 325(D) IS INAPPROPRIATE

Under *Advanced Bionics, LLC v. MED-EL Elektromedizinische Geräte GmbH*, IPR2019-01469, Paper 6 (PTAB Feb. 13, 2020) (precedential) and *Becton, Dickinson & Co. v. B. Braun Melsungen AG*, IPR2017-01586, Paper 8 (Dec. 15, 2017 (precedential-in-part)), the Board should not deny this petition under §325(d). All grounds for trial all rely at least in part on Yanagiuchi and Fujimaki, Japanese-language references that have never before been applied against the ’117 patent’s claims. They both disclose specific ways of calculating display brightness using multiplication of the claimed signals, and adjustment with a dark level bias, in a way that none of the prior art addressed by the Office has before. These references bear directly on the reasons for allowance and denial of the -1262 IPR—i.e., the presence

of a dark level bias to maintain the brightens control signal over a certain level. Ex. 1022-70. Therefore, the grounds presented herein are new and have not been previously considered by the Office.

Reliance on the Yanagiuchi-Toffolo and Ottenstein-Fujimaki combinations also does not warrant denial under §325(d). Toffolo was used in the -1262 IPR against claims 9 and 20, but was not applied against any other claims. Ex. 1019, pp.5, 59-62. The prior institution decision did not address Toffolo's relevance to the claims. Ex. 1033, p.16. Even if the Office had evaluated Toffolo in connection with other claims, the Office has never evaluated the Yanagiuchi-Toffolo combination presented for the first time here.

Ottenstein was buried among over 400 references, including litigation materials, identified during prosecution. The Office never applied Ottenstein against the claims, and it has never seen the Ottenstein-Fujimaki combination relied on here. Ottenstein's teachings (in combination with those of Fujimaki), are highly material and squarely address features key to allowance of the '117 claims in the first place—i.e., the claimed “dark level bias” that “adjust[s] the combined signal to generate a brightness control signal that is used to control a brightness level of a visible display such that the brightness control signal is maintained above a predetermined level when the ambient light decreases to approximately zero.” Ex. 1022-70, -76. Therefore, not only was Ottenstein not applied in a rejection, and its teachings appear

to have been overlooked during examination, its combination with Fujimaki shows that the evidence and facts presented herein warrant further consideration of Ottenstein, thus demonstrating that *Becton, Dickinson* factors (c), (e), and (f) favor institution over denial under § 325(d).²

VI. GENERAL PLASTICS DOES NOT WARRANT DENIAL UNDER §314(A)

This is Petitioners' first petition against the '117 patent. Petitioners were not involved with the filing of the earlier petitions for IPR and there is no close relationship between Petitioners and the prior petitioners (i.e., Samsung and VIZIO). Prior petitioners used different law firms from those representing Petitioners here. *Valve Corp. v. Elec. Scripting Prods., Inc.*, IPR2019-00062 (PTAB Apr. 2, 2019) (precedential). Moreover, Polaris's serial litigation tactics have result in parties sued years apart thus producing different petitions over the years. Polaris sued Samsung in October 2017, and VIZIO in 2018, Ex. 1040, resulting in petitions being filed in

² Henry (applied against claim 6 herein) was cited in an IDS with documents pertaining regarding litigation of Henry. Ex. 1001, References Cited. Henry was never used as a basis for rejection. Because Henry is being used to address a dependent claim the *Becton, Dickinson* factors applicable to the independent claims apply equally to the challenges based on combining Yanagiuchi or Fujimaki with Henry.

June of 2018 and October 2019—before Polaris filed suit against either LG or Hisense, *id.* Thus, the timing of filings is “a direct result of [Polaris’s] litigation activity.” *Alphatech Holdings, Inc. v. Nuvasive, Inc.*, IPR2019-00361, Paper 19 (PTAB Jul. 9, 2019). While all claims challenged here were challenged in one or more prior petitions, no trial has been instituted as to any of them. This factor thus favors institution.

Petitioners were unaware of Fujimaki when the earlier IPRs were filed, and while Yanagiuchi had been cited against an earlier LG patent application in Korea many years ago, Ex. 1042, LG discovered the relevance of Yanagiuchi to the ’117 patent when preparing its defenses to Polaris’s lawsuit. Hisense was unaware of either reference until it learned of the art in connection with preparing invalidity contentions in the litigation (scheduled to be served after this petition is filed). Therefore, this factor favors institution.

While Petitioners have Polaris’s preliminary responses filed in both earlier IPRs and the decisions denying institution, this Petition does not address arguments explicitly raised or issues specifically addressed by the Board in prior papers because it presents new references—Yanagiuchi and Fujimaki—and reflects a different application of the prior art from that previously considered by the Office. This factor favors institution.

Petitioners have diligently pursued this petition by evaluating rafts of prior art

to determine its applicability to the challenged claims. More than 400 documents are cited on the '117 patent, which is one of two patents asserted against LG and Hisense. Ex. 1001, pp.1-3. Petitioner commissioned prior art searches, evaluated prior art from earlier litigations, and obtained translations of relevant references. This Petition is filed before invalidity contentions are even due in the co-pending litigations. Ex. 1043, p.1; Ex. 1044, p.10; Ex. 1045, p.1; Ex. 1046, p.10. Petitioners recognized the relevance of Yanagiuchi and Fujimaki to the claims in connection with the preparation of their invalidity defenses and promptly presented them to the PTAB.

Based on the timing of the Samsung and VIZIO litigations and petitions, Petitioner had little incentive to pay the significant fees and costs to partake in IPRs addressing allegations of patent infringement against their competitors when they were not subject to litigation. After suit was filed against LG and Hisense in late January 2020, they answered the Complaint in April 2020, and received Polaris's infringement contentions on April 20, 2020. Ex. 1047, p.8; Ex. 1048, p.9. This petition is filed several months after Petitioners' answers and before invalidity contentions are due. During this time, a pandemic impacted business, extensive prior art review has been undertaken, translations have been obtained, and expert opinion has been obtained. Thus, to the extent there is any delay, it should not weigh against institution because Petitioners acted promptly under the circumstances.

The PTAB has not instituted any prior trial on the '117 patent. The PTAB can resolve the patentability issues presented in this petition in the one-year period. There are thus no efficiency concerns raised by instituting this proceeding.

That this is LG's and Hisense's first petition, this Petition rests on prior art not seen or evaluated by the Office in the context of the '117 patent before, Petitioner has been diligent in challenging the '117 patent, coupled with the fact that no prior IPRs have been instituted on the '117 patent, collectively weighs heavily in favor of institution. *LG Elecs., Inc. v. Bell N. Research, LLC*, IPR2020-00319, Paper 15 (PTAB Jun. 23, 2020). Polaris's serial litigation over several years, and the fact that Petitioner has indicated that it elects to proceed before the Board on these challenges rather than before the district court, *infra* §XIII, supports institution. *Microsoft Corp. v. Iron Oak Techs., Inc.*, IPR2019-00107, Paper 8, pp.53-54 (PTAB May 15, 2019).

VII. PERSON OF ORDINARY SKILL IN THE ART

A person of ordinary skill in the art ("POSA") at the time of the alleged invention in the 2003-2004 time-frame would have had at least a bachelor's degree in electrical engineering, physics, optics or a related field, and approximately three years of experience with field of visual displays, circuit design, and related technologies. Ex. 1002, ¶¶ 19-21.

VIII. CLAIM CONSTRUCTION

Claim terms are construed according to their ordinary and customary meaning as understood by a POSA in light of the intrinsic record of the patent. 37 C.F.R. §42.100(b). Certain terms have been construed by the Eastern District of Texas and/or the Central District of California. Petitioner applies these constructions in this Petition for consistency.

A. “a first input configured to receive a user signal indicative of a user selectable brightness setting” (claim 1)

This term has been construed as “first input actually programmed or implemented with hardware or software to receive a user signal indicative of a user selectable brightness setting.” Ex. 1038, pp.7-8.

B. “a multiplier configured to selectively generate a combined signal based on both the user signal and the sensing signal” (claim 1) / “selectively multiplying the input signal with a sense signal to generate a combined signal, wherein the sense signal indicates an ambient light level” (claim 15)

The Eastern District of Texas held that the “combined signal includes, but is not necessarily limited to, the product of the user signal and the sensing signal,” and its construction otherwise reflected the claim language. Ex. 1037, p.29. According to the Central District of California, the phrase “multiplier configured to” meant that the multiplier be “actually programmed or implemented with hardware or software” to perform the selective generation of the claim. Ex. 1035, p.12.

C. “a dark level bias configured to adjust the combined signal to generate a brightness control signal that is used to control a brightness level of a visible display” (claim 1) / “adjusting the combined signal with a dark level bias” (claim 15)

The term “dark level bias” has been construed to mean “a value that causes a deviation from the combined signal, where the value is a voltage value of an electrical signal or value of a software variable.” Ex. 1038, p.34. The broader phrase from claim 1 was construed to mean “a dark level bias actually programmed or implemented with hardware or software to adjust the combined signal to generate a brightness control signal that is used to control a brightness level of a visible display.” Ex. 1035, p.34.

D. “approximately zero” (claims 1, 15)

This term has been construed as “zero or a level close enough to zero that a light sensor would measure zero or a corresponding sensing signal would round to zero.” Ex. 1035, p.35.

E. “an overdrive clamp circuit coupled to the brightness control signal to limit its amplitude to a predefined range” (claim 6)

The phrase “to limit its amplitude to a predefined range” has been interpreted, in the context of this phrase, to mean “limit the absolute value of the brightness control signal’s amplitude to be less than a predefined level.” Ex. 1037, p.30.

F. “second input configured to receive a selection signal to selectively operate the brightness control circuit in an auto mode or a manual mode” (claim 9)

This term has been construed to mean “second input actually programmed or

implemented with hardware or software to receive a selection signal to selectively operate the brightness control circuit in an auto mode or a manual mode.” Ex. 1038, pp.7-8.

IX. OVERVIEW OF THE CHALLENGE AND RELIEF REQUESTED

Petitioner requests institution of trial and cancelation of the challenged claims based on the following obviousness (§103) grounds:

Ground	Reference(s)	Claims
1	Yanagiuchi	1-2, 4-5, 7, 15-16
2	Yanagiuchi in view of Toffolo	1-2, 4-5, 7, 9, 15-16
3	Fujimaki	1-2, 4-5, 7, 15-16
4	Ottenstein in view of Fujimaki	1-2, 7, 9, 15-16
5	Yanagiuchi in view of Henry	6
6	Yanagiuchi in view of Toffolo and further in view of Henry	6
7	Fujimaki in view of Henry	6

All citations to Japanese-language references (Yanagiuchi and Fujimaki) are to English translations of the Japanese publications submitted herewith.

X. PRIOR ART STATUS OF REFERENCES

All references relied upon are prior art under §102(b) based on their publication year as shown below:

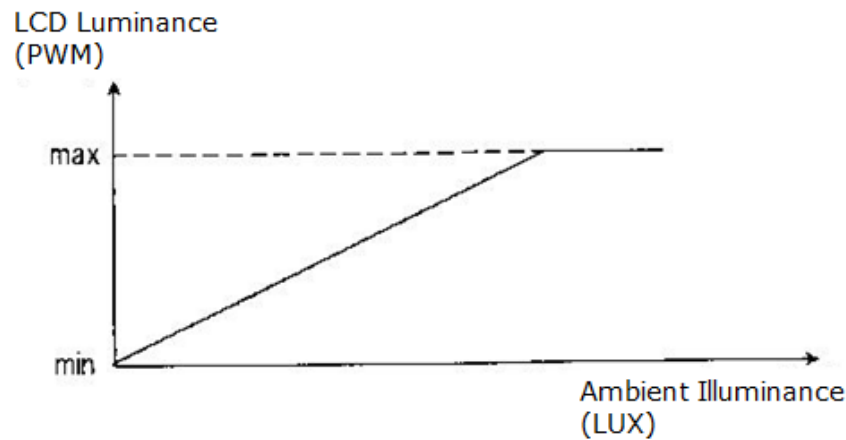
Reference	Publication/Patent Year
Yanagiuchi	1999
Toffolo	2002
Fujimaki	2000
Ottenstein	1993
Henry	2001

XI. DETAILED DISCUSSION OF UNPATENTABILITY

A. Claims 1-2, 4-5, 7, and 15-16 Would Have Been Obvious Over Yanagiuchi (Ground 1) and Claims 1-2, 4-5, 7, 9, and 15-16 Would Have Been Obvious Over Yanagiuchi in View of Toffolo (Ground 2)

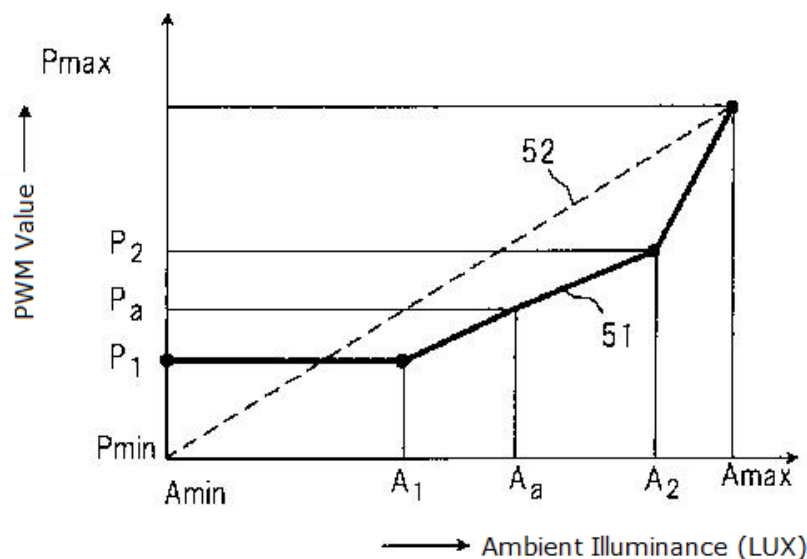
1. Yanagiuchi and Toffolo Overview

Yanagiuchi discloses “an automatic dimmer” designed to solve two problems. Ex. 1003, ¶¶ [0003]-[0004]. Prior art automatic dimmers controlled brightness “along a straight line as shown in FIG. 6” (below), and users lacked the freedom to define (1) “any LCD luminance values between the min-max values” or (2) “the minimum value min on the luminance changing curve.” *Id.*, ¶ [0003].



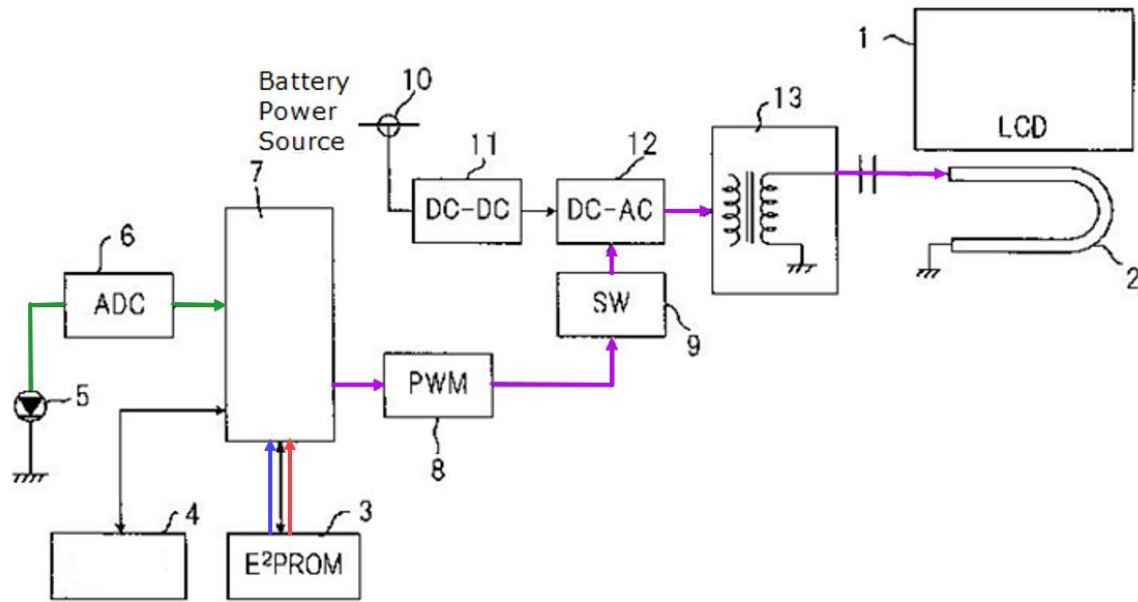
To give users more control over brightness adjustments, Yanagiuchi allows the “user to set the LCD changing curve so that LCD luminance control can be provided along this curve.” *Id.*

Yanagiuchi allows users to specify “one or more breakpoints (A_1, P_1), (A_2, P_2),” such that the luminance changing curve could vary in slope between its endpoints to solve the first problem. *Id.*, ¶¶ [0003], [0006]. Yanagiuchi also allowed users to set “the minimum value min on the luminance changing curve,” thus permitting the user to define (A_{min}, P_1) instead of the prior art (A_{min}, P_{min}) (e.g., Fig. 2):



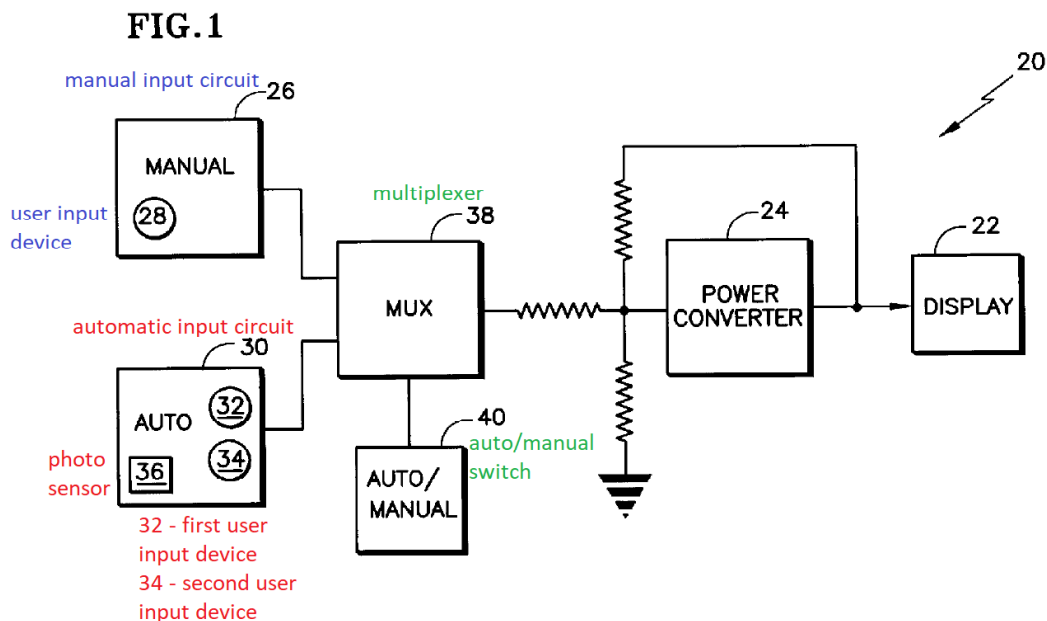
Id., Fig. 2.

Yanagiuchi's user thus defines a start point, end point, and breakpoints via a "control panel" (4). *Id.*, ¶ [0007]. Values associated with these points are stored in E²PROM for later use by a microcomputer to calculate "PWM value P_a " from equation (1) using the sensing signal A_a (a digital version of the analog signal from photosensor (5)) and values reflecting the user selections. *Id.*, ¶¶ [0006]-[0008], Figs. 1, 4. The calculated PWM value (P_a) is then "applied to the CFL 2 to generate backlighting for the LCD display at the luminance desired by the user" *Id.*, ¶ [0008]. The PWM values can have a duty ranging from 0 to 100%. *Id.*



Id., Fig. 1 (annotated), ¶¶ [0006]-[0008].

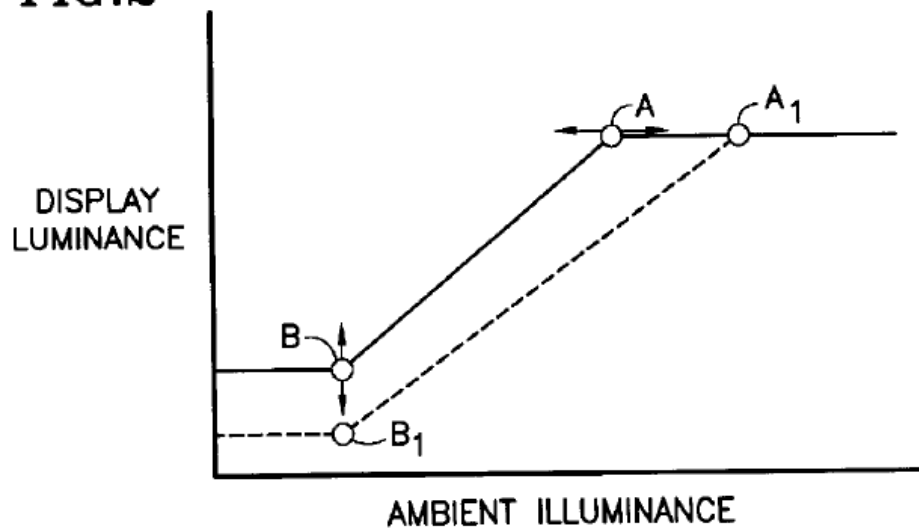
Toffolo discloses a backlight control system for vehicles. Ex. 1006, Abstract, 1:6-8, 1:20-21. Toffolo's uses "automatic and manual brightness control" which allows a user to input values for minimum and maximum display brightness, or override the automatic adjustments in a manual mode. *Id.*, 1:35-40, 2:6-13, 2:29-47, Figs. 1, 2. Toffolo includes a "MUX" to select between automatic and manual brightness adjustment modes. *Id.*, 2:6-9.



Id., Fig. 1 (annotated).

Toffolo may be driven at system limits at the extremes. In Figure 2, the display luminance at point A is the maximum display luminance for the backlight, and point B corresponds to the lowest amount of light that can be sensed by the sensor. *Id.*, 2:18-24. The user adjusts the display luminance at the minimum detectable ambient light and can adjust the point at which the ambient light causes the display to reach its brightest level.

FIG.2



Id., Fig. 2.

2. *Claim 1*

- a. [1.Pre] “A brightness control circuit with selective ambient light correction comprising:”

Yanagiuchi discloses or renders obvious the preamble alone or with Toffolo. Yanagiuchi Figures 1 and 4 shows brightness control circuits. Ex. 1003, Figs. 1, 4, ¶¶ [0006]-[0008], [0010]-[0013]. The circuit forms an “automatic dimmer that control[s] the luminance of an LCD display device based on ambient illuminance,” and thus performs ambient light correction. *Id.*, ¶¶ [0001], [0004]-[0010].

Yanagiuchi’s brightness control circuit performs “selective” ambient light correction in two ways. First, it allows the user to select points, including a start point (A_{min} , P_1), breakpoints (A_1 , P_1), (A_2 , P_2), and an endpoint (A_{max} , P_{max}), thus defining a “luminance changing curve.” *Id.*, ¶¶ [0004]-[0007]. Yanagiuchi’s

ambient light correction is “selective” because the ambient light adjustment is user-selectable. Ex. 1002, ¶ 89. Second, Yanagiuchi’s ambient light correction is “selective” because different curves are used at different times. For example, “luminance changing curve 52” can be “enabled” and “the luminance changing curve can be switched from” curve 52 to curve 51, such that curve 51 is “set.” Ex. 1003, ¶¶ [0011], [0013]. Switching between curve 51 and curve 52 also shows “selective” ambient light correction. Ex. 1002, ¶ 90.

To the extent “selective” in the preamble relates to performing ambient light correction or *not* performing ambient light correction (i.e., not using a sensing signal), Ex. 1034, p.12, this type of “selective” ambient light correction would have been obvious over Toffolo.

Toffolo describes “automatic and manual brightness control,” Ex. 1006, Abstract, which is implemented using a multiplexer allowing the user to “selectively choose[] the input from either the manual input circuit 26 or the automatic input circuit 30 as determined by a switch,” or to override the automatic input circuit by entering a manual input. *Id.*, 2:6-13. Mode selection—i.e., automatic or manual mode—renders Toffolo’s ambient light correction “selective.” Ex. 1002, ¶¶ 92-93.

It would have been obvious to include a feature by which the user selects a manual brightness control mode, thus overriding Yanagiuchi’s automatic brightness control to provide increased flexibility for the user, consistent with Yanagiuchi’s

goals. Ex. 1002, ¶¶ 94-98.

The POSA knew that displays in vehicles, like those of Yanagiuchi and Toffolo, needed to operate under wide variations in ambient light. Ex. 1003, ¶ [0008] (battery for automobile 10 and reference to “engine speed”); Ex. 1006, 1:5-10 (referring to vehicle displays). POSAs therefore used schemes to automatically and manually adjust the display brightness to make displays brighter in bright ambient light and dimmer in lower ambient light. Ex. 1002, ¶ 95 (citing Ex. 1003, ¶¶ [0003], [0006]-[0008], Ex. 1006, 1:20-34). Thus, users were able to maintain an appropriate level of brightness for the display under various conditions.

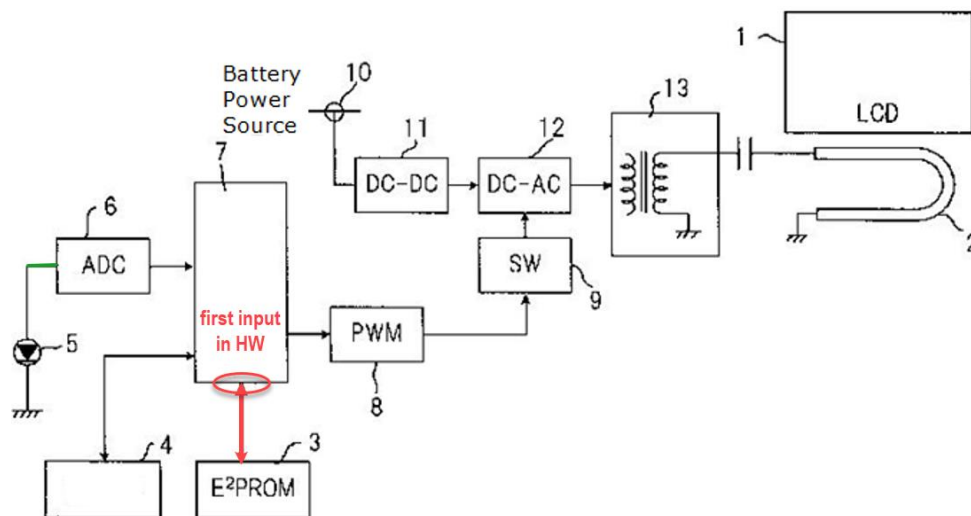
Although Yanagiuchi discusses automatic brightness adjustment, it does not acknowledge manual adjustment. Ex. 1003, ¶ [0002]. Not only was manual adjustment of display brightness well-known, as Toffolo shows, POSAs already knew how to combine automatic brightness adjustment and manual adjustment such that the user could selectively employ either adjustment scheme for their display. A POSA in 2003/2004 would have been motivated to add an ability to selectively activate manual display brightness control in the context of Yanagiuchi’s automatic brightness control system to give the user increased freedom to control backlight brightness. Ex. 1002, ¶¶ 96, 98. The desire to provide the user with freedom to modify brightness levels is suggested by Yanagiuchi. Ex. 1003, ¶ [0003]. Indeed when an operator is driving a vehicle it would be difficult or irresponsible to try to

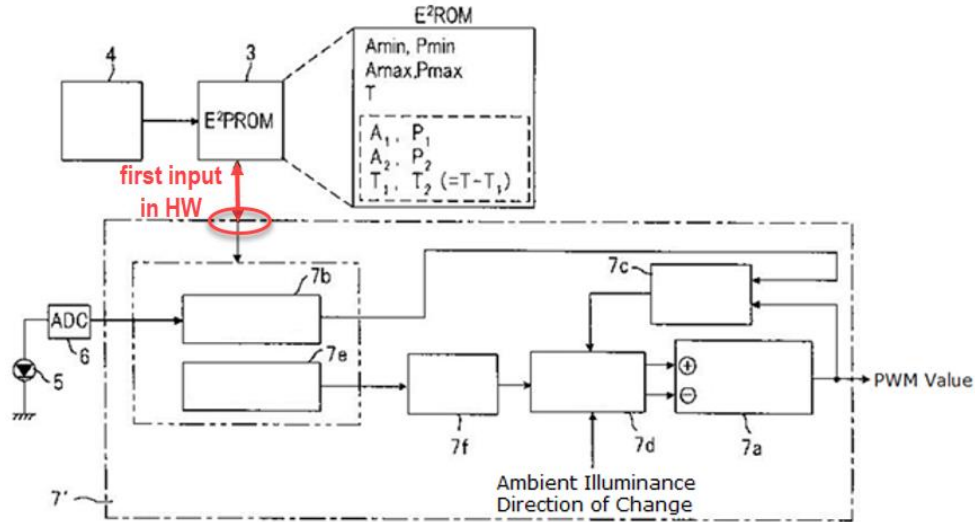
set all of the values required to define an appropriate curve according to Yanagiuchi if the user is unhappy with the amount of light being given off by the display. Ex. 1002, ¶ 97. It thus would have provided an advantage to allow the user to override automatic control in favor of a manual brightness control, at least for some period of time until it became possible to reconfigure the data points for the luminance changing curve or conditions changed. Ex. 1002, ¶ 97. Thus, combining Toffolo's multiplexer and manual adjustment features, along with the ability to toggle between manual and automatic brightness adjustment would have reflected the use of a known technique (i.e., Toffolo's techniques of selective manual and automatic brightness control) to improve a similar device (i.e., Yanagiuchi's automatic brightness control system) in the same way that Toffolo's selective arrangement improved Toffolo. Ex. 1002, ¶ 98. Additionally, applying Toffolo's teachings to Yanagiuchi would have applied a known technique (i.e., selective automatic and manual brightness control) to a device ready for improvement (Yanagiuchi's automatic-only brightness control system) to yield predictable results (i.e., the ability to switch between automatic and manual modes). *Id.* The POSA would have had a reasonable expectation of success in making this change to Yanagiuchi because Toffolo's system is simple and requires well-understood techniques like using switches and multiplexers (or software implementations of them, which were well understood and predictable. *Id.*; Ex. 1006, 3:6-20.

- b. [1A] “a first input configured to receive a user signal indicative of a user selectable brightness setting;”

Yanagiuchi discloses or renders obvious this limitation. This phrase has been construed to require a “first input actually programmed or implemented with hardware or software to receive a user signal indicative of a user selectable brightness setting.” Ex. 1038, pp.4-5. Yanagiuchi discloses the hardware implementation and discloses or renders obvious the software programming. Ex. 1002, ¶¶ 99-106. Both examples of first inputs in Yanagiuchi receive a user signal indicative of a user selectable brightness setting.

Hardware “first input.” Yanagiuchi teaches a first input actually implemented in hardware by teaching the connection between the microcomputer (7) and the E²PROM (3), which permits digitized values stored in memory to be fed to microcomputer (7). Ex. 1003, ¶¶ [0007]-[0008], [0013], [0015], Figs. 1, 4. The hardware-based first input is illustrated below.





Id., Figs. 1, 4 (annotated).

Software “first input.” Yanagiuchi discloses or renders obvious a first input actually programmed with software to receive a user signal indicative of a user selectable brightness setting because microcomputer (7) performs calculations to arrive at P_a based on the stored values for (A_{min}, P_1) , (A_1, P_1) , (A_2, P_2) , and (A_{max}, P_{max}) . *Ex. 1003*, ¶ [0008]. The POA would have understood that when Yanagiuchi describes “the PWM value P_a in response to the ambient illuminance is calculated using Equation (1),” this calculation is performed using software in microcomputer. *Id.*; 1002, ¶¶ 103-104. At the very least, programming microcomputer with software to allow the software to receive the values—a digital signal representing the values—defining the luminance changing curve 51 would have been obvious because (1) software was ubiquitous in vehicles and backlight controls to perform routine calculations and thus implementing calculations like

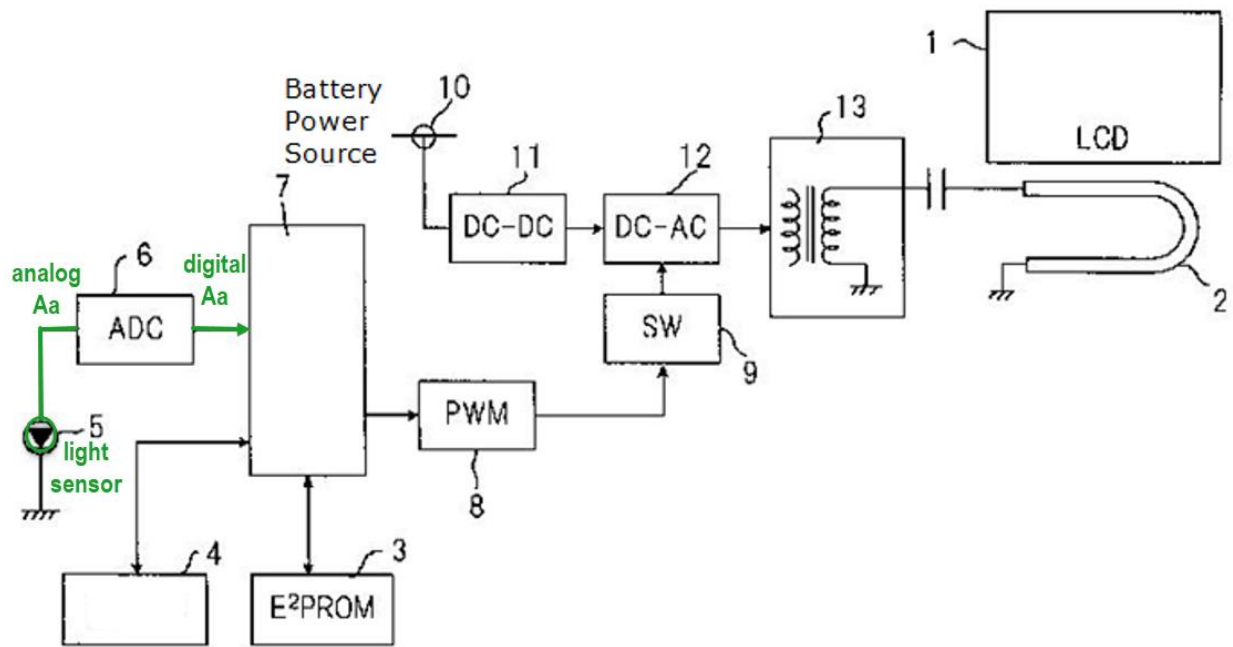
those described by Yanagiuchi in software was routine and had predictable results, and (2) to the extent it can be contended that Yanagiuchi does not use software inputs to calculate the PWM (Pa), using software code to perform that calculation would have required a simple application of software to be executed by Yanagiuchi's microcomputer to execute. Ex. 1002, ¶¶ 105-106 (citing Ex. 1006, 3:6-20 (discussing control and calculations using software)). The results would have been predictable and simple, Ex. 1002, ¶¶ 106; Polaris has said that a single line of code is all that is needed to calculate an expression like Yanagiuchi's equation 1 in the form of $y=mx+b$, Ex. 1036, p.4.

Yanagiuchi's hardware and software "first input[s]" are configured to "receive a user signal indicative of a user selectable brightness setting." The "user signal" such as signals representing digitized representations of user settings (Amin, Pa), (A_1, P_1) , (A_2, P_2) , and (A_{max}, P_{max}) , defining the luminance changing curve 51, are shown in Figure 2. Ex. 1003, Figs. 2, 5(a)-5(b), ¶¶ [0006]-[0007]. The user signal is "indicative" of several "user selectable brightness setting[s]." A first setting is a "breakpoint" (A_2, P_2) , reflecting, at least in part, Yanagiuchi's solution to the problem that users could not set luminance values "between the min-max values." Ex. 1003, ¶¶ [0003], [0006]. A second setting is the "start point" (A_{min}, P_1) , which solves the problem that users could not set the "minimum value min on the luminance changing curve." *Id.* The signals representing these user-defined points

are “indicative” of these user selectable brightness settings because they define the brightness curve by at least providing a start point, end points, and breakpoints. Ex. 1002, ¶ 102.

- c. **[1B]** “a light sensor configured to sense ambient light and to output a sensing signal indicative of the ambient light level;”

Yanagiuchi discloses a light sensor configured to sense ambient light, namely Yanagiuchi’s “photosensor for detecting the ambient luminance 6” (i.e., ambient light level). Ex. 1003, ¶ [0007]; Ex. 1002, ¶ 107. Yanagiuchi’s light sensor outputs a sensing signal indicative of the ambient light level because it generates a “photosensor output” that is fed into an “AD converter for AD conversion,” and is then used by the microcomputer as value Aa for determining the PWM value Pa. Ex. 1003, ¶ [0007], Fig. 1; *id.*, ¶ [0008] (“[M]icrocomputer 7 retrieves the ambient illuminance Aa detected by the photosensor 5”). The sensing signal is shown below:



Id., Fig. 1 (annotated). Because Aa is “ambient illuminance . . . detected by the photosensor 5,” it indicates the ambient light level. Ex. 1003, ¶ [0008]; Ex. 1002, ¶ 107.

- d. [1C] “a multiplier configured to selectively generate a combined signal based on both the user signal and the sensing signal; and”

This phrase was construed as “a multiplier actually programmed or implemented with hardware or software to selectively generate a combined signal based on both the user signal and the sensing signal,” Ex. 1035, p.34, and the combined signal “includes, but is not necessarily limited to, the product of the user signal and the sensing signal,” Ex. 1037, p.20-21. Yanagiuchi teaches a multiplier that generates a combined signal based on both the user signal (i.e., signal representing values A_{min} , A_1 , A_2 , A_{max} , P_1 , P_2 , P_{max}), and the sensing signal (Aa).

Yanagiuchi explains “the PWM value P_a for the ambient illuminance A_a can be calculated using the following equation. $P_a = (A_a - A_1) \cdot (P_2 - P_1) / (A_2 - A_1) + P_1$.”

Ex. 1003, ¶ [0007]. “[T]he PWM value P_a in response to the ambient illuminance A_a detected is calculated using Equation (1),” such that the multiplication is performed by the multiplier. *Id.*, ¶ [0008]. This expression is in the form of $y=mx+b$, which mathematically represents each segment of luminance changing curve 51.³ Ex. 1002, ¶ 109. Because of order of operations, the expression to generate a combined signal is performed by multiplying before adding P_1 .

$$P_a = (A_a - A_1) \cdot \frac{(P_2 - P_1)}{(A_2 - A_1)} + P_1$$

Ex. 1002, ¶ 109. Yanagiuchi therefore describes a multiplier that performs multiplication on the first term of equation 1 (i.e., the portion that takes a generalized form of “ mx ” in the expression $y=mx+b$). The POSA would have understood, or at least found obvious, implementing equation 1, which is executed by microcomputer 7, in software code. Ex. 1002, ¶ 110; *supra* §XI.A.2.a.

Yanagiuchi’s multiplier is configured to “selectively generate” the combined signal because it can also use luminance changing curve 52, instead of the user-

³ Polaris admitted that such an expression can be performed in a multiplier. Ex. 1036, p.4; Ex. 1037, p.17.

configured luminance changing curve 51. Ex. 1003, ¶¶ [0011], [0013]. “[L]uminance changing curve 52” can be “enabled,” or “the luminance changing curve is switched from” curve 52 to curve 51 when curve 51 is “set.” *Id.*, ¶¶ [0011], [0013]. This results in Yanagiuchi’s multiplier multiplying “selectively” because Yanagiuchi does not use user-settable values when using curve 52. Ex. 1002, ¶ 111.

Additionally, configuring Yanagiuchi such that the multiplier “selectively generat[ing] a combined signal” would have been obvious over Yanagiuchi in view of Toffolo based on the obviousness of incorporating Toffolo’s ability to select between manual and automatic brightness adjustment. *Supra* §XI.A.2.a. This would have enhanced system flexibility. Ex. 1002, ¶ 112.

- e. [1D] “a dark level bias configured to adjust the combined signal to generate a brightness control signal that is used to control a brightness level of a visible display such that the brightness control signal is maintained above a predetermined level when the ambient light level decreases to approximately zero.”

Yanagiuchi describes a dark level bias—i.e., term P_1 . P_1 is a “dark level bias” because it is “a value deviation from the ambient light level,” as indicated by the sensing signal (A_a), when the ambient light level approaches approximately zero. Ex. 1035, p.18; Ex. 1002, ¶ 113. P_1 is a variable implemented in software, or at the very least it would have been obvious to implement it in software as a variable value for the reasons discussed above. *Supra* §XI.A.2.a.

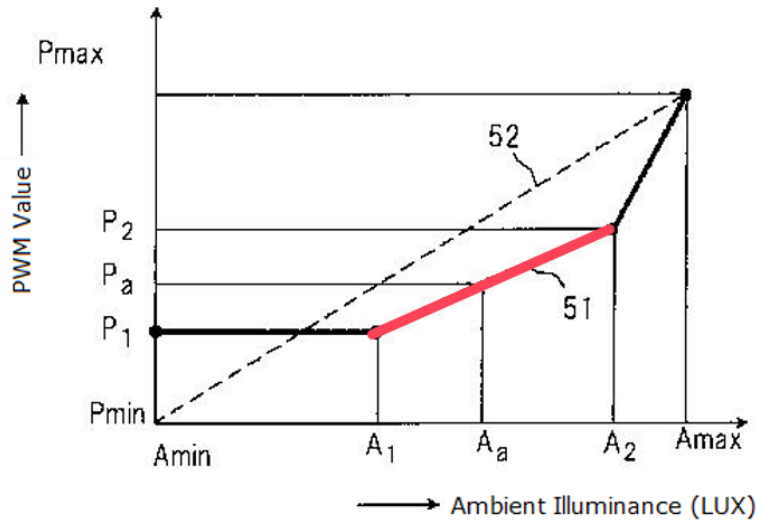
Yanagiuchi adds P_1 to the combined signal as shown in the following

expression, thereby adjusting the combined signal to generate a “brightness control signal” (P_a):

$$P_a = \boxed{(A_a - A_1) \cdot \frac{(P_2 - P_1)}{(A_2 - A_1)}} + \boxed{P_1}$$

combined signal *dark level bias*

Ex. 1003, ¶ [0007]. The POSA would have understood that the exemplary expression above is for the segment of Yanagiuchi’s figure 2 shown below in red:



Ex. 1003, Fig. 2 (annotated). Based on Figure 2, the complete expression for Yanagiuchi’s brightness control signal (P_a) is:

$$P_a = \begin{cases} \text{if } A_{min} \leq A_a \leq A_1, & (A_a - A_{min}) \left[\frac{(P_1 - P_{min})}{(A_1 - A_{min})} \right] + P_{min} = (A_a - A_{min})0 + P_1 = P_1 \\ \text{if } A_1 \leq A_a \leq A_2, & (A_a - A_1) \left[\frac{(P_2 - P_1)}{(A_2 - A_1)} \right] + P_1 \\ \text{if } A_2 \leq A_a \leq A_{max}, & (A_a - A_2) \left[\frac{(P_{max} - P_2)}{(A_{max} - A_2)} \right] + P_2 \end{cases}$$

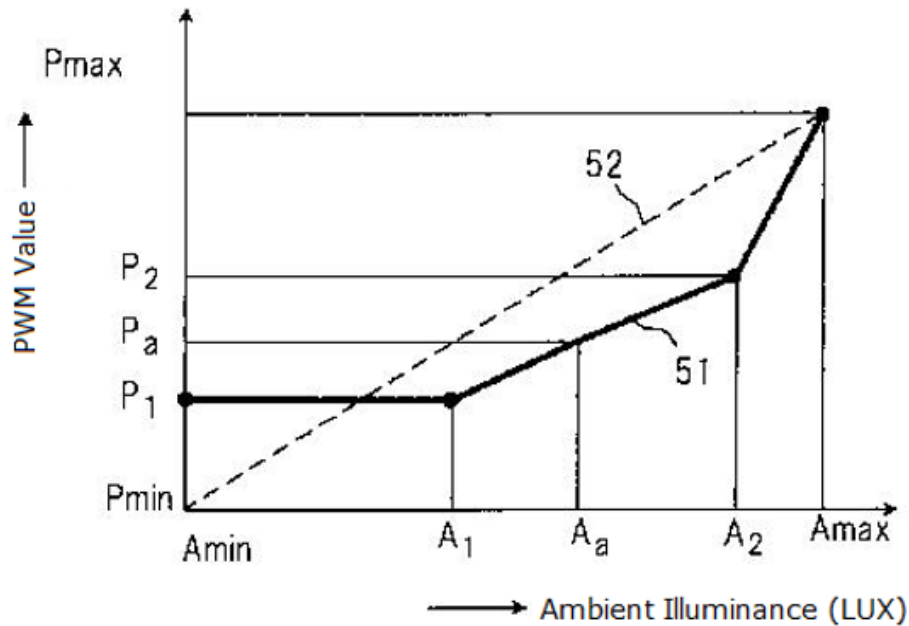
Ex. 1002, ¶ 104;⁴ Ex. 1003, Abst., ¶¶ [0006]-[0008] (luminance changing curve 51 is “linearly approximated”). The brightness control signal Pa in Yanagiuchi is used to control a brightness level of a visible display, because it is used to produce “the drive voltage waveform (or power) with a pulse width corresponding to the PWM value Pa” and is “applied to the CFL 2 to generate backlighting for the LCD display” Ex. 1003, ¶ [0008].

P₁ maintains the brightness control signal above a predetermined level (i.e., values less than P₁) when the ambient light level is “approximately zero” (i.e., the sensor measures zero or a corresponding sensing signal would round to zero). The POSA would have at least found it obvious that when Yanagiuchi’s sensor determined that the ambient light level was “approximately zero”, the corresponding sensor signal Aa would measure or round to zero. *Id.*, Figs. 2, 5, ¶ [0006]; Ex. 1002, ¶¶ 113-114.

Yanagiuchi explains that the prior art exhibited automatic dimming along a “straight line determined by the luminance min-max values” Ex. 1003, ¶ [0003]. This straight line is also reflected in Fig. 2 as “dashed line 52” extending from

⁴ The first segment has a slope of zero, and thus, because of multiplication, the result for the “mx” term is zero, and the value of Pa for all sense signals in the range of A_{min} to A₁ is equal to P₁. Ex. 1002, ¶ 104; Ex. 1003, Fig. 2.

(Amin, Pmin) to (Amax, Pmax). *Id.*, ¶ [0006].



Yanagiuchi’s origin—Pmin—corresponds to a PWM that has a duty of 0%, thus indicating that the origin point on this graph corresponds with a value of zero. *Id.*, ¶ [0008] (“converting PWM values to a duty between 0 and 100 (%)”); Ex. 1002, ¶ 117. Thus, the POSA would have understood, or at the very least found obvious, that Yanagiuchi’s graph shows (Amin, Pmin) as (0, 0), such that the value of P₁ maintains the brightness control signal above a predetermined level (i.e., values less than P₁) when the ambient light level is approximately zero when A_a=Amin. Based on this obvious interpretation of Yanagiuchi’s graph, setting Amin=zero would have been obvious, because the system would have been able to fully employ the capabilities of Yanagiuchi’s sensor. Ex. 1035, p.35; Ex. 1002, ¶ 118. Indeed, interpreting Yanagiuchi’s graph as having an origin of (0, 0), such that Amin

corresponds to 0 when the ambient light level is approximately zero would have been a common-sense implementation of Yanagiuchi based on the illustrated graph and the teachings of the reference.

Setting Amin to zero for ambient light levels of approximately zero would also have been obvious over Yanagiuchi in view of Toffolo. Toffolo allows the user to set the display luminance at the point at which “the photosensor 36 cannot distinguish ambient light levels below that of point B.” Ex. 1006, 2:21-24. This point corresponds to an ambient light level “close enough to zero that a light sensor would measure zero or a corresponding sensing signal would round to zero” because Toffolo’s sensor cannot distinguish ambient light from complete darkness at that point and would therefore perceive complete darkness. Ex. 1002, ¶ 119. The POSA would have found it obvious to set Amin to correspond with Toffolo’s point “B” because setting Amin at the level at which the light sensor could no longer output a signal measuring the light level—i.e., a sensing signal of zero—would have allowed the user to set luminance changing curves over the entire operational range of the light sensor, giving the user maximum control and taking advantage of the full range of Yanagiuchi’s equipment. Ex. 1002, ¶ 120. The Amin would only have needed to be set to correspond to an ambient light level of “approximately zero” (permitting use over a full range of ambient light conditions), and doing so would have been predictable based on Yanagiuchi’s mathematics, graphs, and equations. Ex. 1002, ¶

120.

3. *Claim 2*

This claim requires that the “dark level bias” be “provided to the multiplier such that the amount of adjustment to the combined signal is dependent on the user selectable brightness setting.” Yanagiuchi teaches a dark level bias P_1 “provided to the multiplier”:

$$P_a = \overbrace{\left(A_a - A_1 \right) \cdot \frac{\left(P_2 - P_1 \right)}{\left(A_2 - A_1 \right)}}^{\text{combined signal}} + \overbrace{P_1}^{\text{dark level bias}}$$

Ex. 1003, ¶ [0006]; Ex. 1002, ¶ 122. Here, the “amount of adjustment to the combined signal” is $+P_1$. As explained above, Yanagiuchi has two different “user selectable brightness setting[s],” which solve different problems. One setting is $(A_{\min}, P_1)$, which sets a minimum brightness level at the minimum ambient light level. *Supra* § XI.A.2.b. With this user setting, the amount of adjustment provided by the dark level bias—i.e., $+P_1$ —depends on the user selectable brightness setting $(A_{\min}, P_1)$. Ex. 1002, ¶ 122. This is also true for the amount of adjustment when $A_{\min} \leq A_a \leq A_1$ since $P_a = P_1$ over this segment of the curve. *Supra* § XI.A.2.e.

4. *Claim 4*

This claim requires that the dark level bias be “added to the combined signal,” which Yanagiuchi teaches as shown below:

$$P_a = \overbrace{(A_a - A_1) \cdot \frac{(P_2 - P_1)}{(A_2 - A_1)}}^{\text{combined signal}} + \overbrace{P_1}^{\text{dark level bias}}$$

Ex. 1003, ¶¶ [0006], [0008]. Claim 4 requires “such that the amount of adjustment to the combined signal”—here, $+P_1$ —“is independent of the user selectable brightness setting.” As explained above, Yanagiuchi has several “user selectable brightness setting[s],” which solve different problems. One setting is breakpoint (A_2, P_2) , which changes the ambient light response of the display from the prior art configuration (line 51). *Supra* §XI.A.2.b; Ex. 1002, ¶ 124. The addition of P_1 to the combined signal (i.e., the “amount of adjustment”) is independent of this user-selectable brightness setting (A_2, P_2) . Ex. 1002, ¶ 124.

5. Claim 5

Claim 5 depends from claim 4 and requires that “the dark level bias is added to an output of the multiplier.” This is taught by Yanagiuchi because P_1 is added to the output of the multiplier:

$$P_a = (A_a - A_1) \cdot \frac{(P_2 - P_1)}{(A_2 - A_1)} + P_1$$

Ex. 1003, ¶ [0007]. Based on order of operations, multiplication is performed before P_1 is added to the “output” of that multiplication. Ex. 1002, ¶ 125.

6. *Claim 7*

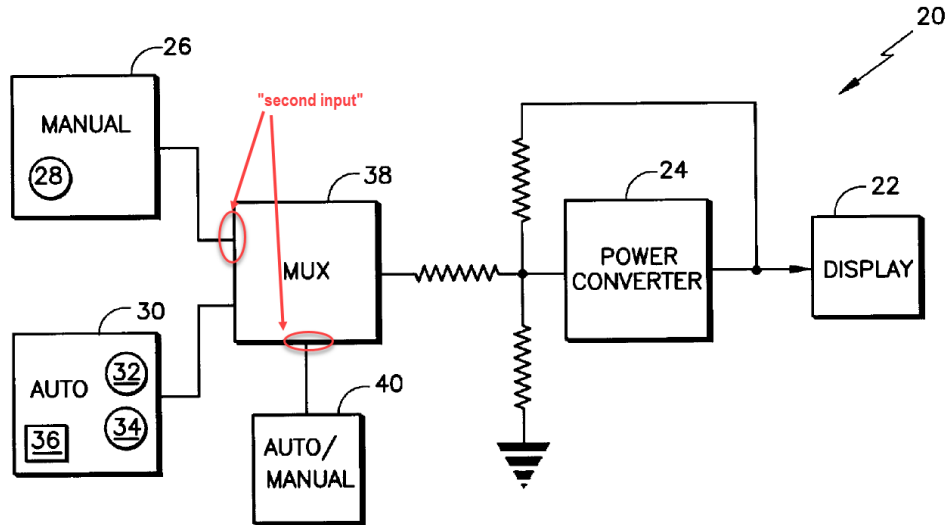
Yanagiuchi describes providing the brightness control signal to a display driver to control backlight illumination of a liquid crystal display as required by claim 7. Yanagiuchi teaches a “unit for converting PWM values to a duty between 0 and 100 (%)” a switch (9) and other circuitry for outputting “square wave signals (AC voltage) of a certain duty, and 13 is a transformer” to increase the voltage to drive the CFL [cathode fluorescent lamp] 2.” Ex. 1003, ¶¶ [0002], [0008]. The drive signal is the “CFL drive waveform,” and is generated by a “driver.” The driver thus includes the switch, which operates based on the calculated duty values, and at least the circuitry that generates the resulting drive signal for CFL 2. *Id.*, Fig. 1, ¶ [0008]; Ex. 1002, ¶ 127. This drives the backlight to control illumination for the liquid crystal display. Ex. 1003, ¶¶ [0003]-[0005].

7. *Claim 9 (Ground 2 Only)*

Claim 9 requires “a second input configured to receive a selection signal to selectively operate the brightness control circuit in an auto mode or a manual mode.” While Yanagiuchi teaches different automatic modes, it does not teach a manual mode. However, configuring Yanagiuchi to have a second input that operates to receive the claimed selection signal would have been obvious over Toffolo.

Toffolo teaches a “second input,” which includes an “input actually programmed or implemented with hardware or software to receive a selection signal

to selectively operate the brightness control circuit in an auto mode or a manual mode,” Ex. 1038, pp.7-8, as shown below:



Ex. 1006, Fig. 1 (annotated). Switch 40 provides a selection signal to control the state of MUX (38) to selectively operate the brightness control circuit in an auto or manual mode using automatic or manual input circuits (26, 30). *Id.*, 2:6-9. The input from manual input circuit is another example of a second input that allows the MUX to be controlled to override automatic mode when the user manually adjusts the brightness. *Id.*, 2:9-13. The “automatic” circuit (Fig. 3), shows a voltage applied across it, and when that voltage drops to zero (i.e., no voltage is applied), the sensor would be disabled. Ex. 1002, ¶ 131. Toffolo also teaches that the input from the manual circuit and the MUX can be implemented in software. *Id.*, 3:6-19.

Claim 9 also requires that the “selection signal enables the light sensor in the auto mode and disables the light sensor in the manual mode.” This feature would

have been obvious over Yanagiuchi in view of Toffolo. The POSA implementing Toffolo's circuits in software would have found it obvious to disable the photosensor (36) when it was not in use, and to enable it when it was in use, because the POSA would have recognized that in a manual mode, the photosensor was unnecessary. Therefore, the POSA would have sought to preserve power in a vehicle application when the sensor was not needed because the POSA would have wanted to avoid unnecessarily draining the battery of the vehicle, such as when the vehicle was in an accessory mode. Ex. 1002, ¶¶ 132-134.

It would have been obvious to include at least one of Toffolo's second input and the claimed selection signal for choosing between modes in Yanagiuchi because having an input either in hardware or software for receiving a signal selecting between an automatic and manual mode in Yanagiuchi would have been beneficial, simple to implement, predictable, and merely an expected, obvious use for Toffolo's old technology in a different device ready for improvement. Ex. 1002, ¶ 134. The obviousness of adding the ability to select between an automatic and manual mode is discussed above in further detail, and the POSA would have understood that a second input would have been needed to receive the user's selection between modes in Yanagiuchi's microcomputer. Ex. 1002, ¶ 134; *supra* §XI.A.2.a.

8. *Claim 15*

- a. **[15.Pre]** “A method to selectively provide ambient light correction, said method comprising:”

Supra §XI.A.2.a. Yanagiuchi’s brightness control circuit performs, or renders obvious the claimed method alone or in combination with Toffolo because the methods would have been obvious over the obvious circuitry to implement these features.

- b. **[15A]** “receiving a user input signal indicative of a user selectable brightness setting;”

Supra §XI.A.2.b. To implement Yanagiuchi’s “luminance changing curve 51,” this step of the method would be performed such that the calculation of P_a is performed for that curve, as described above. Ex. 1002, ¶ 136.

- c. **[15B]** “selectively multiplying the input signal with a sense signal to generate a combined signal, wherein the sense signal indicates an ambient light level; and”

Supra §§XI.A.2.c-d. As discussed above, Yanagiuchi discloses “microcomputer 7” that multiplies a user input signal with a sense signal based on ambient light levels to generate a combined signal: “[T]he PWM value P_a for the ambient illuminance A_a can be calculated using the following equation. $P_a = (A_a - A_1) \cdot (P_2 - P_1) / (A_2 - A_1) + P_1$ (1).” Ex. 1003, ¶ [0007], Fig 2. Moreover, Yanagiuchi says that this equation is used to calculate any value of P_a based on the user-defined points and the sense signal A_a . *See id.*, ¶ [0008] (“PWM value P_a . . . is calculated using Equation (1)”). Multiplication and addition performed by this

expression still meets the claim under the claim construction advocated for and obtained by Polaris in district court. Ex. 1037, p.30; Ex. 1036, p.4.

The step of “selectively multiplying” is disclosed by Yanagiuchi and rendered obvious over Yanagiuchi and Toffolo as described above. *Supra* §XI.A.2.d.

- d. [15C] “adjusting the combined signal with a dark level bias to generate a brightness control signal for controlling brightness of a visible display such that the brightness control signal is maintained above a predetermined level when the ambient light level decreases to approximately zero.”

Supra §XI.A.2.d. Performing the step of adjusting the combined signal (i.e., “mx” term found in Yanagiuchi’s equation (1)) is disclosed by completing the calculation of that expression based on the order of operations, such that the last term (e.g., P_1 , the “dark level bias”) is added to the combined signal, as discussed in detail above. *Id.* This process produces a brightness control signal maintained above a predetermined level—i.e., levels below the PWM associated with P_1 —under the conditions stated in claim 15. *Id.*

9. *Claim 16*

Claim 16 defines different ways that the step of “selectively multiplying” may be accomplished including by using “a software algorithm.” As explained above, Yanagiuchi alone or with Toffolo discloses or renders obvious selective multiplication using a software algorithm. *Supra* §§XI.A.2.a, XI.A.2.d, XI.A.8.c.

B. Claims 1-2, 4-5, 7, and 15-16 Would Have Been Obvious Over Fujimaki (Ground 3)

1. Fujimaki Overview

Fujimaki discloses a dimming device for an LCD backlight controlled based on external illuminance and user preferences. Ex. 1009, Abstract, ¶ [0004]. The external illuminance is detected by external light sensor 21, while user preferences are input by a user. Ex. 1009, ¶ [0019], FIG. 3. Fujimaki calculates screen illuminance using the external illuminance and user preferences. Ex. 1009, ¶¶ [0021]-[0023].

2. Claim 1

a. [1.Pre]

Fujimaki shows a brightness control circuit in FIG. 1, including a “liquid crystal display device 1” and “dimmer device 2” (Ex. 1009, FIG. 1, ¶ [0018]), which performs a dimming operation for ambient light correction. *Id.*, ¶¶ [0005], [0029]. Fujimaki discloses the preamble because it teaches a display device that allows for changes to the brightness control range for the display screen. *Id.*, ¶ [0019]. The display screen in Fujimaki includes a “LCD 4 [] controlled by a control circuit 7 [which is part of dimmer device 2].” *Id.*, ¶ [0018], [0019]. Further, the control circuit 7 of dimmer device 2 controls the display screen “brightness based on the detected ambient illuminance.” *Id.*, ¶ [0020]. Fujimaki discloses selective ambient

light correction by allowing users to select a standard, brighter, or darker screen. *Id.*, ¶[0009].

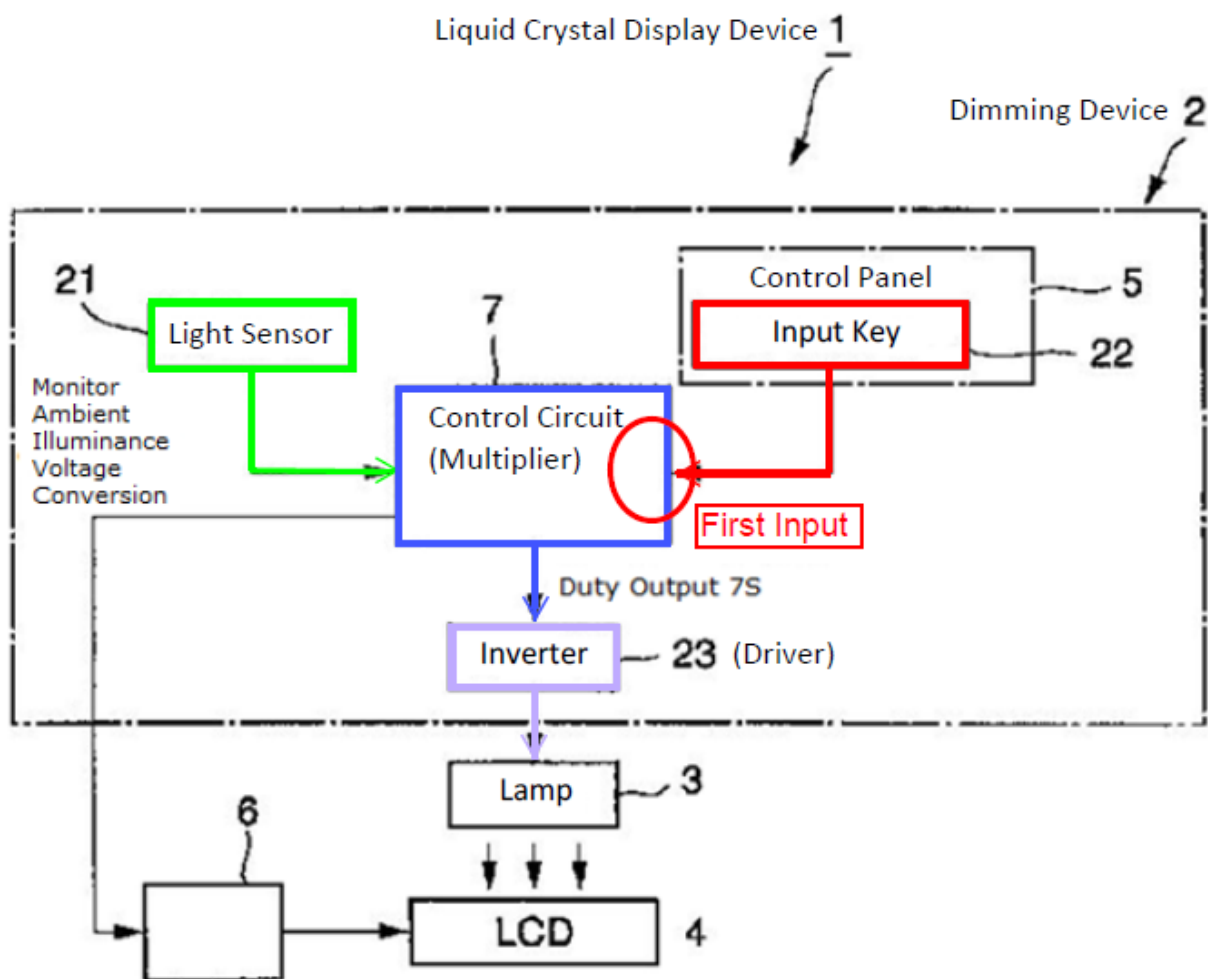
Fujimaki discloses selective ambient light correction by allowing a user to select among: (1) a standard screen, (2) a brighter screen “when the minimum brightness is set higher,” or (3) a darker screen by “set[ting] the minimum brightness lower.” *Id.*, ¶ [0009]. To the extent selective correction is limited to selecting between manual and automatic modes, it would have been obvious to add a manual mode to Fujimaki because it increases the system’s flexibility. A POSA would be motivated to include the ability to override an automatic mode for users who want more control. *Id.*, ¶ [0006].

b. **[1A]** first input limitation⁵

Fujimaki discloses a first input configured to receive a user signal as the interface of control circuit 7 (shown below):

⁵ Complete text for each limitation is found in the listing of claims and above.

[FIG. 1]



Id., FIG. 1. Because control circuit 7 “can be configured using a microcomputer” (*id.* ¶ [0020]), a POSA would understand that Fujimaki discloses software to receive signals (and process them into values). Ex. 1009, ¶ [0026] (“control circuit 7 sets . . . a range”). Annotated FIG. 1 above shows the user signal indicates user selectable brightness settings such as “a changeable range defined by a minimum luminance inputted by the input means.” *Id.*, ¶ [0008].

For example, claim 1 of Fujimaki discloses “an input means for setting and inputting a luminance range changeable by the luminance control means.” *Id.*, ¶¶ [0008], [0021], [0023] (luminance range “ $L_{\max}$ – $L_{\min}$ ”). Fujimaki discloses “[w]hen the minimum luminance setting key 22 is operated, the screen on the LCD 4 switches to the minimum luminance setting screen, and the changeable minimum luminance range is displayed in a digital or analog manner.” *Id.* ¶ [0030].

Accordingly, Fujimaki discloses a first input that receives a user signal indicative of user selectable brightness setting as a changeable luminance range ($L_{\max}$ – $L_{\min}$). *Id.*, ¶¶ [0008], [0023].

c. **[1B] light sensor limitation**

Fujimaki discloses an ambient light sensor 21 detecting “ambient illuminance.” Ex. 1009, ¶ [0019]. The ambient light sensor outputs a sensing signal indicative of ambient light level (e.g., corresponding to a sensed, n th step) to control circuit 7. *Id.*; ¶ [0023] (“ n th step ($n = 1, 2, 3 \dots$)”), ¶ [0032] (“the signal detected by the ambient light sensor 21 is retrieved”).

d. **[1C] multiplier limitation**

Fujimaki discloses a multiplier that is actually programmed or implemented with hardware or software in the form of a control circuit 7 configured using a microcomputer that executes “a control program stored in ROM using an area of the RAM as work space... .” Ex. 1009, ¶¶ [0020], [0022]. The multiplier generates a

combined signal based on both the user signal (luminance range ($L_{max}-L_{min}$)) (*id.* ¶ [0023]), and the sensing signal (represented by “n” – the nth step of ambient illuminance) (*id.*). Ex. 1002, ¶155-156.

This is disclosed by Fujimaki as:

$$L_n = L_{min} + \frac{1}{N} \boxed{(L_{max} - L_{min})} \times \boxed{n}$$

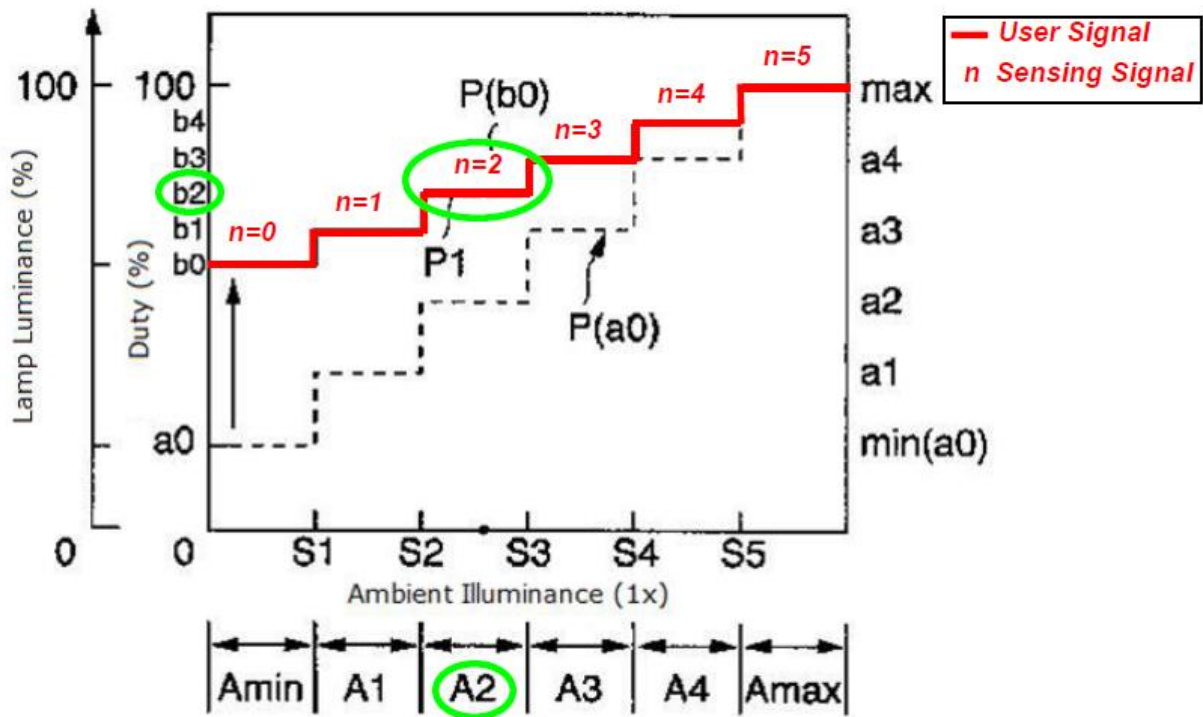
User signal

Sensing signal
indicative of
ambient light
level

Ex. 1002, ¶ 157.

Annotated FIG. 2 below shows the above equation in operation. In FIG. 2, the user selectable brightness range is represented by control line P(b0). Ex. 1009, ¶ [0025] (“when ... duty b(0) is set ..., the standard control line P(a0) is changed to control line P(b0).”) Then, when sensing signal falls within the range A2, “duty b(2) is generated as drive pulse signal (duty output).” Ex. 1009, ¶ [0028].

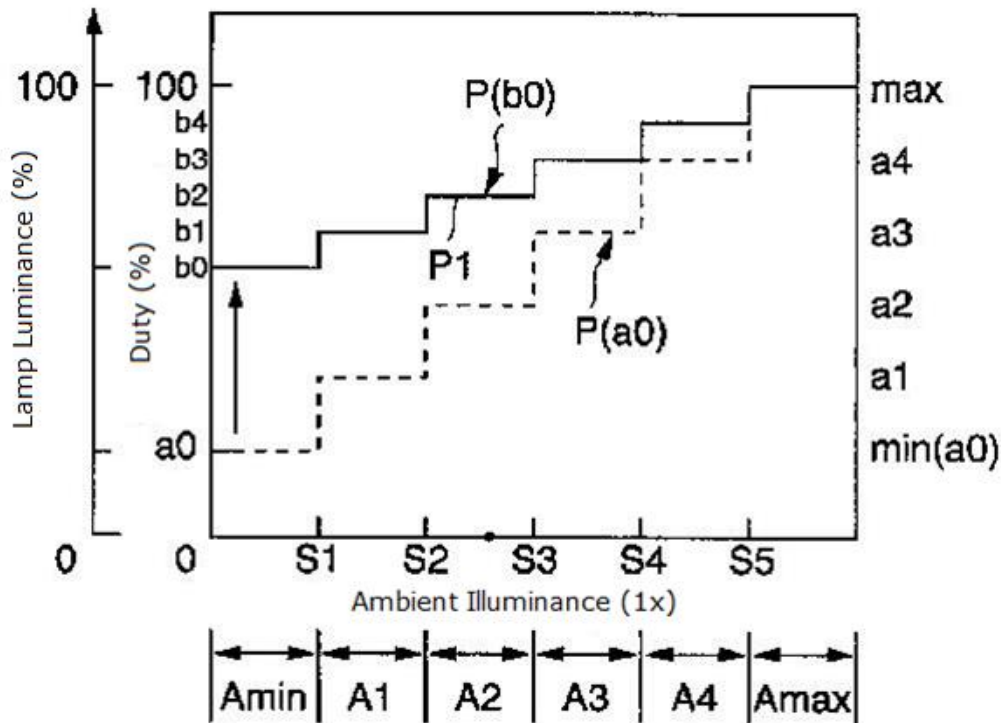
[FIG. 2]



As discussed in Fujimaki, duty output 7S “is outputted to drive the lamp.” Ex. 1009, ¶ [0033].

e. [1D] dark level bias limitation

Fujimaki discloses a dark level bias L_{min} . Ex. 1009, ¶ [0023] (“ L_{min} : minimum duty”). The dark level bias, L_{min} , corresponds to a minimum amount of display luminance, which is shown as either of $a(0)$ or $b(0)$ in FIG. 2:

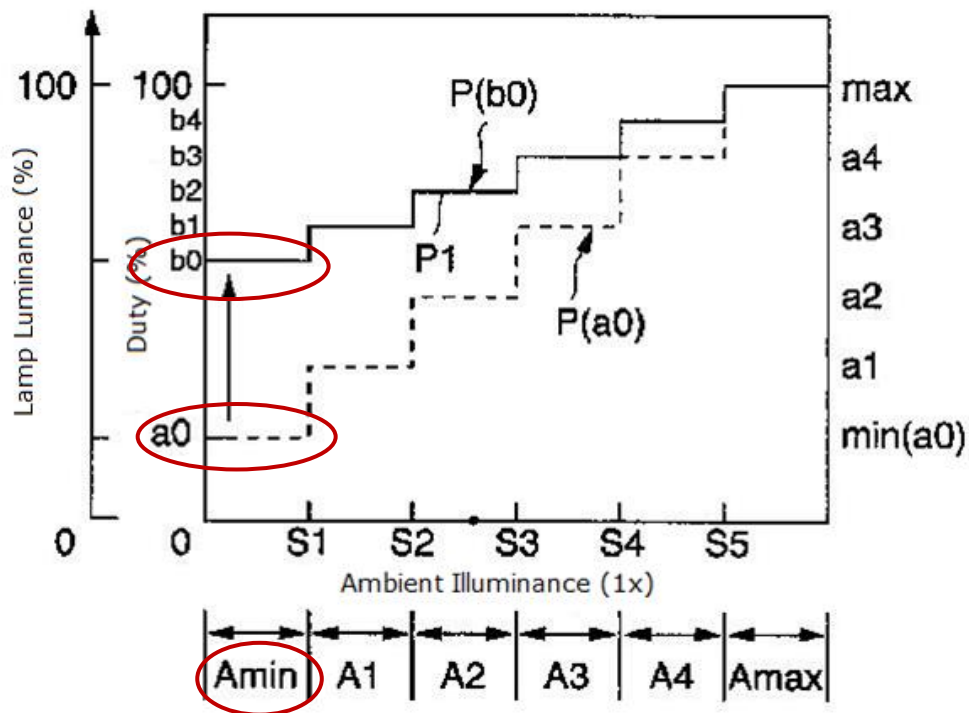


The dark level bias adjusts the combined signal to control a brightness level of display LCD 4 to maintain the brightness control signal above a predetermined level, L_{min} . Ex. 1009, ¶¶ [0018], [0023], [0030]. Fujimaki discloses the microcomputer of the control circuit 7 adjusts the combined signal by adding L_{min} to the combined signal, $(L_{max} - L_{min}) \times n$. *Id.*

$$L_n = \boxed{L_{min}} + \frac{1}{N} \boxed{(L_{max} - L_{min})} \times \boxed{n}$$

Dark level bias
User signal
Sensing signal
indicative of
ambient light
level

The dark level bias, L_{min} , is a value that is retrieved from memory and added to the combined signal to maintain the brightness control signal, L_n , above a predetermined level when a sensed amount of ambient light approaches zero. Ex. 1009, ¶ [0026]; Ex. 1002, ¶170. When the ambient light level approaches zero (falls within the lower end of A_{min} range), FIG. 2 shows the sensing signal n becomes 0 to indicate the low ambient light level. Ex. 1002, ¶ 171. When $n=0$, the lamp luminance (controlled by L_n) is maintained above a predetermined level, which is governed by the value L_{min} . *Id.* In FIG. 2, PWM values corresponding to a_0 and b_0 represent luminance output when the ambient light level approaches zero. *Id.*



Ex. 1009, ¶¶ [0023], [0025]-[0026]; Ex. 1002, ¶¶ 168-172.

3. *Claim 2*

This claim requires the “dark level bias is provided to the multiplier such that the amount of adjustment to the combined signal is dependent on the user selectable brightness setting.” Fujimaki discloses the adjusted combined signal is dependent on user selectable brightness settings. Ex. 1009, ¶¶ [0023]-[0026]. Fujimaki discloses control circuit 7 adjusts the display by the dark level bias, L_{min} . Ex. 1009, ¶ [0023]. The user selectable brightness setting is also dependent on L_{min} because that forms part of the user selectable luminance range ($L_{max}-L_{min}$). Thus, Fujimaki discloses the amount of adjustment provided by the dark level bias (L_{min}) is dependent of the user selectable brightness setting. Ex. 1009, ¶¶ [0023], [0025]; Ex. 1002, ¶¶ 174-176.

4. *Claim 4*

This claim requires the “dark level bias” be “added to the combined signal such that the amount of the adjustment to the combined signal is independent of the user-selectable brightness setting.” Although Fujimaki discloses a dark level bias, L_{min} , that is dependent on the user selectable brightness setting, range $L_{max}-L_{min}$, it would have been obvious to replace Fujimaki’s dark level bias with a fixed minimum luminance offset while maintaining the ability of a user to select a brightness range. Ex. 1002, ¶ 178.

$$L_n = \boxed{L_{min}} + \frac{1}{N} \boxed{(L_{max} - L_{min})} \times \boxed{n}$$

Dark level bias
User signal
Sensing signal indicative of ambient light level

↓ replace

$$L_n = \boxed{\text{constant}} + \frac{1}{N} \boxed{(L_{max} - L_{min})} \times \boxed{n}$$

Dark level bias
User signal
Sensing signal indicative of ambient light level

Modifying Fujimaki's vehicle displays to provide a minimum brightness setting present no matter what the user selected as its brightness setting would have been desirable to ensure that the vehicular display was readable, for example, at start up during nighttime. Fujimaki already discloses something like this in the form of a standard minimum luminance $a(\min)$ that is a default setting where there is no user input. *Id.* ¶¶ [0025], [0035]; Ex. 1002, ¶¶ 179-180. And it would have been obvious to extend a standard minimum luminance in the form of a constant in situations (i.e. control lines) that were user selected. Ex. 1009, ¶¶ [0006], [0010], [0017], [0055]; Ex. 1002, ¶ 181.

5. Claim 5

This claim requires the dark level bias be added to an output of the multiplier. Fujimaki teaches adding the dark level bias, L_{min} , to the output of the multiplier $(L_{max} - L_{min}) \times n$ in the expression: “ $L_n = L_{min} + (L_{max} - L_{min})/N)n$.” Ex. 1009, ¶ [0023]. Order of operations requires the multiplication and division be performed first. Ex. 1002, ¶¶ 183-184. Moreover, under the claim construction, a multiplier is not limited to taking the product of the values, but may include other operations. Ex. 1037, p.29. Thus, a POSA would have understood Fujimaki discloses this limitation. Ex. 1002, ¶¶ 185-186.

6. *Claim 7*

This claim requires the “brightness control signal is provided to a display driver to control backlight illumination of a liquid crystal display.”

Fujimaki discloses “a liquid crystal display panel 4 (LCD 4 below) illuminated by the lamp 3.” Ex. 1009, ¶ [0018]. Further, Fujimaki discloses control circuit 7 provides “... an inverter 23 for supplying drive power to the lamp 3 based on the drive pulse signals (duty output) 7S.” *Id.* ¶¶ [0019], [0024]. Thus, Fujimaki discloses the brightness control signal is provided to a display driver (inverter 23) to control backlight (lamp 3) illumination of a liquid crystal display (LCD 4). Ex. 1002, ¶¶ 188-190.

7. *Claim 15*

a. **[15.Pre]**

Supra §XI.B.2.b.

b. **[15A]** receiving user input limitation

Supra §XI.B.2.b.

c. **[15B]** “selectively multiplying” limitation

Supra §XI.B.2.c-d. Fujimaki discloses a multiplier (a microcomputer) configured to selectively generate a combined signal based on a user-selected control line (P(b0)). Ex. 1009, ¶¶ [0020], [0025]-[0027]. The multiplier generates the combined signal based on the user signal (Lmax–Lmin) and the sensing signal (n). Ex. 1009, ¶ [0023]; Ex. 1002, ¶¶ 204-206. The multiplier selectively multiplies the sense signal and the user signal based on a user-selected control line P(b0) to generate a combined signal (((Lmax–Lmin)/N)n). Ex. 1009, ¶ [0023]; Ex. 1002, ¶¶ 207-212.

d. **[15C]** “adjusting” with “dark level bias” limitation

Supra §XI.B.2.e.

8. *Dependent Claim 16*

Fujimaki discloses selectively multiplying the input signal with the sense signal by software that executes a calculation. Ex. 1009, ¶ [0022] (“calculations are performed by the control circuit 7 using the equation shown below to change the lamp luminance”), ¶ [0020] (“lamp luminance can be obtained by executing a

control program stored in ROM”); Ex. 1002, ¶ 214. The input signal indicative of the user selectable brightness setting ($L_{\max}$ – $L_{\min}$) is selectively multiplied by the sense signal n by control circuit 7. Ex. 1009, ¶ [0023]. Further, the software algorithm is shown in the flowchart of FIG. 3. The software calculation is performed when the user either decreases (step ST21) or increases (step ST31) lamp luminance. Ex. 1009, ¶¶ [0033]-[0034]; Ex. 1002, ¶¶ 220-222.

C. Claims 1-2, 7, 9, and 15-16 Would Have Been Obvious Over Ottenstein in View of Fujimaki (Ground 4).

1. Ottenstein Overview

Ottenstein discloses an automatic brightness control that compensates for effects from ambient light on a display. Ex. 1012, Abstract. Ottenstein discloses this automatic compensation includes both an automatic and manual mode. Ex. 1012, 1:51-55; Ex. 1002, ¶ 225. In automatic mode, user adjustments to brightness controls vary display brightness in conjunction with ambient light signals. Ex. 1012, 3:16-20; Ex. 1002, ¶¶ 223-225. Ottenstein describes the benefits of the automatic brightness controls as allowing a display “to maintain a constant contrast ... despite changing ambient light conditions.” Ex. 1012, 1:30-33; 4:20-32.

2. Claim 1

a. [1.Pre]

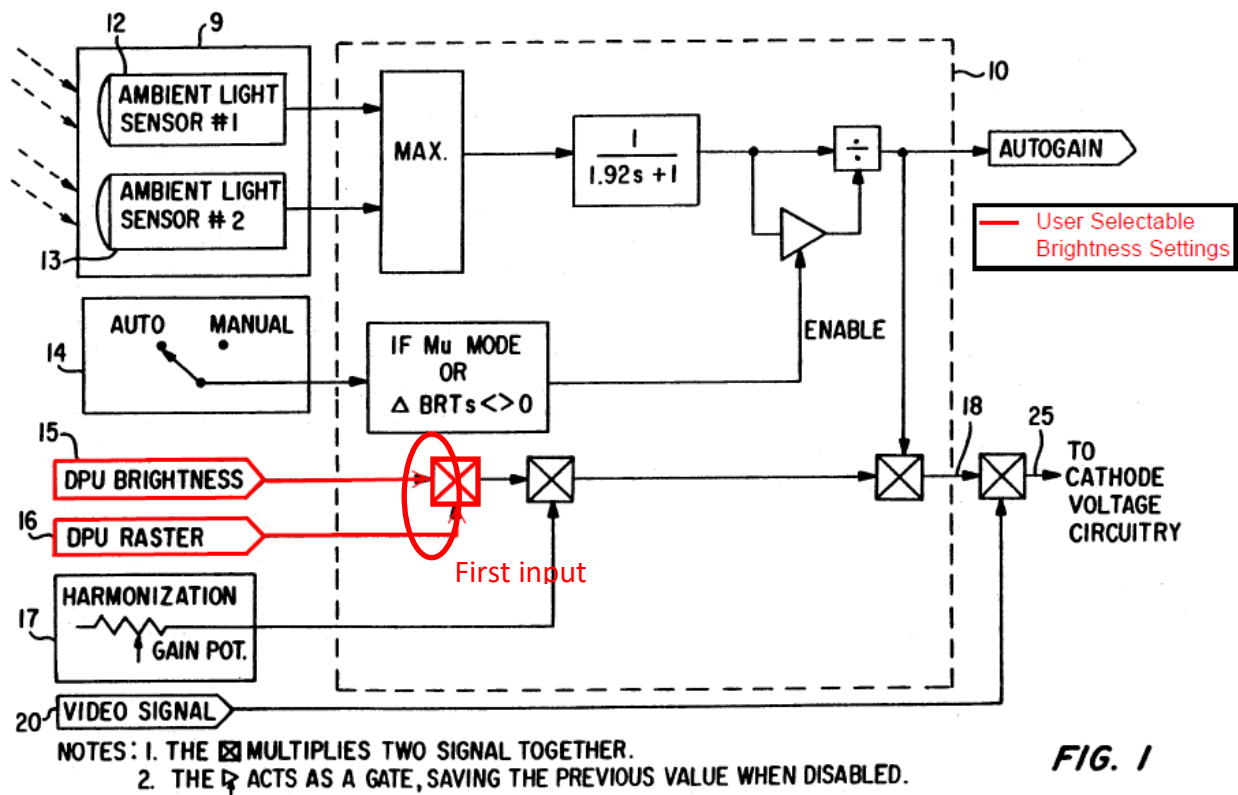
Ottenstein discloses “a control that automatically adjusts the display brightness, increasing and decreasing display brightness for variable levels of

ambient brightness.” Ex. 1012, 2:14-20. Ottenstein further discloses selective ambient light correction, including selectable auto and manual modes. Ex. 1012, 1:50-55, FIG. 1, 14. Ottenstein discloses a brightness control circuit that includes microprocessor 10 and ambient light sensors 12, 13. Ex. 1012, FIG. 1.

b. [1A] “first input” limitation

Ottenstein discloses two “rocker switches allow[] the operator to control ... raster brightness and overall brightness.” Ex. 1012, 1:55-58, 2:30-32. Further, Ottenstein discloses a first input as the interface between the DPU Brightness 15 and DPU Raster 16 and the microprocessor 10. *Id.*, 2:24-28 (“Microprocessor 10 also ***interfaces*** with ... two pilot selected brightness settings, DPU Brightness (BRT) 15 and DPU Raster 16.”) (emphasis added); 1:56-59, 2:30-37.

Annotated FIG. 1 below shows the first input of the microprocessor 10 receives the user signal from the connection points for DPU Brightness 15 and DPU Raster 16. *Id.*, 2:39-45; 2:32-37.



c. **[1B]** “light sensor” limitation

Ottenstein discloses two ambient light sensors. Ex. 1012, 1:59-60; 4:5-9. The ambient light sensors 12, 13 are configured to sense ambient light. *Id.*, 1:29-32, 4:2-9. Further, Ottenstein discloses the ambient light sensors output sensing signals to microprocessor 10, which indicate ambient light levels and may be sampled, e.g., at 10 Hz. *Id.*, 2:20-24, 4:5; FIG. 1.

d. **[1C]** “multiplier” limitation

Ottenstein discloses a multiplier in microprocessor 10 and is shown in annotated FIG. 1 below.

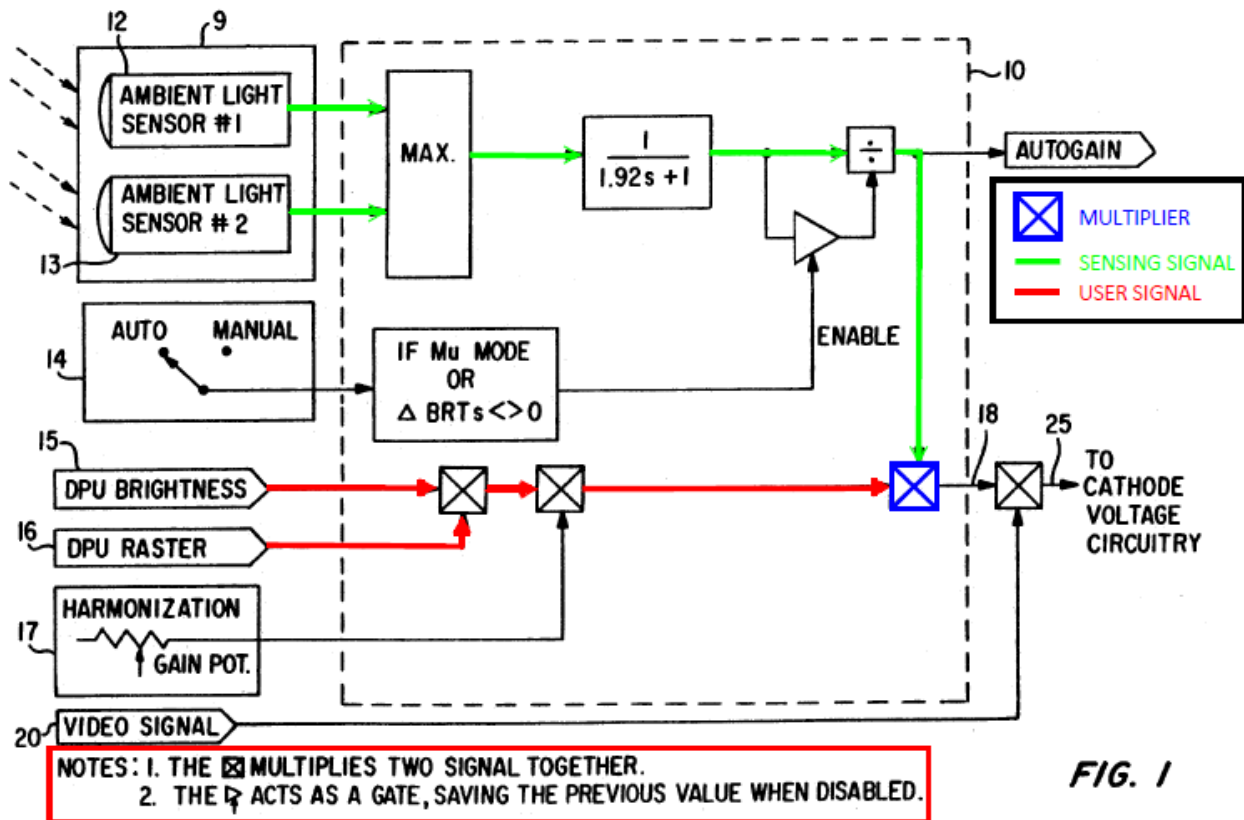


FIG. 1

The multiplier, which is software executed by microprocessor 10, “multiplies two signal[s] together.” Ex. 1012, FIG. 1 (annotated). Specifically, the green lines of annotated FIG. 1 show a pathway of the sensing signal ambient light sensors 12, 13, while the red lines show a pathway of the user signal corresponding to the user selectable brightness settings (DPU Brightness 15 and DPU Raster 16). *Id.* Ottenstein discloses the microprocessor 10 multiplies these signals to selectively generate a combined signal based on both the user signal and the sensing signal. Ex. 1012, FIG. 1; 3:20-35. Ex. 1002, ¶ 234-237.

e. [1D] “dark level bias” limitation

Ottenstein discloses the claimed dark level bias in two ways.

First, Ottenstein discloses the brightness control signal is maintained above a predetermined level when the ambient light level decreases to approximately zero by maintaining the sensing signal at least “10% of full scale.” Ex. 1012, 3:65-4:5. A POSA would understand that this first way could be implemented using two techniques. Ex. 1002, ¶ 239. In a first technique, a POSA would recognize that when the sensing signal decreases to approximately, “say less than 10%” of a sensed amount of ambient light, then the sensed signal should be replaced with a dark level bias that is 10% of full scale brightness. Ex. 1012, 4:2; Ex. 1002, ¶¶ 240-241. In a second technique, the POSA would also know that the dark level bias can be added to the ambient light signal. Ex. 1012, 4:1. Ottenstein’s equation would look like:

$$F = (DPU\ BRT) \times (DPU\ Raster) \times (Harmonized\ Gain) \times \left(\frac{DLB}{A0}\right)$$

Ex. 1002, ¶¶ 243-44.

In the first technique, DLB = at least 10% of full scale. In the second technique, DLB = A + 10% of full scale.

Either technique would comport with a POSA’s understanding of how to implement the first way that Ottenstein teaches the dark level bias when the ambient light sensor decreases to approximately zero. Ex. 1002, ¶ 246.

Second, Ottenstein discloses maintaining the brightness control signal above a predetermined level by multiplying the user signals with a harmonization signal. Specifically, Ottenstein shows this multiplication in FIG. 1 by multiplying the user

signal (e.g., from DPU Brightness 15 and DPU Raster 16) and the harmonization signal from harmonization gain pot 17. Ex. 1012, col. 3:38-44. Ottenstein discloses the harmonization gain pot 17 is “a potentiometer used to calibrate the cathode voltage at the manufacturing site.” Ex. 1012, 2:46-48. Just like the ’117 patents’ teachings regarding VCC, Ottenstein’s harmonization gain pot 17 supplies minimum voltage to the systems to ensure a minimum amount of brightness. Ex. 1001, 9:38-10:20; 2:31-36 (disclosing use in CRT displays); Ex. 1012, 2:46-53 (explaining harmonization gain pot and user signals output by the microprocessor is used to produce cathode voltage 25). Thus, Ottenstein describes a dark level bias in the same way as the alleged invention in the ’117 patent. Ex. 1002, ¶¶ 247-250.

To the extent that Ottenstein does not disclose that the brightness control signal is maintained above *a predetermined level* when the ambient light level decreases to approximately zero, it have would have been obvious to a POSA to modify Ottenstein with the predetermined level described in Fujimaki to ensure the user can continue to view their display screen in dark conditions. Ex. 1009, ¶ [0048] (“when the ambient illumination becomes darker, the LCD 2 darkens”); Ex. 1002, ¶ 251.

It would have been obvious to a POSA to modify the vehicular display of Ottenstein (a non-CRT cockpit display) to include a minimum luminance value that achieves the at least 10% of full scale described in Ottenstein. Thus, such a POSA

would have known that the 10% of full scale could be implemented using a changeable value, e.g., just like the Lmin value used by the vehicular display of Fujimaki (a LCD vehicle TV). A POSA would know that this provides a display that allows for changes to the brightness of a display “that are aligned with a user’s overall preference.” Ex. 1009, ¶ [0006]; ¶ [0023]; Ex. 1002, ¶ 252.

3. *Claim 2*

This claim calls for the “dark level bias” to be “provided to the multiplier such that the amount of adjustment to the combined signal is dependent on the user selectable brightness setting.” Ottenstein discloses the dark level bias is provided to the multiplier such that the amount of the adjustment to the combined signal is dependent on the user selectable brightness setting. Because 10% of full scale is multiplied by the user selectable brightness signal settings, the amount of adjustment to the combined signal is dependent on the user setting. Similarly, because the dark level bias (harmonized gain signal) is multiplied by the user selectable brightness setting (DPU Raster and DPU Brightness), the amount of the adjustment to the combined signal necessarily depends on the user selectable brightness setting. Ex. 1012, col. 3:38-44; Ex. 1002, ¶¶ 254-255.

4. *Claim 7*

This claim requires that the “brightness control signal is provided to a display driver to control a backlight illumination of a liquid crystal display.” While

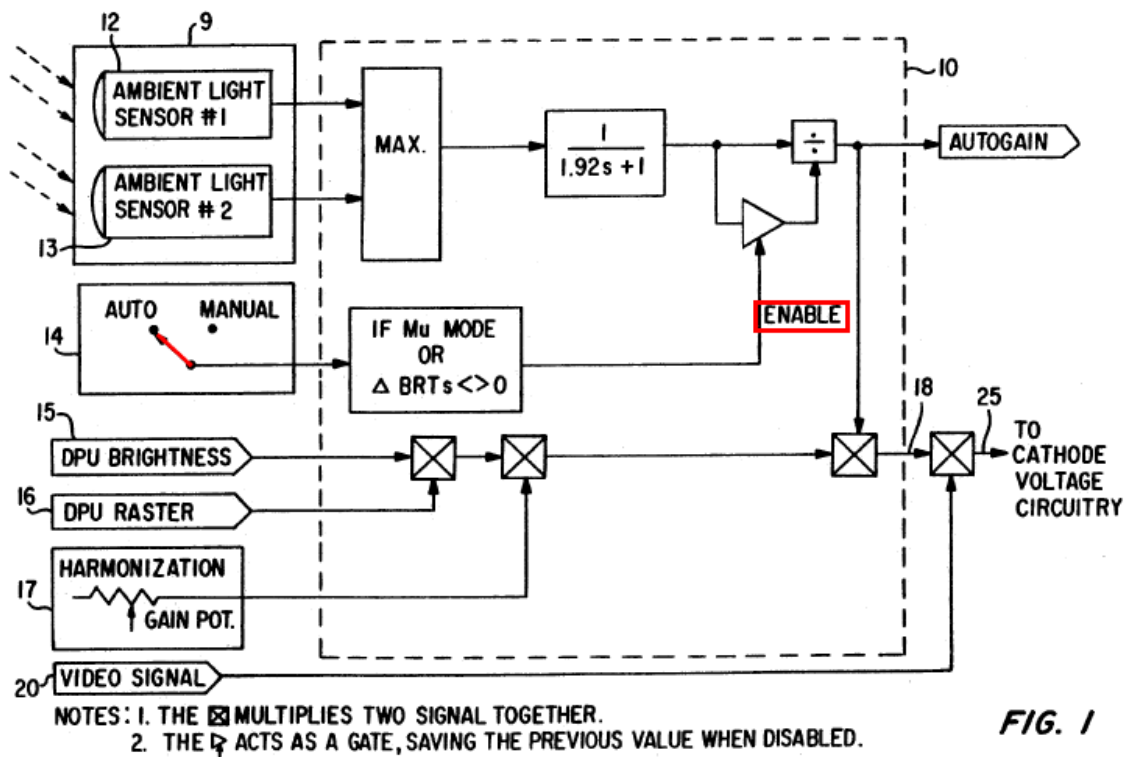
Ottenstein's primary embodiment is directed to a CRT display, Ottenstein makes clear "the present invention is independent of a specific hardware implementation" and it applies to displays that are not CRT displays. Ex. 1012, 1:32-36. The POSA would have understood that another type of display that would have benefited from Ottenstein's brightness control scheme includes Fujimaki's backlit LCD. Ex. 1009, ¶ [0018]. The POSA would have understood that Ottenstein expressly suggests using the techniques with other display types, and thus would have looked to references like Fujimaki for other control schemes. Ex. 1002, ¶¶ 257-258. In so doing, the POSA would have seen that the LCD display of Fujimaki is driven by a display driver that receives a signal with a specific calculated duty for controlling the display brightness. Ex. 1002, ¶ 260. Thus, the POSA would have found it obvious to use Ottenstein's techniques as modified in connection with claim 1, with Fujimaki's display. Ex. 1002, ¶¶ 259-260.

5. *Claim 9*

This claim requires "a second input configured to receive a selection signal to selectively operate the brightness control circuit in an auto mode or a manual mode," wherein the selection signal enables the light sensor in the auto mode and disables the light sensor in the manual mode." Ottenstein discloses that second input 14 allows a user to selectively operate the brightness control circuit in an auto or manual mode. Ex. 1012, FIG. 1. The second input 14 is an "auto mode/manual mode switch

14” configured to receive a selection signal (the output of 14) to selectively operate the brightness control in an auto mode or a manual mode. Ex. 1012, 2:28-30 (“switch 14 enables the operation of the automatic brightness control and the manual mode disables it.”).

Ottenstein also discloses the selection signal enables the light sensor (12,13) in the auto mode:



A POSA would have understood that Ottenstein’s selection signal disables the light sensor (12, 13) in the manual mode. Ex. 1012, 2:28-30; Ex. 1002, ¶¶ 262-266.

6. Claim 15

a. [15.Pre]

Supra §XI.C.3.a.

b. [15A] “receiving” limitation

Supra §XI.C.3.b.

c. [15B] “selectively multiplying” limitation

Supra §§XI.C.3.c-d. Ottenstein discloses an ambient light sensor. Ex. 1012, 1:59-60; 4:5-9. Further, Ottenstein discloses the ambient light sensors output sensing signals to the microprocessor 10. *Id.*, 2:20-24; FIG. 1.

Ottenstein discloses a multiplier, microprocessor 10, “multiplies two signal together,” selectively generating a combined signal based on both the user signal (DPU Raster and DPU Brightness) and the sensing signal from ambient light sensors 12, 13. Ex. 1012, FIG. 1, 3:20-35.

d. [15C] “adjusting” with “dark level bias” limitation

Supra §XI.C.3.e.

7. *Claim 16*

This claim requires that the “step of selectively multiplying the input signal with the sense signal is performed” using a “software algorithm.” Like the ’117 patent, Fujimaki and Ottenstein also disclose that the selective multiplication of the input signal and the sensed signal is performed by a software algorithm. Ex. 1002, ¶278. For instance, Ottenstein discloses an expression “in Programming Design Language.” Ex. 1012, 3:35-44. Thus, a POSA would know that the claim feature is implemented by software. Ex. 1002, ¶ 279.

D. Claim 6 Would Have Been Obvious Over Yanagiuchi in View of Henry (Ground 5), and [2] Yanagiuchi in View of Toffolo and Further in View of Henry (Ground 6).

1. Henry Overview

Henry discloses a dimmable backlight system for controlling a cold cathode fluorescence lamp (CCFL) that is particularly useful in permitting lamp overdrive in cold environments, such as those occurring in automobiles, until such time as the lamp warms up, and then preventing damage to the lamp by avoiding overdrive using clamp circuits. Ex. 1039, 1:6-9, 1:65-2:29, 5:65-67, 6:49-59, 12:1-17, 13:61-14:27, 14:50-63, Figs. 4, 5. Henry discloses inverter circuits (16, 18) that receive signals DUTYCTRL and AMPLCTRL, respectively. *Id.*, 11:1-5, 12:42-46, Fig. 4. Inverter 14 “effectively passes a DC voltage input signal at the DUTYCTRL input to the BRITE input of the PWM circuit 802, but clamps the output voltage at 2.5 volts.” *Id.*, 12:14-17, 11:40-41, 11:47-54. “[I]ntegrator 18 effectively offsets a DC voltage input signal at the AMPLCTRL input to the BRT input of the PWM circuit 802, but clamps the output voltage at 2.5 volts.” *Id.*, 14:25-27. The values of AMPLCTRL input and DUTYCTRL input are determined by a processor “based on the dimming level set,” and these signals may be adjusted “independently or in combination to achieve the desired dimming level.” *Id.*, 14:50-55. A PWM circuit can monitor these signals so the PWM circuit can control lamp brightness, and can allow overdriving of the lamp in low temperatures when it is safe to do so. *Id.*, 5:24-30, 14:56-63. In

this way, Henry teaches an overdrive clamp circuit that is coupled to brightness control signals (e.g. AMPLCTRL and/or DUTYCTRL) to limit their amplitudes to predefined ranges (e.g., not to exceed 2.5V). Ex. 1002, ¶¶ 84-85.

2. Obviousness of Claim 6: Grounds 5 and 6

Neither Yanagiuchi nor Yanagiuchi in view of Toffolo expressly teach the overdrive clamp circuit of claim 6. Henry does. A POSA would have found it obvious to look to Henry for ideas about how to improve Yanagiuchi's system. For example, Yanagiuchi and Henry describe CFLs for in-vehicle use, Ex. 1003, ¶¶ [0006], [0008], Ex. 1039, 1:6-9, where cold start of the CFL is an issue, Ex. 1039, 1:23-30. Moreover, Henry explains that CFLs may be overdriven, and thus damaged. Ex. 1039, 2:3-6, 4:42-43, 58-60. The POSA would have recognized the same issue with Yanagiuchi leading the POSA to look to Henry for a way to initially start a CFL, but once proper temperature was reached, avoiding overdriving the lamp by limiting the amplitude of the brightness control signal to a predetermined range (e.g., between zero and a safe maximum depending on the CFL). Ex. 1002, ¶ 282. The POSA would have understood this was especially relevant to Yanagiuchi's system or the Yanagiuchi-Toffolo system because of the flexibility given to the user to set Pmax. Ex. 1002, ¶ 282; Ex. 1003, ¶¶ [0006]-[0007]. In cold conditions, the user program a much higher brightness setting than would be appropriate after the CFL warmed up, thus leading to overdriving the lamp. Ex. 1002, ¶ 282. Therefore,

it would have been obvious and common sense to include an overdrive clamp to prevent the user from inadvertently overdriving and damaging the lamp. Ex. 1002 ¶ 282. Adding an overdrive clamp circuit as claimed would have merely been the combination of known elements (Yanagiuchi's backlight brightness control, alone or in combination with Toffolo's manual override system and Henry's overdrive clamp circuit) to obtain predictable results—i.e., allowing Yanagiuchi's dimming control in a manner that prevented overdriving the backlight and thus damaging the equipment. Ex. 1002, ¶ 282. This modification to Yanagiuchi would have required simply applying a known technique (Henry's overdrive prevention at normal operating temperatures), to a device ready for improvement (i.e., Yanagiuchi or the Yanagiuchi-Toffolo combined system). Ex. 1002, ¶ 282. Henry explicitly motivates the POSA to add an overdrive clamp circuit to avoid damaging the CFL under varying temperature conditions and user-controlled dimming conditions. Ex. 1002, ¶ 282. Adding an overdrive clamp circuit would have improved the Yanagiuchi and Yanagiuchi-Toffolo system in an analogous manner to the way it improved Henry's. Ex. 1002, ¶ 282. Claim 6 would therefore have been obvious.

E. Claim 6 Would Have Been Obvious Over Fujimaki in View of Henry (Ground 7)

Claim 6 requires “an overdrive clamp circuit coupled to the brightness control signal to limit its amplitude to a predefined range.” Fujimaki does not expressly teach the overdrive clamp circuit of claim 6, however, Henry discloses this feature.

[IX.D.1].

A POSA would have found it obvious to look to Henry for ideas about how to improve Fujimaki. Both Fujimaki and Henry describe CFLs, Ex. 1009, ¶[0018]; Ex. 1039, 1:5-8, and vehicle CFLs, where cold start of the CFL was known to cause problems, Ex. 1009, ¶[0055]; Ex. 1039, 1:23-28. Henry explains that CFLs may be overdriven, and thus damaged. Ex. 1039, Abstract, 2:3-6. The POSA would have recognized the same potential problem with Fujimaki. Ex. 1002, ¶¶ 287-289. Therefore, a POSA would have looked to Henry for an overdrive clamp circuit that limits an amplitude of a brightness control signal to a predetermined range (e.g., between zero and a safe maximum). Ex. 1039, 4:40-47; Ex. 1002, ¶ 290.

Additionally, such a POSA would have understood that Fujimaki would have benefited from an overdrive clamp circuit because of the flexibility given to the user to set a changeable luminance range in Fujimaki. Ex. 1002, ¶ 291; Ex. 1009, ¶¶ [0005]-[0006]. In cold conditions, the user may seek to have a much higher brightness setting than would be appropriate after the CFL warmed up. Ex. 1002, ¶ 292; Ex. 1039, 4:40-47. Therefore, it would have been obvious to include an overdrive clamp to prevent overdriving and damaging the backlight. Ex. 1002, ¶ 292.

Further, adding an overdrive clamp circuit as claimed would have merely been the combination of known elements (the dimming control for lamp luminance in

Fujimaki with the overdrive clamp circuit of Henry) to obtain predictable results. Ex. 1002, ¶293. By modifying the dimming controls of Fujimaki with the overdrive clamp circuit, a POSA would have arrived at a system that avoided overdriving and thus potentially damaging the lamp in a predictable manner, while still permitting user-controllable dimming of the backlight. Ex. 1039, 6:51; Ex. 1002, ¶ 294. This modification would have required simply applying a known technique (Henry's overdrive prevention at normal operating temperatures), to a device ready for improvement (the dimming control system of Fujimaki). Ex. 1002, ¶ 294. Combining Fujimaki with Henry's overdrive clamp circuit would have improved the dimming control system in an analogous manner to the improvement in Henry. Ex. 1002, ¶ 295.

XII. GROUNDS FOR STANDING

Petitioner submits that the '117 patent is available for IPR and that it is not estopped from challenging the '117 patent. This Petition is being filed well in advance of the one-year bar under 35 U.S.C. §315(b).

XIII. THE *APPLE* FACTORS SHOW THAT TRIAL SHOULD BE INSTITUTED

The factors set forth in *Apple Inc. v. Fintiv, Inc.*, IPR2020-00019, Paper 11 (Mar. 20, 2020) warrant granting institution.

Stay. To avoid duplication of efforts, Petitioners will promptly move to stay the co-pending litigation. 70% of such motions are granted in the C.D. Cal. Ex.

1049; Ex. 1050 (12 of 14 cases stayed, all cases stayed since SAS decided).

Trial. Hisense is scheduled to start trial on September 14, 2021 and LG is scheduled to start trial on October 5, 2021—before a final written decision is expected here. To avoid duplicating efforts, Petitioners have filed a contingent election of defenses indicating that if institution is granted, they will not present invalidity defenses based on the grounds presented herein or any other defenses based on Yanagiuchi, Fujimaki, or Ottenstein as primary references at any jury trial or on summary judgment. Ex. 1057, Ex. 1058. This will avoid duplicative efforts. The trial dates, which are 14 months away, are speculative. Hisense witnesses are in China, which prohibits depositions, Ex. 1051, p.2, thus requiring travel which is currently limited and there are mandatory quarantine periods of two weeks in Hong Kong and Korea (where LG’s witnesses will primarily be located), Exs. 1052, p.1, 1053, p.2, 1054, p.2, 1055. LG’s trial date is scheduled for the same day as a trial in another case brought by Polaris on a different patent, thus suggesting that maintaining such a trial schedule is speculative. Ex. 1043, 1056.

Investment in parallel proceedings. This Petition was filed well before the §315(b) date and even before invalidity contentions. Exs. 1043, 1044. While a claim construction hearing is scheduled before an Institution Decision is expected in this proceeding, the court has already issued multiple claim construction orders and “[n]o technology tutorial is necessary,” indicating that the Court will not need to invest

significant effort to address any remaining claim construction issues. Exs. 1043, 1045.

Overlap. While there is overlap between the parties and the challenged claims here and those asserted in the district court, Petitioner has undertaken efforts to avoid duplication of efforts in parallel proceedings. Exs. 1050, 1051. Therefore, efforts will not be duplicated between invalidity proceedings.

Other circumstances. This Petition presents a strong challenge. This favors institution because an instituted trial here may continue even if the litigation ends. Petitioner further submits that: (1) the PTAB, as a technically-proficient fact-finder is well-suited to address the technical issues raised in this proceeding in an efficient manner; (2) a decision on the merits of the challenges at the institution phase may aid the parties in resolving their disputes through ADR, which must be completed by June 30, 2021, Exs. 1043, 1045, and (3) a patentability ruling will benefit the public based on a complete record that would otherwise be absent from a black-box jury verdict form. Thus, as to the latter point, proceedings before the Board will perform an important public function concerning the patentability of the '117 patent in ways that a jury trial cannot. This will be especially helpful to the public given Polaris's staged litigation strategy and the remaining patent term. Thus, trial should be instituted.

XIV. MANDATORY NOTICES

A. Real Party-In-Interest

The real-parties-in-interest are LG Electronics, Inc., LG Electronics U.S.A., Inc., Hisense Co., Ltd., Hisense Electronics Manufacturing Co. of America Corp., Hisense Int'l Co., Ltd., Hisense Int'l (HK) Co., Ltd., Hisense Int'l (Hong Kong) America Investment Co. Ltd., Hisense USA Corp., and Qingdao Hisense Electronics Co. Ltd.

B. Related Matters

The '117 patent is currently involved in the following civil actions:

Polaris PowerLED Technologies, LLC v. LG Electronics, Inc., et al., No. 8-20-cv-00125 (C.D. Cal.); and

Polaris PowerLED Technologies, LLC v. Hisense Elecs., Mfg. Co. of Am. Corp., et al., No. 8-20-cv-00123 (C.D. Cal.).

The '117 patent was at issue in *Polaris PowerLED Technologies, LLC v. VIZIO, Inc., et al.*, 8-18-cv-01571 (C.D. Cal.), but has been dismissed. It is identified here because Patent Owner contends it may appeal the District Court's ruling and the deadline for filing a Notice of Appeal has not yet run.

While IPR2020-00043 was denied, a request for rehearing has been filed and is currently pending. Therefore, Petitioner identifies that matter here as well.

C. Lead and Back-Up Counsel

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D. Service

Petitioner consents to service by email on the following email addresses:

sommer@gtlaw.com; kuov@gtlaw.com; colinj@gtlaw.com;
mferrario@kilpatricktownsend.com; jvlewis@kilpatricktownsend.com.

XV. FEES

Fees were paid through PTAB E2E.

XVI. CONCLUSION

Claims 1-2, 4-7, 9, and 15-16 of the '117 patent are unpatentable. Trial should be instituted and the claims should be cancelled.

Dated: July 16, 2020

Respectfully Submitted,

/Andrew R. Sommer/

Andrew R. Sommer
Reg. No. 53,932

/Matias Ferrario/

Matias Ferrario
Registration No. 51,082

CERTIFICATE OF COMPLIANCE

This petition complies with the word count limits set forth in 37 C.F.R. § 42.24(a)(i), effective May 2, 2016, because this Petition contains 13,702 words, excluding the parts of the petition exempted by 37 C.F.R. § 42.24(a), as determined using the word count provided by Microsoft Word, which was used to prepare this Petition.

Dated: July 16, 2020

Respectfully Submitted,

/Andrew R. Sommer/

CERTIFICATE OF SERVICE

Pursuant to 37 C.F.R. §§ 42.6(e) and 42.105(a), the undersigned certifies that on July 16, 2020, I caused a true and correct copy of Petition for *Inter Partes* Review, the associated Powers of Attorney, and Exhibits 1001-1004, 1006, 1008-1010, 1012-1019, 1021-1058 by EXPRESS MAIL on the Patent Owner at the correspondence address of record for U.S. Patent No. 8,223,117 as follows:

Knobbe Martens Olson & Bear LLP
2040 Main Street
Fourteenth Floor
Irvine, CA 92614

I further certify that a courtesy copy of the above-identified materials were served on litigation counsel by electronic means upon the foregoing individuals:

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