UNITED STATES PATENT AND TRADEMARK OFFICE

BEFORE THE PATENT TRIAL AND APPEAL BOARD

NINTENDO CO., LTD., and
NINTENDO OF AMERICA INC.,
Petitioners

v.

POLARIS POWERLED TECHNOLOGIES, LLC,
Patent Owner

Case No. IPR2023-00778
U.S. Patent No. 8,223,117 B2
Issue Date: July 17, 2012

Title: Method and Apparatus to Control Display Brightness with Ambient Light Correction

PETITION FOR *INTER PARTES* REVIEW OF U.S. PATENT NO. 8,223,117 B2

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List of Exhibits

Exhibit No.	Description of Document
1001	U.S. Patent No. 8,223,117 B2 to Bruce R. Ferguson (filed Dec. 17, 2008, issued Jul. 17, 2012) ("'117" or "'117 patent")
1002	Declaration of R. Jacob Baker ("Baker")
1003	U.S. Patent No. 4,769,708 to John W. Stoughton (filed Apr. 23, 1987, issued Sep. 6, 1988) ("Stoughton")
1004	U.S. Patent No. 3,813,686 to Eugene Peter Mierzwinski (filed April 13, 1973, issued May 28, 1974) ("Mierzwinski")
1005	U.S. Patent No. 3,983,575 to Nagai, et al. (filed May 12, 1975, issued Sept. 28, 1976) ("Nagai")
1006	Japanese Patent Application Publication No. H6[1994]-308891 to Yoko Shimomura (filed Apr. 23, 1993, published Nov. 4, 1994) ("Shimomura")
1007	Certified Translation of Shimomura (EX1006), including certification of Tonja Shepard
1008	Excerpts from Donald G. Fink, Television Engineering Handbook, First Edition, McGraw-Hill Book Company (1957) ("Fink")
1009	U.S. Patent No. 3,096,399 to L.P. Thomas, Jr. (filed December 30, 1960, issued July 2, 1963) ("Thomas")
1010	Gildo Cecchin, *One Knob Picture Control*, published in IEEE Transactions on Broadcast and Television Receivers, No. 3, pp.179-184 (August 1974) ("Cecchin")
1011	U.S. Patent No. 4,511,921 to Wayne E. Harlan et al. (filed June 16, 1982, issued April 16, 1985) ("Harlan")
1012	U.S. Patent No. 6,798,395 to Atsushi Yamauchi et al. (filed June 19, 2000, issued September 28, 2004) ("Yamauchi")

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Exhibit No.	Description of Document
1013	U.S. Patent No. 6,947,017 B1 to Shawn R. Gettemy (filed August 29, 2001, issued September 20, 2005) ("Gettemy")
1014	Excerpts from Philip Kerman, *ActionScripting in FLASH* (2001) ("Kerman")
1015	Excerpts from Gary Rosenzweig, *Using Macromedia Director 8* (2000) ("Rosenzweig")
1016	U.S. Patent No. 7,110,062 B1 to J. Turner Whitted et al. (filed April 26, 1999, issued September 19, 2006) ("Whitted")
1017	U.S. Patent No. 7,928,955 B1 to Cynthia S. Bell (filed March 13, 2000, issued April 19, 2011) ("Bell")
1018	Excerpts from Eugene D. Nichols et al., *Mathematics Dictionary and Handbook* (1993)
1019	U.S. Patent No. 6,207,943 B1 to Thomas C. Smelker (filed October 30, 1998, issued March 27, 2001) ("Smelker")
1020	U.S. Patent Application Pub. No. 2002/0167637 A1 (filed February 21, 2002, published November 14, 2002) ("Burke")
1021	U.S. Patent No. 6,618,042 B1 to John P. Powell (filed October 28, 1999, issued September 9, 2003) ("Powell")
1022	Don A. Gregory, et al., *Full Complex Modulation Using Liquid-Crystal Televisions*, Applied Optics, Vol. 31, No. 2, pp. 163-165 (1992)
1023	Hee-Chul Kim, et al., *An Image Interpolator with Image Improvement for LCD Controller*, IEEE Transactions on Consumer Electronics, Vol. 47, No. 2, pp. 263-271 (May 2001)
1024	U.S. Patent No. 5,825,408 to Masami Yuyama et al. (filed January 11, 1996, issued October 20, 1998) ("Yuyama")

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Exhibit No.	Description of Document
1025	Office Action Summary and Detailed Action from ’117 Patent (filing 12/17/2008, notification date 11/07/2011)
1026	Expert Report of Dr. Ravin Balakrishnan dated January 25, 2023, served in *Polaris PowerLED Technologies, LLC v. Nintendo Co., Ltd., et al*, Case No. 2:22-cv-00386-JLR (W.D. Wash.)
1027	Claim construction order entered on January 7, 2019, in *Polaris PowerLED Tech., LLC v. Samsung Elecs. Am., Inc.*, Case. No. 2:17-cv-00715 (E.D. Tex.)
1028	Claim construction order entered on November 26, 2019, in *Polaris PowerLED Tech., LLC v. VIZIO, Inc.*, No. 8:18-cv-01571 (C.D. Cal.)
1029	Declaration of Ingrid Hsieh-Yee, Ph.D. (with exhibits)
1030	Proof of Service of Summons and Complaint, ECF No. 9, dated Mar. 30, 2022, filed in *Polaris PowerLED Technologies v. Nintendo Co., et al*, Case No. 2:22-cv-00386-JLR (W.D. Wash.)
1031	Reserved
1032	Order staying proceedings entered on January 31, 2023 in *Polaris PowerLED Technologies v. Nintendo Co., et al*, Case No. 2:22-cv-00386-JLR (W.D. Wash.)
1033	Claim construction order entered on December 23, 2019, in *Polaris PowerLED Tech., LLC v. VIZIO, Inc.*, No. 8:18-cv-01571 (C.D. Cal.)
1034	Request for *Ex Parte* Reexamination of U.S. Patent No. 8,223,117 B1 filed by Microsoft Corporation (Control No. 90/019,119) (filed October 7, 2022)
1035	Order Granting Request for Ex Parte Reexamination filed by Microsoft Corporation (Control No. 90/019,119) (filed January 5, 2023)

Petitioners respectfully request institution of *inter partes* review of claims 1-2, 7, 9, and 15-16, as shown below.

I. MANDATORY NOTICES UNDER §42.8(A)(1)

A. Real Party-In-Interest Under §42.8(b)(1)

Nintendo Co., Ltd. and Nintendo of America Inc. (collectively, "Petitioner") are the real parties-in-interest to this IPR petition.

B. Related Matters Under §42.8(b)(2)

The '117 patent is the subject of the following pending litigation involving Petitioner: *Polaris PowerLED Techs., LLC v. Nintendo Co.*, No. 2:22-cv-00386-JLR (W.D. Wash.). Petitioner was served with the Complaint in that action on March 30, 2022. (**EX1030**, p.002.) The '117 patent is also subject to the following currently-pending litigation: *Polaris PowerLED Techs., LLC v. Dell Technologies Inc.*, No. 1:22-cv-00973 (W.D. Tex.).

The '117 patent was formerly the subject of the following actions: *Polaris PowerLED Techs., LLC v. LG Elecs. Inc.*, No. 8:20-cv-00125 (C.D. Cal.) (terminated February 22, 2023), *Polaris PowerLED Techs., LLC v. Hisense Elecs. Mfg. Co. of Am. Corp.*, No. 8:20-cv-00123 (C.D. Cal.) (terminated April 27, 2021), *Polaris PowerLED Techs., LLC v. Wistron Corp.*, No. 8:19-cv-01935 (C.D. Cal.) (terminated February 28, 2020), *Polaris PowerLED Techs., LLC v. AmTRAN Tech. Co.*, No. 8:19-cv-01630 (C.D. Cal.) (terminated February 24, 2020), *Polaris PowerLED Techs. LLC v. Hon Hai Precision Indus. Co.*, No. 8:19-cv-01926 (C.D.

Cal.) (terminated February 12, 2020), *Polaris PowerLED Techs., LLC v. Top Victory Elecs. Taiwan Co.*, No. 8:19-cv-01580 (C.D. Cal.) (terminated February 10, 2020), *Polaris PowerLED Techs., LLC v. VIZIO, Inc.*, No. 8:18-cv-01571 (C.D. Cal.) (final judgment August 24, 2020), *aff'd,* 2020-2328 (Fed. Cir. Aug. 31, 2021), *Polaris PowerLED Techs., LLC v. Samsung Elecs. Am., Inc.*, No. 2:17-cv-00715 (E.D. Tex.) (terminated July 26, 2019).

The '117 patent was formerly the subject of the following IPRs with which Petitioner had no involvement: *Samsung Elecs. Co. v. Polaris PowerLED Techs., LLC*, IPR2018-01262, institution denied (Jan. 17, 2019), *VIZIO, Inc. v. Polaris PowerLED Techs., LLC*, IPR2020-00043, institution denied (May 4, 2020), *Hisense Co. v. Polaris PowerLED Techs., LLC*, IPR2020-01337, institution denied (March 9, 2021), and *LG Elecs., Inc. v. Polaris PowerLED Techs., LLC*, IPR2020-01283, institution denied (March 9, 2021).

The '117 patent is the subject of a pending *ex parte* reexamination (Control No. 90/019,119), filed by third party Microsoft Corporation ("Microsoft EPR"). (**EX1034**.) Petitioner had no involvement in the preparation or filing of the Microsoft EPR. Because the request raised substantial new questions of patentability, reexamination was ordered in January 2023. (**EX1035**.) As of the filing of this Petition, no Office Action has yet issued in the Microsoft EPR.

C. Lead and Back-Up Counsel under §42.8(b)(3)

Petitioner provides the following designation of counsel.

LEAD COUNSEL	BACK-UP COUNSEL
Matthew J. Brigham (Reg. No. 44,047) mbrigham@cooley.com COOLEY LLP ATTN: Patent Group 1299 Pennsylvania Ave. NW, Suite 700 Washington, DC 20004 Tel: (650) 843-5677 Fax: (650) 849-7400	Andrew C. Mace (Reg. No. 63,342) amace@cooley.com COOLEY LLP ATTN: Patent Group 1299 Pennsylvania Ave. NW, Suite 700 Washington D.C. 20004 Tel: (650) 843-5808 Fax: (650) 849-7400
	Patrick. W. Lauppe (Admission *pro hac vice* to be requested) plauppe@cooley.com COOLEY LLP ATTN: Patent Group 1299 Pennsylvania Avenue NW Suite 700 Washington D.C. 20004 Tel: (650) 843-5226 Fax: (650) 849-7400
	Dena Chen (Admission *pro hac vice* to be requested) dchen@cooley.com COOLEY LLP ATTN: Patent Group 1299 Pennsylvania Avenue NW Suite 700 Washington D.C. 20004 Tel: (650) 843-5135 Fax: (650) 849-7400

LEAD COUNSEL	BACK-UP COUNSEL
	Mark R. Weinstein (Admission *pro hac vice* to be requested) mweinstein@cooley.com COOLEY LLP ATTN: Patent Group 1299 Pennsylvania Avenue NW Suite 700 Washington D.C. 20004 Tel: (650) 843-5007 Fax: (650) 849-7400

D. Service Information

This Petition is being served by Federal Express to the attorneys of record for the '117 patent, KNOBBE MARTENS OLSON & BEAR LLP, 2040 Main St., Fourteenth Floor, Irvine, CA 92614. This Petition is also being served on litigation counsel identified in the Certificate of Service. Petitioner consents to electronic service at the addresses provided above for lead and back-up counsel.

E. Power of Attorney

Filed concurrently per 37 C.F.R. § 42.10(b).

II. FEE PAYMENT

Petitioner requests review of six claims, with a $41,500 payment.

III. REQUIREMENTS UNDER §§ 42.104 AND 42.108 AND CONSIDERATIONS UNDER §§ 314(A) AND 325(D)

A. Standing

Petitioner certifies that the '117 patent is available for IPR and that Petitioner is not barred or otherwise estopped.

B. Identification of Challenge

Petitioner requests institution of IPR based on the following grounds:

Ground	Claims	Basis under §103
1	1-2, 9, 15-16	Stoughton, Mierzwinski, Nagai
2	7	Stoughton, Mierzwinski, Nagai, Shimomura
3	1-2, 7, 9, 15-16	Gettemy, Kerman, Rosenzweig, Whitted, Bell

Submitted with this Petition is the Declaration of R. Jacob Baker (**EX1002**) ("Baker"), a qualified technical expert (Baker, ¶¶1-19, Ex. A), and the Declaration of Ingrid Hsieh-Yee (**EX1029**).

C. §§314 and 325(d)

No basis exists under either §314(a) or §325(d) for discretionary denial.

<u>§314(a)</u>: Petitioner has not previously filed an IPR petition against the '117 patent. The district court in the pending litigation, on January 31, 2023 and before any claim construction briefing or Markman hearing, stayed the litigation pending the Microsoft EPR. (**EX1032**, p.0013.) Mindful of the Board's limited resources, this Petition challenges only six claims, corresponding to the same claims being asserted against Petitioner in the litigation.

<u>§325(d)</u>: None of the prior art cited in any of the grounds identified in **Part III.B** above was previously presented during prosecution of the '117 patent, or considered by the PTAB in connection with any of the previous IPR petitions identified in **Part I.B** in which institution was denied.

Petitioner does not believe § 325(d) applies to the Microsoft EPR because it is currently pending and has not resulted in an initial Office Action. *See, e.g*, *Mueller Sys. v. Rein Tech*, IPR2020-00099, Paper 9 at 10-14 (PTAB May 12, 2020) (holding that 325(d) did not apply to prior art submitted in pending reexamination that had not yet generated initial Office Action). Nevertheless, Petitioner notes the Microsoft EPR also cites Whitted (**EX1016**) for several proposed substantial new questions (SNQs) of patentability. (**EX1034**, pp.007, 0014, 0096-156.) The Examiner has observed that Whitted raised an SNQ with respect to claims 1-7, 9, and 15-18, but otherwise has not commented on Whitted. (**EX1035**, pp.0010-11.)[1] Because no initial Office Action has issued, the Examiner has <u>not</u> indicated that the claims of the '117 patent are patentable over Whitted (nor is it clear he will do so in the future). The first and second prongs of *Advanced Bionics* therefore do not apply as Whitted has not yet been fully considered and no error by the Examiner with respect to Whitted has occurred. Nevertheless, as demonstrated below, **Ground 3** does not

[1] Microsoft also attached Gettemy (**EX1013**) as an exhibit to its *ex parte* reexamination request but did not rely on it for its SNQs. The Examiner did not mention Gettemy in ordering *ex parte* reexamination.

cite Whitted alone but in combination with other references that were not previously considered. The combinations of references cited herein present compelling grounds of obviousness that were not presented during original prosecution, in the previous IPR petitions, or in the pending Microsoft EPR.

IV. OVERVIEW OF THE '117 PATENT

A. Level of Ordinary Skill in the Art

A person of ordinary skill would have possessed at least a bachelor's degree in electrical engineering, physics, optics or a related field, and approximately three years of experience in the fields of visual displays, circuit design, and related technologies. (Baker, ¶¶23-25.) The Board adopted this formulation in *LG Electronics v. Polaris PowerLED Technologies*, IPR2020-01283, Paper 9, pp.8-9 (PTAB Mar. 9, 2021). Other formulations are also possible but, even if adopted, they would not materially change the analysis or the outcome. (Baker, ¶¶28-31.)

B. Specification Overview

The '117 patent is directed to controlling the brightness of a visual display to compensate for changes in ambient lighting. ('117, 1:19-22; Baker, ¶¶49-50.) The patent acknowledges prior art LCD systems in which an ambient light sensor is used to adjust the backlight level in response to the ambient light level. ('117, 1:51-54.) In one embodiment, brightness in LCD applications is adjusted based on user input and ambient lighting conditions by using "the mathematical product of a light sensor output and user selectable brightness control." ('117, 1:60-67.)

V. CLAIM CONSTRUCTION

No claim construction rulings have issued in the pending litigation between Petitioner and Patent Owner. District courts in two previous litigations involving Samsung and Vizio issued constructions for certain terms. (Baker, ¶58; **EX1027**; **EX1028; EX1033**.) The Board acknowledged these constructions in *LG Electronics v. Polaris PowerLED Technologies*, IPR2020-01283, Paper 9, pp.9-11 (PTAB Mar. 9, 2021), but did not expressly construe any term. Petitioner here does not believe any term requires express construction at this time because, as shown below, the claims are obvious even if the Board adopted the prior district court constructions and constructions proposed by the parties in the pending litigation.

VI. THE CHALLENGED CLAIMS ARE UNPATENTABLE

A. Overview of the Grounds of Unpatentability

The challenged claims of the '117 patent attempt to lay claim to techniques for adjusting the brightness of a display based on current ambient lighting conditions. This is a crowded field as demonstrated by the Patent Office devoting an entire classification to it (H04N5/58), which contains hundreds of patents. The techniques claimed in the '117 patent were already well-known.

Petitioner has presented two separate and independent base grounds for demonstrating the obviousness of the challenged claims. **Grounds 1 and 2** rely primarily on Stoughton (**EX1003**), which uses hardware-based componentry. **Ground 3** presents an obviousness ground based primarily on Gettemy (**EX1013**), which discloses a brightness control system that uses software executing on a processor. (Baker, ¶¶62-65.) Both approaches render the challenged claims invalid.

Each of the relied-upon references qualifies as prior art. The U.S. patent references (**EX1003-1005**, **EX1013**, **EX1016-1017**) qualify as prior art under at least § 102(e) (pre-AIA) because they issued from applications before the ’117 patent’s earliest filing date, with some of them (**EX1003-1005**, **EX1016-1017**) also qualifying as § 102(b) (pre-AIA) art. Kerman (**EX1014**) and Rosenzweig (**EX1015**) qualify as prior art under at least § 102(b) because they were published more than one year before the ’117 patent’s earliest filing date, as evidenced by their availability in public libraries and being accessible to the public. (**EX1029**, Hsieh-Yee Decl., ¶¶29-80.) Shimomura (**EX1006**) qualifies as § 102(b) prior art because it is a Japanese patent application published more than one year before the ’117 patent’s earliest filing date. Petitioner has also provided a certified English translation of Shimomura (**EX1007**).

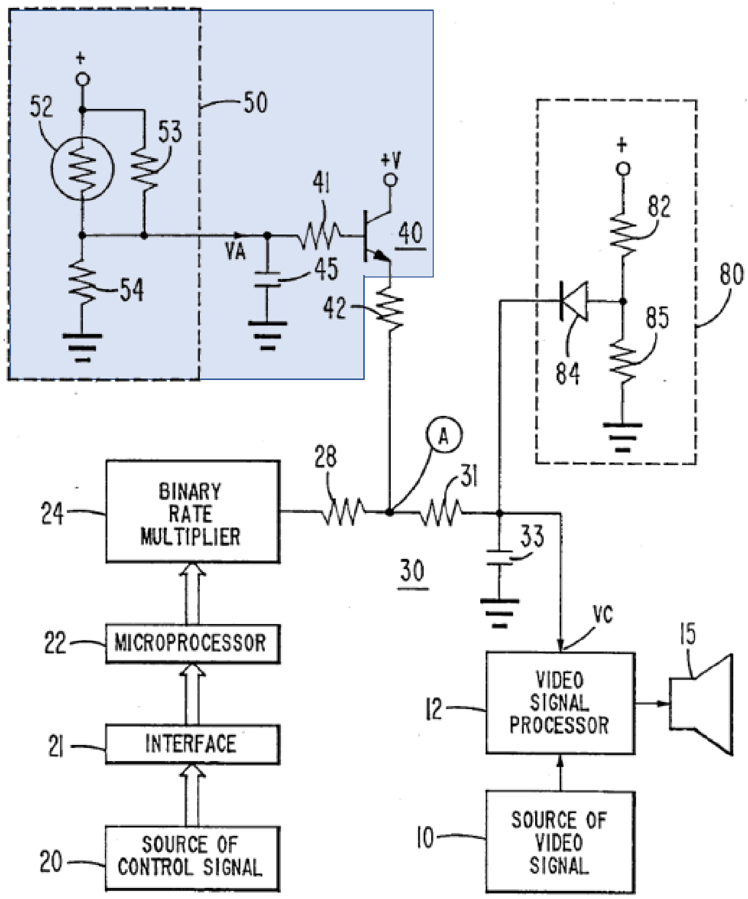
B. Ground 1: Claims 1-2, 9, 15-16 Are Obvious Over Stoughton in view of Mierzwinski and Nagai

1. Independent Claim 1

The preamble recites “**[a] brightness control circuit with selective ambient light correction comprising**.” Even if the preamble imposes a limitation, it is disclosed by and rendered obvious over the prior art.

Stoughton, entitled “Manual and Automatic Ambient Light Sensitive Picture

Control for a Television Receiver," is directed to a television receiver with a "contrast control apparatus" for "both manually and automatically" controlling picture contrast "in response to ambient light." (Stoughton, 2:27-29, 1:6-9, Fig. 1.) Figure 1 of Stoughton discloses the claimed brightness control circuit:



(Stoughton, Fig. 1 (highlighting added).) Petitioner will describe various aspects of the circuit in Figure 1 and further explain their operation in the detailed analysis below. For purposes of the preamble, Figure 1 discloses a "**brightness control circuit**" because the circuit above changes (corrects) the contrast of a display based on ambient lighting levels.

More specifically, the highlighted section of Figure 1 above provides circuitry for sensing ambient light levels. (Stoughton, 3:18-34; Baker, ¶¶68, 71, 134-139.) As Stoughton explains: "<u>Control voltage VA</u> modifies the DC value associated with the BRM [binary rate multiplier] output signal at node A <u>in response to ambient light conditions</u>, thereby providing an auxiliary means of <u>controlling the contrast of a displayed image in response to ambient lighting conditions</u>." (Stoughton, 3:36-41.)[2] As Petitioner will explain below, voltage VP (which depends on "[c]ontrol voltage VA") is output from the ambient light circuitry shown in highlighting above and corresponds to the claimed "**sensing signal**." (Stoughton, 4:19-31, 3:31-36.) The output signal of BRM **24**, as will be explained below, represents the claimed "**user signal**." Because the circuit in Figure 1 adjusts (corrects) the contrast based on at least ambient lighting levels (as represented by control voltage VA), it discloses a brightness control circuit with ambient light correction. (Baker, ¶139.)

<u>Contrast vs Brightness</u>

Stoughton discloses techniques for contrast adjustment but does not expressly use the term "**brightness**." But this distinction is immaterial because brightness and contrast are inextricably intertwined concepts such that changes to contrast result in changes to the brightness of the display.

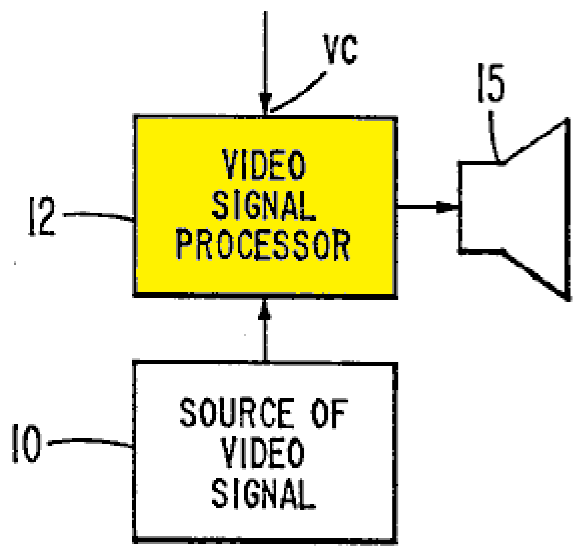
[2] Except as otherwise noted, all emphasis has been added by Petitioner.

The fact that contrast adjustments directly affect display brightness was well-known to ordinarily skilled artisans – and likely anyone who had even used a television set – since at least the 1950s. (Baker, ¶142 (quoting Donald G. Fink, *Television Engineering Handbook* (1957) (**EX1008**), at p.0058 ("The contrast control affects both the brightness and the contrast of the picture.").) In this case, claim 1 is a "**comprising**" claim that does not limit the claimed circuit to only adjusting the brightness of a display. The circuit in Stoughton provides a "**brightness control circuit**" because, as explained, it controls contrast of a display which in turn directly controls the brightness of the display. (Baker, ¶¶140-144.)

In the event Patent Owner argues that claim 1 requires adjustment to brightness separate from other display parameters such as contrast, it would have been obvious to adapt the circuit of Stoughton to use ambient lighting levels to also separately adjust brightness. For example, **Mierzwinski** discloses "[a] circuit deployed in a color television receiver for varying the brightness, contrast and color saturation of a displayed picture in accordance with variations in ambient light in the vicinity of a receiver screen[.]" (Mierzwinski, Abstract; *see also id.*, Fig. 2, 1:16-20, 1:47-53, 5:25-30.) Mierzwinski discloses a circuit, similar to the one in Stoughton, that detects ambient lighting levels. But the circuit in Mierzwinski uses the ambient lighting levels to adjust both display brightness and contrast of the display. (Mierzwinski, 4:65-5:24, 3:35-61, Fig. 2; Baker, ¶¶145-147.)

Rationale and Motivation to Combine (Stoughton with Mierzwinski): It would have been obvious to combine Stoughton with Mierzwinski, predictably resulting in the control circuit of Stoughton adapted to separately control both brightness and contrast of the display, to the extent the claim is interpreted as requiring a circuit that directly controls display brightness. (Baker, ¶148.)

This combination would have been straightforward. As shown in Figure 1 above (and shown in part at right), Stoughton discloses video signal processor **12** that receives the signal (VC) that it uses to adjust contrast. (Stoughton, 2:67-3:2.) It would have been obvious to adapt video signal processor **12** to also adjust both display brightness and contrast based on the VC signal, consistent with the embodiment in Mierzwinski. This is, in fact, the only change to the Stoughton Figure 1 circuit that would have been required. (Baker, ¶¶143, 147; Mierzwinski, 5:25-34.) Stoughton and Mierzwinski are analogous references in the same field as the ’117 patent of controlling display parameters, including in response to changes in ambient lighting conditions. (Baker, ¶147.)



It was well-known decades before the ’117 patent – and would have been known even to laypersons who had experience adjusting their television sets – that optimal viewing conditions depended on properly adjusting <u>both</u> brightness and contrast. (Baker, ¶¶150-151; Mierzwinski, 1:22-29.) A skilled artisan would thus have been motivated to adapt the circuit of Stoughton to adjust contrast <u>and</u> brightness levels, based on ambient lighting levels, to achieve a more optimal picture. (Baker, ¶¶148-156.) The combinability of Stoughton and Mierzwinski is also enhanced by the similarities between their respective circuits, which would have provided a further motivation to combine. (Baker, ¶¶152-153.)

Additionally, a skilled artisan would have been motivated to combine in order to improve user experience. As explained for claim 1**[a]** below, Stoughton discloses a user control that allows the user to adjust contrast. Under the proposed combination with Mierzwinski, because the circuit of Stoughton would have controlled contrast <u>and</u> brightness, the user control would have provided adjustments for contrast <u>and</u> brightness, thus obviating the need to include a separate user control for brightness and streamlining operation for the user. (Baker, ¶¶154-155; *see also* Gildo Cecchin, *One Knob Picture Control* (1974) (**EX1010**), p.002 (explaining the difficulties that television users experience when attempting to correctly adjust picture contrast and brightness separately).) A skilled artisan would have had at least a reasonable expectation of success and could have implemented the proposed combination using conventional techniques. (Baker, ¶¶156, 143, 147.)

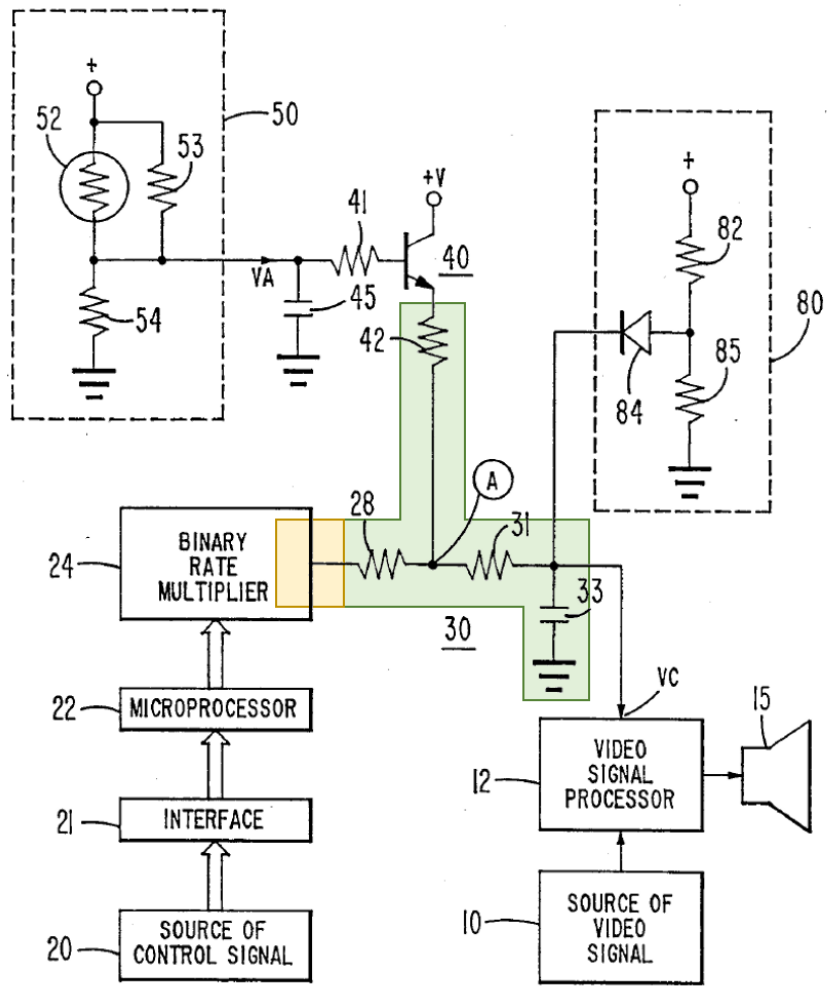
“<u>Selective</u> Ambient Light Correction”

One final point warrants comment. The preamble recites a brightness control circuit “**with <u>selective</u> ambient light correction**,” and Petitioner in the litigation has argued that “**selective**” is indefinite as to its full scope because it is unclear what it covers beyond the ability to operate the circuit in either automatic or manual modes. This issue has no impact on this IPR because it would have been obvious to adapt Stoughton to enable the user to selectively operate the brightness control circuit in automatic mode (discussed for claim 1 and claim 9 below), or a manual mode in which the user manually controls the display brightness (discussed for claim 9 below). (Baker, ¶157.) Petitioner’s full scope indefiniteness arguments are therefore not pertinent here because the proposed combination discloses the narrowest possible scope of “**selectively**.” As explained for claim 9 below, it would have been obvious in view of **<u>Nagai</u>** to operate the circuit in Stoughton in either mode. (Baker, ¶¶157-175.) In either mode, as explained below, the user can make selections that impact the brightness of the display, as discussed in the next section.

(a) “a first input configured to receive a user signal indicative of a user selectable brightness setting” (Claim 1[a])

The court in the *Vizio* litigation previously construed “**first input configured to**” as requiring that the first input be “*actually programmed or implemented with hardware or software*[.]” (**EX1033**, p.007.) To the extent this construction is applied, it is readily satisfied by the prior art.

The "**first input**" in Stoughton corresponds to a wire or conductor shown in Figure 1 below in yellow highlighting, which receives the output of binary rate multiplier (BRM) **24**:



(Stoughton, Fig. 1 (highlighting added).) The wire at the output of binary rate multiplier (BRM) **24** shown in yellow highlighting is a "**first input**" because it is an input to the "**multiplier**," shown in green highlighting and which will be described in detail in the discussion of claim 1**[c]** below. (Baker, ¶¶177-179.)

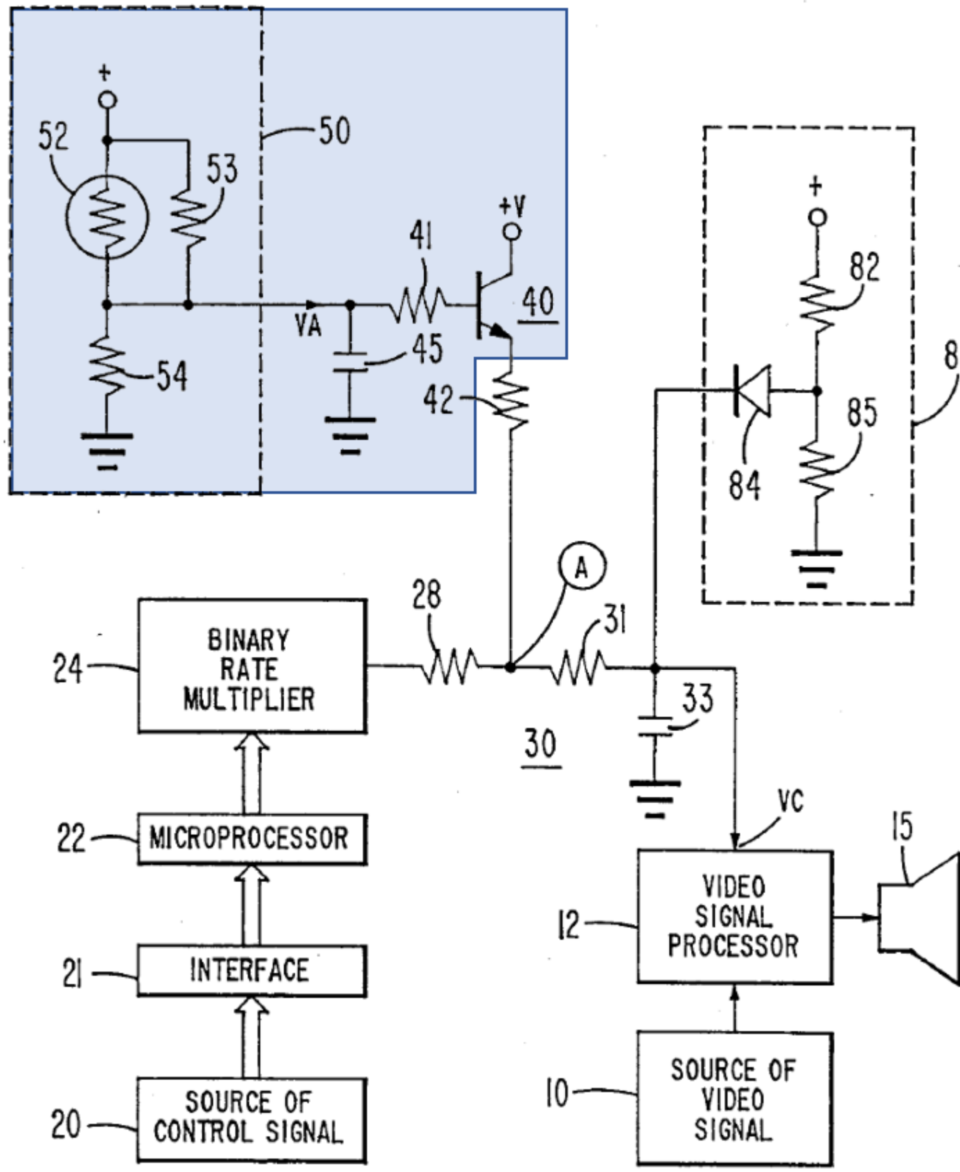
The first input in Stoughton is also "**configured to receive a user signal indicative of a user selectable brightness setting**." Stoughton explains that a user, operating a "viewer operated remote control unit," can provide to the circuit of Figure 1 a "viewer selected contrast level." (Stoughton, 2:40-44, 2:45-53.) As explained for the preamble, Stoughton alone discloses, or it would have been obvious in combination with Mierzwinski, that this viewer selected contrast level would also provide a "**user-selectable <u>brightness</u> setting**." (Baker, ¶180.)

The "**user signal**" in Stoughton thus takes the form of the signal output by BRM **24** and received by the "**first input**" and provided to the "**multiplier**," as shown. More specifically, BRM **24** receives from microprocessor **22** a binary coded signal (*e.g.*, four bits) that represents the viewer selected contrast level. (Stoughton, 2:41-56, 3:56-4:2.) BRM **24** uses this signal, in turn, to output a "binary output signal," *i.e.*, the "**user signal**," that "comprises substantially constant amplitude pulses with a pulse width (duty factor) determined by the contrast control information supplied from microprocessor **22**." (Stoughton, 2:57-63.) Because this signal was based on and reflects the viewer selected contrast level information, it is "**indicative of a user selectable brightness setting**." (Baker, ¶¶181-185.)

A dispute in the pending litigation has arisen regarding construction of "**signal**," with Patent Owner taking the position that this term should be given its plain and ordinary meaning and that it "*includes both hardware and software* *signals*." Petitioner has taken a different position and contends that the term requires "*a time-varying electrical quantity that can be used to transmit information*." This dispute is irrelevant here because the "**user signal**" in Stoughton qualifies as a signal under either definition, as it is a hardware signal that includes time-varying electrical voltages used to transmit information. (Baker, ¶¶186-187.)

(b) "a light sensor configured to sense ambient light and to output a sensing signal indicative of the ambient light level" (Claim 1[b])

The "**light sensor**" in Stoughton corresponds to the circuitry in Stoughton Figure 1 highlighted in blue:



(Stoughton, Fig. 1 (highlighting added); Baker, ¶¶189, 193.)

Referring to the circuitry shown above in blue, Stoughton states that "[s]ource **50** includes a variable impedance network with an ambient light responsive light dependent resistor (LDR) **52**[.]" (Stoughton, 3:22-24.) Because the impedance of LDR **52** changes based on the intensity of ambient light, the emitter of transistor **40** outputs a voltage that varies based on the ambient light intensity detected by LDR **52**. (Stoughton, 3:31-34, 4:53-56; Baker, ¶¶190-191.)

The circuitry highlighted in blue above therefore qualifies as a "**light sensor**" configured to "**sense ambient light and to output a sensing signal indicative of the ambient light level**." As noted for the preamble, the output of the light sensor is voltage VP that is indicative of the amount of ambient light. (Stoughton, 3:31-34 ("<u>An auxiliary contrast control voltage VA</u> from source **50** varies in accordance with the impedance of LDR **52**, which in turn <u>varies with the intensity of ambient light</u>."), 3:34-36 (disclosing that control voltage VA is "conveyed via" resistor **41** and follower transistor **40**), 4:30-31 ("'VP' is the magnitude of the pull-up voltage at the emitter of transistor **40**.").) The "**sensing signal**" thus corresponds to voltage VP (which depends on control voltage VA). (Baker, ¶¶194-195.)

This voltage VP is also "**output**" to node A as shown in Figure 1. (Stoughton, 3:34-36, 4:30-31.) As Petitioner will explain, in the discussion of claim 1**[c]** below, the voltage VP will be multiplied by the "**user signal**" from BRM **24** (claim 1**[a]**). For the same reasons as the "**user signal**" discussed above, voltage VP qualifies as a "**sensing <u>signal</u>**" under both parties' proposed constructions. (Baker, ¶¶198, 58.)

Petitioner notes that nothing in the '117 patent requires that the claimed "**light sensor**" be limited solely to light detecting elements. The '117 patent itself describes exemplary light sensors based on simple electronic components that include additional components and circuitry beyond the light detector for further processing and transforming the output of light detector before it is used by other parts of the system. ('117, 8:10-40 (Fig. 5), 8:41-62 (Fig. 6), 4:48-57.) The claim thus does not preclude inclusion of the blue-highlighted components in Figure 1 beyond LDR **52** as part of the claimed "**light sensor**." These other components are thus properly considered part of the claimed light sensor. (Baker, ¶¶192-193.)

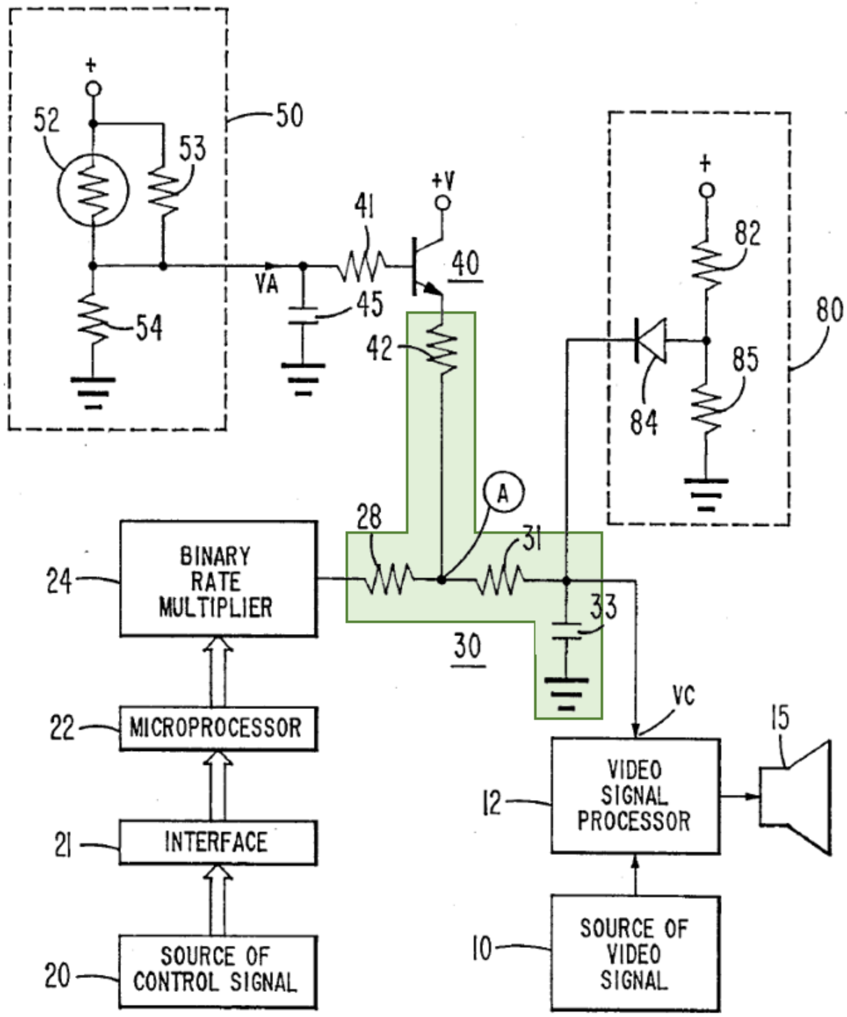
As shown in the highlighted Figure 1 above, Petitioner has not included resistor **42** as part of the claimed "**light sensor**." This is because resistor **42** is part of the impedance network downstream from transistor **40** that leads to the circuitry for multiplying the sensing and user signals. Petitioner has therefore included resistor **42** as part of the claimed "**multiplier**," below. (Baker, ¶¶194-199, 212.)

(c) "a multiplier configured to selectively generate a combined signal based on both the user signal and the sensing signal; and" (Claim 1[c])

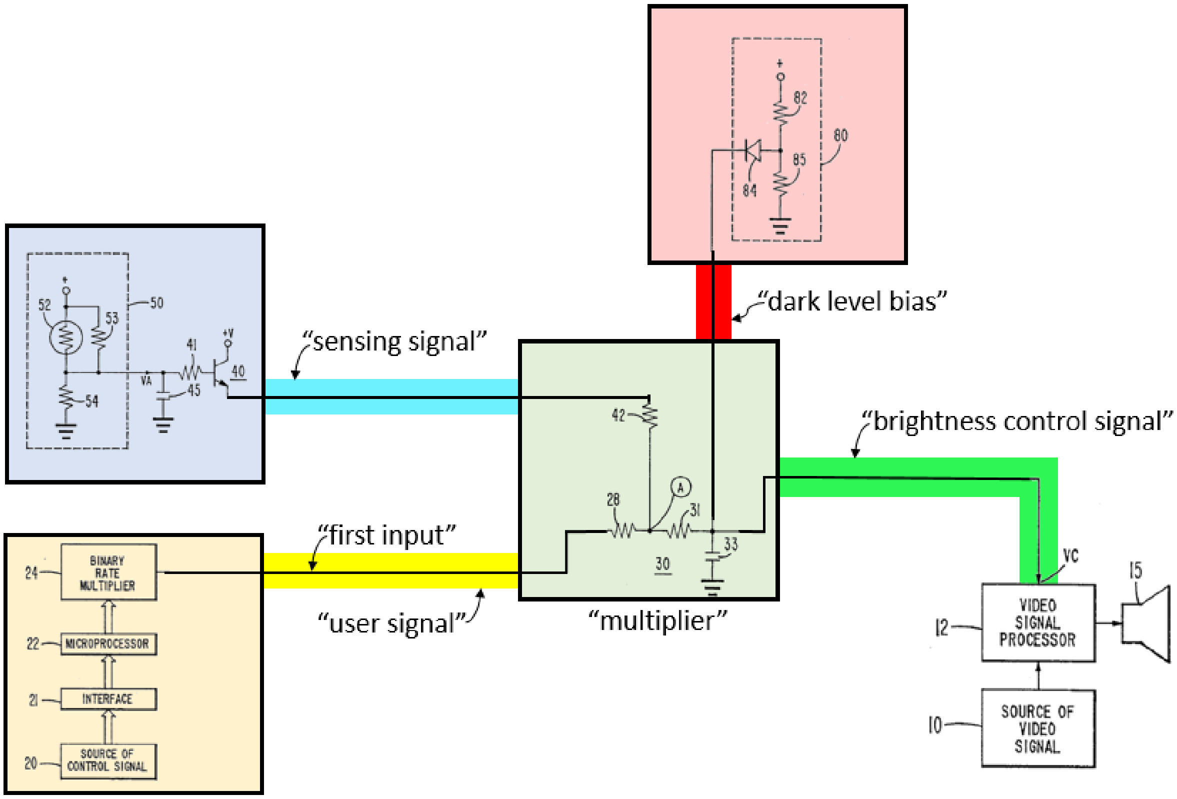
The court in the *Vizio* litigation previously construed "**multiplier configured to**" as requiring that the multiplier be "*actually programmed or implemented with hardware or software*." (**EX1028**, p.0034.) And the court in the *Samsung* litigation construed "**combined signal**" as including, but not necessarily being limited to, "*the product of the user signal and the sensing signal*." (**EX1027**, p.0029.) To the extent these constructions are applied, they are readily satisfied by the prior art.

The "**multiplier**" in Stoughton corresponds to the following components of

Figure 1 shown in green highlighting:



(Stoughton, Fig. 1 (highlighting added); Baker, ¶¶200, 207, 210.) For purposes of illustration, Petitioner's expert created the demonstrative figure below that incorporates the components in Figure 1 of Stoughton and their relationships to one another, but organizes them to illustrate how Petitioner has mapped them to the claimed "**multiplier**," "**user signal**," and "**sensing signal**":



(Baker, ¶201.) For completeness, the figure above also identifies the "**dark level bias**" (in light red), the wire by which the "**dark level bias**" is provided (in dark red), and the wire by which the claimed "**brightness control signal**" is output from the multiplier to video signal processor **12** (in dark green), which are covered in more detail in the discussion for claim 1**[d]** below. (Baker, ¶202.)

Stoughton explains that a "**combined signal**," *i.e.*, a voltage across capacitor **33** as shown in Figure 1, is determined by multiplying the "**user signal**" (of claim 1**[a]**) with the "**sensing signal**" (of claim 1**[b]**):

> The DC value of the signal at node A is recovered for contrast control purposes by means of integrator **30**. The output signal of BRM **24**, when integrated over time by circuit **30**, provides a DC voltage across

capacitor **33** in accordance with the expression

$$\frac{N}{2^n} \times VP$$

where "N" is the output number of the BRM (the number of pulses per unit of time), "n" is the number of binary bit stages of the BRM (four in this example), and "VP" is the magnitude of the pull-up voltage at the emitter of transistor **40**.

(Stoughton, 4:16-31.) The factor N ÷ 2^n on the left side of the expression above represents the portion of time during which the output of BRM **24**, *i.e.*, the "**user signal**," is high. (Baker, ¶¶202-205.) That factor is multiplied by VP, the pull-up voltage at the emitter of transistor **40**, *i.e.*, the "**sensing signal**." (*See also* Stoughton, 4:56-59 ("For example, a 50% change in the magnitude of the pull-up voltage [VP] will produce a 50% change in image contrast regardless of the form (i.e., duty cycle) of the BRM output signal.").) Accordingly, a DC voltage in accordance with the expression above generates a "**combined signal**," the voltage across capacitor **33** representing the product of the user signal and sensing signal. (Baker, ¶¶202, 206.) All of the circuitry highlighted in green above is involved in generating this DC voltage. (Baker, ¶207.)[3] This DC voltage also qualifies as a signal under both sides'

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[3] As discussed for claim 1**[b]** above, Petitioner has mapped transistor **40** in Figure 1 as part of the claimed "**light sensor**." (Baker, ¶¶198, 193-194.) But it would have

competing constructions for the term "**signal**." (Baker, ¶211.)

As explained below for claim 9, it would have been obvious in light of Nagai to "**selectively generate a combined signal**"—*i.e.*, to do so in the auto mode, but not the manual mode.

(d) "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." (Claim 1[d])

The court in the *Vizio* litigation construed "**dark level bias**" as "*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*." (**EX1028**, p.0034.) That court also construed this limitation as being "*actually programmed or implemented with hardware or software*." (**EX1028**, p.0034.) Even if these constructions were applied, they are readily satisfied and rendered obvious over the prior art.

The "**dark level bias**" in Stoughton corresponds to a deviation/bias signal provided by limiter circuit **80** shown in light red highlighting below:

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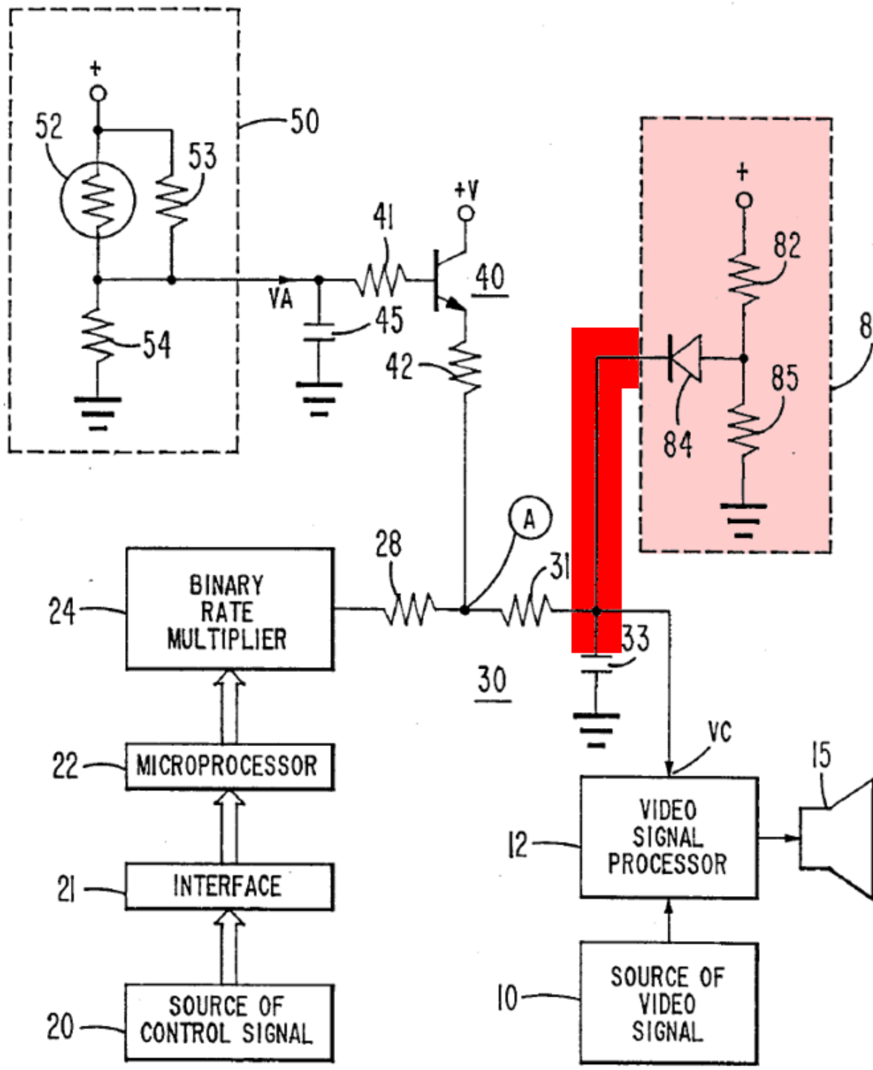
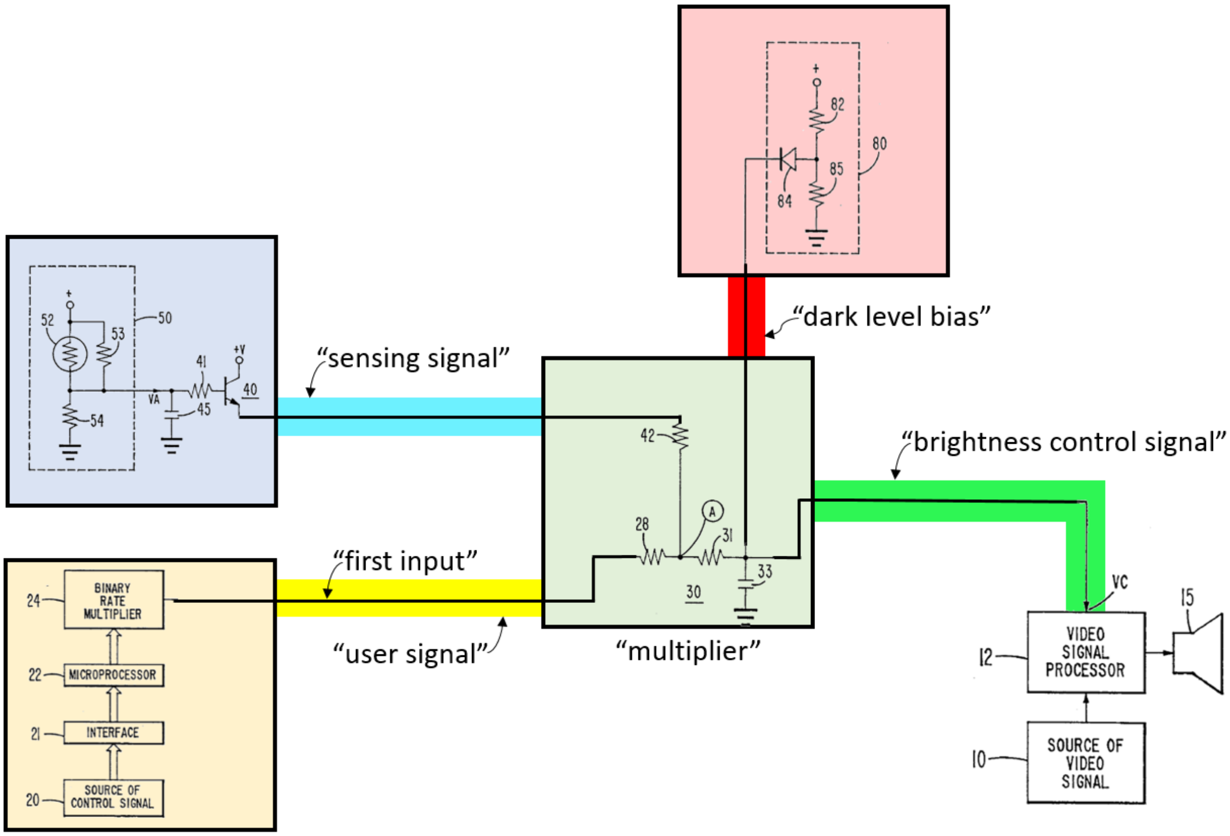
made no difference to a skilled artisan or the prior art mapping if transistor **40** were instead considered part of the claimed "**multiplier**." (Baker, ¶¶212-213.)



(Stoughton, Fig. 1 (highlighting added).) The annotated figure above also shows, in darker red highlighting, the wire or conductor by which the "**dark level bias**" is output from limiter circuit **80** to the claimed multiplier. (Baker, ¶¶215, 224.) Petitioner will describe the "**dark level bias**" in Stoughton below.

The claimed "**brightness control signal**" in Stoughton corresponds to voltage VC, shown above being output to video signal processor **12**, and also shown in green in the demonstrative figure below. That demonstrative figure, as explained, shows the “**dark level bias**” in Stoughton and its relationship to other components in Stoughton’s Figure 1 circuit:



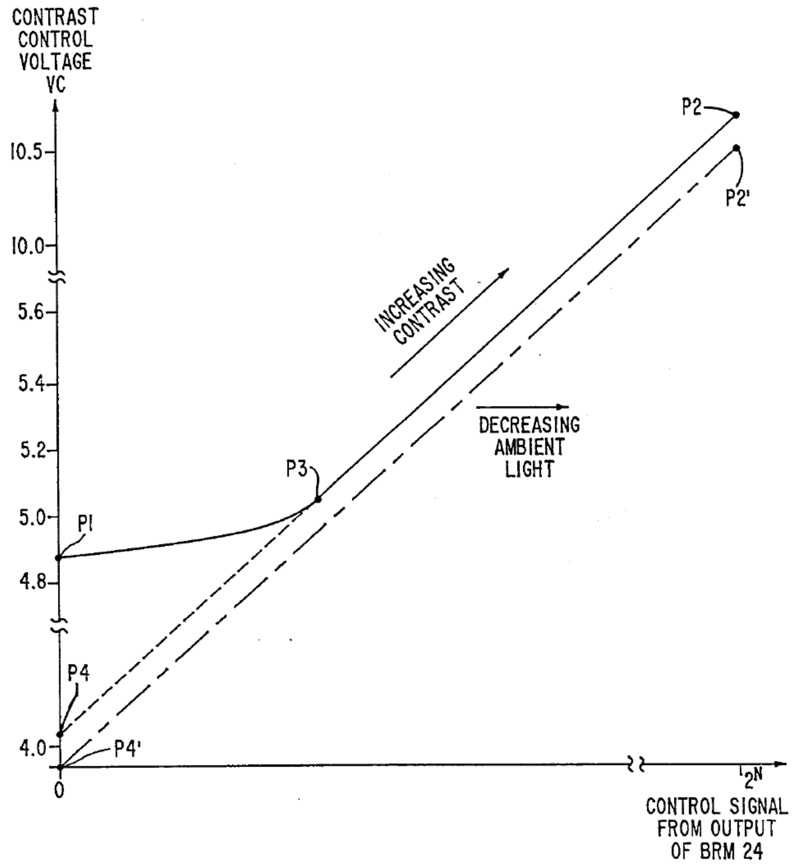
(Baker, ¶216.)

Now turning back to the limiter circuit **80** and the “**dark level bias**” it provides, Stoughton explains that its purpose is to ensure that, as ambient lighting levels decrease, the contrast control voltage will not fall below a predetermined level:

> Referring again to FIG. 1, in accordance with the principles of the present invention a limiter circuit **80** is included in the contrast control system. Limiter **80** includes voltage divider resistors **82** and **84** coupled between a source of positive DC potential and ground. A normally

> nonconductive limiter diode **85** is connected as shown between the junction of resistors **82** and **84** and the terminal of capacitor **33** at which the gain control voltage is developed. A desired threshold operating condition of diode **85** is established by a bias voltage applied to the anode of diode **85** from the junction of resistors **82** and **84**. As will be discussed, limiter diode is rendered conductive when the voltage across capacitor **33** decreases sufficiently in a direction related to reduced image contrast. When conductive, diode **85** limits the voltage across capacitor **33** to a value related to the DC voltage appearing at the junction of resistor **82** and **84** less the offset voltage drop across diode **85**, as will be explained in connection with FIG. 3.

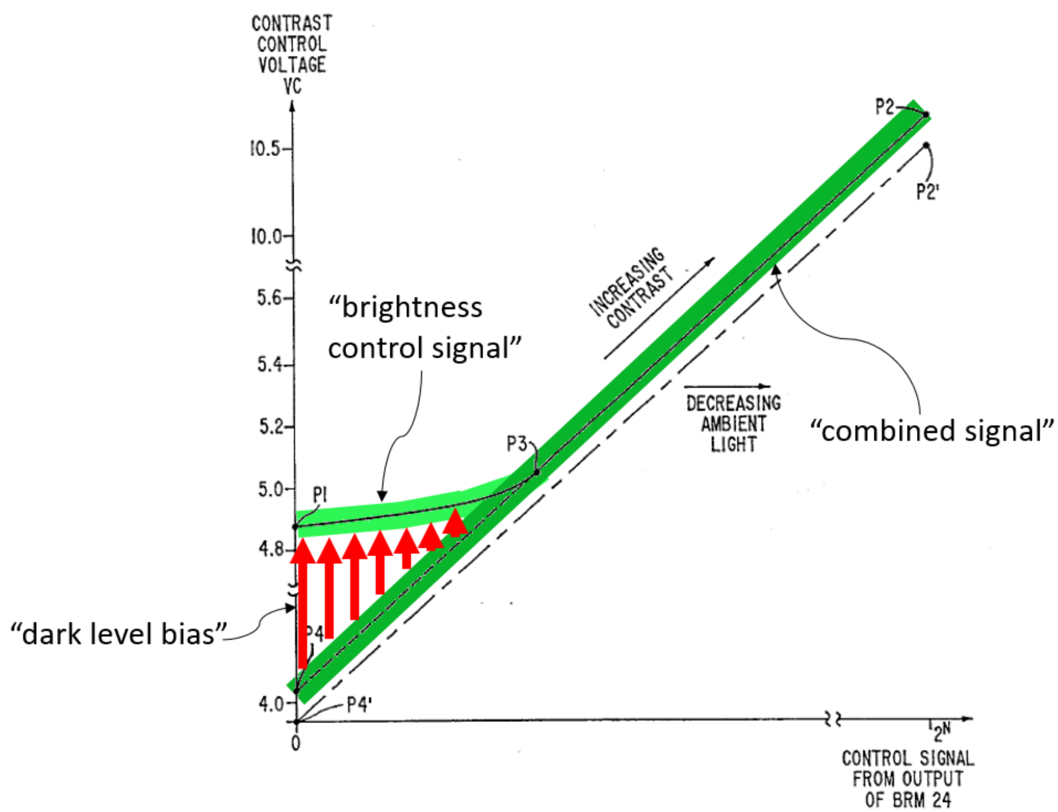
(Stoughton, 4:60-5:10.) The output of limiter circuit **80** thus provides a bias that limits the voltage across capacitor **33** (the "**combined signal**") to maintain it at a predetermined threshold. (Baker, ¶217.) This is shown in Figure 3:



(Stoughton, Fig. 3.)

Figure 3 shows a curve representing the impact of limiter circuit **80** on contrast control voltage VC. (Baker, ¶217.) "The dashed line between point **P3** and **P4** represents a continuation of the response characteristic between points **P2** and **P3** which would otherwise exist in the absence of the limiting action of circuit **80**." (Stoughton, 5:33-37; 5:48-50 ("This effect is illustrated by response **P2**'-**P4**', which would be produced in the absence of limiter **80** for a low ambient light condition.").) But as shown in the slightly curved line from **P3** to **P1**, limiter circuit **80** causes the control voltage VC to deviate from the line between **P2** and **P4** starting at **P3**. Thus, in turn, "minimum contrast end point **P1** [is maintained] at a voltage sufficient to prevent the displayed image from being extinguished." (Stoughton, 5:50-54.)

In other words, when control voltage VC reaches the point represented by **P3**, limiter circuit **80** causes the rate of change of the contrast response to slow down, causing the "flatter" line between points **P3** and **P1**. (Baker, ¶217; Stoughton, 5:22-33; *see also id.* 4:60-5:21, 5:38-6:5.) This occurs because, as explained, limiter circuit **80** provides voltage to capacitor **33** ("**dark level bias**") when the voltage across capacitor **33** falls below a threshold. (Stoughton, 4:60-5:10; Baker, ¶¶217-219.) The following annotated Figure 3 shows the impact of limiter circuit **80**:



(Baker, ¶219.) As shown, the dark level bias (red arrows) adjusts the "**combined signal**" (dark green) of the voltage across capacitor **33** – resulting in a higher-voltage "**brightness control signal**" (light green) that remains above a threshold voltage (around 4.9 volts as shown in Figure 3). (Baker, ¶¶219, 225-228.)

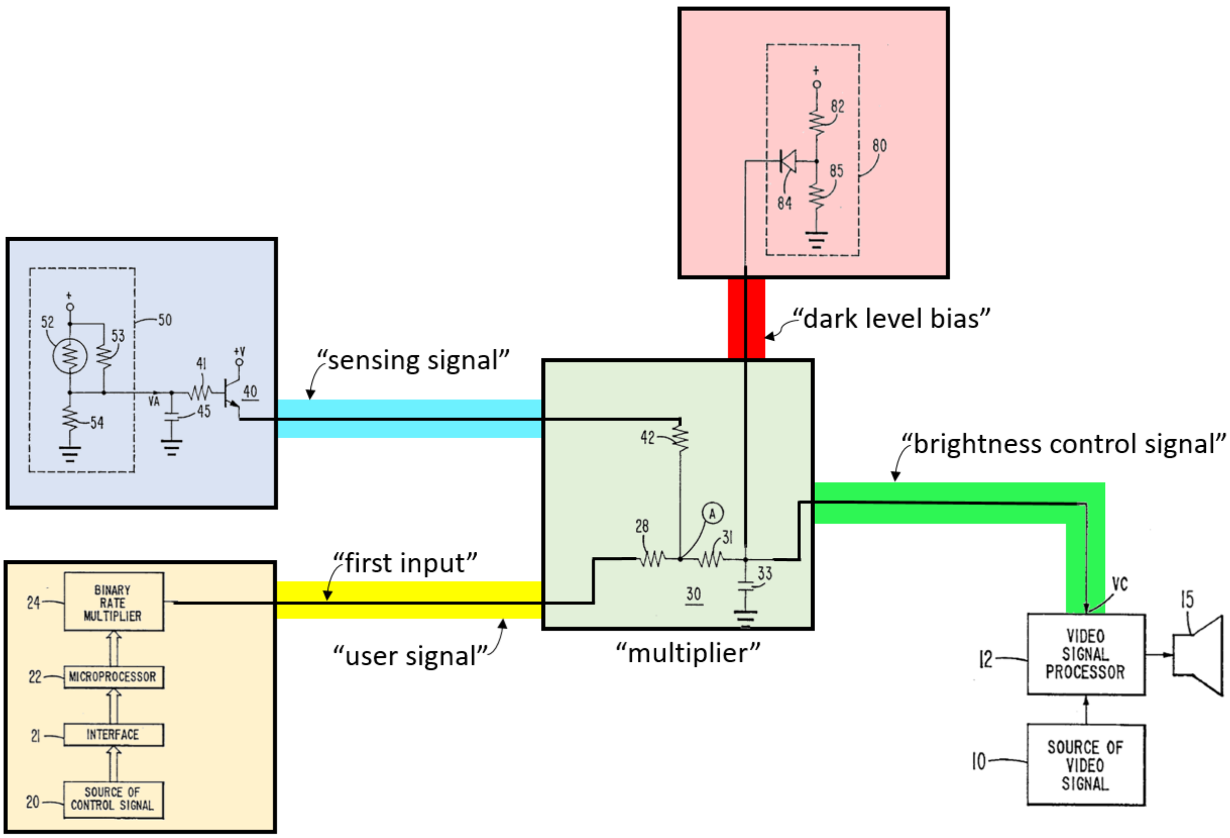
Accordingly, the output signal of Stoughton's limiter circuit **80** is "**configured to adjust** [*i.e.*, increase] **the combined signal** [*i.e.*, the voltage VC across capacitor **33** based on multiplying the output of BRM **24** and the pull-up voltage at the emitter of transistor **40**] **to generate a brightness control signal** [*i.e.*, the adjusted voltage VC across capacitor **33**] **that is used to control a brightness level of a visible display such that the brightness control signal is maintained above a predetermined level** [*i.e.*, that is used to control the contrast/brightness and is maintained by limiter circuit **80** keeping capacitor **33** above a certain threshold voltage]." (Baker, ¶218.) As noted, limiter circuit **80** provides a dark level bias that adjusts a previously existing "**combined signal**" across capacitor **33**, because the value of this "**combined signal**" VC determines whether or not limiter circuit **80** provides the dark level bias at all. The circuit in Stoughton thus performs three distinct steps: (1) formation of the combined signal across capacitor **33**; (2) provision of a dark level bias from limiter circuit **80** if the voltage across capacitor **33** is too low; and (3) upward adjustment of the voltage across capacitor **33** to form the brightness control signal. (*Id.*)

The "**brightness control signal**" thus corresponds, as noted, to the voltage VC across capacitor **33**, which is output to video signal processor **12** to control the display contrast. (Stoughton, Figs. 1, 2; 2:34-37, 4:16-18, 4:42-52.) And as explained above for the preamble, it would have been obvious based on Stoughton alone, or in view of Mierzwinski, that voltage VC qualifies as a "**<u>brightness</u> control signal that is used to control a <u>brightness</u> of a visible display**." (Baker, ¶221.)

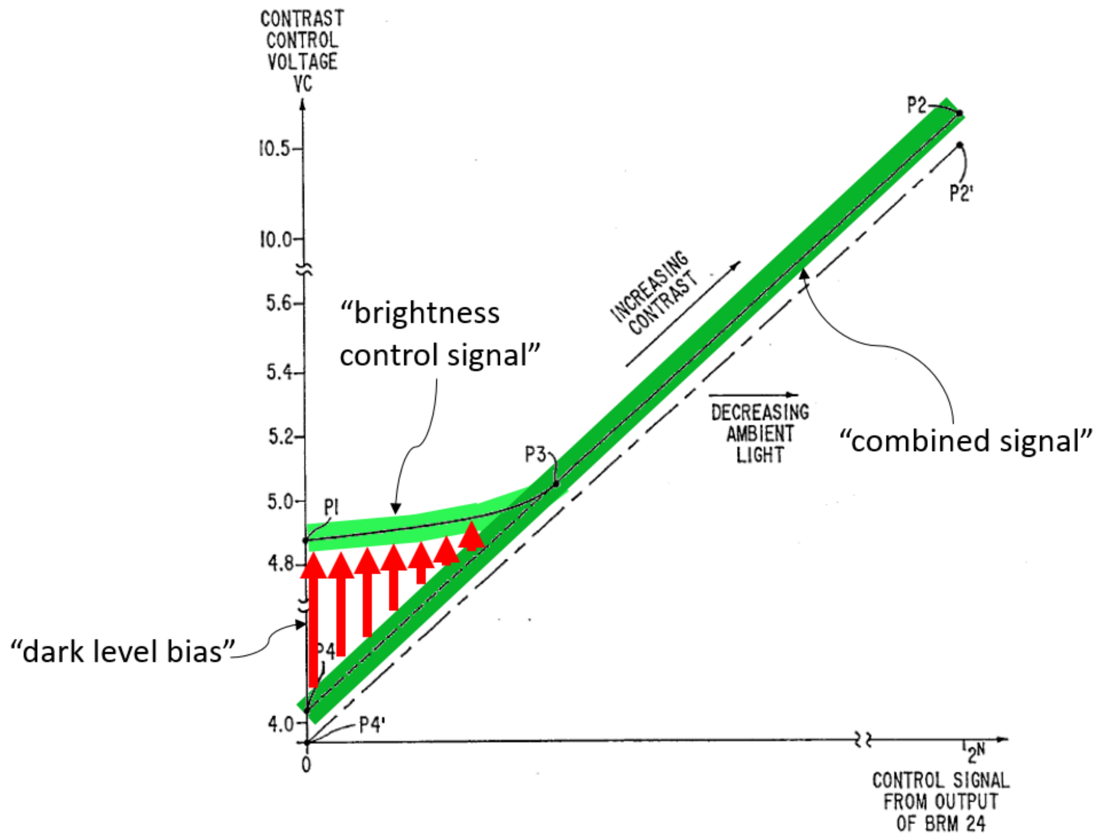
Limiter circuit **80** in Stoughton also operates such that the brightness control signal is maintained above a predetermined level "**when the ambient light level decreases to approximately zero**." Stoughton explains that as ambient light diminishes to a low ambient light condition, voltage VC could otherwise decrease such that the display image is extinguished—as shown by the line P2' to P4' in Figure 3. (Stoughton, 5:43-50.) This is prevented "by the action of limiter **80**, which maintains minimum contrast end point P1 at a voltage sufficient <u>to prevent the displayed image from being extinguished</u>." (Stoughton, 5:50-54.) Stoughton thus discloses that in response to a decrease in ambient light level sufficient to extinguish the display—which would obviously have included an ambient light level of "**approximately zero**"—limiter circuit **80** maintains that control signal above a predetermined minimum level. (Baker, ¶¶222, 227.)

2. **Claim 2: "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."**

As explained for claim 1**[d]**, the "**dark level bias is provided to the multiplier**," as shown in the demonstrative based on Figure 1:



(Baker, ¶231.) And as explained for claim 1**[d]**, "**the amount of adjustment to the combined signal is dependent on the user selectable brightness setting**." Referring again to the annotated figure based on Figure 3:



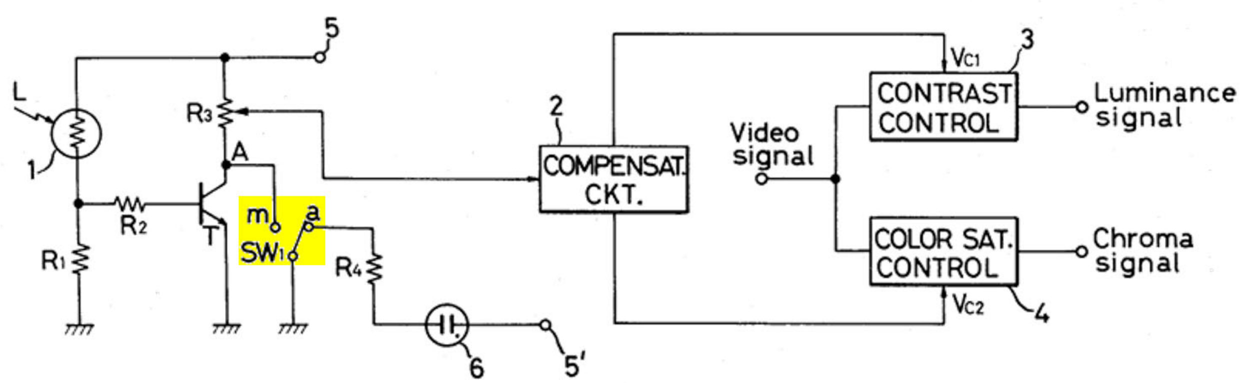
(Baker, ¶232.) As shown, the amount of adjustment to the combined signal (shown in red arrows) gets larger as the user selected brightness setting (as reflected by the control signal from BRM **24**) decreases. Stated more succinctly, assuming the same ambient lighting level, a *lower* user selectable brightness setting results in a *greater* adjustment to the combined signal. (Baker, ¶¶232-233.)

3. Claim 9: "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."

Stoughton does not disclose that the Figure 1 circuit can be operated in an auto or manual mode, but it would have been obvious in view of **Nagai** to modify Stoughton's circuit to provide this functionality.

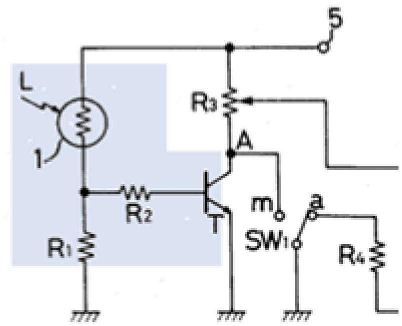
Nagai discloses a contrast control circuit similar to Stoughton that is responsive to ambient lighting levels. (Nagai, Abstract.) Figure 1 of Nagai below discloses a switch SW_1 that can connect to nodes "a" or "m" (shown in yellow):

Fig.1



(Nagai, Fig. 1 (highlighting added).) When switch SW_1 is connected to node "a," the circuit operates in an **automatic** mode in which changes in ambient light detected by ambient light sensor **1** (and user adjustment of variable resistor R_3) cause a change in the signal to compensating circuit **2**, which leads to a change in V_{C1} that adjusts display contrast through contrast control unit **3**. (Nagai, 2:32-58, 2:64-3:44.)

But when SW_1 is connected to node "m," the circuit operates in a **manual** mode in which changes in ambient light detected by ambient light sensor **1** cause no change in the signal input to compensating circuit **2**. This is because point "A" (shown just above node "m") is connected to ground through switch SW_1. (Nagai, 2:53-61.) In manual mode, therefore, V_{C1} can only be adjusted manually using user-adjustable resistor R_3. (Nagai, 2:59-63.) Moreover, in manual mode, the ambient light sensor circuitry in Nagai (shown in blue at right) is disabled. (Baker, ¶¶159-162.)



Rationale and Motivation to Combine (Stoughton and Mierzwinski with Nagai): It would have been obvious to combine Stoughton and Mierzwinski with Nagai, predictably resulting in the brightness control circuit of Stoughton as described for claim 1, further adapted to include a switch allowing the user to select between auto and manual mode in which the ambient light sensor circuitry is, respectively, enabled or disabled. (Baker, ¶¶163, 167, 237-238, 157-175.)

The proposed combination would have been exceedingly simple to implement. For example, a switch could have been placed at either of the following two highlighted points in Stoughton's circuit shown in Figure 1:

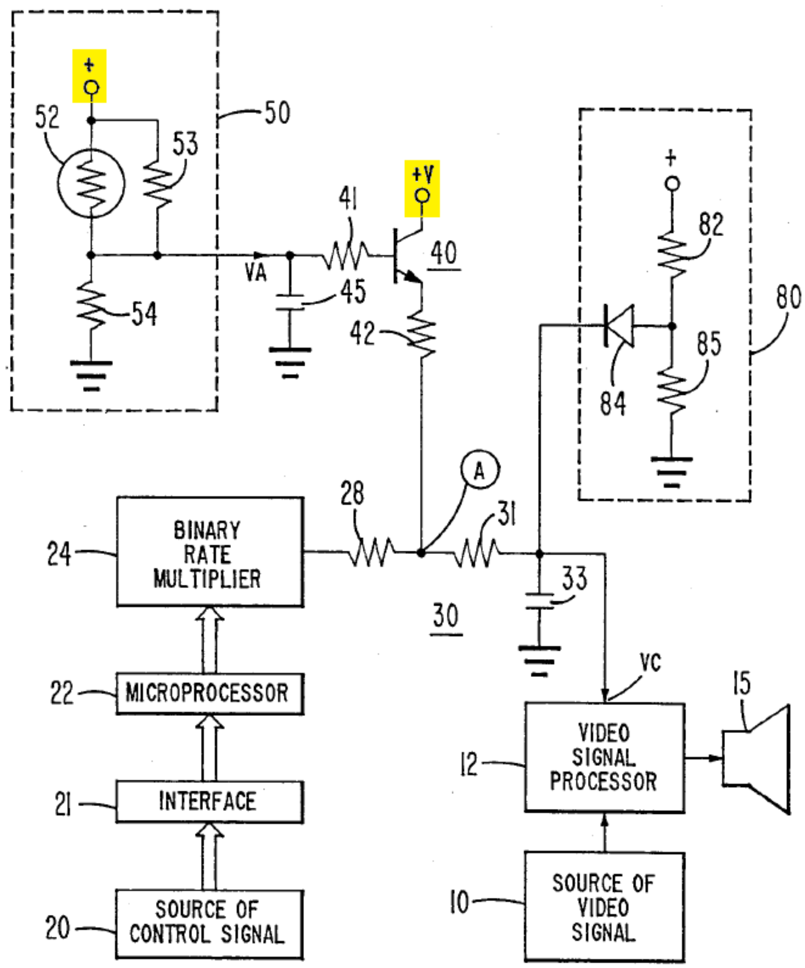


Fig. 1

(Stoughton, Fig. 1 (highlight added); Baker, ¶¶164-165.)

These places are mere examples; it would have been obvious that adding a switch at these or other locations would have disconnected the voltage source from the circuit in manual mode, thereby disabling the ambient light sensor circuitry and causing it to have no impact on output signal VC. (Baker, ¶166.) Under the proposed combination, therefore, the circuit of Stoughton would have been adapted such that in automatic mode, the signal flowing through the switch ("**selection signal**") allows the signal from the ambient light sensor circuitry to flow, whereas in manual mode, the light sensor circuitry is disabled and no signal flows from it into other portions of the circuit. (Baker, ¶¶236-238.) It would have been obvious that the circuit of Stoughton would have included a "**second input**" configured to receive the selection signal. (Baker, ¶238.) This arrangement mirrors the embodiment in the '117 patent in which a selection signal that is either "logic high" or "logic low" to allow and prevent, respectively, the signal from the visible light sensor from flowing. ('117, 7:2-7, 7:49-55.) Like Stoughton and Mierzwinski discussed above, Nagai is an analogous reference in the same field as the '117 patent. (Baker, ¶168.)

A skilled artisan would have been motivated to combine in order to afford greater user control over the brightness of the display. It would have been obvious, for example, that many situations could have arisen in which it was desirable for users to fully (manually) control display brightness. (Baker, ¶¶170-171, 173.) A user with poor eyesight, for instance, may have desired to maintain their screen at a high level of brightness even in low ambient lighting conditions. (Baker, ¶171.) Some users may also have preferred a manual mode because they were accustomed to displays that lacked automatical brightness adjustment based on ambient lighting. (Baker, ¶172.) A skilled artisan would also have been motivated to include a manual mode because, by disabling the ambient light sensor circuitry, the brightness control circuit (and thus the display) would have consumed less power. (Baker, ¶174.) A skilled artisan would have had at least a reasonable expectation of success because

Stoughton and Nagai disclose similar circuits and the combination could have been implemented using conventional techniques. (Baker, ¶¶164-166, 169, 175, 234-238.)

4. Independent Claim 15

Claim 15 is substantially similar to claim 1 but written as a method claim. As explained for claim 1**[a],** the proposed combination discloses and renders obvious "**receiving a user input signal indicative of a user selectable brightness setting**," *i.e.*, the user brightness selection represented, as explained, as the output of BRM **24**. The proposed combination also discloses and renders obvious "**selectively multiplying the input signal with a sense signal to generate a combined signal, wherein the sense signal indicates an ambient light level**," because—in auto but not manual mode—it multiplies the user input signal by the VP, the pull-up voltage at the emitter of transistor **40** ("**sense signal**"), which is based on and indicates an ambient light level as explained for claim 1**[b]** and 1**[c]**. And finally, the proposed combination renders obvious "**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**," as was fully described for claim 1**[d]**. As also fully explained for claim 1, a skilled artisan would have been motivated to combine to operate the system built based on the proposed combination in a manner that practices each limitation of claim 15. (Baker, ¶242.)

5. Claim 16: "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."

It would have been obvious that the selective multiplying step (as described for claim 1**[c]**) would have been performed by at least a mixed-signal circuit and/or an analog circuit. (Baker, ¶¶249-250.)

C. Ground 2: Claim 7 Is Obvious Over Stoughton, Mierzwinski, Nagai, and Shimomura

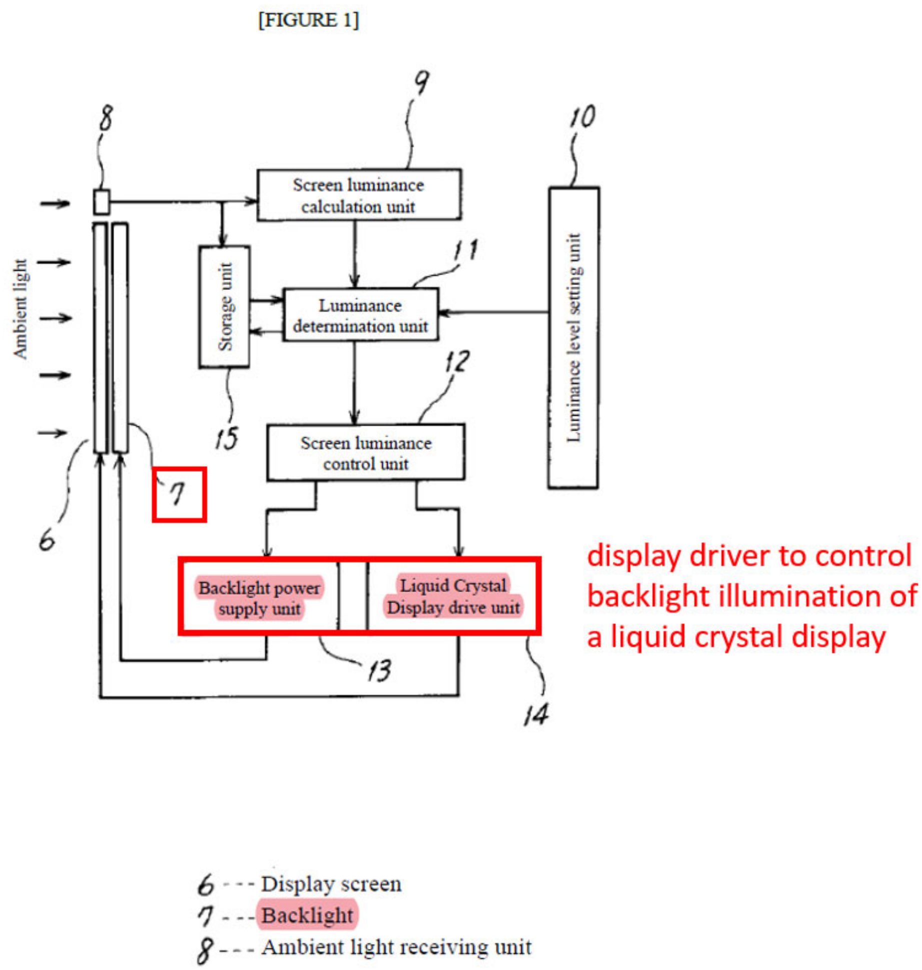
1. Claim 7: "The brightness control circuit of claim 1, wherein the brightness control signal is provided to a display driver to control backlight illumination of a liquid crystal display."

The embodiment in Stoughton pertains to conventional cathode ray tube (CRT) displays, and thus, does not expressly disclose contrast/brightness control for a liquid crystal display (LCD). Claim 7 would therefore have been obvious over the prior art for **Ground 1** in further view of **<u>Shimomura</u>**. (Baker, ¶253.) Petitioner will cite to the certified Japanese translation of Shimomura (**EX1007**).

Shimomura explains that in display devices, the user can set the brightness of a display screen, and brightness can be changed based on changes in the illumination environment. (Shimomura, ¶[0001], ¶[0004].) Shimomura also teaches that brightness control can be easily applied to various types of display devices, including cathode ray tubes (CRTs), liquid crystal displays (LCDs), among others.

(Shimomura, ¶[0003].)

Figure 1 of Shimomura below depicts LCD drive unit **14**, a backlight power supply unit **13**, and backlight **7**:



(Shimomura, Fig. 1 (annotations added); Shimomura, ¶[0027], ¶[0023], claim 4; Baker, ¶¶253-256.) Figure 1, as shown, shows a "**display driver**" taking the form of the combination of the backlight power supply unit **13** and LCD drive unit **14**, which together control the illumination of backlight **7**. (Baker, ¶256.) Shimomura explains that the backlight power supply unit **13** "supplies power to the backlight **7** and controls the luminance of the backlight **7** by receiving signals from the screen luminance control unit **12**." (Shimomura, ¶[0027].) Shimomura therefore discloses what an ordinarily skilled artisan would have readily understood, *i.e.*, that controlling brightness of an LCD includes controlling its backlight illumination.

Rationale and Motivation to Combine (Stoughton with Shimomura): It would have been obvious to combine Stoughton and Shimomura, predictably resulting in the Stoughton brightness control system of **Ground 1** adapted to further "**control backlight illumination of a liquid crystal display**." (Baker, ¶257.) Under the proposed combination, therefore, the "**brightness control signal**" from claim 1**[d]** would, in the case where an LCD was being used, have controlled its backlight illumination. (*Id.*) Shimomura, like Stoughton discussed for claim 1, is an analogous reference in the same field and would have been pertinent to problems facing the inventor. (Baker, ¶¶257-265.)

An ordinarily skilled artisan would have been motivated to combine in order to adapt the Stoughton brightness control circuit to LCD devices, which were becoming more and more popular by the early 2000s due to their well-recognized benefits over cathode ray tube (CRT) devices, including their improved form factor (being less heavy and thinner), having better resolution, and consuming less power. (Baker, ¶¶259, 263.) LCD devices were also commonly regarded as known substitutes for conventional cathode ray tube (CRT) display devices. (Baker, ¶264.)

A skilled artisan would thus have understood that Stoughton's techniques would have been fully applicable to LCD devices, and would have had at least a reasonable expectation of success in implementing the proposed combination using known and conventional techniques. (Baker, ¶¶264-265.)

D. Ground 3: Claims 1-2, 7, 9, 15-16 Are Obvious Over Gettemy in View of Kerman, Rosenzweig, Whitted, and Bell

1. Independent Claim 1

The preamble recites "**[a] brightness control circuit with selective ambient light correction comprising**." The preamble is disclosed by and rendered obvious over Gettemy, if it imposes a limitation.

Gettemy discloses a portable computer that includes "<u>a dynamic brightness range control</u> to maximize readability in various ambient lighting conditions and to prolong the lifetime of the display, the light and the battery." (Gettemy, 1:10-15.) Figure 3 shows a portable computer **300** with its main components:

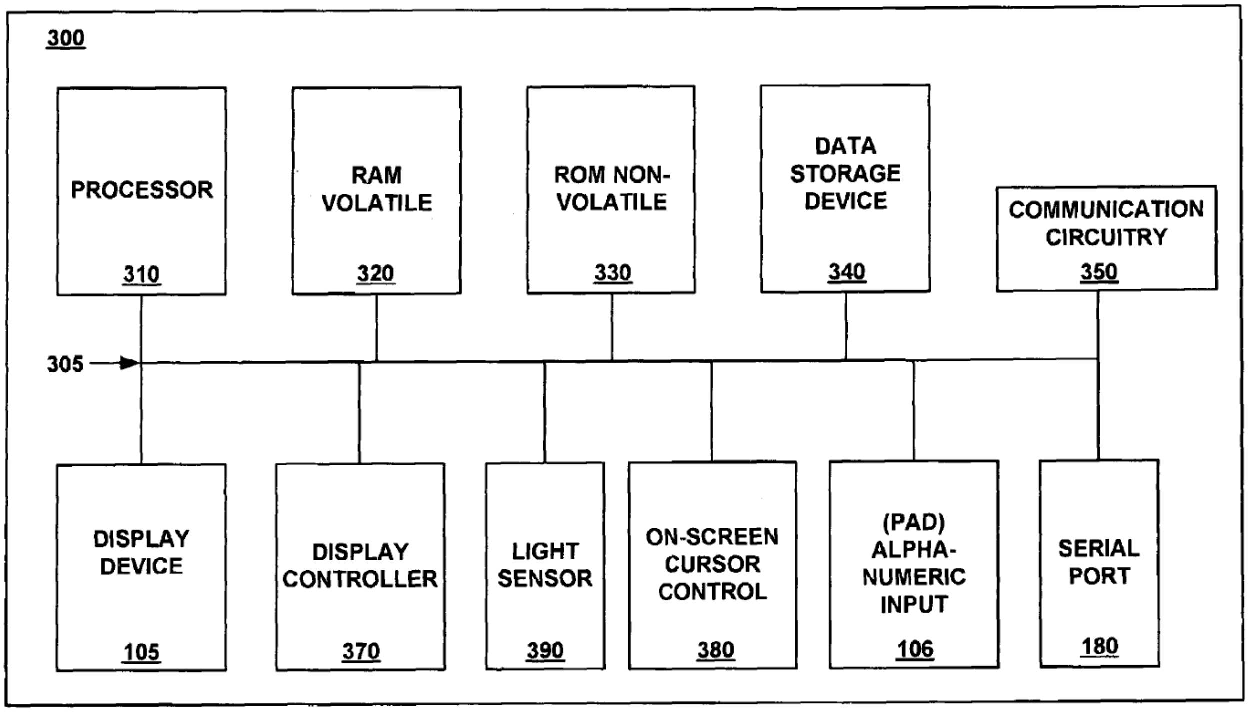


FIGURE 3

(Gettemy, Fig. 3.) The key components of portable computer **300** include processor **310**, light sensor **390**, display controller **370**, display device **105**, and on-screen cursor control **380**. As Gettemy explains:

> In one embodiment, portable computer system **300** includes one or more light sensors **390** to detect the ambient light and provide a signal to the main processor **310** for determining when to implement a change in brightness range. Display controller **370** implements display control commands from the main processor **310** such as increasing or decreasing the brightness of the display device **105**.

(Gettemy, 5:31-37.) It would have been obvious that the components in the portable computer have formed at least one "**brightness control circuit**," because they provide Gettemy's brightness control functionality and would have been connected using electrical circuitry. (Baker, ¶269.) Gettemy also confirms that the brightness control circuit has "**ambient light correction**," because as explained above, it can provide adjustment ("**correction**") to the display brightness based on ambient lighting conditions. (Gettemy, *e.g.*, 5:31-37, 6:18-22.)

As explained for **Ground 1**, Petitioner in the pending litigation has asserted that "**selective**" is indefinite as to its full scope because it is unclear what it covers (if anything) beyond the ability to operate in either automatic or manual modes. This issue is not pertinent here because it would have been obvious to operate the circuit in Gettemy in either automatic mode (discussed for claim 1 and claim 9 below), or a manual mode in which the user can manually control the display brightness (discussed for claim 9 below). (Baker, ¶271.) With respect to the automatic mode, on which Petitioner will focus for claim 1, the user can make selections that influence display brightness. (Gettemy, 6:16-22.) Petitioner will describe them below.

(a) "a first input configured to receive a user signal indicative of a user selectable brightness setting;" (Claim 1[a])

Figure 4 of Gettemy shows a user interface for receiving a user selectable brightness setting:

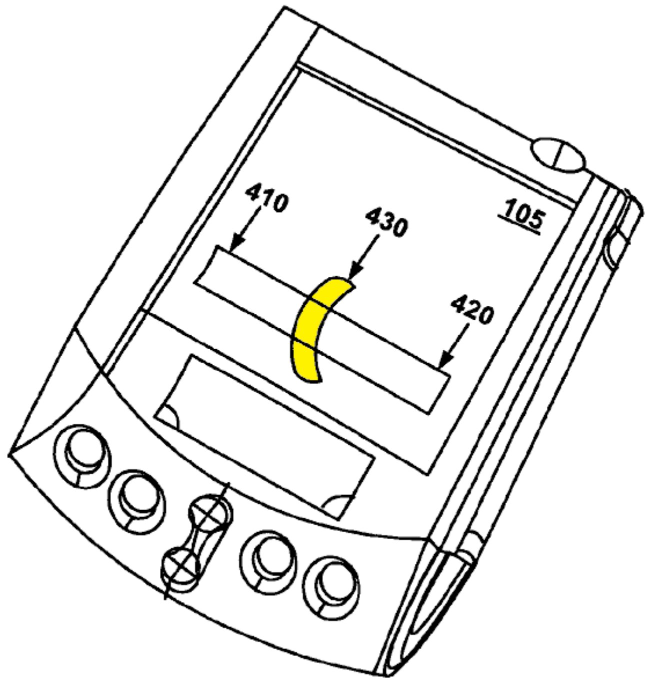


FIGURE 4

(Gettemy, Fig. 4 (highlighting added).) Figure 4 shows display screen **105** with "the user brightness setting which may be implemented as a graphical user interface." (Gettemy, 5:40-42.) The user can adjust brightness "by moving the slider **430** to the right for an increase in brightness or to the left for a decrease in brightness." (Gettemy, 5:42-46.) Accordingly, the "**user signal indicative of a user selectable brightness setting**" corresponds in Gettemy to the user selection, represented as the relative position of slider **430** within the currently-displayed range. (Baker, ¶275; Gettemy, *e.g.*, 6:4-6 ("In step **640** of FIG. 6, the processor interprets <u>the brightness setting of said slider position **430** relative to the low range setting **410** and the high range setting **420**</u>."), 6:18-22.) As explained in more detail for claim 1**[c]** below, Gettemy uses the relative position of the slider to compute a new brightness level when the brightness range changes when ambient lighting levels change.

Gettemy does not disclose the precise format used to internally represent the relative slider position, but it would have been obvious to use a numerical percentage value. (Baker, ¶¶277-278.) This is supported by Figure 5:

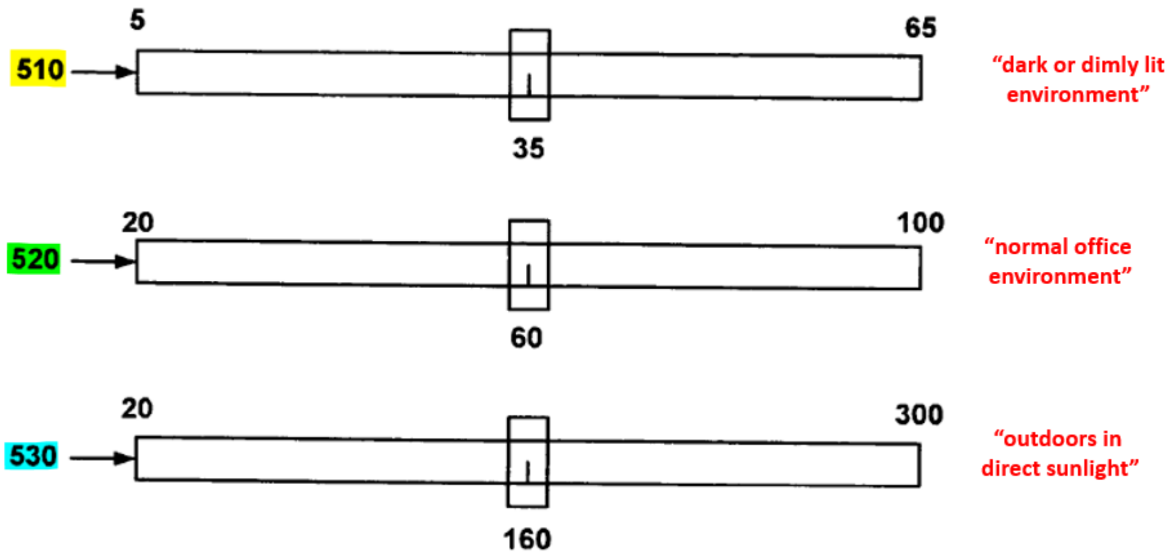


FIGURE 5

(Gettemy, Fig. 5 (colored highlighting and annotations added), 3:31-35.) Figure 5 shows three sliders at the "midpoint" position of the slider (Gettemy, 6:7-10) in three brightness ranges, each corresponding to a different ambient lighting condition. As shown, the midpoint value is **35** for range **510** of 5-65, **60** for range **520** of 20-100, and **160** for range **530** of 20-300. (Gettemy, 6:7-10.) But all three of these values represent the same *relative* (midpoint) position. (Baker, ¶¶275-276.)

It would have been obvious to represent the relative slider position as a numerical value representing a percentage value, such as "50" or "0.5" using the examples above. The use of a percentage would have been regarded as the simplest technique for representing the relative position of the slider. (Baker, ¶277.)

And as explained in detail for claim 1**[c]** below, both **<u>Kerman</u>** and **<u>Rosenzweig</u>**, which provide more details about the slider controls used in Gettemy, use a percentage (or decimal percentage) to represent the relative position of the slider ("**user signal**"). (Baker, ¶¶278, 301, 311.)

For example, Rosenzweig discloses calculating the position of the slider "as a number between 0 and 1," *i.e.*, as a decimal percentage, in response to the user moving the slider to a different position. (Rosenzweig, pp.0046-47; *see also id.*, p.0045 ("It computes the value of the slider as a number between 0 and 1, regardless of the real range.").) Kerman similarly discloses calculating a percentage based on the current slider position. (Kerman, pp.0042-43, ¶9.) Petitioner will provide more information about Rosenzweig and Kerman below in the discussion of the "**multiplier**" limitation. For purposes of claim 1**[a]**, they confirm that it would have been obvious to represent the relative slider position in Gettemy as a percentage (or decimal percentage) value. (Baker, ¶¶278-283.)

As noted for **Ground 1**, a dispute in the pending litigation exists regarding construction of "**signal**," with Patent Owner taking the position that this term should be given its plain and ordinary meaning and that it "*includes both hardware and software signals*." As explained in **Part I.B**, the pending litigation is stayed and, as such, the district court has not addressed this issue.

In order to streamline the Board's consideration of the prior art, Petitioner for purposes of this IPR only adopts Patent Owner's construction of "**signal**." *E.g.*, *Glux Visual Effects Tech (Shenzhen) v. Ultravision Techs*, IPR2020-01052, Paper 28, p.33 (PTAB Nov. 17, 2021) ("*Western Digital* states, and we agree, that '37 C.F.R. § [42.]104(b)(3) does not require [a p]etitioner to express its subjective agreement regarding correctness of its proffered claim constructions or to take ownership of those constructions,' such as in a district court proceeding." (citation omitted)). Patent Owner contends that its construction is supported by both intrinsic and extrinsic evidence. Patent Owner has pointed to statements in the written description that the claimed multiplier (discussed for claim 1**[c]** below), which multiplies the "**user signal**" and the "**sensing signal**" can be implemented using a software algorithm. ('117, 2:7-9, 5:37-39.) Patent Owner has also pointed to statements referring to the "**user signal**" as a "digital word," which according to Patent Owner, indicate that a signal can take the form of a value in a software implementation. ('117, *e.g.*, 3:59-63, 10:33-35, 13:20-21 (claim 12); **EX1026**, ¶¶26, 47, 48.) Patent Owner has also pointed to extrinsic evidence including third party patents that purport to use "signal" to describe software values. (**EX1026**, ¶55.)

Gettemy clearly teaches a "**user signal**" under Patent Owner's software-based view. (Baker, ¶¶276, 283.) Gettemy explains that physical quantities may take the form of signals, and that "[i]t has proven convenient at times… to refer to these signals as bits, values, elements, <u>symbols</u>, characters, terms, numbers, or the like." (Gettemy, 3:66-4:5.) The relative position of the slider therefore qualifies as a "**user <u>signal</u>**" under Patent Owner's interpretation. (Baker, ¶¶276, 283.)

Gettemy also discloses that the "**user signal**" is received by "**a first input**." Gettemy explains that user input from an input device such as a touch screen device is provided to main processor **310**. (Gettemy, 5:14-20, 5:21-28.) It would have been obvious that main processor **310** would have then processed the user input – in this case user input reflecting the position of the slider – to determine the relative position of the slider ("**user signal**"). (Baker, ¶¶279-280; Gettemy, 6:4-6.) The "**first input**" in Gettemy thus corresponds to main processor **310** and software functionality, such as a software variable or routine, that receives the "**user signal**." (Baker, ¶¶279, 281.) As detailed below, that "**user signal**" is received and used by other software in Gettemy to set or adjust the display brightness.

(b) "a light sensor configured to sense ambient light and to output a sensing signal indicative of the ambient light level;" (Claim 1[b])

Gettemy discloses a "**sensing signal**" in the form of a brightness range determined by main processor **310** based on the current ambient light level, as explained below. Figure 5 of Gettemy provides several examples of brightness ranges based on different ambient light levels:

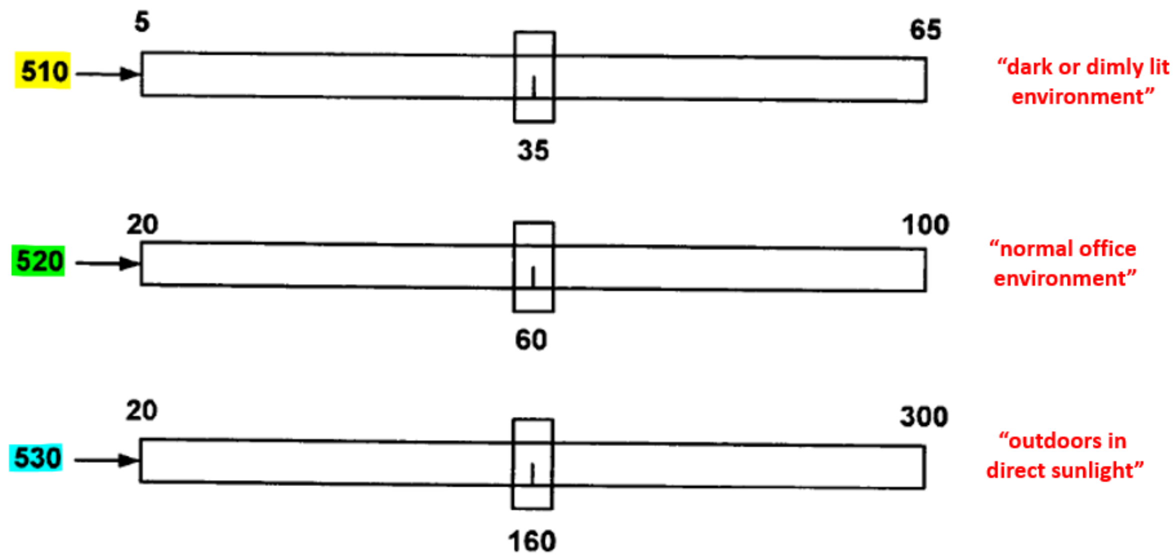


FIGURE 5

(Gettemy, Fig. 5 (colored highlighting and annotations added), 3:31-35.) "Range **510** may be used when in a dark or dimly lit environment. Range **520** may be used in a normal office environment and range **530** may be used outdoors in direct sunlight." (Gettemy, 5:50-53.) The particular brightness range selected, therefore, is based on the amount of ambient light detected by one or more ambient light sensors (Gettemy, 5:31-35):

> In step **610** [of Fig. 6] <u>one or more light sensors detect the ambient light and send a signal representing this information to the processor</u>. The signal can be from a single sensor, or can be the average of signals from a plurality of sensors. <u>The processor then, as shown in step **620**,</u> accesses stored data which configures the ranges and <u>determines if the ambient light signal requires a change to the brightness range. If a change to brightness range is required, the processor then implements the range change</u>.

(Gettemy, 5:56-64; *see also id.*, 2:41-44.)

Petitioner has not mapped the "**sensing signal**" of claim 1**[b]** to a raw sensor signal provided by ambient light sensors **390**, as this information is not directly used to determine display brightness. (Baker, ¶286.) Petitioner has instead mapped the "**sensing signal**" to the brightness range in Gettemy (defined by its maximum and minimum values), which the processor selects *based on* the ambient light sensor signal. (Gettemy, 5:60-64.) That brightness range is "**indicative of the ambient light level**" because it reflects the current level of ambient light as based on the ambient light sensor; using the exemplary ranges in Figure 5, range **510** is "**indicative**" of low ambient light level, range **520** is "**indicative**" of normal office ambient light level, and range **530** is "**indicative**" of high ambient light level, as noted. (Gettemy, 5:50-53, Fig. 5.)

And like the '117 patent, Gettemy's sensing signal is "in proportion to the level of ambient light" ('117, 2:28-39) because Gettemy's brightness range increases as the ambient light level increases. For example, Figure 5 shows range **510** of 60 between 5-65 ("*dark or dimly lit*"), range **510** of 80 between 20-100 ("*normal office environment*"), up to range **530** of 280 between 20-300 ("*outdoors in direct sunlight*"). (Gettemy, 6:6-10, 5:50-54; *see also Mathematics Dictionary and Handbook* (1993), **EX1018**, p.004 (describing range as "[t]he difference between the largest and smallest number in a set of data.").) With respect to all of the exemplary ranges in Gettemy, an increase in the ambient light level results in: (1) an increase in the maximum value in the selected brightness range, and also (2) an increase in the size of the selected range (*e.g.*, the difference between the maximum and minimum values in the range). (Baker, ¶287.)

And although Figure 5 shows only three exemplary ranges **510**, **520**, and **530**, it would have been obvious that main processor **310** could have been enabled to select from a larger number of ranges to provide more granularity and diversity in available brightness levels. (Baker, ¶¶287-288.) And as explained above, it would also have been obvious under Patent Owner's software-based interpretation that the brightness range qualifies as a "**sensing <u>signal</u>**." (Baker, ¶290.)

Accordingly, the "**light sensor**" in Gettemy corresponds to light sensor **390**, along with software executed by main processor **310** that uses the output from light sensor **390** to determine the brightness range. That selected brightness range ("**sensing signal**") will then be "**output**" or provided to other software in Gettemy to determine the brightness for the display consistent with the position of the slider chosen by the user, as explained below. (Baker, ¶288.)

Petitioner notes that nothing in the '117 patent requires that the claimed "**light sensor**" be limited solely to light detecting elements. As explained for **Ground 1**, the '117 patent describes exemplary light sensors based on simple electronic components that include additional components beyond the light detector for further processing and transforming the output of light detector before it is used by other parts of the system. ('117, 8:10-40 (Fig. 5), 8:41-62 (Fig. 6), 4:48-57; Baker, ¶289.) The claim thus does not preclude the further inclusion of main processor **310** and software executed by that processor as part of the claimed "**light sensor**."

(c) "a multiplier configured to selectively generate a combined signal based on both the user signal and the sensing signal; and" (Claim 1[c])

The court in the *Vizio* litigation previously construed "**multiplier configured to**" as requiring that the multiplier be "*actually programmed or implemented with hardware or software*." (**EX1028**.) And the court in the *Samsung* litigation construed "**combined signal**" as including, but not necessarily being limited to, "*the product of the user signal and the sensing signal*." (**EX1027**.) To the extent these constructions apply, they are readily satisfied by the prior art.

Gettemy computes a brightness value for the display based on: **(1)** the selected brightness range based on ambient lighting conditions ("**sensing signal**") and **(2)** the relative position of the slider ("**user signal**"). As Gettemy explains:

> At any time, the user can display the currently selected range setting and move the slider up or down to increase or decrease the brightness setting of the display. The computer processor <u>will dynamically adjust the range when the ambient light changes sufficiently</u>, <u>keeping the brightness level commensurate with the slider position last selected relative to the new range setting</u>.

(Gettemy, 6:16-22.) Figure 7 shows several examples of how the processor adjusts the brightness level commensurate with the slider position based on the range:

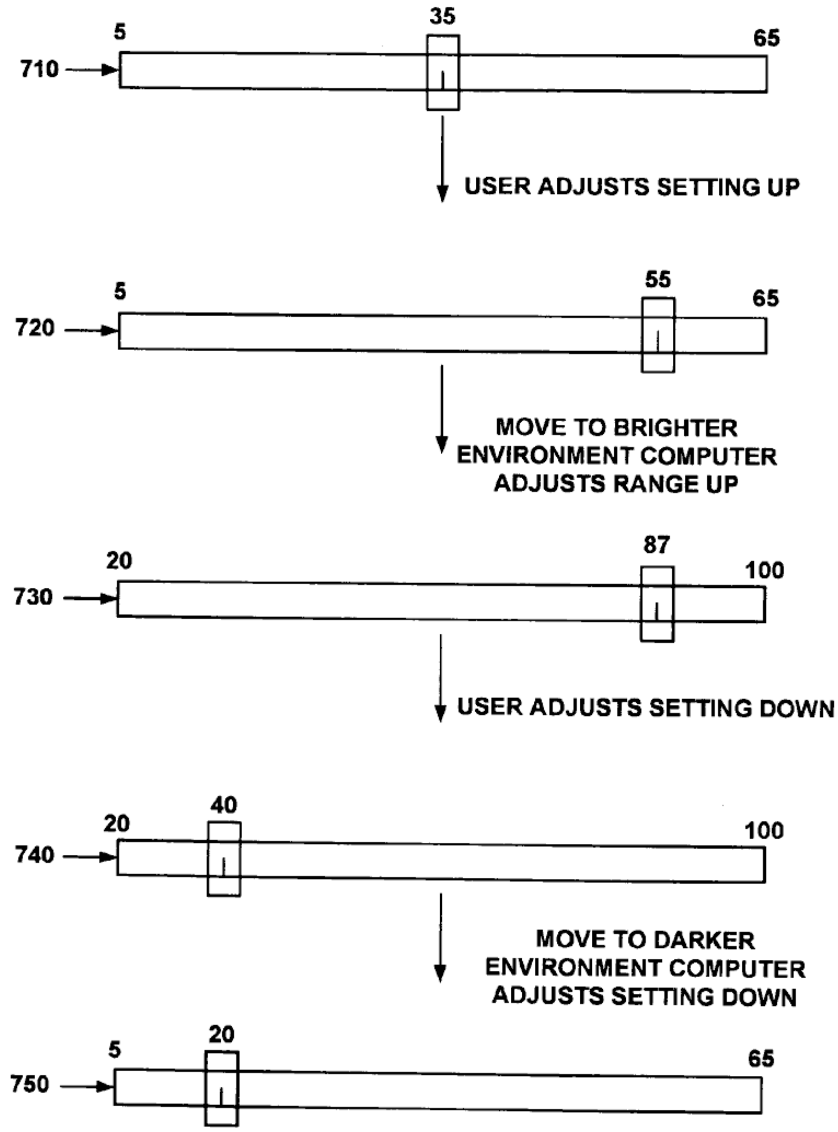


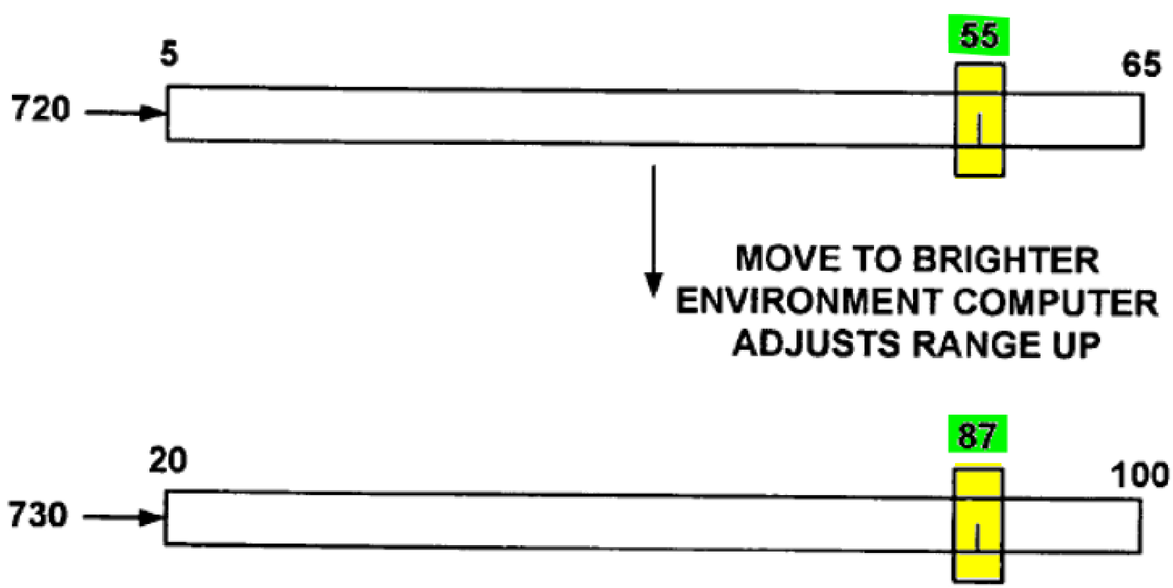
FIGURE 7

(Gettemy, Fig. 7.) Steps **710-720** show the user moving the slider to the right to increase brightness, in this case to a position that corresponds to a brightness of 55 nits within the 5-65 range. At step **730**, after the user moves to a brighter environment, the processor increases the brightness range to 20-100 nits, and accordingly, increases the brightness. (Gettemy, 6:25-31.) Accordingly, at step **730**, "[t]he brightness setting for the previously set slider position is now 87 nits." (Gettemy, 6:30-31.) The two remaining steps **740-750** show the same process but in the opposite direction of decreasing brightness. (Gettemy, 6:31-36.)

Gettemy therefore discloses and renders obvious generating a display brightness value "**based on both the user signal and the sensing signal**," because Gettemy determines the display brightness value based on **(1)** the brightness range selected by the processor based on the current ambient light level ("**sensing signal**") and **(2)** the relative position of the slider ("**user signal**"). (Baker, ¶¶292-315.)

"Multiplier" Limitation

Gettemy does not disclose precise details about how main processor **310** increases or decreases the brightness value associated with the relative slider position in response to a change in the brightness range. Referring back to Figure 7:



(Gettemy, Fig. 7 (partial figure; highlighting added).) In the example above, the processor in step **730** has obviously increased the display brightness from **55** to **87** in response to the user moving to a brighter environment.

It would have been obvious that main processor **310** uses multiplication of the "**user signal**" and the "**sensing signal**" (as described above) to compute the new display brightness value. This is confirmed by **Kerman** and **Rosenzweig**, which describe conventional slider controls such as those used in Gettemy.

Kerman is a textbook describing programming techniques for Flash, a well-known software development platform. (Kerman, p.0025; Baker, ¶¶298-300.) Kerman includes an entire chapter devoted to "explor[ing] a popular user interface control: the slider." (Kerman, p.0039.) Kerman explains that, to create a slider control, the programmer must specify the "bounds" of the slider, *i.e.*, the minimum (`min`) and maximum (`max`) values. (Kerman, p.0039, ¶7.) These values are equivalent to the low and high values, respectively, that define the ranges for the sliders in Gettemy. These range values "make sure that the `_x` property doesn't go below `min` or above `max`." (Kerman, p.0041, ¶8.) The "`_x`" property refers to the value (between `min` and `max`) associated with the slider at its current position. (*Id.*)

Another key piece of information for a slider control, according to Kerman, is a **percent**, which represents the location of the slider relative to the total length of the slider control based on `max` and `min`. (Kerman, p.0041, ¶9.) For example, if the percentage is "50," the `_x` property will be set to the midpoint value between min and max. (Baker, ¶301.)

Kerman discloses source code for a simple formula that calculates, based on min and max, the current value of the slider (_x) based on a given percent:

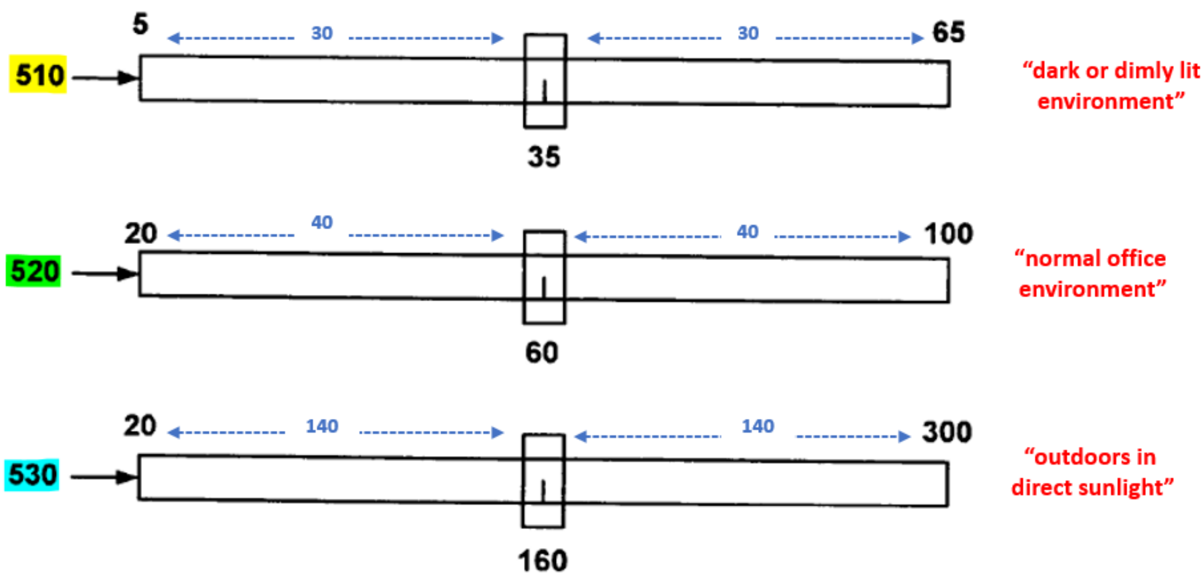
```
percent=50;
_x= min+((max-min)*(percent/100));
```

(Kerman, p.0047, ¶7.) The asterisk (*) in the source code above refers to a multiplication operation, and the forward slash (/) to a division operation. (Baker, ¶302.) This formula is straightforward and easily applied.

Assume the simple example of a slider operating in a range between 100 and 200, with max = **200**, min = **100**, and assume percent = **50**, consistent with the example. (Baker, ¶303.) The value of _x (the value associated with the current position of the slider) is thus: **100** + ((**200** – **100**) × (**50** ÷ **100**)), which equals **150**. Stated simply, **150** is the value associated with the slider when it is located 50% between 100 (min) and 200 (max). (*Id.*)

The key feature of this formula, for purposes of **Ground 3**, is that it can be easily used to calculate the new value for the current slider position in response to a change in the range of values. (Baker, ¶304.) For example, assume a range change such that, max = **250**, min = **150**, but the percent remains at **50**. As a result of applying different ranges, the value of property _x is now **200**. Although the example above assumes an exemplary percent of **50**, it would have been obvious that different values could have been used. (*Id.*)

It would have been apparent and obvious that Gettemy, which uses the same types of slider controls as Kerman, uses this calculation to determine the display brightness value by multiplying the current relative position of the slider (the "**user signal**") with the current brightness range (the "**sensing signal**"). Referring again to the examples in Figure 5:



(Gettemy, Fig. 5 (colored annotations added).) The "**user signal**" in these "midpoint" examples can readily be represented as a percentage value as explained for claim 1**[a]**, *e.g.*, "50" or "0.5," reflecting that the slider is at the midpoint between low and high values. And the "**sensing signal**" as noted for claim 1**[b]** represents the brightness range selected by the main processor based on the current ambient light level. When expressed as a numerical value, a "range" of a set of numbers is simply the difference between the highest and lowest values in the set, *e.g.*, "**60**" for the 5-65 brightness range **510** for "*dark or dimly lit*" environments. (*See Mathematics Dictionary and Handbook* (1993), **EX1018**, p.004 (describing range as "[t]he difference between the largest and smallest number in a set of data.").)

Based on these values, the display brightness in Gettemy, *i.e.*, the current value of the slider, can be readily calculated using the formula in Kerman: **_x** [*display brightness value*] = **min** [*low range setting*] + ((**max** [*high range setting*] – **min** [*low range setting*]) × (**percent** [*relative slider position*] ÷ 100)). Assuming the same midpoint percent of **50** ("**user signal**") and applying the same `min` and `max` values as Figure 5, this formula yields the same brightness display values:

Slider Position ("user signal")	**Brightness Range (*i.e.* max – min) from Figure 5 ("sensing signal")**	**Display Brightness Value from Figure 5 (*i.e.* Value for Current Slider Position)**
50	"*dark or dimly lit*" (5 to 65): **60**	5 + (**60** × (**50** ÷ 100)) = **35**
50	"*normal office*" (20 to 100): **80**	20 + (**80** × (**50** ÷ 100)) = **60**
50	"*outdoor/direct sunlight*" (20 to 300): **280**	20 + (**280** × (**50** ÷ 100)) = **160**

(Baker, ¶305.) The Kerman formula, as shown, yields the exactly same display brightness values shown in Figure 5 (*i.e.*, **35**, **60**, and **160**). In each of these examples, the "**user signal**" (**50**) was divided by 100 to get **0.5**, which is then **multiplied** by the "**sensing signal**," a numerical value reflecting the range (*i.e.*, difference between max and min values (*e.g.*, 65 – 5 = **60**). That value is then added to the low range (`min`) value. (*Id.*) This formula also produces the same values for the examples in Figure 7 of Gettemy. (Baker, ¶306.) It therefore would have been obvious based on Kerman that main processor **310** in Gettemy multiplies the "**user signal**" with the "**sensing signal**," using the formula above (or a variation with immaterial differences).[4] (Baker, ¶307.)

The fact that all of the display brightness values reported in Gettemy exactly follow the formula in Kerman is neither an accident nor a coincidence – it simply confirms that the Kerman formula is how one calculates the value corresponding to a relative percentage within a specified range of values. (Baker, ¶308.) This is further confirmed by **<u>Rosenzweig</u>**, which also details how to create slider controls. (Rosenzweig, pp.0044-50.) Rosenzweig explains that the software implementing a slider "needs to know how far to the left and right it can move, and what range of values it represents, such as 1 to 3, 0 to 100, or -500 to 500." (Rosenzweig, p.0044.) Rosenzweig discloses simple equations for determining the value associated with a slider control based on the slider's current position and range – and those equations are mathematically equivalent to those in Kerman. (Baker, ¶¶309-310.) For

[4] For example, if the "**user signal**" were represented as a decimal value (*e.g.*, "0.5") instead of a percent value (*e.g.*, "50"), the formula in Kerman would simply not perform division of the "**user signal**" by 100. (Baker, ¶307 n.7.)

example, Rosenzweig discloses the following source code for determining the value associated with a slider in response to moving it to a different position:

```
-- this handler takes the mouse position and figures the
-- value of the slider
on moveMarker me
  -- compute the position as a number between 0 and 1
  x = the mouseH - pBounds.left
  sliderRange = pBounds.right-pBounds.left
  pos = float(x)/sliderRange

  -- translate to a value
  valueRange = pMaximumValue - pMinimumValue
  pValue = pos*valueRange + pMinimumValue
  pValue = integer(pValue)

  -- check to make sure it is within bounds
  if pValue > pMaximumValue then
    pValue = pMaximumValue
  else if pValue < pMinimumValue then
    pValue = pMinimumValue
  end if
end
```

(Rosenzweig, pp.0046-47 (red box annotation added).) The source code above was written in a programming language called Lingo and is straightforward. (Rosenzweig, p.0021; Baker, ¶311.) The first section, as indicated by the comment above, "compute[s] the position [of the slider] as number between 0 and 1." (Rosenzweig, pp.0046-47; Baker, ¶311.) It computes the relative pixel position of the mouse within the displayed slider (**x**), the number of pixels in the slider (**sliderRange**), and then divides the former by the latter to calculate the slider position (**pos**). (Baker, ¶311.) The value "**pos**" thus represents a percentage value (*i.e.* "between 0 and 1"), which is equivalent to the "percent ÷ 100" calculation from Kerman.[5]

The next three lines under "translate to a value," are the key lines for claim 1**[c]**. They use "**pos**" to calculate the underlying value associated with the position on the slider. In plain English, they compute the range of the slider (**valueRange**), by subtracting the minimum value in the range from the maximum value (**pMaximumValue - pMinimumValue**), which is equivalent to "`max – min`" from Kerman above. The second line, shown in **red**, calculates the value associated with the slider (**pValue**) by ***multiplying*** the decimal percent value of the slider position (**pos**) by the slider range (**valueRange**), which is equivalent to "((max – min) * (percent ÷ 100))" from Kerman. It then adds to that value the minimum value in the range (**pMinimumValue**), again mirroring the operation performed by the equation in Kerman which adds "**min**" to yield "**_x**." The equation in Rosenzweig, therefore, would have produced the exact same values as Kerman provided that it was provided equivalent values. (Baker, ¶¶312-313.)

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[5] As noted in the text, Rosenzweig discloses two ranges: (1) the range of pixels in the slider control physically displayed on the screen ("**sliderRange**"), and (2) the range of the underlying values of the slider ("**valueRange**"). The range relevant to the claimed multiplier is the **valueRange**. (Baker, ¶311 n.9.)

Petitioner notes that the display brightness values in Gettemy, as confirmed by Kerman and Rosenzweig, incorporates a further addition of the minimum value (`min`) of the selected brightness range (*e.g.*, **5 +** (**60** × **0.5**) = **35** in the "*dark or dimly lit*" embodiment above), as shown above. But this further adjustment presents no obstacle to obviousness of claim 1**[c]** because Gettemy would have used *at least* multiplication of the "**user signal**" and "**sensing signal**." (Baker, ¶¶314-315.)

Rationale and Motivation to Combine (Gettemy with Kerman and Rosenzweig): It would have been obvious to combine Gettemy with Kerman and Rosenzweig, predictably resulting in the Gettemy brightness control system in which main processor **310** selectively multiplies the "**user signal**" and the "**sensing signal**" to obtain a display brightness value ("**combined signal**"), as described above. The claimed "**multiplier**" thus would have corresponded to software executed by main processor **310** for performing this computation. (Baker, ¶¶316-321.)

Gettemy is an analogous reference in the field of adjusting the brightness level for a display. Kerman and Rosenzweig are also analogous references that describe techniques for obtaining input from a user through a user interface, such as a standard slider control. These references would have been reasonably pertinent to problems facing the inventor, including how to acquire user input indicative of a brightness setting. Slider controls were commonly used to obtain user input relating to device parameters such as audio volume and display brightness. (Baker, ¶¶317-318.)

An ordinarily skilled artisan would have been motivated to combine with Kerman and Rosenzweig because they provide "under the hood" implementation details about computation of values associated with the slider controls in Gettemy. (Baker, ¶319.) A further motivation is provided by the fact that, as explained, the techniques in Kerman and Rosenzweig produce the exact same values reported in all of the examples in Gettemy. (Baker, ¶¶320-321.)

More fundamentally, multiplication as disclosed in Kerman and Rosenzweig was among a finite number of predictable solutions for how to combine the "**user signal**" and "**sensing signal**" in Gettemy to produce the display brightness value. (Baker, ¶¶320, 296.) An ordinarily skilled artisan would have appreciated that the techniques in Kerman and Rosenzweig would have been applicable to any situation in which the current value of a slider needs to be determined, and thus, would have been suitable to compute the display brightness value in Gettemy for the current slider position in response to a change of the brightness range. (Baker, ¶320.) A skilled artisan would have had at least a reasonable expectation of success and could have implemented the proposed combination using conventional programming techniques. (Baker, ¶321.)

(d) "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." (Claim 1[d])

The court in the *Vizio* litigation construed "**dark level bias**" as "*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*." (**EX1028**, p.0034.) That court also construed this limitation as being "*actually programmed or implemented with hardware or software*." (**EX1028**, p.0034.) Even if these constructions are applied, they are satisfied and rendered obvious by Gettemy in view of <u>Bell</u> and <u>Whitted</u>.

Gettemy explains that main processor **310** uses the display brightness value ("**the combined signal**") to send an appropriate control command to display controller **370** to change the brightness. (Gettemy, 6:11-16, 5:35-37.) Gettemy therefore discloses "**a brightness control signal that is used to control a brightness level of a visible display**," *i.e.*, a command signal sent to display controller **370** to change the brightness of display device ("**a visible display**").

But Gettemy does not appear to disclose a "**dark level bias**." Although the sliders in Gettemy do not permit the user to move the slider below the minimum value of the applicable range (*e.g.* "5" for the "*dark or dimly lit*" range in Figure 5), nothing in Gettemy suggests that the purpose of this minimum is to maintain brightness at a predetermined level. (Baker, ¶324.) But the claimed dark level bias feature is obvious over Gettemy in further view of **Whitted** and **Bell**.

Starting with Whitted, it discloses techniques for adjusting the brightness of a display based on ambient lighting conditions. (Whitted, 3:25-27, 3:33-37.) Whitted discloses an intensity control circuit **503** and brightness control circuit **504** that determine the amount of power supplied to the backlight **510** of the display, and thus, its brightness. (Whitted, 7:62-8:5.) Similar to Gettemy, display brightness can be controlled by: **(1)** user input based on a potentiometer (knob) to adjust a brightness control signal and **(2)** ambient lighting conditions as detected by a photo sensor. (Whitted, 8:5-8, 7:56-61.) "The intensity control circuit **503** determines the amount of power supplied to the backlight **510** as a function of the output of the photo-sensor **502** and the received brightness control signal." (Whitted, 8:9-12, *see also id.*, 8:16-22.)

Whitted explains that, to accommodate dark environments, "[a] minimum power level is set, e.g., pre-programmed, for the backlight **510** to insure that the display will be readable in low light conditions." (Whitted, 8:22-25.)

> In one embodiment, even if the output of the photo-sensor **502** indicates little or no incident light, the intensity control circuit **503** <u>does not lower the power output to the backlight **510** below a preselected threshold to insure that in dark or dimly lit conditions, images on the display panel **206** will remain visible</u>. In such an embodiment, intensity control circuit **503** maintains <u>backlight light output between a minimum threshold level and full intensity</u> as a function of the output of the photo-

sensor **502** and the brightness control circuit **504**.

(Whitted, 8:26-35.) Whitted thus ensures that regardless of the current ambient lighting condition, or user input, the display brightness never falls below "a minimum threshold level" (*id.*), even in dark lighting conditions.

<u>Bell</u> similarly discloses techniques for adjusting the brightness of a display based on ambient lighting conditions. (Bell, 1:67-2:4.) Bell explains that, "[a]s the brightness of the environment decreases, the brightness of the display is proportionally reduced for viewing." (Bell, 5:54-56.) Bell further explains that, "[i]n a very dark environment, <u>a minimum brightness level may afford comfortable viewing</u>." (Bell, 5:56-58.) "For low ambient luminance levels," Bell explains, "a minimum but non-zero display brightness permits viewing of the microdisplay." (Bell, 6:3-5.) Figures 4 and 5 show examples:

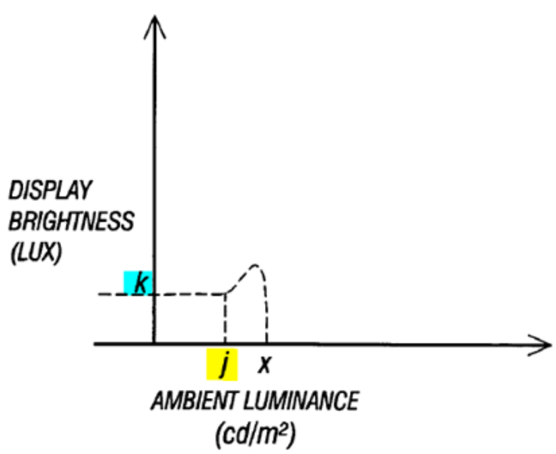

FIGURE 4

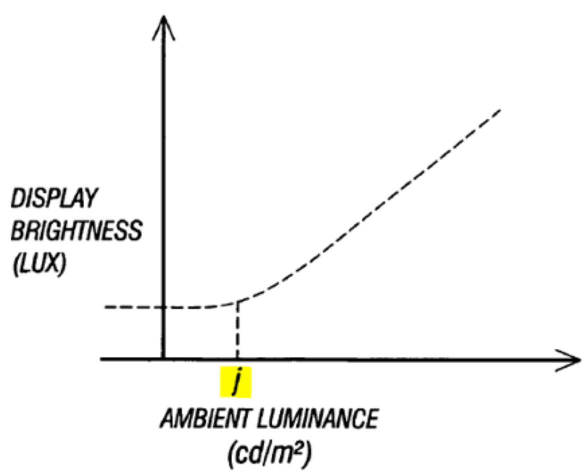

FIGURE 5

(Bell, Figs. 4-5 (highlighting added).) Figures 4 and 5 show the relationship between brightness of the display (vertical axis) and ambient luminance (horizontal axis), for two different types of displays. Both figures show that brightness of the display decreases as ambient luminance decreases – but only until ambient luminance reaches **j** shown in highlighting, at which point display brightness does not further decrease. (Baker, ¶¶328-329.) Display brightness is instead maintained at **k**, a minimum brightness that continues to apply as ambient luminance decreases to zero. Bell explains that "in very low light ambients, a display brightness of **k** LUX may be sufficient to readily view the display." (Bell, 5:29-31.) Conversely, as ambient brightness exceeds **j**, display brightness increases.

Figure 4 shows the graph for a *transmissive* display, such as an LCD display that uses backlighting. Once ambient brightness reaches **x**, as shown, the backlighting is turned off because "the display has become readable without the assistance of the backlight." (Bell, 5:39-42.) This is why Figure 4 shows display brightness "dropping off" at ambient luminance **x**. (Bell, 6:5-7.) This difference between Figures 4 and 5 is immaterial as both show the same relevant relationship, *i.e.*, maintenance of minimum display brightness level **k** as ambient luminance decreases toward zero. (Baker, ¶330.)

Rationale and Motivation to Combine (Gettemy, Kerman, and Rosensweiz with Whitted and Bell): It would have been obvious to combine with Whitted and Bell, predictably resulting in the Gettemy brightness control system in which the "**multiplier**" as described for claim 1**[c]** would have been further adapted to adjust the computed display brightness value ("**combined signal**") to "**generate a brightness control signal** [that] **is maintained above a predetermined level when the ambient light level decreases to approximately zero**." (Baker, ¶¶331-337.)

This combination would have been trivially easy to implement. The proposed combination need not rely on any specific circuitry or techniques from Whitted and Bell, but rather, relies on them only for general teachings about maintaining the brightness level above a predetermined minimum threshold value, and the reasons to do so (detailed below). (Baker, ¶332.) Under the proposed combination, software executed by main processor **310** would have been further adapted, before generating the brightness control signal sent to display controller **370** to change the current display brightness (Gettemy, 6:11-16, 5:37-39), to check whether the display brightness value computed at claim 1**[c]** ("**combined signal**") exceeds a predetermined minimum threshold level as disclosed in Whitted and Bell.

For example, suppose the user placed the slider in Gettemy at the ten percent (**10%**) position within the "*dark or dimly lit*" range of Figure 5 between 5-65 nits. This would have resulted in a display brightness value of **5 +** (**0.1** × **60**) = **<u>11</u>** ("**combined signal**"). Under the further combination with Whitted and Bell, main processor **310** in Gettemy would have been *further* adapted, for example using rudimentary IF-THEN logic, to check whether **<u>11</u>** ("**combined signal**") is greater than a desired minimum value. If not, the combined signal would have been adjusted upward to ensure that the corresponding "**brightness control signal**" sent to display controller **370** is maintained above a predetermined level. (Baker, ¶¶332-333.) Whitted and Bell, like Gettemy discussed above, are analogous references in the same field as the '117 patent of controlling the brightness of a display based on ambient lighting conditions. (Baker, ¶334.)

A skilled artisan would have been motivated to combine for a straightforward reason – to ensure that the display is sufficiently bright to allow the user to view it, even in low or dark ambient light environments. (Baker, ¶335.) This motivation is expressly stated in Whitted, explaining that "[a] minimum power level is set, e.g., pre-programmed, for the backlight **510** <u>to insure that the display will be readable in low light conditions</u>." (Whitted, 8:22-25.) This motivation is also echoed throughout Bell. (Bell, 5:56-58; *see also id.*, 5:29-31, 6:3-5.) This would have provided a beneficial backstop to ensure that the combination of user input (through the slider) and ambient lighting conditions in Gettemy did not result in a brightness level for the display that was undesirably low. (Baker, ¶336.)

For example, although the exemplary slider controls in Gettemy include non-zero minimum user settings (such as "5" in the "*dark or dimly lit*" range), these minimum values could nevertheless have produced brightness levels that were unacceptably low based on additional factors. For example, it was well-known that conventional displays would become dimmer as they age, requiring a concomitant increase in brightness level to compensate for this degradation to maintain the desired level of brightness. (Baker, ¶336.) The teachings in Whitted and Bell would thus have enabled the system of Gettemy to compensate for these additional factors to ensure that the combination of **(1)** the user setting through the slider control, **(2)** ambient lighting conditions, and **(3)** the age and/or condition of the display, did not result in a brightness level that would have made the display useless to the user. (*Id.*) A skilled artisan would also have had at least a reasonable expectation of success and could have implemented the proposed combination using conventional techniques. (Baker, ¶337.)

2. Claim 2: "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."

As explained above, the "**dark level bias**" combination would have been provided to the software executed by main processor **310** that determines the display brightness value ("**the multiplier**"), which it would have used to adjust the display brightness value ("**the combined signal**"). It would have been obvious that the dark level bias would have been provided to the "**multiplier**" because it would have been used to determine the *final* display brightness value used to generate the brightness control signal, as explained for claim 1**[d]**. (Baker, ¶339.)

It would also have been obvious that the amount of the adjustment could have been "**dependent on the user selectable brightness setting**." Take the example in

Figure 5 of the range **510** involving a "*dark or dimly lit environment*," *i.e.*, between **5-65** nits. Suppose the user moved the slider to the left to a relative position corresponding to a value of **11** nits, and the desired minimum level was **15** nits. The combined signal would have been adjusted (*i.e.*, by **+5**) so it exceeds that minimum level. But if the user moved the slider to a position corresponding to **13** nits, the display brightness would again have to be adjusted – but by a lesser amount to exceed the minimum level (*i.e.*, by **+3**). In both cases, adjustment to the display brightness value is "**dependent on the user selectable brightness setting**." These scenarios are mere examples; a wide variety of other scenarios could have resulted causing the amount of adjustment to the "**combined signal**" to depend on the user selectable brightness setting. (Baker, ¶¶340-341.)

3. Claim 7: "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."

Gettemy discloses a "**display driver**" in the form of display controller **370** that controls the brightness of the display. (Gettemy, 5:35-37.) As explained for claim 1**[d]**, the "**brightness control signal**" is provided to display controller **370.** (Gettemy, 6:11-16, 5:35-37.)

Gettemy also confirms that the display could have been "**a liquid crystal display**." (Gettemy, 1:43-45.) It would have been obvious that controlling the brightness of a liquid crystal display would have required "**control**[ing] [its]

backlight illumination," because the backlight controls the perceived brightness. (Baker, ¶¶343-344; *see also* Whitted, 8:12-16, 1:55-57 ("Transmissive LCDs… use an internal light source **107**, referred to as a backlight, for illumination.").) This is confirmed by Bell, which explains that display brightness of an LCD depends on its backlighting brightness. (Bell, 5:26-27 & Fig. 4; Baker, ¶344.)

4. Claim 9: "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."

It would have been obvious that the system built based on the proposed combination could have operated in "**a manual mode**." Gettemy describes a "conventional approach" that "<u>gives the user manual control</u> of the amount of light being produced for the transmissive and emissive display screens. (Gettemy, 2:11-14.) Gettemy further explains that "[t]he dynamically adjustable range settings, in still another embodiment, <u>can be overridden by the user</u>, <u>enabling the user to control the brightness of the display screen</u>." (Gettemy, 2:54-57.)

It therefore would have been obvious to provide a "**second input**" to receive a selection from the user ("**selection signal**") to selectively operate the brightness control circuit in either "**an auto mode**," *i.e.*, the dynamic brightness mode of Gettemy described for claim 1, or in "**a manual mode**," *i.e.*, by deferring entirely to user selection. The "**second input**" would have taken the form of software executed by main processor **310** for receiving and implementing the user's selection reflecting a desire to switch to either auto or manual mode (*e.g.* using conventional user interface techniques). (Baker, ¶¶346-347.)

It therefore would have been obvious that "**the selection signal enables the light sensor in the auto mode**," because the light sensor would have been required in the automatic/dynamic mode of Gettemy to select the appropriate brightness range based on ambient lighting conditions. Conversely, "**the selection signal… disables the light sensor in the manual mode**" because the light sensor would not have been needed when brightness is adjusted manually without regard to ambient lighting. A skilled artisan would also have been motivated to disable the light sensor in manual mode to conserve battery power. (Baker, ¶348.)

This ability to selectively operate in either automatic or manual mode would have provided a benefit of flexibility in display brightness adjustment. Gettemy provides an express motivation by explaining that manual brightness setting "is satisfactory for conscientious users who regularly monitor the brightness settings and manually adjust them accordingly." (Gettemy, 2:14-17.) As explained for claim 9 in **Ground 1**, it would have been obvious that a user with poor eyesight may have desired to maintain their screen at a high level of brightness even in low ambient lighting conditions. (Baker, ¶171.) Although Gettemy touts the benefits of a dynamic brightness system, it does not teach away from or discourage <u>also</u> providing the option to selectively operate the brightness control circuit in manual mode in appropriate circumstances. (Baker, ¶349.)

5. Independent Claim 15

Claim 15 is substantially similar to claim 1 but written as a method claim. As explained for claim 1**[a]**, Gettemy discloses and renders obvious "**receiving a user input signal indicative of a user selectable brightness setting**," *i.e.*, the user brightness selection represented, as explained, as the relative slider position (*e.g.*, as a percentage value). The proposed combination also discloses and renders obvious "**selectively multiplying the input signal with a sense signal to generate a combined signal, wherein the sense signal indicates an ambient light level**," because it multiplies the user input signal by the range selected by the processor ("**sense signal**"), which based on and indicates an ambient light level as explained for claim 1**[b]** and 1**[c]**. And finally, the proposed combination renders obvious "**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**," based on the combination of Gettemy, Whitted, and Bell, as was fully described for claim 1**[d]**. As also fully explained for claim 1, an ordinarily skilled artisan would have been motivated to combine to operate the system built based on the proposed combination in a manner that practices each limitation of claim 15. (Baker, ¶350.)

6. Claim 16: "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."

As explained for claim 1**[c]**, the step of selective multiplying is performed by at least "**a software algorithm**." (Baker, ¶351.)

VII. CONCLUSION

Petitioner respectfully requests institution of review on the challenged claims.

Dated: March 28, 2023

Respectfully submitted,

/s/ *Matthew J. Brigham*
Matthew J. Brigham
Reg. No. 44,047
Counsel for Petitioner

COOLEY LLP
ATTN: Patent Group
1299 Pennsylvania Avenue NW
Suite 700
Washington, DC 20004
Tel: (650) 843-5001
Fax: (650) 849-7400

CERTIFICATE OF COMPLIANCE WITH WORD COUNT

Pursuant to 37 C.F.R. § 42.24(d), I certify that this petition complies with the type-volume limits of 37 C.F.R. § 42.24(a)(1)(i) because it contains 13,962 words, according to the word-processing system used to prepare this petition, excluding the parts of this petition that are exempted by 37 C.F.R. § 42.24(a) (including the table of contents, a table of authorities, mandatory notices, a certificate of service or this certificate word count, appendix of exhibits, and claim listings).

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COOLEY LLP
ATTN: Patent Docketing
1299 Pennsylvania Avenue NW
Suite 700
Washington, D.C. 20004
Tel: (650) 843-5001
Fax: (650) 849-7400

/s/ Matthew J. Brigham
Matthew J. Brigham

CERTIFICATE OF SERVICE

I hereby certify, pursuant to 37 C.F.R. Sections 42.6 and 42.105, that a complete copy of the attached **PETITION FOR INTER PARTES REVIEW OF U.S. PATENT NO. 8,223,117 B2,** including all exhibits (**EXS1001-1035**) and related documents, are being served via Federal Express on the 28th day of March, 2023, the same day as the filing of the above-identified document in the United States Patent and Trademark Office/Patent Trial and Appeal Board, upon Patent Owner by serving the correspondence address of record with the USPTO as follows:

20995 – Knobbe Martens Olson & Bear LLP
2040 Main Street
Fourteenth Floor
Irvine, CA 92614
United States

And, via Federal Express upon counsel of record for Patent Owner in *Polaris PowerLed Technologies, LLC v. Nintendo Co., Ltd, et al*., in the United States District Court, Western District of Washington, Case No. 2:22-cvc-00386-JLR as follows:

Jeremy E. Roller
Arete Law Group PLLC
1218 Third Avenue, Suite 2100
Seattle, WA 98101
Phone: (206) 428-3250
Fax: (206) 428-3251
jroller@aretelaw.com

Robert F. Kramer
David Alberti
Sal Lim
Russell S. Tonkovich
Marc Belloli
Sven Raz
Aidan Brewster
Kramer Alberti Lim
Tonkovich & Belloli LLP
577 Airport Boulevard, Suite 250
Burlingame, CA 94010
Phone: (650) 825-4300
Fax: (650) 460-8443
rkramer@krameralberti.com
rtonkovich@krameralberti.com
sraz@krameralberti.com
abrewster@krameralberti.com
dalberti@krameralberti.com

rkramer@krameralberti.com
slim@krameralberti.com
KramerDay-Polaris@kramerday.com

And, via Federal Express upon the following counsel for Polaris PowerLED Technologies, LLC:

Jason A. Fitzsimmons
Sterne, Kessler, Goldstein & Fox PLLC
1100 New York Ave, NW Suite 600
Washington DC 20005

Dated: March 28, 2023

<u>/s/ Matthew J. Brigham</u>
Matthew J. Brigham