

The Honorable James L. Robart

UNITED STATES DISTRICT COURT
WESTERN DISTRICT OF WASHINGTON
AT SEATTLE

POLARIS POWERLED TECHNOLOGIES,
LLC,

Plaintiff,

v.

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

Defendants.

No. 2:22-cv-00386-JLR

**EXPERT REPORT OF DR. RAVIN BALAKRISHNAN RELATING TO CLAIM
CONSTRUCTION**



Dr. Ravin Balakrishnan

Executed: January 25, 2023

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I. INTRODUCTION

1. I have been retained as an expert in this case by counsel for Plaintiff Polaris PowerLED Technologies, LLC (“Polaris”). I expect to testify at trial regarding the matters set forth in this report, if asked about these matters by the parties’ attorneys.

2. I understand that Polaris has accused Defendants Nintendo Co., Ltd. and Nintendo of America, Inc. (“Nintendo” or “Defendants”) of infringing claims 1, 2, 7, 9, 15, and 16 (“Asserted Claims”) of U.S. Patent No. 8,223,117 (“the ’117 patent” or “the Asserted Patent”). Polaris alleges the Nintendo Switch and Nintendo Switch OLED devices (the “Accused Products”) infringe the asserted claims.

3. I understand that the parties have provided proposed claim constructions for a variety of claim terms from the ’117 patent. I have been asked to provide an opinion on how a person of ordinary skill in the art (“POSITA”) would understand the claim terms discussed below in the Asserted Claims in light of the specification, file history, and extrinsic evidence.

II. QUALIFICATIONS AND PROFESSIONAL EXPERIENCE

4. I am currently a tenured Full Professor of Computer Science in the Department of Computer Science at the University of Toronto. I joined the faculty at the University in 2001, was granted tenure in 2006, and served as Chair of my Department from 2015 to 2019. From 2006-2016, I held the Canada Research Chair in Human-Centered Interfaces in the Department of Computer Science.

5. In conjunction with my professorship, I serve as Co-Director of the Dynamic Graphics Project Laboratory at the University of Toronto that has nine faculty members and roughly 50 graduate students and postdoctoral researchers working on various aspects of human-computer interaction, computer graphics, interactive technologies and virtual environments. Tech transfer of research to industry from this lab in recent years has resulted in several spin-off companies, including ones focused on 3D user interfaces, medical data visualization, virtual reality, and 3D architectural visualization and interaction.

6. I earned a B.Sc. in Computer Science from the University of New Brunswick in 1993, and a Ph.D. in Computer Science from the University of Toronto in February 2001. Since receiving my Ph.D., I have been a member of the faculty of the Department of Computer Science at the University of Toronto where my research has focused on human computer interaction (“HCI”), including the development of user interface technologies to improve HCI. This includes studying various characteristics of visual displays and human interactions with display technology.

7. I have published over 140 refereed publications in the field of human-computer interaction. I have further presented numerous conference abstracts, posters, talks, and demonstrations in my field. My work has been cited more than 20,000 times across a spectrum of high-impact publications, and my current h-index score (from Google Scholar) is 81, which is an indication of the significant impact of my research on scholarly literature in the field of Computer Science. I am a named inventor on twenty issued patents in my area of work.

8. I have received major awards and honors in my field. For example, in 2007, I received an Alfred P. Sloan Research Fellowship. In 2011, I was elected into the Association for Computing Machinery’s Computer Human Interaction Academy, which is an honorary group consisting of researchers who have made extensive contributions to the study of HCI and who have led the shaping of the HCI field. In 2020, I was presented with the Canadian Human Computer Communications Society’s Achievement Award, which recognizes researchers who have made a substantial contribution to the fields of computer graphics, visualization, or human-computer interaction.

9. My research at the University of Toronto has involved nearly every broad aspect of human-computer interaction and data visualization. For instance, I have done significant work in the areas of input devices, displays, sensing technologies, interfaces to small and/or mobile computers, interfaces to displays of the future, and interaction techniques, including touch and multi-touch, gestural, sketching, and multi degree-of-freedom interactions.

As another example, I have done work in the evaluation of user interfaces, including associated metrics and predictive models of human performance.

10. In addition to my research at the University of Toronto, I have collaborated with researchers at leading institutions worldwide. For example, I have been a visiting professor at Laboratoire de Recherche en Informatique (LRI) at the Université Paris-Sud, France.

Additionally, I have been a visiting researcher at several industrial laboratories, including: (1) HPLabs, (2) Mitsubishi Electric Research Laboratories (MERL), and (3) Microsoft Research Labs.

11. I have also served on the organizing and paper reviewing committees of many leading conferences in my field, and have taken on editorial roles for leading technical journals in fields pertinent to my research. For example, I have been an associate editor of the Association for Computing Machinery (“ACM”) Transactions on Computer-Human Interaction and an associate editor of the IEEE Transactions on Visualization and Computer Graphics, which are both peer-reviewed journals. Similarly, I have been the paper’s chair for the ACM UIST Symposium on User Interface Software and Technology, and have served multiple times as an associate chair for the ACM CHI Conference on Human-Computer Interaction.

12. As set forth in my CV, I have over thirty years of experience studying and teaching computer science. I have been a professor of computer science for over twenty years. A complete list of my qualifications is set forth in my curriculum vitae, a copy of which is attached as Ex. A.

III. CLAIM CONSTRUCTION

13. I have been informed and understand that a claim construction analysis begins with the ordinary meaning of a claim term, and there is a presumption that the term carries its plain meaning to a POSITA. I have also been informed and understand that the most important sources for determining the meaning of a claim term are the claims, the specification (or “written description”), and prosecution history of the patent at issue, which collectively are

called “intrinsic evidence.” I have been further informed and understand that the meaning of a claim term may also be guided by “extrinsic evidence,” such as dictionaries, treatises, and expert testimony.

14. It is my understanding that an inventor may define a claim term in either the specification or prosecution history that is different from the term’s ordinary meaning. I have been informed that the meaning of a claim term may also be modified if the patentee clearly and unequivocally disavowed a broader meaning of the term in either the patent specification or the prosecution history.

IV. LEVEL OF ORDINARY SKILL IN THE ART

15. Based on the materials and information I have reviewed and on my experience in the technical areas relevant to the ’117 patent, the person of ordinary skill in the art with respect to the ’117 patent at the time of the alleged invention would have had at least a bachelor’s degree in electrical engineering, physics, or computer science, and 2-4 years of experience in the field of visual displays and related technologies.

V. U.S. PATENT NO. 8,223,117 (“’117 PATENT”)

16. The ’117 patent was filed on December 17, 2008; and claims priority to U.S. Patent Application No. 11/023,295 filed on December 27, 2004, which issued as U.S. Patent No. 7,468,722 (“’722 patent”). The ’117 patent further claims priority to Provisional Application No. 60/543,094 filed on February 9, 2004.

17. The ’117 patent describes brightness control circuits that can automatically control the brightness of a display based on the ambient light detected by a sensor and the preferences of a user via user selectable brightness settings. Ex. B (’117 Patent), Abstract, Figs. 1-10, col. 1:60-12:25. The brightness control circuit of the ’117 patent can be implemented in various ways including in software, analog circuitry, or mixed-signal circuitry. *Id.* at col. 2:7-16, 5:30-43, 14:9-12. In the embodiments of the ’117 patent, a light sensor detects the ambient light in the vicinity of the light sensor.

18. The '117 patent describes several different embodiments in the Figures and text. Figure 1 shows a first embodiment. In Figure 1, shown below, the brightness control signal is created using a dark level bias, a sensing signal from the light sensor, and a user signal indicative of a user selectable brightness setting (called "dimming control"). *Id.* at Fig. 1, col. 4:45-5:14. K1 (100), K2 (102), and K3 (108) in Figure 1 are scaling factors that process and adjust the dark level bias, sensing signal from the ambient light sensor, and the combined signal. *Id.* K1 and K2 scale the dark level bias and sensing signal, respectively, prior to forming the combined signal. *Id.* K3 scales the brightness control signal. *Id.*

FIG. 1

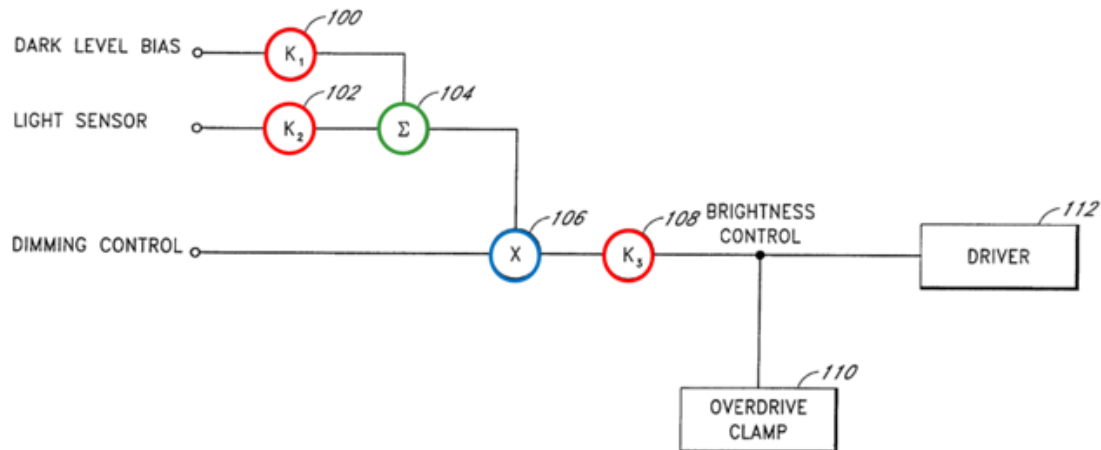


FIG. 1 is a block diagram of one embodiment of a brightness control circuit with ambient light correction. A user input (DIMMING CONTROL) is multiplied by a sum of a dark level bias (DARK LEVEL BIAS) and a light sensor output (LIGHT SENSOR) to produce a brightness control signal (BRIGHTNESS CONTROL) for a display driver 112. In one configuration, the dark level bias and the light sensor output are adjusted by respective scalar circuits (k1, k2) 100, 102 before being added by a summing circuit 104. An output of the summing circuit 104 and the user input is provided to a multiplier circuit 106. An output of the multiplier circuit 106 can be adjusted by a third scalar circuit (k3) 108 to produce the brightness control signal. An overdrive clamp circuit 110 is coupled to the brightness control signal to limit its amplitude range at the input of the display driver 112.

Id. at Fig. 1, col. 4:46-61 (annotation added).

19. In Figure 1, the scaled dark level bias is added to the scaled sensing signal from the ambient light sensor at 104. *Id.* at Fig. 1, col. 4:45-5:14. The sum is then multiplied by the “dimming control,” which is a user signal indicative of a user selectable brightness setting and further scaled to form the brightness control signal. *Id.* An overdrive clamp circuit (110) limits the amplitude range of the brightness control signal. *Id.*

20. In Figure 2, shown below, the brightness control signal is created using dark level bias, a sensing signal from the light sensor, and a user signal indicative of a user selectable brightness setting (called “dimming control”). *Id.* at Fig. 2, col. 5:15-43. K1 (100), K2 (102), and K3 (108) in Figure 2 are scaling factors that process and adjust the dark level bias, sensing signal from the ambient light sensor, and brightness control signal, respectively. *Id.*

FIG. 2

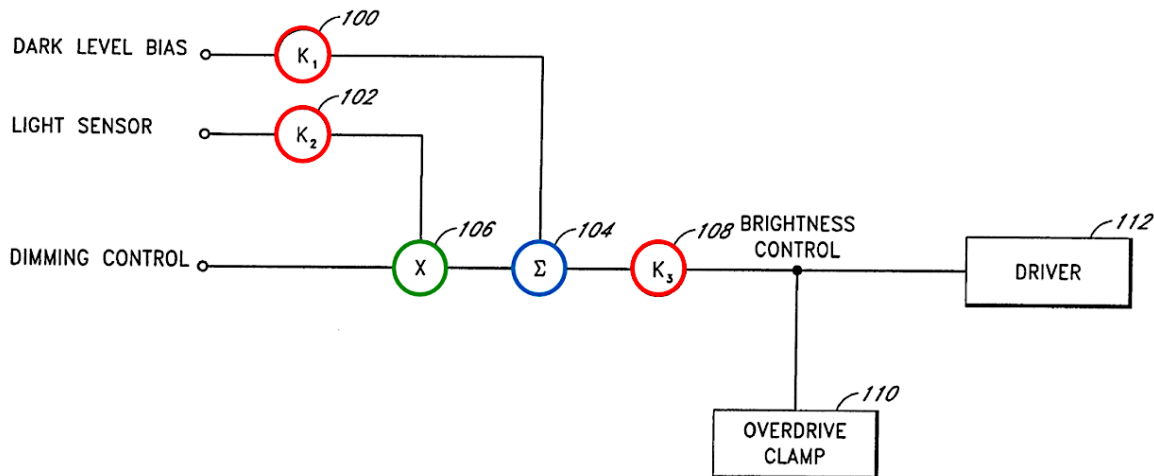


FIG. 2 is a block diagram of another embodiment of a brightness control circuit with ambient light correction. A light sensor output (LIGHT SENSOR) is adjusted by a scalar circuit (k2) 102 and then provided to a multiplier circuit 106. A user input (DIMMING CONTROL) is also provided to the multiplier circuit 106. The multiplier circuit 106 outputs a signal that is the product of the user

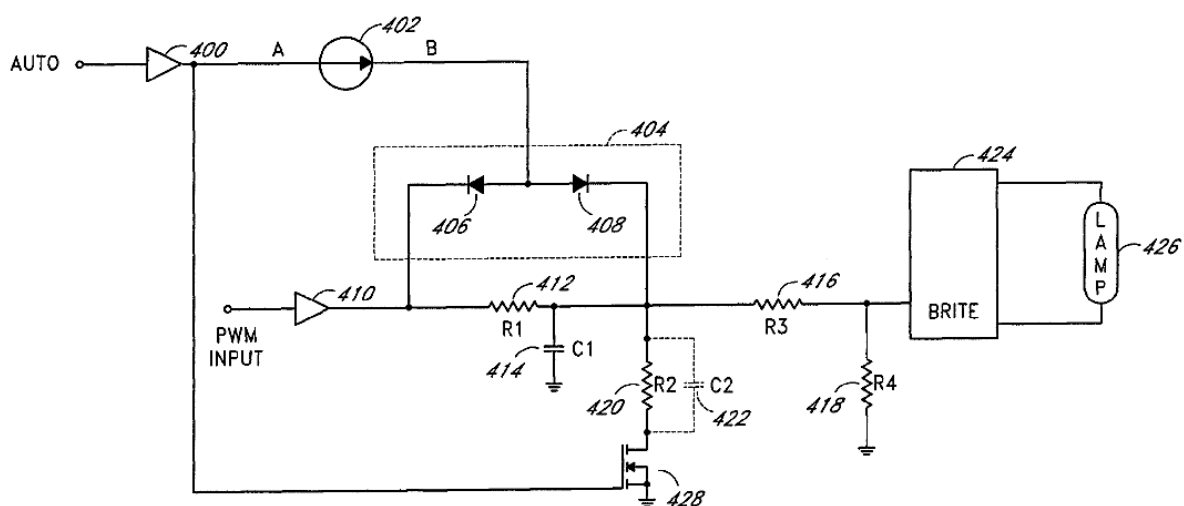
input and scaled light sensor output. A summing circuit 104 adds the product to a dark level bias (DARK LEVEL BIAS) that has been adjusted by scalar circuit (k1) 100. An output of the summing circuit 104 is adjusted by scalar circuit (k3) 108 to generate a brightness control signal (BRIGHTNESS CONTROL) for a display driver 112. An overdrive clamp 110 is coupled to the brightness control signal to limit its amplitude range at the input of the display driver 112.

Id. at Fig. 2, col. 5:15-29 (annotation added).

21. In Figure 2, the scaled sensing signal is multiplied by the “dimming control,” which is a user signal indicative of a user selectable brightness setting. A dark level bias is then added to this value. After the dark level bias is added, the result is scaled further and becomes the brightness control signal. *Id.* at Fig. 2, col. 5:15-43.

22. Figure 4, shown below, is another embodiment of a brightness control circuit of the '117 patent. *Id.* at Fig. 4, col. 6:22-8:9. Figure 4 shows a multiplier that combines a sensing signal from a light sensor with a user adjustable PWM logic signal, which is a user signal. *Id.* The brightness control circuit can operate in an automatic or a manual mode. *Id.* at Fig. 4, col. 7:3-8:90.

FIG. 4



23. In the automatic mode, the brightness control signal (“BCS”) generated by the embodiment in Figure 4 is in accordance with the following equation.

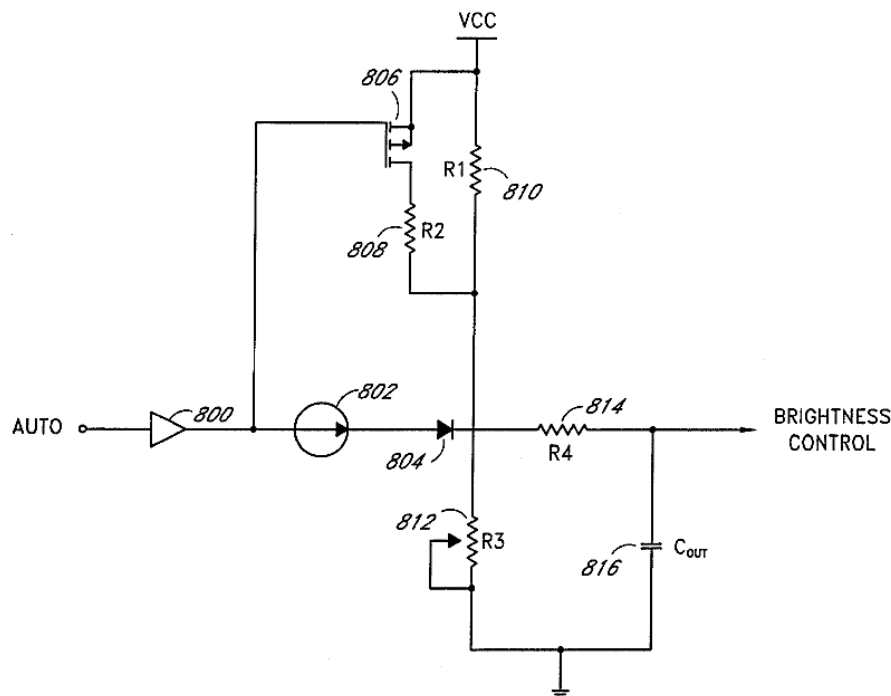
$$BCS1 = dutycycle \times \left[\left(\frac{VCC \times R2 \times R4}{[(R1 + R2) \times (R3 + R4)] + (R1 \times R2)} \right) + \left(\frac{ISRC \times R1 \times R2 \times R4}{[(R1 + R2) \times (R3 + R4)] + (R1 \times R2)} \right) \right]$$

The term “duty cycle” corresponds to the duty cycle of the user adjustable PWM logic signal. The term “VCC” corresponds to the logic high output from the input buffer circuit 410. The term “ISRC” corresponds to the sensor current signal. The first major term within the brackets corresponds to a scaled dark bias level of the brightness control signal in total ambient darkness. The second major term within the brackets introduces the effect of the visible light sensor 402. The network of resistors 412, 420 416, 418 helps to provide the dark bias level and to scale the product of the sensor current signal and the user adjustable PWM logic signal.

Ex. B (‘117 Patent), Fig. 4, col. 7:3-47. The “duty cycle” corresponds to the user signal indicative of the user selectable brightness setting. *Id.* ISRC is the sensing signal. *Id.* R1-R4 are the values of resistors in the resistor network. *Id.* R1-R4 are values used to scale the ISRC sensing signal in the second bracketed term. The first term in brackets, which includes “VCC,” is the scaled dark level bias. *Id.* The scaled dark level bias is composed of several different values, including VCC, R1, R2, R3, and R4. *Id.* In the equation of Figure 4, the scaled dark level bias is first added to the scaled sensing signal before multiplying by the “duty cycle” user signal. *Id.* Further, as shown above in Figure 4, the dark level bias is applied in stages at R1, R2, R3, and R4 in the circuit.

24. Figure 8, which is shown below, is another embodiment of a brightness control circuit in the ‘117 patent that can operate in auto or manual mode. *Id.* at Fig. 8, col. 9:38-10:32.

FIG. 8



Id. at Fig. 8.

25. In auto mode, the brightness control circuit of Figure 8 operates according to the following equation. *Id.* at col. 9:61-10:19.

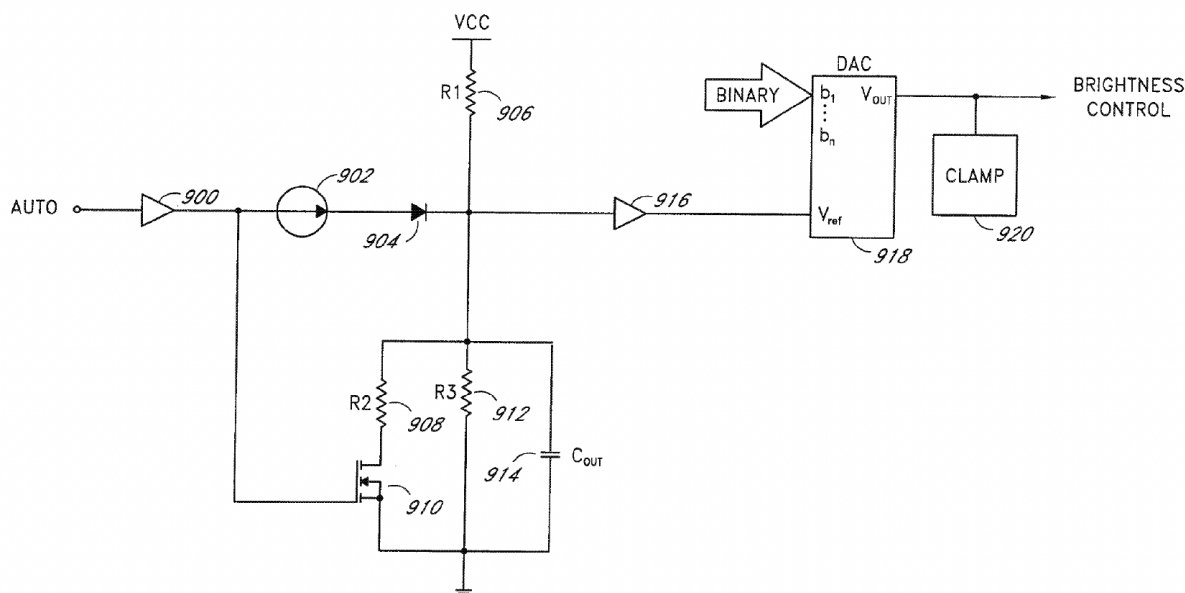
$$BCS3 = \left[VCC \times \frac{R3}{(R1 + R3)} \right] + \left[ISRC \times \frac{(R1 \times R3)}{(R1 + R3)} \right]$$

The first major term in brackets of the above equation corresponds to the brightness control signal in total ambient darkness. The second major term in brackets introduces the effect of the visible light sensor 802. The maximum range for the brightness control signal in the auto mode is determined by the compliance voltage of the visible light sensor 802.

Id. at col. 10:10-19.

26. Figure 9, which is shown below, is another example embodiment of a brightness control circuit with a multiplier circuit to combine a light sensor output with a user adjustable digital word. *Id.* at Fig. 9, col. 10:33-11:26. The embodiment of Figure 9 can operate in auto or manual mode. *Id.*

FIG. 9



27. In auto mode, the embodiment of Figure 9 calculates the brightness control signal as follows:

$BCS5 =$

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

Id. at col. 11:10-15.

28. The binary % fullscale element is the user signal indicative of the user's brightness setting. *Id.* at Fig. 9, col. 10:33-11:26. ISRC is the sensing signal, and R1-R3 are resistor values. *Id.* The dark level bias is the VCC term, which includes VCC, R1, R2, and R3. *Id.* As shown in Figure 9, the dark level bias is applied in stages at R1, R2, and R3 in the circuit.

VI. THE PARTIES' CONSTRUCTIONS

29. I understand that the parties have proposed the following constructions:

Claim Term	Polaris' Construction	Nintendo's Construction
"A brightness control circuit with selective ambient light correction comprising"	Limitation with plain and ordinary meaning	Preambles are not limiting If the preambles are construed to be limiting, "selective" is indefinite, because it lacks reasonable certainty as to its full scope.
"A method to selectively provide ambient light correction, said method comprising"	Limitation with plain and ordinary meaning	Preambles are not limiting If the preambles are construed to be limiting, "selective" is indefinite, because it lacks reasonable certainty as to its full scope.
"a first input configured to receive a user signal"	"a first input actually programmed or implemented with hardware or software to receive a user signal"	Parties' apparent dispute is "signal": "signal" means "a time-varying electrical quantity that can be used to transmit information"
"a second input configured to receive a selection signal"	"a second input actually programmed or implemented with hardware or software to receive a selection signal"	Parties' apparent dispute is "signal": "signal" means "a time-varying electrical quantity that can be used to transmit information"

“a multiplier configured to selectively generate a combined signal based on both the user signal and the sensing signal”	“a multiplier actually programmed or implemented with hardware or software to selectively generate a combined signal based on both the user signal and the sensing signal, wherein the combined signal includes, but is not necessarily limited to, the product of the user signal and the sensing signal”	Parties’ apparent dispute is “multiplier” / “multiply”, “selectively,” and “signal”: See above construction of “signal”; see below construction of “selectively” “multiplier” means “software algorithm or analog/mixed signal circuitry that combines multiple signals and outputs substantially zero if the user signal is about zero”
“selectively multiplying the input signal with a sense signal to generate a combined signal, wherein the sense signal indicates an ambient light level”	“selectively multiplying the input signal with a sense signal to generate a combined signal, wherein the sense signal indicates an ambient light level and wherein the combined signal includes, but is not necessarily limited to, the product of the input signal and the sense signal”	Parties’ apparent dispute is “multiplier” / “multiply”, “selectively,” and “signal”: See above construction of “signal”; see below construction of “selectively” “multiplier” means “software algorithm or analog/mixed signal circuitry that combines multiple signals and outputs substantially zero if the user signal is about zero”
“selectively generate”	Plain and ordinary meaning	“selectively” is indefinite, because it lacks reasonable certainty as to its full scope
“selectively operate”	Plain and ordinary meaning	“selectively” is indefinite, because it lacks reasonable certainty as to its full scope
“selectively multiplying”	Plain and ordinary meaning	“selectively” is indefinite, because it lacks reasonable certainty as to its full scope

“dark level bias”	“a value that causes a deviation from the combined signal, where the value is a voltage value of an electrical signal or a value of a software variable”	Parties’ apparent dispute is “bias,” “signal,” and “predetermined”: “signal” means “a time-varying electrical quantity that can be used to transmit information” “bias” means “voltage or current” “predetermined” means “minimum”
“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”	“a dark level bias actually programmed or implemented with hardware or software to adjust the combined signal to generate a brightness control signal that is used to control a brightness level of a visible display”	Parties’ apparent dispute is “bias,” “signal,” and “predetermined”: “signal” means “a time-varying electrical quantity that can be used to transmit information” “bias” means “voltage or current” “predetermined” means “minimum”
a dark level bias configured to adjust the combined signal to generate a brightness control signal...such that the brightness control signal is maintained above a predetermined level when the ambient light level decreases to approximately zero	“a dark level bias actually programmed or implemented with hardware or software to adjust the combined signal to generate a brightness control signal ... such that the brightness control signal is maintained above a predetermined level when the ambient light level decreases to approximately zero”	Parties’ apparent dispute is “bias,” “signal,” and “predetermined”: “signal” means “a time-varying electrical quantity that can be used to transmit information” “bias” means “voltage or current” “predetermined” means “minimum”
“adjusting the combined signal with a dark level bias to generate a brightness control signal ... such that the brightness control signal is maintained above a predetermined level when the	Plain and ordinary meaning	Parties’ apparent dispute is “bias,” “signal,” and “predetermined”: “signal” means “a time-varying electrical quantity

ambient light level decreases to approximately zero”		that can be used to transmit information” “bias” means “voltage or current” “predetermined” means “minimum”
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30. While the terms proposed for construction are longer phrases, Nintendo picks several isolated words rather than construing the proposed phrases in context. Because of this, I will address Nintendo’s constructions in the course of discussing the longer phrases.

VII. “CONFIGURED TO,” “SIGNAL,” AND IMPLEMENTATION OF CLAIMS IN SOFTWARE

31. One of ordinary skill in the art would understand the term “configured to” in the ’117 patent to mean “actually programmed or implemented with hardware or software to.” I understand that this is how district courts have construed “configured to” in prior litigations when it construed the following terms.

Claim	Term	Construction by District Court
1	“a first input configured to receive a user signal indicative of a user selectable brightness setting”	“first input <i>actually programmed or implemented with hardware or software to</i> receive a user signal indicative of a user selectable brightness setting”
1	“a multiplier configured to selectively generate a combined signal based on both the user signal and the sensing signal”	“a multiplier <i>actually programmed or implemented with hardware or software to</i> selectively generate a combined signal based on both the user signal and the sensing signal”
1	“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”	“a dark level bias <i>actually programmed or implemented with hardware or software to</i> adjust the combined signal to generate a brightness control signal that is used to control a brightness level of a visible display”

9	“second input configured to receive a selection signal to selectively operate the brightness control circuit in an auto mode or a manual mode”	“second input <i>actually programmed or implemented with hardware or software to</i> receive a selection signal to selectively operate the brightness control circuit in an auto mode or a manual mode”
13	“amplifier configured to generate the sensing signal”	“amplifier <i>actually programmed or implemented with hardware or software to</i> generate the sensing signal”

Ex. C, 34-35; Ex. D, 7-8; Ex. E, 3-4. In each of these instances where the implementation is in software, the signals would be digital and represented in the software as, for example, variables or other appropriate data structures.

32. In any sort of electronic or computerized apparatus like those claimed in the ’117 patent, all functions are performed in hardware and/or software. The ’117 patent similarly uses the term “circuit” as it is often used in the field to broadly refer to hardware or software. *See, e.g.*, Ex. B (’117 Patent), col. 5:37-38 (“The multiplier circuit 106 can be implemented using software algorithm or analog/mixed-signal circuitry.”).

33. One of ordinary skill in the art would thus understand that the elements with “configured to” can be implemented in hardware or software. The specification states that the “multiplier” can be a “software algorithm.” *Id.* The multiplier is central to the claimed invention as it performs the math to generate the combined signal based on the user and sensing signals and performs mathematical operations involving the dark level bias.

1. A brightness control circuit with selective ambient light correction comprising:

...

a multiplier configured to selectively generate a combined signal based on both the user signal and the sensing signal; and

a dark level bias configured to adjust the combined signal to generate a brightness control signal . . . 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.

3. The brightness control circuit of claim 2, wherein the *multiplier multiplies a sum of the user signal and the sensing signal by the dark level bias* to generate an output signal corresponding to the brightness control signal.

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.

17. The method of claim 15, wherein the *dark level bias is added to the sense signal before selective multiplication* such that the amount of adjustment to the combined signal is dependent on the input signal.

Id. at claims 1, 2, 3, 16, 17 (emphasis added).

34. One of ordinary skill in the art would understand that, if the multiplier or the multiplication is performed in software, then the “user signal”, “sensing signal,” and “dark level bias” would also be implemented (i.e., represented and manipulated) in software. The specification states that “[i]n one embodiment, software algorithm can be used to multiply the light sensor output with the user selectable brightness control.” *Id.* at col. 2:7-9. In order for a software algorithm to multiply two signals or values (e.g., the “sensing signal” and “user signal”), both of these signals need to be present as software variables. In general, for any math performed in software, all values used in the calculation must also be present in the software.

35. The “combined signal” generated by the software algorithm multiplier will also be in software. If the “combined signal” is in software, then the “dark level bias” would also be in software in order for the “dark level bias” to adjust it. This is consistent with Figure 1 and 2, which show a high level block diagram that can be implemented in either hardware or software.

36. Similarly, claim 2 states that the “dark level bias is provided to the multiplier.” *Id.* at claim 2. For the “dark level bias” to be provided to a multiplier implemented by a software algorithm, the “dark level bias” would also need to be in software (e.g., a software

variable). Claim 3 provides that “the multiplier multiplies a sum of the user signal and the sensing signal by the dark level bias.” *Id.* at claim 3. Again, if the software algorithm multiplier is multiplying the “dark level bias” by the “sum of the user signal and sensing signal,” then all signal values would need to be in software (e.g., a software variable). Otherwise, the claim and specification would not make sense to one of ordinary skill in the art as the only way that the multiplier can be a “software algorithm” is if the signals that it is manipulating (e.g., user signal, sensing signal, dark level bias) are all implemented in software (e.g., as software variables).

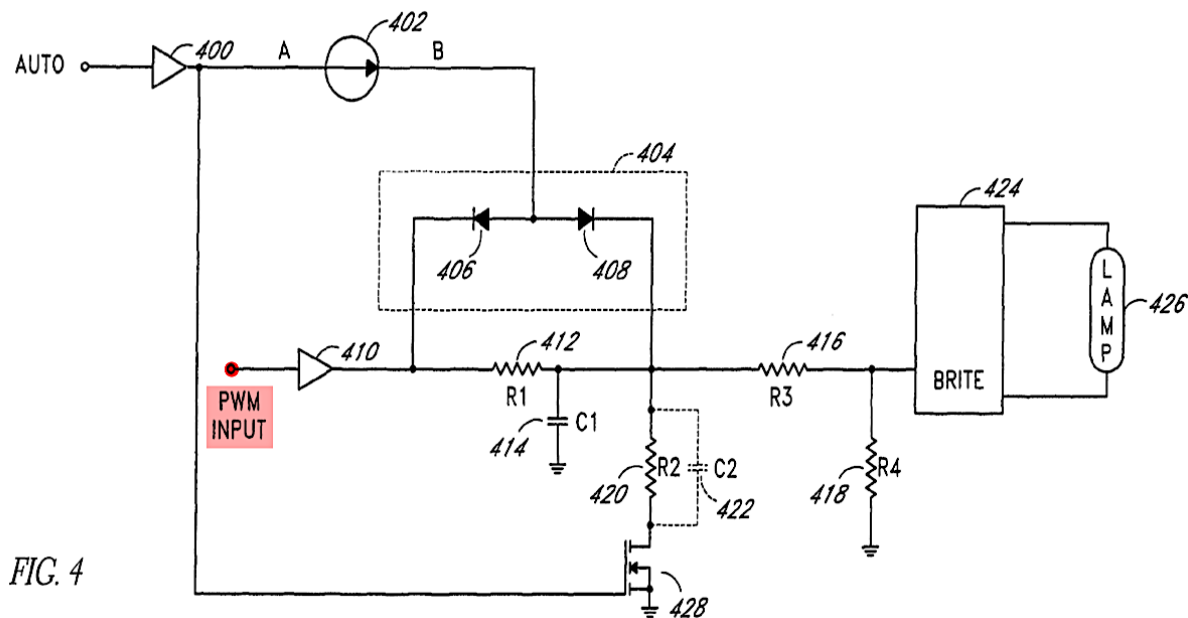
37. One of ordinary skill in the art would understand that all of the structures that are “configured to” perform in the claims of the ’117 patent can be implemented in hardware or software. One of ordinary skill in the art would understand that “first input” (claim 1) and “second input” (claim 9) can be implemented in either hardware or software.

38. One of ordinary skill in the art would understand that “multiplier” (claim 1) can be implemented in either hardware components or as a software algorithm as described in the ’117 patent. Ex. B (’117 Patent), col. 5:37-38. One of ordinary skill in the art would understand that the “a dark level bias configured to adjust the combined signal” (claim 1) could similarly be a hardware signal, such as a voltage signal, or a software variable if part of a software algorithm depending, in part, on whether the combined signal was generated in software based on a software algorithm multiplier or whether the combined signal is a hardware signal (e.g., a voltage signal) generated by a hardware multiplier.

39. Claim 1 contains the limitation “a first input configured to receive a user signal indicative of a user selectable brightness setting.” In view of the intrinsic evidence, one of ordinary skill in the art would understand “a first input configured to receive a user signal indicative of a user selectable brightness setting” in claim 1 to mean “a first input actually programmed or implemented with hardware or software to receive a user signal indicative of a user selectable brightness setting.” One of ordinary skill in the art would understand that the plain language of this limitation covers implementations in hardware or software. Further, the

specification of the '117 patent describes both hardware and software embodiments of “a first input configured to receive a user signal” as discussed in detail below. In light of the specification, one of ordinary skill in the art would understand that the “first input configured to receive a user signal indicative of a user selectable brightness setting” in claim 1 could be implemented in either hardware or software. For example, if the user signal was a hardware analog voltage signal, the “first input” would be implemented in hardware to receive that analog voltage signal. Similarly, if the user signal was a software signal (e.g., a software variable), the “first input” would be implemented in software to receive that software signal.

40. The specification of the '117 patent describes preferred embodiments with hardware implementations of “a first input configured to receive a user signal indicative of a user selectable brightness setting.” For example, Figure 4 shows the “first input configured to receive a user signal” implemented in hardware at the PWM input.



Ex. B ('117 patent), Fig. 4 (annotation added). Regarding Figure 4, the specification states that “the user adjustable PWM logic signal varies in duty cycle from 0% for minimum user-defined brightness to 100% for maximum user-defined brightness.” *Id.* at col. 6:25-28. The PWM logic signal is a pulse-width modulated signal, which is a hardware analog voltage signal, that

the user adjusts according to the user's preferred brightness. The PWM input in Figure 4 is the "first input" that receives this PWM logic signal ("user signal") indicative of the user selectable brightness setting.

41. Software is a series of instructions executed by a processor. A programmer would normally write software in a high level, human-readable language such as Python or C++. Software written in a high level, human-readable language, is commonly referred to as source code. Writing source code in a high level, human readable language allows the programmer, as well as others of skill in the art, to read and understand the purpose and function of the software.

42. However, processors understand machine code and not source code. Machine code is a binary language of 0s and 1s. Tools such as a compiler and assembler are typically used to translate the high level, human readable source code into binary machine code software (i.e., composed of 0s and 1s). This binary machine code software is typically loaded into memory in a device to be executed by the processor. The binary machine code software generated from source code contains digital words of a defined length that provide instructions regarding arithmetic and logic operations to be performed in the software. The binary machine code software instructions and the values used by those software instructions are thus represented as digital words when they are compiled from source code into machine code in the memory of a device. A digital word in binary machine code software would be a series of 0s and 1s. For example, a 16-bit digital word in binary machine code software could be "0010110011010011." "Digital words" are also referred to as "binary words" as digital words consist of a series of 0s and 1s (i.e., binary).

43. It was well-known and understood in the art at the time of the '117 patent filing in February 2004 that a "digital word" is part of the compiled software running on a processor.¹ For example, an issued U.S. patent filed June 30, 2000, provides the following description of

¹ The '117 patent claims priority back to a provisional application filed on February 9, 2004. Ex. B.

how source code is compiled into a sequence of digital words that comprise the executable software that actually runs on the processor.

The software which executes upon processors is a sequence of digital words known as machine code. This machine code is understandable by the hardware of the processors. However, programmers typically write programs in a higher-level language which is much easier for humans to comprehend. The *program listings in this higher level language are called source code*. In order to *convert the human-readable source code into machine-readable machine code*, several special software tools are known in the art. These software tools are compilers, linkers, assemblers, and loaders.

Ex. F (U.S. Patent No. 6,675,289), col. 1:15-25 (emphasis added).

44. Similarly, another issued U.S. patent filed June 3, 1992 explains that “digital words” are used in software programs:

An EMG sensing circuit 64 conditions this input signal and converts it into a *digital word for processing by software* implemented on the personal computer 46 in FIG. 1.

...entering a plurality of therapeutic parameters into the graphic interface, the *parameters being represented as digital words in a computer program*...

Ex. G (U.S. Patent No. 5,300,096), col. 5:1-4, 14:10-13 (emphasis added).

45. In light of the background described above, one of ordinary skill in the art would understand that the use of digital words in an embodiment would encompass implementations in software. In the '117 patent, one of ordinary skill in the art would understand the preferred embodiments in which the “first input configured to receive a user signal” is implemented using a digital word (*e.g.*, a binary word) to be a software implementation.

The *user preference* can also be provided in other forms, such as a potentiometer setting or *a digital signal (e.g., a binary word)*.

In one embodiment in which the user preference is indicated by a digital word,...

12. The brightness control circuit of claim 1, wherein *the user signal corresponds to a digital word*, and the multiplier is implemented with a digital-to-analog converter configured to receive the digital word and a reference signal determined by the sensing signal to generate the brightness control signal.

Ex. B ('117 Patent), col. 3:28-30, 3:59-60, 13:20-24 (emphases added). Moreover, the '117 patent specification explicitly states that “[t]he user input can come from processors in LCD devices” indicating the “input configured to receive a user signal” can be in software running on a processor. *Id.* at col. 5:7. After all, the main purpose of a processor is to execute software in a device.

46. One of ordinary skill in the art would understand that a digital word is a binary word (*i.e.*, a series of 0s and 1s) in software. Ex. H (U.S. Patent No. 7,523,337), col. 4:26-27 (“In a further embodiment, A/D converter 910 outputs a ***digital word (e.g., a binary word)*** in either a parallel or serial format.”) (emphasis added); Ex. I (U.S. Patent No. 3,786,869), col. 2:34-35 (“The output of the encoder will be ***a binary word of four bits and this digital word*** will be repeated approximately every 100 milliseconds.”) (emphasis added)

47. Similarly, with regard to the embodiment of Figure 9, the '117 patent's specification describes using a “digital word” value (*i.e.*, a series of 0s and 1s) to represent the user signal indicative of a user selectable brightness setting.

FIG. 9 is a schematic diagram of one embodiment of a brightness control circuit with a multiplier circuit to combine a light sensor output with a ***user adjustable digital word...A binary input (bn . . . b1) is used to indicate user dimming preference.*** The DAC 918 generates an analog voltage (V_{out}) corresponding to the binary input.

Ex. B ('117 Patent), col. 10:33-39 (emphasis added). In a software implementation, the binary input would receive the digital word value (*i.e.*, user signal) in the software, and is thus “a first input configured to receive a user signal.”

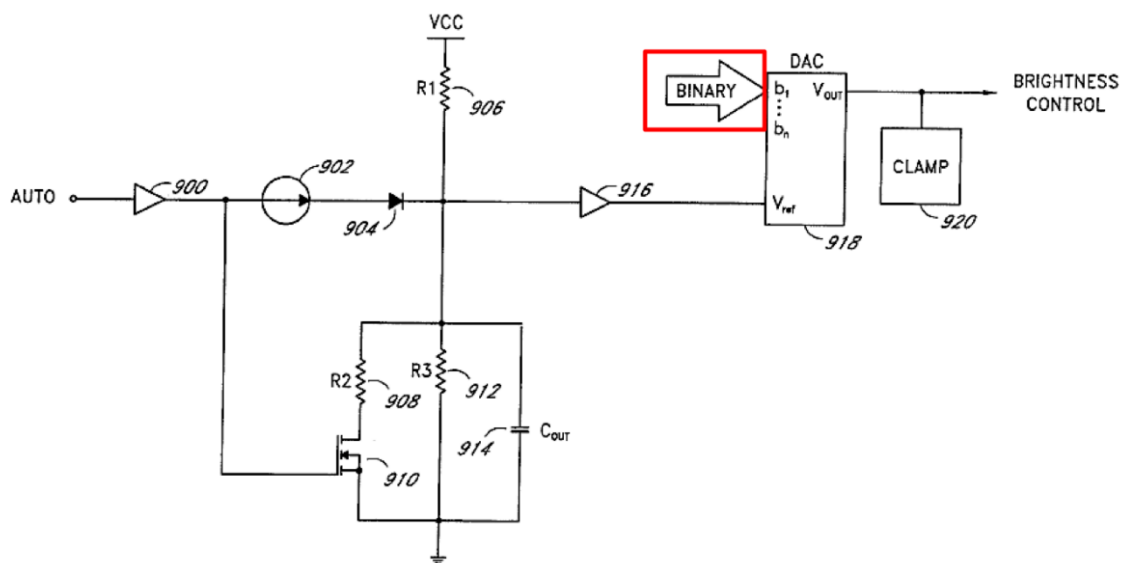
48. As shown in the description of Figure 9, there is a digital-to-analog converter (DAC) to convert the digital word in a software implementation to a hardware analog voltage signal.

FIG. 9 is a schematic diagram of one embodiment of a brightness control circuit with a multiplier circuit to combine a light sensor output with a user adjustable digital word...A binary input (bn . . . b1) is used to indicate user dimming preference. ***The DAC 918 generates an analog voltage (V_{out}) corresponding to the binary input.***

Id. at 10:33-39 (emphasis added). This further confirms that the digital word can be in software because a software digital word would require the conversion using a digital-to-analog converter (DAC) as shown in Figure 9 to generate the required hardware analog voltage signal.

49. Figure 9 further shows that the binary input can be in software. In Figure 9, the “binary input” shown in the arrow goes directly into the DAC and is not part of the hardware circuitry. This is because the patent contemplates that the binary input can originate *in software*.

FIG. 9



Id. at Fig. 9 (annotation added).

50. In light of the specification of the '117 patent as described above, one of ordinary skill in the art would understand “a first input configured to receive a user signal indicative of a user selectable brightness setting” in claim 1 to mean “a first input actually programmed or implemented with hardware or software to receive a user signal indicative of a user selectable brightness setting.”

51. Claim 9 of the '117 patent contains the limitation “a second input configured to receive a selection signal to selectively operate the brightness control circuit in an auto mode or a manual mode.” In view of the intrinsic evidence, one of ordinary skill in the art would understand “a second input configured to receive a selection signal to selectively operate the brightness control circuit in an auto mode or a manual mode” in claim 9 to mean “a second input actually programmed or implemented in hardware or software to receive a selection signal to selectively operate the brightness control circuit in an auto mode or a manual mode.” One of ordinary skill in the art would understand that the plain language of this limitation covers implementations in both hardware and in software.

52. The '117 patent's specification describes the “selection signal to selectively operate the brightness control circuit in an auto mode or a manual mode” in claim 9 as an “enable signal” that selects between auto and manual modes as shown below:

The *manual mode* excludes the visible light sensor 402, while the *auto mode* includes the visible light sensor 402 for automatic adjustment of display brightness as ambient light changes. *An enable signal (AUTO) selects between the two modes.*

In one embodiment, the brightness control circuit of FIG. 8 selectively operates in an *auto mode or a manual mode*. *An enable signal (AUTO) indicates the selection of operating mode.*

Ex. B ('117 Patent), col. 6:38-42, 9:61-64 (emphasis added).

53. Because the plain meaning of “selection signal” in claim 9 encompasses both hardware and software signals, the “second input configured to receive a selection signal to selectively operate the brightness control circuit in an auto mode or a manual mode” can be implemented in either hardware or software (or a combination of both). For example, if the “selection signal” was an analog voltage signal, then the “second input configured to receive” that analog voltage “selection signal” would likely also be in hardware capable of receiving such an analog voltage signal. Similarly, if the “selection signal” is a software signal, then the “second input configured to receive” that software “selection signal” would likely be in

software so that it is capable of receiving a software signal. This is because software cannot directly receive an analog voltage signal. An analog voltage signal would have to be converted into a digital software value in order to be received and used in software.

54. As discussed above in detail, the '117 patent explicitly discloses that the invention can be implemented in software or hardware. Therefore, in context of the intrinsic evidence, one of ordinary skill in the art would understand that each “signal” in the asserted claims (e.g., “user signal,” “input signal,” “sensing signal,” “sense signal,” “combined signal,” “brightness control signal,” and “selection signal”) can be a hardware signal (e.g., a voltage signal) or a software signal (e.g., a software variable). Contrary to Nintendo’s construction of “signal,” one of ordinary skill in the art would not understand “signal” to be limited to only “a time-varying electrical quantity that can be used to transmit information.” Nintendo’s construction is contrary to the intrinsic evidence disclosing software embodiments with mathematical operations requiring the signals to be in software in software implementations of the '117 patent.

55. The use of “signal” in the '117 patent is consistent with the plain meaning of “signal” to one of ordinary skill in the art, which includes both hardware and software signals. Some examples from the literature demonstrating the understanding of “signal” as including hardware and software signals are shown below.

The interface controller and display driver 64 processes the compensated output signal 60 and issues the necessary **hardware or software signals** to the display 44 such that the cursor 40 is accordingly moved on the display 44.

Ex. J (U.S. Patent No. 6,104,969), col. 2:56-60 (emphasis added).

The event trigger signal 99 may, for example, be a **hardware or software signal**, or alternatively may be the lack of activity on control lines 72.

Ex. K (U.S. Patent Pub. No. 2002/0188880), ¶ 26 (emphasis added).

If desired, the action may be a text entry into a dialog box, a striking of a key on a keyboard, a moving of a mouse, or a receiving of another **hardware or software signal**.

Ex. L (U.S. Patent Pub. No. 2002/0077921), ¶ 147 (emphasis added).

Such a signal may be a **hardware or software signal** from the DRM system 32 or the rendering application 34, for example, and is known or should be apparent to the relevant public and therefore need not be described herein in any detail.

Ex. M (U.S. Patent Pub. No. 2002/0012432), ¶ 279 (emphasis added).

The measurement result published in a measurement point MEP can be a counter value, a data processed counter value, or any other **hardware or software signal**.

Ex. N (U.S. Patent No. 5,655,071), col. 7:37-40 (emphasis added). There is nothing in the intrinsic evidence, including the specification and file history of the '117 patent, that would limit any "signal" in the asserted claims to being a "a time-varying electrical quantity that can be used to transmit information" as Nintendo contends. Therefore, because the plain meaning of "signal" encompasses hardware and software signals, one of ordinary skill in the art would understand the each "signal" in the asserted claims of the '117 patent to encompass both a hardware and a software signal or combination of the two, especially as the patent specifically contemplates software embodiments as discussed in detail above.

56. Indeed, it was common knowledge to a POSITA at the time of the invention that "signal" could and did encompass digital information stored as a variable. The concept was so commonplace that "digital signals" were studied within the subfield of "digital signal processing" in Electrical Engineering and described in textbooks. In describing this concept, *The Scientist and Engineer's Guide to Digital Signal Processing*, excerpted and attached hereto as Ex. O, explains that this is a core concept to digital signal processing: "Real-time applications input a sample, perform the algorithm, and output a sample, over-and-over. Alternatively, they may input a group of samples, perform the algorithm, and output a group of samples. This is the world of Digital Signal Processors." *Id.* at pp. 506-507. *The Scientist and Engineer's Guide to Digital Signal Processing* contains numerous references to digital signals. In one chapter, a diagram shows a buffer used to store the most recent values of a "continually updated signal" in software. *Id.* at p. 507. In another chapter, "data files" are described as "represent[ing] images and other acquired signals." *Id.* at p. 481.

57. Thus, I disagree with Nintendo’s proposal that “signal” in the ’117 patent means “a time-varying electrical quantity that can be used to transmit information.” This construction, and the attendant definitions provided by Nintendo, appear to define “signal” in such a way that it does not encompass digital information, and is instead restricted to only electrical signals that must vary over time. This is contrary to the intrinsic and extrinsic evidence discussed herein regarding software implementations, as well as the prior claim constructions recognizing that evidence.

VIII. “DARK LEVEL BIAS” AND IMPLEMENTATION OF CLAIMS IN SOFTWARE

58. The parties have proposed the following “dark level bias” terms in the claims of the ’117 patent for construction.

Claim Term	Polaris’ Construction	Nintendo’s Construction
“dark level bias”	“a value that causes a deviation from the combined signal, where the value is a voltage value of an electrical signal or a value of a software variable”	Parties’ apparent dispute is “bias,” “signal,” and “predetermined”: “signal” means “a time-varying electrical quantity that can be used to transmit information” “bias” means “voltage or current” “predetermined” means “minimum”
“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”	“a dark level bias actually programmed or implemented with hardware or software to adjust the combined signal to generate a brightness control signal that is used to control a brightness level of a visible display”	Parties’ apparent dispute is “bias,” “signal,” and “predetermined”: “signal” means “a time-varying electrical quantity that can be used to transmit information” “bias” means “voltage or current”

		“predetermined” means “minimum”
a dark level bias configured to adjust the combined signal to generate a brightness control signal...such that the brightness control signal is maintained above a predetermined level when the ambient light level decreases to approximately zero	“a dark level bias actually programmed or implemented with hardware or software to adjust the combined signal to generate a brightness control signal ... such that the brightness control signal is maintained above a predetermined level when the ambient light level decreases to approximately zero”	Parties’ apparent dispute is “bias,” “signal,” and “predetermined”: “signal” means “a time-varying electrical quantity that can be used to transmit information” “bias” means “voltage or current” “predetermined” means “minimum”
“adjusting the combined signal with a dark level bias to generate a brightness control signal ... such that the brightness control signal is maintained above a predetermined level when the ambient light level decreases to approximately zero”	Plain and ordinary meaning	Parties’ apparent dispute is “bias,” “signal,” and “predetermined”: “signal” means “a time-varying electrical quantity that can be used to transmit information” “bias” means “voltage or current” “predetermined” means “minimum”

59. One of ordinary skill in the art would understand the plain and ordinary meaning of “dark level bias” in the context of the ’117 patent to be “a value that causes a deviation from the combined signal, where the value is a voltage value of an electrical signal or a value of a software variable.” This value adjusts the combined signal to maintain the brightness control signal above a predetermined level when the ambient light level decreases to approximately zero (i.e., at a “dark level”).

60. The ’117 patent is clear that the invention can be implemented in hardware or software. Ex. B (’117 Patent), col. 2:7-10, 5:37-38, 14:9-12. The ’117 patent describes the “multiplier” as being capable of being implemented in hardware *or* software. For example, the specification states, “In one embodiment, [a] software algorithm can be used to multiply the

light sensor output with the user selectable brightness control.” *Id.* at col. 2:7-9. As another example, the specification describes FIGS. 1 and 2 as being capable of implementation via software, stating “The multiplier circuit **106** can be implemented using software algorithm or analog/mixed-signal circuitry.” *Id.* at col. 5:37-38. Indeed, one of the asserted claims, claim 16, reads: “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.”

61. One of ordinary skill in the art would understand the claim language of claims 1 and 15 to define “dark level bias” as a value (*e.g.*, voltage value of an electrical signal or a value of a software variable) that adjusts the combined signal to generate a brightness control signal that is maintained above a predetermined level when the ambient light level is very low (*i.e.*, “approximately zero”).

1. A brightness control circuit with selective ambient light correction comprising:

a first input configured to receive a user signal indicative of a user selectable brightness setting;

a light sensor configured to sense ambient light and to output a sensing signal indicative of the ambient light level;

a multiplier configured to selectively generate a combined signal based on both the user signal and the sensing signal; and

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.

15. A method to selectively provide ambient light correction, said method comprising:

receiving a user input signal indicative of a user selectable brightness setting;

selectively multiplying the input signal with a sense signal to generate a combined signal, wherein the sense signal indicates an ambient light level; and

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.***

Ex. B ('117 Patent), claims 1, 15 (emphasis added). This adjustment by the “dark level bias” is important as it allows the screen to still be visible in the absence of ambient light when the sensing signal has, for example, a value of zero. For example, if the sensing signal has a value of zero and is multiplied by the user signal, the resulting combined signal will be zero. In this case, the “dark level bias” value will adjust the combined signal to generate a brightness control signal such that the display is visible in total ambient darkness (*i.e.*, when ambient light is approximately zero)

62. The dependent claims confirm the understanding that the “dark level bias” has its plain and ordinary meaning of a “a value that causes a deviation from the combined signal, where the value is a voltage value of an electrical signal or a value of a software variable.” In the dependent claims, the “dark level bias” is “added to,” or multiplied by, other signal values, which only makes sense if the “dark level bias” is a “value.”

3. The brightness control circuit of claim 2, wherein the multiplier ***multiplies*** a sum of the user signal and the sensing signal ***by the dark level bias*** to generate an output signal corresponding to the brightness control signal.

4. The brightness control circuit of claim 1, wherein the ***dark level bias is added to*** the combined signal such that the amount of adjustment to the combined signal is independent of the user selectable brightness setting.

5. The brightness control circuit of claim 4, wherein the ***dark level bias is added*** to an output of the multiplier.

17. The method of claim 15, wherein the ***dark level bias is added to*** the sense signal before selective multiplication such that the amount of adjustment to the combined signal is dependent on the input signal.

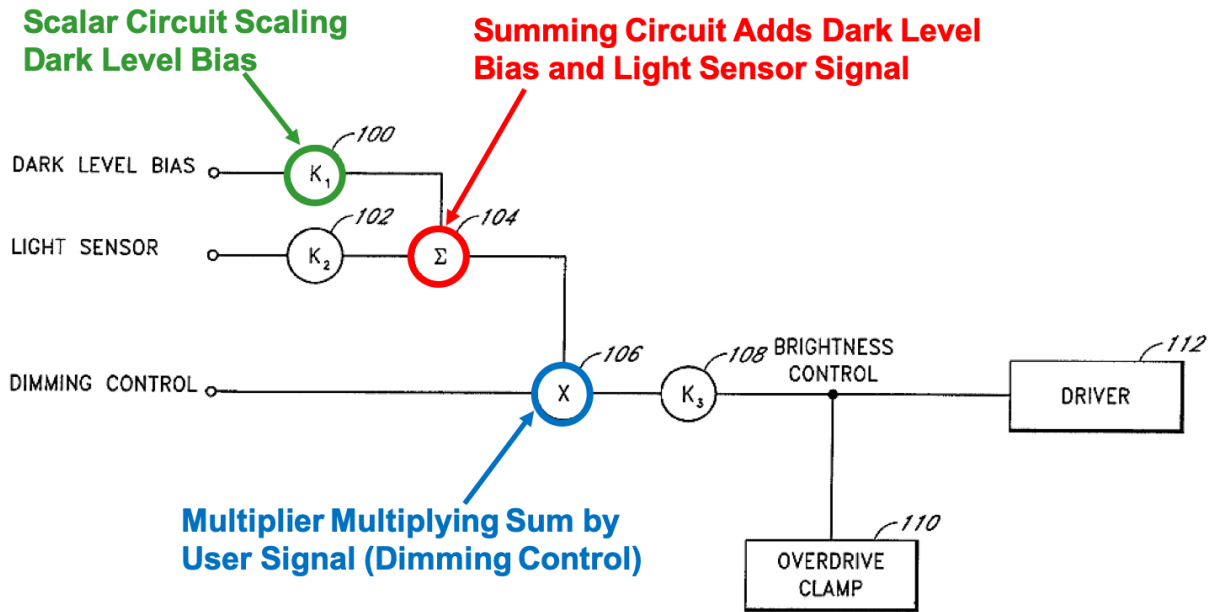
18. The method of claim 15, wherein ***the dark level bias is added*** to the combined signal after selective multiplication such that the amount of adjustment to the combined signal is independent of the input signal and the sense signal.

Id. at claims 3-5, 17-18. Because the “dark level bias” is added to, and multiplied by, other signal values, the “dark level bias” must be a value (e.g., voltage value of an electrical signal or value of a software variable), which is consistent with its plain and ordinary meaning to one of ordinary skill in the art in the context of the ’117 patent.

63. Similarly, claim 2 states that the “dark level bias is provided to the multiplier.” *Id.* at claim 2. For the “dark level bias” to be provided to a software algorithm multiplier, the “dark level bias” would also necessarily be in software (e.g., a software variable). Claim 3 provides that “the multiplier multiplies a sum of the user signal and the sensing signal by the dark level bias.” *Id.* at claim 3. Again, if the software algorithm multiplier is multiplying the “dark level bias” by the “sum of the user signal and sensing signal,” then all values would be in software (e.g., as software variables). Otherwise, the claim and specification would not make sense to a POSITA as the only way that the multiplier can be a “software algorithm” is if the signals that it is manipulating (e.g., user signal, sensing signal, dark level bias) are implemented in software (e.g., as software variables).

64. The embodiments of the ’117 patent similarly confirm that one of ordinary skill in the art would understand “dark level bias” in the context of the ’117 patent to be “a value that causes a deviation from the combined signal, where the value is a voltage value of an electrical signal or a value of a software variable” that is applied when the ambient light level is low (*i.e.*, at a dark level). Figure 1 is a block diagram showing that the “dark level bias” is a value that can be scaled by scalar circuit K₁. *Id.* at Fig. 1, col. 4:45-61. Figure 1 then shows the value of the “dark level bias” is added to the sensing signal value from the light sensor before being multiplied by the dimming control (*i.e.*, user signal). *Id.*

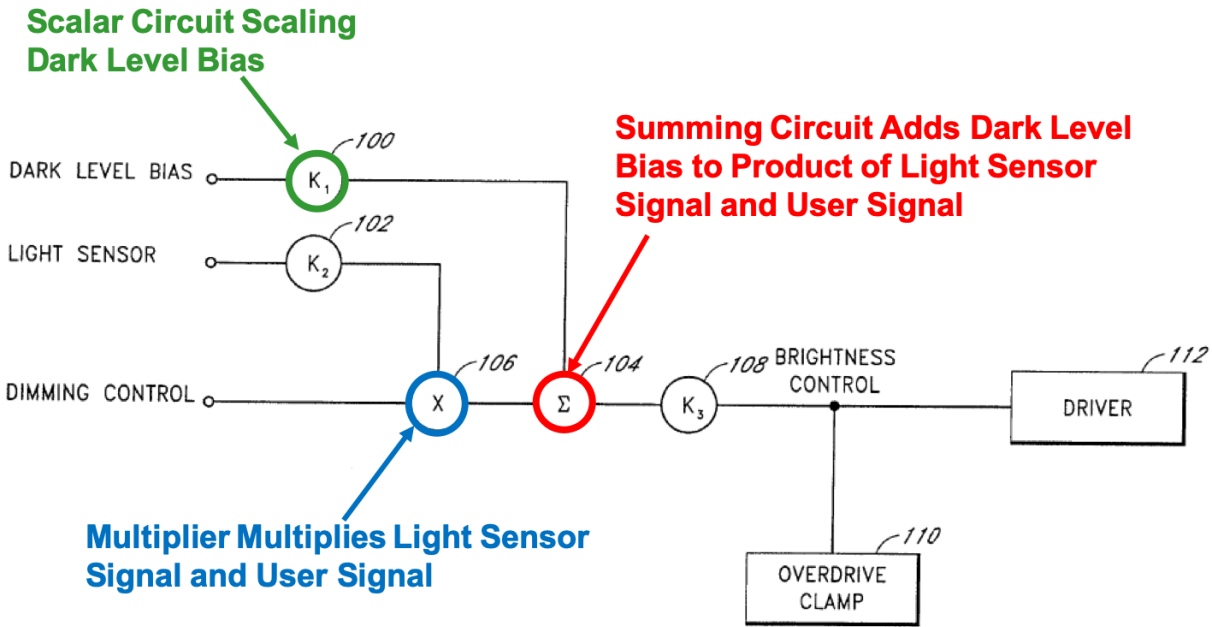
FIG. 1



Id. at Fig. 1 (annotation added). The fact that the “dark level bias” is added to the sensing signal confirms that the “dark level bias” is a value (*e.g.*, voltage value of an electrical signal or the value of a software variable) that causes a deviation from the combined signal.

65. Figure 2 shows that the “dark level bias” is a “value” that can be scaled by scalar circuit K_1 . *Id.* at Fig. 2, col. 5:15-29. The dark level bias value is then added to the product of the sensing signal and user signal by summing circuit 104 in Figure 2.

FIG. 2



Id. at Fig. 2 (annotation added). The fact that the “dark level bias” is added by summing circuit 104 means that it is “a value that causes a deviation from the combined signal, where the value is a voltage value of an electrical signal or a value of a software variable.”

66. With respect to Figures 4, 8, and 9, the ’117 patent discloses equations confirming that the “dark level bias” is a value in accordance with its plain and ordinary meaning. In the equation for Figure 4, the first mathematical term in brackets is the “dark level bias” wherein VCC is the logic high output from the input buffer circuit and R1-R4 are resistor values.

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

Dark Level Bias

The term “dutycycle” corresponds to the duty cycle of the user adjustable PWM logic signal. The term “VCC” corresponds to the logic high output from the input

buffer circuit 410. The term “ISRC” corresponds to the sensor current signal. The **first major term within the brackets corresponds to a scaled dark bias level** of the brightness control signal in total ambient darkness. The second major term within the brackets introduces the effect of the visible light sensor 402. The network of resistors 412, 420 416, 418 helps to provide the dark bias level and to scale the product of the sensor current signal and the user adjustable PWM logic signal.

Id. at Fig. 4, col. 7:17-35 (annotation, emphasis added). Defining the “dark level bias” as a mathematical term confirms that the dark level bias is a value (*e.g.*, voltage value of an electrical signal or the value of a software variable) that can be used to cause a deviation from the combined signal to generate the brightness control signal.

67. The embodiments of Figures 8 and 9 similarly provide equations. In Figure 8, the automatic brightness control operates according to the following equation.

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

Dark Level Bias

Id. at col. 9:61-10:19 (annotation added). ISRC is the sensing signal, and the first bracketed term is the dark level bias value. *Id.* at Fig. 8, col. 9:38-10:19. R3 is a user signal. *Id.*

68. Similarly, in Figure 9, the “dark level bias” is the first mathematical term in brackets containing “VCC.”

$$\text{BCS5} = \text{binary \% fullscale} \times \left(\left[\frac{[VCC \times (R2 \times R3)] + [ISRC \times R1 \times R2 \times R3]}{(R1 \times R2) + (R1 \times R3) + (R2 \times R3)} \right] \right)$$

Dark Level Bias

Id. at col. 11:10-15 (annotation added). Defining the “dark level bias” as a mathematical term in the embodiments of Figures 8 and 9 confirm that the dark level bias is “a value that causes a deviation from the combined signal, where the value is a voltage value of an electrical signal or a value of a software variable.” Further, in both Figures 8 and 9, if the sensing signal ISRC is

zero, then the “dark level bias” term is responsible for maintaining the brightness control signal above a predetermined level by ensuring that, even if ISRC equals zero, a non-zero number will result for the brightness control signal.

69. Claim 1 contains the limitation “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.” Ex. B, Claim 1 (emphasis added). Similarly, claim 15 contains the limitation “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.” *Id.*, Claim 15 (emphasis added). In the context of the ’117 patent, one of ordinary skill in the art would understand that “predetermined” has its plain and ordinary meaning of “determined beforehand.” Ex. P (Dictionary), 978. The “predetermined level” can be any level determined by the system.

IX. MATERIALS REVIEWED

70. Among the materials I have reviewed in forming my opinions are the ’117 patent, the file history of the ’117 patent, all documents cited in the parties’ disclosure of proposed constructions and extrinsic evidence pursuant to Local Patent Rule 131, any document cited in this expert report, and the prior claim construction orders at PPLT00028963-PPLT00028992, PPLT00032089-PPLT00032099, PPLT00029802-PPLT00029837, PPLT00029794-PPLT00029801.

X. SUPPLEMENTATION OF OPINIONS

71. I understand that discovery is ongoing in this case. I therefore reserve the right to adjust or supplement my opinions after I have had the opportunity to review further deposition testimony or in light of additional documents that may be brought to my attention. I also reserve the right to adjust or supplement my analysis in light of any critique of or comments on my report or alternative opinions advanced by or on behalf of Nintendo.