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571-272-7822

Paper 10
Entered: May 25, 2022

UNITED STATES PATENT AND TRADEMARK OFFICE

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BEFORE THE PATENT TRIAL AND APPEAL BOARD

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HOME DEPOT U.S.A., INC.,
Petitioner,

v.

LYNK LABS, INC.,
Patent Owner.

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PGR2022-00009
Patent 10,932,341 B2

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Before JON B. TORNQUIST, MONICA S. ULLAGADDI, and SCOTT RAEVSKY, *Administrative Patent Judges*.

ULLAGADDI, *Administrative Patent Judge*.

# DECISION
Granting Institution of Post-Grant Review
*35 U.S.C. § 324*

# I. INTRODUCTION

Home Depot U.S.A., Inc. ("Petitioner") filed a Petition (Paper 1, "Petition" or "Pet.") requesting post-grant review of claims 1–5, 7–12, and 14–19 of U.S. Patent No. 10,932,341 B2 (Ex. 1001, "the '341 patent"), accompanied by the supporting Declaration of Dr. Dean Neikirk (Ex. 1002). Lynk Labs, Inc. ("Patent Owner") filed a Preliminary Response (Paper 5, "Preliminary Response" or "Prelim. Resp.").

We have authority to determine whether to institute a post-grant review. 35 U.S.C. § 324(c); 37 C.F.R. § 42.4(a) (2021). Under 35 U.S.C. § 324(a), a post-grant review may not be instituted "unless . . . the information presented in the petition . . . , if such information is not rebutted, would demonstrate that it is more likely than not that at least 1 of the claims challenged in the petition is unpatentable." After considering the Petition and Patent Owner's Preliminary Response, as well as all supporting evidence, we determine that Petitioner has satisfied the burden under 35 U.S.C. § 324(a) to show that it is more likely than not that at least one of the challenged claims of the '341 patent is unpatentable. Therefore, we authorize a post-grant review to be instituted as to all grounds and all challenged claims. 37 C.F.R. § 42.208(a) ("When instituting post-grant review, the Board will authorize the review to proceed on all of the challenged claims and on all grounds of unpatentability asserted for each claim.").

Our determinations at this stage of the proceeding are based on the evidentiary record developed thus far. This decision to institute trial is not a final decision as to patentability of claims for which post-grant review is

instituted. Our final decision will be based on the full record developed during trial.

## II. BACKGROUND

### *A. Real Parties in Interest*

Petitioner (i) identifies Home Depot Product Authority, LLC as a real party-in-interest, (ii) identifies The Home Depot, Inc. as a potential real party-in-interest because it is also a named defendant in a related litigation (discussed *infra*), and (iii) "[i]n an abundance of caution," identifies as potential real parties-in-interest suppliers of certain products that have been accused in the litigation and from whom Petitioner has requested indemnification, including Bel Air Lighting, Inc., New Bright Technology, Cordelia Lighting, Elec-Tech Solid State Lighting (HK) Ltd., Globe Electric, King of Fans, Inc., Leedarson Lighting/Green Intelligence Co., and Year Young Industrial Co. Pet. 1. Petitioner notes that "[t]hese suppliers have not yet controlled or participated in the drafting of this Petition, and none has consented to being named an RPI." *Id.*

Patent Owner identifies itself as the real party-in-interest. Paper 3, 1.

### *B. Related Matters*

The parties identify: *Lynk Labs, Inc. v. The Home Depot USA, Inc., et al.*, No. 6:21-cv-00097 (W.D. Tex.) ("the Texas Litigation") as a related matter involving the '341 patent. Pet. 2; Paper 3, 1. Patent Owner also identifies *Lynk Labs, Inc. v. Home Depot USA, Inc. et al.*, No. 1:21-cv-05021 (N.D. Ga.) ("the Georgia Litigation") and notes that the Georgia



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Litigation "was transferred from the Western District of Texas."[1] Prelim. Resp. 1.

Patent Owner also identifies U.S. Patent Application Nos. 17/001,074, 17/157,264, 17/216,032, 17/266,505, and 17/306,450 as "pending applications [that] may affect, or be affected by, a decision in this proceeding." Paper 3, 1.

IPR2022-00143 also challenges the '341 patent, specifically, claims 1–3, 5, 7–10, 12, 14–17, and 19, and a decision in IPR2022-00143 has not yet been rendered.

IPR2021-01541 challenges U.S. Patent No. 10,537,001, a parent of the '341 patent, and *inter partes* review was instituted on May 16, 2022.

### *C. The '341 Patent*

The '341 patent is titled "Multi-Voltage and Multi-Brightness LED Lighting Devices and Methods of Using Same" and "relates to light emitting diodes ('LEDs') for AC operation . . . [and] to multiple voltage level and multiple brightness level LED devices, packages and lamps." Ex. 1001, code (54) (Title), 1:25–28.

The '341 patent explains that existing LED packages do not provide "a multi-voltage and/or multi-current circuit monolithically integrated on a single substrate." *Id.* at 2:65–67. The '341 patent provides that it would be advantageous to (i) have a multi-voltage and/or multi-brightness circuit that can "provide options in voltage level, brightness level and/or AC or DC powering input power preference," and (ii) provide multiple voltage level

[1] We collectively refer to the Texas Litigation and the Georgia Litigation as "the Related Litigation."



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and/or multiple brightness level light emitting LED circuits, chips, packages, and lamps "that can easily be electrically configured for at least two forward voltage drive levels with direct AC voltage coupling, bridge rectified AC voltage coupling or constant voltage DC power source coupling." *Id.* at 3:1–12. To this end, the '341 patent discloses an

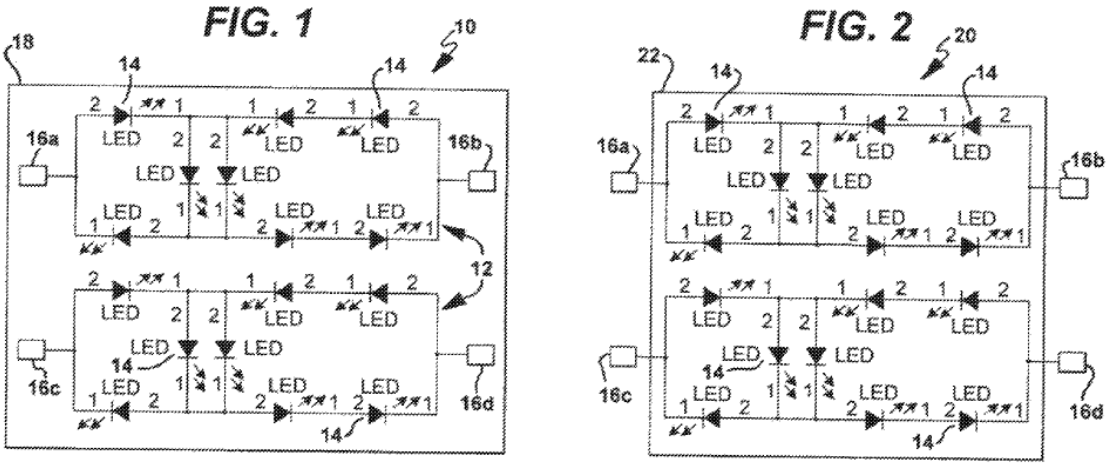
> invention [that] comprises circuits and devices that can be driven with more than one AC or DC forward voltage "multi-voltage" at 6V or greater based on a selectable desired operating voltage level that is achieved by electrically connecting the LED circuits in a series or parallel circuit configuration and/or more than one level of brightness "multi-brightness" based on a switching means that connects and/or disconnects at least one additional LED circuit to and/or from a first LED circuit. The desired operating voltage level and/or the desired brightness level electrical connection may be achieved and/or completed at the LED packaging level when the multi-voltage and/or multi-brightness circuits and/or single chips are integrated into the LED package, or the LED package may have external electrical contacts that match the integrated multi-voltage and/or multi-brightness circuits and/or single chips within, thus allowing the drive voltage level and/or the brightness level selectability to be passed on through to the exterior of the LED package and allowing the voltage level or brightness level to be selected at the LED package user, or the PCB assembly facility, or the end product manufacturer. . . .
>
> According to another aspect of the invention, each multi-voltage AC LED device would be able to be driven with at least two different AC forward voltages resulting in a first forward voltage drive level by electrically connecting the two single voltage AC LED circuits in parallel and a second forward voltage drive level by electrically connecting the at least two single voltage level AC LED circuits in series.

*Id.* at 3:11–32, 4:12–19.



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Figures 1 and 2 of the ’341 patent, illustrating schematic diagrams of multi-voltage and/or multi-brightness LED lighting devices, are reproduced below. *Id.* at 9:56–57, 10:12–13.




Figures 1 and 2 illustrate schematic diagrams of multi-voltage and/or multi-brightness LED lighting devices. *Id.* at 9:56–57, 10:12–13.

The multi-voltage and/or multi-brightness LED lighting device 10 illustrated in Figure 1 includes at least two AC LED circuits 12 configured in an imbalanced bridge circuit, each of which have at least two LEDs 14. *Id.* at 9:56–10:11. The at least two AC LED circuits have electrical contacts 16a, 16b, 16c, and 16d at opposing ends to provide connectivity options for an AC voltage source input. *Id.* For example, if 16a and 16c are electrically connected together and 16b and 16d are electrically connected together and one side of the AC voltage input is applied to 16a and 16c and the other side of the AC voltage input is applied to 16b and 16d, the circuit becomes a parallel circuit with a first operating forward voltage. *Id.* If, however, only 16a and 16e are electrically connected and the AC voltage inputs are applied to electrical contacts 16b and 16d, a second operating forward voltage is required to drive the single chip 18. *Id.* The ’341 patent further explains that

single chip 18 may also be configured to operate at more than one brightness level "multi-brightness" by "electrically connecting for example 16a and 16b and applying one side of the line of an AC voltage source to 16a a[n]d 16b and individually applying the other side of the line from the AC voltage source a second voltage to 26b and 26c." *Id.*

In the multi-voltage and/or multi-brightness LED lighting device 20 illustrated in Figure 2, the at least two AC LED circuits 12 are integrated onto substrate 22. *Id.* at 10:12–23. The at least two AC LED circuits 12 are configured in an imbalanced bridge circuit, each of which have at least two LEDs 14. *Id.* The at least two AC LED circuits have electrical contacts 16a, 16b, 16c, and 16d on the exterior of the substrate 22 and can be used "to electrically configure and/or control the operating voltage and/or brightness level of the multi-voltage and/or multi-brightness LED lighting device." *Id.*

Figures 6 and 7 of the '341 patent, illustrating more schematic diagrams of multi-voltage and/or multi-brightness LED lighting devices, are reproduced below. *Id.* at 10:65–66, 11:18–19.



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FIG. 6

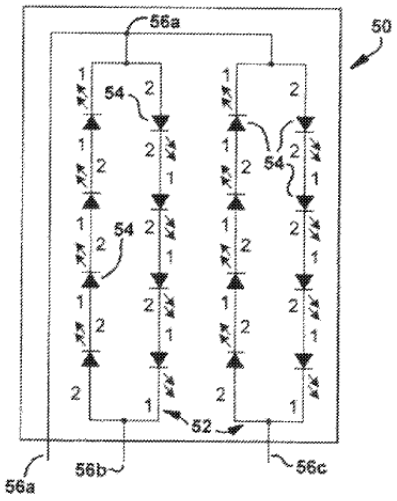
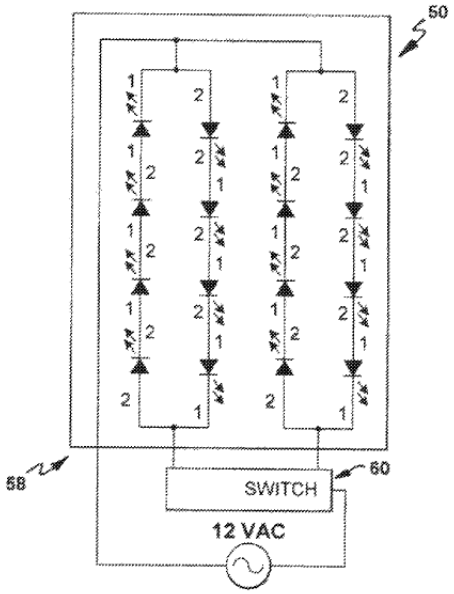



FIG. 7




Figures 6 and 7 illustrate schematic diagrams of multi-voltage and/or multi-brightness LED lighting devices. *Id.* at 10:65–66, 11:18–19.

The multi-voltage and/or multi-brightness LED lighting device 50 illustrated in Figure 6 includes at least two AC LED circuits 52, each of which have at least two LEDs 54 in series and anti-parallel relation. *Id.* at 10:65–11:17. The at least two AC LED circuits 52 have at least three electrical contacts 56a, 56b and 56c, and are electrically connected together in parallel at one end 56a and left unconnected at the opposing ends of the electrical contacts 56b and 56c. *Id.* One side of an AC voltage source line is electrically connected to 56a and the other side of an AC voltage source line is individually electrically connected to 56b and 56c "with either a fixed connection or a switched connection thereby providing a first brightness when AC voltage is applied to 56a and 56b and a second brightness when an AC voltage is applied to 56a, 56b and 56c." *Id.* The multi-voltage and/or multi-brightness LED device shown in Figure 7, which is similar to the

device shown in Figure 6, is further integrated within a lamp 58 and connected to a switch 60 to control the brightness level of the multi-voltage and/or multi-brightness LED lighting device. *Id.* at 11:18–22.

Figure 9 of the '341 patent, reproduced below, illustrates another schematic diagram of a multi-brightness LED lighting device. *Id.* at 11:40–42.

FIG. 9

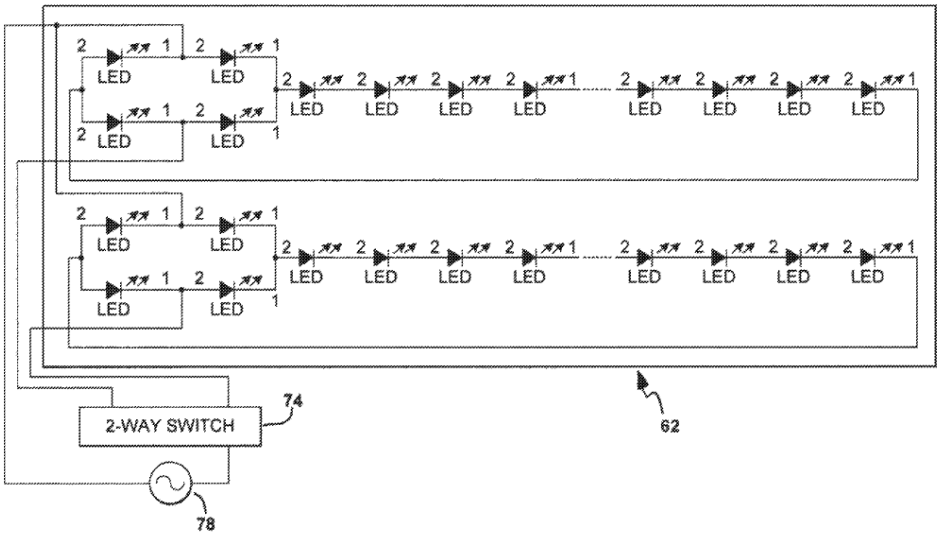



Figure 9 illustrates another schematic diagram of a multi-voltage and/or multi-brightness LED device including at least two single voltage LED circuits integrated with a single chip or within a substrate. *Id.* at 11:36–42.

The device illustrated in Figure 9 includes: two sets of four LEDs, each set configured in a bridge circuit; two bridge-rectified series LED circuits having plural LEDs connected in series; and a switch 74 electrically connected between the multi-brightness LED lighting device 62 and an AC voltage source 78, to enable a change in the brightness level of the multi-brightness LED lighting device. *Id.* at 11:23–42.[2]

[2] We refer to the description of Figure 8 with respect to Figure 9 because the description of Figure 9 references the description of Figure 8.



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### *D. Illustrative Claims*

Petitioner challenges claims 1–5, 7–12, and 14–19 of the '341 patent. Pet. 1. Claims 1, 8, and 15 are independent. Claims 1, 8, and 15 are illustrative and reproduced below.

> 1. [1.pre] An LED lighting device comprising:
> [1.a] a first operating LED circuit and at least one additional LED circuit,
> [1.b] at least one of the first operating LED circuit or the at least one additional LED circuit including at least two LEDs connected in either series or parallel, and
> [1.c] the at least one additional LED circuit being configured to emit a different color light compared to the first operating LED circuit; and
> [1.d] a switch capable of at least one of:
> (a) switching a voltage level input to at least one of the first operating LED circuit or the at least one additional LED circuit, or
> (b) switching the at least one additional LED circuit on or off,
> [1.e] wherein (a) or (b) is selectable by a user switching the switch, and
> [1.f] wherein the LED lighting device is configured to connect to an AC voltage power source.
>
> 8. [8.pre] An LED lighting device comprising:
> [8.a] a first operating LED circuit and at least one additional LED circuit,
> [8.b] at least one of the first operating LED circuit or the at least one additional LED circuit including at least two LEDs connected in either series or parallel, and
> [8.c] the at least one additional LED circuit being configured to emit a different color light compared to the first operating LED circuit; and
> [8.d] a switch capable of at least one of:



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(a) switching a brightness level of at least one of the first operating LED circuit or the at least one additional LED circuit, or

(b) switching the at least one additional LED circuit on or off,

[8.e] wherein (a) or (b) is selectable by a user switching the switch, and

[8.f] wherein the LED lighting device is configured to connect to an AC voltage power source.

15. [15.pre] An LED lighting device comprising:

[15.a] a first operating LED circuit and at least one additional LED circuit,

[15.b] at least one of the first operating LED circuit or the at least one additional LED circuit including at least two LEDs connected in either series or parallel, and

[15.c] the at least one additional LED circuit being configured to emit a different color light compared to the first operating LED circuit; and

[15.d] a switch capable of at least one of:

(a) switching a voltage level input to at least one of the first operating LED circuit or the at least one additional LED circuit, or

(b) switching the at least one additional LED circuit on or off,

[15.e] wherein (a) or (b) is selectable by switching the switch, and

[15.f] wherein the LED lighting device is configured to connect to an AC voltage power source.

Ex. 1001, 12:9–27, 12:47–65, 13:18–14:10 (bracketed identifying labels added in accordance with Petitioner's labeling, *see* Pet. 34–40, 46–53).

### *E. Asserted Grounds*

Petitioner presents the following challenges as summarized in the chart below. Pet. 5.

| Ground | Claims Challenged | 35 U.S.C. § | Reference(s)/Basis |
|---|---|---|---|
| 1 | 3, 10, 17 | 112(a), | Lack of Written |



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| Ground | Claims Challenged | 35 U.S.C. § | Reference(s)/Basis |
|---|---|---|---|
| | | 112(b)[3] | Description; Lack of Enablement; Indefiniteness |
| 2 | 4, 11, 18 | 112(a), 112(b) | Lack of Written Description; Lack of Enablement; Indefiniteness |
| 3 | 1, 3, 5, 7, 8, 10, 12, 14, 15, 17, 19 | 102[4] | Bruning[5] |
| 4 | 1–3, 5, 7–10, 12, 14– | 103[3] | Bruning, Kabel[6] |

[3] 35 U.S.C. §§ 112(a), 112(b) are applicable to any patent application filed on or after September 16, 2012. The application underlying the '341 patent was filed in 2020. *Infra* §§ III.A.2–3 (determining that at least one claim in the '341 patent has an effective filing date after March 16, 2013 and implicating AIA versions of the statues for each challenged ground).

[4] Per the Manual of Patent Examining Procedure (MPEP) § 2159.02, America Invents Act ("AIA") 35 U.S.C. §§ 102, 103 took effect on March 16, 2013. AIA 35 U.S.C. §§ 102, 103 apply to any patent application that contains or contained at any time a claim to a claimed invention that has an effective filing date that is on or after March 16, 2013. If a patent application (1) contains or contained at any time a claim to a claimed invention having an effective filing date as defined in 35 U.S.C. § 100(i) that is on or after March 16, 2013 or (2) claims or ever claimed the benefit of an earlier filing date under 35 U.S.C. §§ 120, 121, or 365 based upon an earlier application that ever contained such a claim, then AIA 35 U.S.C. §§ 102, 103 apply to the application, (i.e., the application is an AIA application). If there is ever even a single claim to a claimed invention in the application having an effective filing date on or after March 16, 2013, AIA 35 U.S.C. §§ 102, 103 apply in determining the patentability of every claimed invention in the application. This is the situation even if the remaining claimed inventions all have an effective filing date before March 16, 2013, and even if a claim to a claimed invention having an effective filing date on or after March 16, 2013, is canceled.

[5] U.S. Patent Application Publication No. 2002/0070914 A1, published June 13, 2002 (Ex. 1004, "Bruning").

[6] U.S. Patent Application Publication No. 2004/0164948 A1, published August 26, 2004 (Ex. 1005, "Kabel").

| Ground | Claims Challenged | 35 U.S.C. § | Reference(s)/Basis |
|---|---|---|---|
| | 17, 19 | | |
| 5 | 1, 2, 5, 7–9, 12, 14–16, 19 | 103 | Dowling,[7] Mueller[8] |

## III. ANALYSIS

### *A. Eligibility for Post-Grant Review*

As a threshold matter, we must determine whether the '341 patent is eligible for post-grant review. The post-grant review provisions set forth in section 6(d) of the Leahy-Smith America Invents Act, Pub. L. No. 112-29, 125 Stat. 284 (September s, 2011) ("AIA"), apply only to patents subject to the first-inventor-to-file provisions of the AIA. *See* AIA § 6(f)(2)(A) (stating that the provisions of Section 6(d) "shall apply only to patents described in section 3(n)(1)"). Patents subject to the first-inventor-to-file provisions are those that issue from applications "that contain[] or contained at any time . . . a claim to a claimed invention that has an effective filing date as defined in section 100(i) of title 35, United States Code, that is on or after" March 16, 2013. AIA § 3(n)(1); *see supra* n.4.

Our rules require that each petitioner requesting post-grant review certify that the challenged patent is available for post-grant review. 37 C.F.R. § 42.204(a) ("The petitioner must certify that the patent for which review is sought is available for post-grant review. . . ."). In addition, "[a] petition for a post-grant review may only be filed not later than the date that is 9 months after the date of the grant of the patent or of the issuance of a reissue patent (as the case may be)." 35 U.S.C. § 321(c). Petitioner has the

[7] U.S. Patent Application Publication No. 2002/0048169 A1, published April 25, 2002 (Ex. 1006, "Dowling").
[8] U.S. Patent No. 6,016,038, issued January 18, 2000 (Ex. 1007, "Mueller").

burden of demonstrating eligibility for post-grant review. *See Mylan Pharms. Inc. v. Yeda Res. & Dev. Co.*, PGR2016-00010, Paper 9 at 9–10 (PTAB Aug. 15, 2016).

*1. Legal Requirements for Post-Grant Review Eligibility*

The post-grant review provisions apply only to a patent that contains a claim with an effective filing date on or after March 16, 2013. *See* AIA §§ 3(n)(1), 6(f)(2)(A).

The ’341 patent issued from U.S. Application No. 16/740,295, filed on January 10, 2020 (“the ’295 application”). Ex. 1001, codes (21), (22). The ’295 application was filed as (i) a continuation of U.S. Application No. 16/274,164, filed on February 12, 2019, now U.S. Patent No. 10,537,001 (Ex. 1020, “the ’001 patent”), and in turn is (ii) a continuation of U.S. Application No. 15/685,429, filed on August 24, 2017, now U.S. Patent No. 10,271,393 (“the ’393 patent”), and in turn is (iii) a continuation of U.S. Application No. 14/172,644, filed on February 4, 2014, now U.S. Patent No. 9,750,098 (“the ’098 patent”), and is in turn (iv) a continuation of U.S. Application No. 13/322,796, filed as Application No. PCT/US2010/001597 (Ex. 1018, “the ’597 PCT”) on May 28, 2010, now U.S. Patent No. 8,648,539 (“the ’539 patent”). *Id.* at code (63).

U.S. Patent No. 8,648,539 claims priority as a continuation-in-part of U.S. Application No. 12/287,267, filed on October 6, 2008, now U.S. Patent No. 8,179,055 (“the ’055 patent”). *Id.* The ’341 patent also claims the benefit of U.S. Provisional Application No. 61/217,215, filed on May 28, 2009, and U.S. Provisional Application No. 60/997,771, filed on October 6, 2007. Ex. 1001, code (60).



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Petitioner contends that the '341 patent is eligible for post-grant review because, even if some of the claims are entitled to the benefit of a filing date before March 16, 2013 by virtue of the parent application(s), (i) challenged claims 3, 4, 10, 11, 17, and 18 have an earliest effective filing date that is on or after March 16, 2013, and (ii) one of the parent applications of the '341 patent that issued as a patent contains claims having earliest effective filing dates on or after March 16, 2013. Pet. 16–23. Petitioner further contends that the Petition was filed within nine months of the issue date of the '341 patent. *Id.* at 3.

To determine whether any of claims 3, 4, 10, 11, 17, and 18 of the '341 patent confer PGR eligibility, we must determine whether these claims are *not* entitled to an effective filing date earlier than March 16, 2013. The "effective filing date" of a claimed invention is defined under 35 U.S.C. § 100(i)(1)(B) as being "the filing date of the earliest application for which the patent . . . is entitled, as to such invention, to a right of priority under section 119, 365(a), or 365(b) or to the benefit of an earlier filing date under section 120, 121, or 365(c)." In order for a patent application to be entitled to a "right of priority" or an earlier filing date based upon an earlier-filed application, the earlier-filed application must have been disclosed "in the manner provided by section 112(a) (other than the requirement to disclose the best mode)." 35 U.S.C. §§ 119(e)(1), 120.

To determine whether any of claims 3, 4, 10, 11, 17, and 18 of the '341 patent is entitled to a right of priority and effective filing date based on the '597 PCT (i.e., the first application in the priority chain filed before 2013), we determine whether it, the earlier-filed application, satisfies the following two requirements set forth in 35 U.S.C. § 112(a)—"(1) a written



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description of the subject matter of the claim(s) at issue in the later filed nonprovisional application, and (2) an enabling disclosure to permit one of ordinary skill in the art to make and use the claimed invention in the later filed nonprovisional application without undue experimentation." *See* MPEP § 211.05. "If there is a continuous chain of copending nonprovisional applications, each copending application must disclose the claimed invention of the later-filed application in the manner provided by 35 U.S.C. § 112(a) in order for the later-filed application to be entitled to the benefit of the earliest filing date." *Id.* If a claimed invention is not entitled to claim priority to a prior application, the effective filing date is "the actual filing date of the patent or the application for the patent containing a claim to the invention." 35 U.S.C. § 100(i)(1)(A).

*2. Claims 3, 10, and 17 of the '341 Patent*

Petitioner argues that claims 3, 10, and 17 of the '341 patent have an effective filing date on or after March 16, 2013 because none of the pre-AIA applications in the priority chain of the '341 patent discloses "providing two different DC forward voltages to either the first operating LED circuit or the [at least] one additional LED circuit as required by these claims, much less in combination with the LED device recited in the independent claims from which they depend." Pet. 17–20.

In particular, Petitioner argues that "[n]o Pre-AIA Application discloses the claimed switch under the proper construction of 'forward voltage.'" *Id.* at 18 (citing Pet. § V.E.2). Petitioner contends that "forward voltage" is expressly defined in the intrinsic record as "the minimum voltage difference required between the anode and cathode of the LEDs in the claimed circuit to allow current to flow through the LEDs." *Id.* at 25



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(discussing applicant's definition of this term in the prosecution history of Application No. 16/274,164); *infra* § III.E.2.[9] According to Petitioner, "[b]ecause each circuit has only one such minimum, there is only one 'forward voltage' for each circuit, and no switch can provide 'at least two different DC forward voltages' to either circuit." Pet. 18. As such, Petitioner contends, "[t]hese claims to impossible subject matter are not disclosed in any Pre-AIA Application." *Id.* (citing Pet. § VI.A.1; Ex. 1002 ¶ 32). We refer to these arguments as Petitioner's "impossibility of multiple minimum voltages" arguments and address them in Section III.F *infra*, as it is necessary to first construe "forward voltage" (in Section III.E.2 *infra*) to reach a determination as to these arguments.

Petitioner also takes the position that "[n]one of these embodiments disclose or enable the full breadth of these claims" because the claims encompass a situation in which the two different voltages are applied to only one of the LED circuits under any construction of "forward voltage" as it appears in the claim term "two different DC forward voltages." Pet. 19–20. We address this argument in the following paragraphs because we need not first construe "forward voltage" to reach a determination as to this argument.

[9] Petitioner also argues, "[i]n the alternative, 'forward voltage' should be construed as 'a voltage in a diode's forward direction.'" Pet. 26. According to Petitioner, "[t]he concept of direction, such as 'forward' and 'reverse,' with respect to diodes is well known to a POSITA." *Id.* Petitioner further argues that "[i]f 'forward voltage' is not construed according to its express definition, then it should encompass any voltage in a forward direction, regardless of whether the voltage is so small that no visible light is emitted by the LED, or is so large that the resulting current destroys the LED." *Id.* (citing Ex. 1002 ¶ 48).



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Patent Owner responds that the '597 PCT discloses "a 'multi-voltage AC or DC operable LED device' that allows for 'forward voltage drive selection.'" Prelim. Resp. 6 (citing Ex. 1018 ¶¶ 24, 25). Patent Owner points to paragraphs 28 and 30 of the '597 PCT, which disclose an LED device that is "driven with at least two different DC forward voltages," including "a first forward voltage drive level when the two single voltage LED circuits *are connected in parallel* and a second forward voltage drive level that is twice the level of the first forward voltage drive level when the at least two LED circuits *are connected in series*." Ex. 1018 ¶ 28 (emphases added). Patent Owner takes the position that, "[b]ecause the claims provide different voltages to 'at least one of' the two circuits, they are broad enough to allow for different voltages to one *or* both of the LED circuits" and that "[i]t need not be limited to only one circuit." Prelim. Resp. 6 (emphasis added).

Petitioner has the better position. Claims 3, 10, and 17 recite "wherein the switching of the switch provides at least two different DC forward voltages to *at least one of* the first operating LED circuit or the at least one additional LED circuit." Encompassed within the scope of each of claims 3, 10, and 17 are three situations: (1) when two different DC forward voltages are provided to *only* the first operating LED circuit; (2) when two different DC forward voltages are provided to *only* the at least one additional LED circuit; and (3) when two different DC forward voltages are provided to the first operating LED circuit *and* the at least one additional LED circuit. We agree with Petitioner's position—that it is necessary to support the full breadth of these claims (i.e., all three situations)—and not merely one of the three situations, as Patent Owner contends. *See* Pet. 19; Prelim. Resp. 6; *see also LizardTech, Inc. v. Earth Resource Mapping, Inc.*, 424 F.3d 1336, 1345

(Fed. Cir. 2005) ("Whether the flaw in the specification is regarded as a failure to demonstrate that the patentee possessed the full scope of the invention recited in [a] claim . . . or a failure to enable the full breadth of that claim, the specification provides inadequate support for the claim under section 112, paragraph one.").

Neither the cited portions of the '597 PCT nor the entirety of the '597 PCT provides written description support for situations (1) and (2) under *any* construction of "forward voltage" as it appears in the claim term "two different DC forward voltages" recited in claims 3, 10, and 17. The cited portions of the '597 PCT disclose "a first forward voltage drive level when the two single voltage LED *circuits are connected in parallel* and a second forward voltage drive level that is twice the level of the first forward voltage drive level when the at least two LED *circuits are connected in series*." Ex. 1018 ¶ 28 (emphases added). That is, the forward voltage drive level in the '597 PCT depends on whether the (at least) two single voltage LED circuits are connected together in parallel or in series. This is distinguishable from situations (1) and (2) because the cited portions do not disclose that the two different forward voltage drive levels are applied to only one single voltage LED circuit—the cited portions describe only a situation in which at least two LED circuits are required.

For the foregoing reasons, on this record, we determine that the '597 PCT does not provide sufficient support in order to "reasonably convey[] to those skilled in the art that the inventor had possession of the claimed subject matter as of the filing date" of the '597 PCT. *Ariad Pharm., Inc. v. Eli Lilly & Co.*, 598 F.3d 1336, 1351 (Fed. Cir. 2010) (en banc). Accordingly, we are persuaded that the '597 PCT lacks sufficient written

description support for the inventions recited in claims 3, 10, and 17 of the '341 patent. Dependent claims 3, 10, and 17 of the '341 patent are therefore not granted priority and do not receive an effective filing date as early as that of the '597 PCT (i.e., 2010).

In this case, the effective filing date is only as early as the filing date of the '295 application from which the '341 patent matured. Patent Owner has not demonstrated that any of the applications intervening between the '597 PCT and the '295 application—U.S. Patent Application Nos. 16/274,164, 15/685,429, and 14/172,644—provide sufficient support (i.e., enablement or written description) for claims 3, 10, and 17 of the '341 patent. The '295 application was filed on January 10, 2020, which is after March 16, 2013, and thus the first-inventor-to-file provisions of the AIA apply to our analysis of *all* of the challenged claims. *See supra* n.4. We note that even if these first-inventor-to-file provisions of the AIA are implicated by only dependent claims 3, 10, and 17 of the '341 patent, we still apply the AIA versions, and not the pre-AIA versions, of 35 U.S.C. §§ 112, 102, and 103 to our analysis of *all* of the challenged claims. *Id.*

We further determine that Petitioner filed the Petition within the 9-month statutory period for requesting post-grant review in accordance with 35 U.S.C. § 321(c). The '341 patent issued on February 23, 2021 (*see* Ex. 1001, code (45)), and the Petition in this proceeding was accorded a filing date of November 12, 2021 (*see* Paper 4). Thus, the Petition was filed less than 9 months after the date of issuance of the '341 patent.

For the foregoing reasons and at this stage of the proceeding, we are persuaded by Petitioner's first basis for PGR eligibility of the '341 patent.



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*3. Claims 4, 11, and 18 of the '341 Patent*

Petitioner argues that claims 4, 11, and 18 of the '341 patent have an effective filing date on or after March 16, 2013 because they claim "impossible subject matter [that] is not disclosed in the Pre-AIA Applications," particularly because "the independent claims define the 'LED lighting device' [as] compris[ing] the switch, but the dependent claims [4, 11, and 18] require that the switch be 'between' that same 'LED lighting device' and the power source." Pet. 20–21. At this stage, for purposes of efficiency, we address only lack of written description support with respect to claims 4, 11, and 18 in this section because this issue is dispositive as to eligibility of these claims for post-grant review.

Patent Owner disputes Petitioner's position and initially contends that "[t]hese limitations [of dependent claims 4, 11, and 18] are clearly supported and disclosed in the '597 [PCT] Application" because Figures 7 and 9 of the '597 Application "clearly disclose 2-way switch 60 connected between an AC power source and an LED lighting device." Prelim. Resp. 6 (citing Ex. 1018 ¶¶ 57, 58, Figs. 7, 9). Patent Owner further argues that "Petitioner's argument, however, is not that these claims have an effective filing date on or after March 16, 2013 (as would be required to file a PGR)" but that, "instead, Petitioner is arguing that the claims are indefinite as impossible to perform," which "is not relevant for the analysis of whether a PGR is appropriate." *Id.* at 6–7 (citing Pet. 20–21; AIA § 3(n)(1)). According to Patent Owner, "[u]nder Petitioner's argument, these claims are not entitled to any priority date at all, much less a priority date on or after March 16, 2013." *Id.* at 7.



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Patent Owner alternatively contends that the claimed switch acts as an interface:

> While the independent claims characterize the LED device as "comprising" the switch, a POSITA would understand that Claims 4, 11 and 18 are simply specifying where in the LED device the switch would be connected relative to the power source. In other words, the claims are directed to a switch that acts as the interface between the AC voltage power source and the LED lighting device. *See, e.g.*, Ex. 1001, Figs. 7, 9 (showing a switch located between a voltage source and the rest of a LED device). By acting as the interface, this switch is both *a part of* the LED lighting device (as the independent claims require) and *between* the AC voltage power source and the LED lighting device (as the dependent claims require).

*Id.*

Patent Owner's arguments are unavailing at this stage. As to Patent Owner's initial contention, Patent Owner cites portions in Figures 7 and 9 of the '597 PCT and the '341 patent that depict switch 60 as being external to multi-voltage and/or multi-brightness LED lighting device 50 and lamp 58 in Figure 7 and depict two-way switch 74 as external to multi-brightness LED lighting device 62 in Figure 9. *See id.* at 6 (citing Ex. 1018 ¶¶ 57, 58, Figs. 7, 9). Patent Owner also cites paragraphs 57 and 58 of the '597 PCT in support of its argument. *Id.* Paragraph 57 of the '597 PCT describes Figure 7 and does not disclose how switch 60 is part of LED lighting device 50 and/or lamp 58. Ex. 1018 ¶ 57. Paragraph 58 of the '597 PCT describes Figure 8, which depicts "at least two bridge rectified 68 series LED circuits 69," but does not depict a switch, let alone one included within multi-brightness LED lighting device 62. *Id.* ¶ 58. The cited figures of the '597 PCT do not depict and the cited portions do not describe how the claimed "switch" can be a constituent part of the LED lighting device of independent



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claims 1, 9, and 15 *and* be between the LED lighting device and AC voltage power source as required by claims 4, 11, and 18. *See Synchronoss Techs., Inc. v. Dropbox, Inc.*, 987 F.3d 1358, 1366–67 (Fed. Cir. 2021) (finding the challenged claims indefinite and therefore invalid because they were "nonsensical and require an impossibility—that the digital media file contain a directory of digital media files").

As to Patent Owner's alternative "interface" contention, Patent Owner does not cite sufficient underlying evidence or support for characterizing the switch as an "interface," nor are we able to discern such support in the present record. *See* Prelim. Resp. 7.

At this stage of the proceeding, we are persuaded by neither Patent Owner's arguments nor the cited portions discussed above that the '597 PCT provides sufficient written description support under 35 U.S.C. § 112. Patent Owner has not demonstrated, at this stage of the proceeding, that the applications intervening between the '597 PCT and the '295 application—U.S. Application Nos. 16/274,164, 15/685,429, and 14/172,644—provide sufficient support (e.g., written description support) for claims 4, 11, and 18 of the '341 patent. On the current record, the effective filing date is not earlier than the actual filing date of the '295 application from which the '341 patent matured. *Cf. Dynamic Drinkware, LLC v. National Graphics, Inc.*, 800 F.3d 1375, 1379–80 (Fed. Cir. 2015) (determining that after Petitioner satisfies its initial burden of production to show that the claims are unpatentable in part because they lack priority to an earlier filed application,



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burden of production shifts to Patent Owner to argue or produce evidence that the asserted claims are in fact entitled to the benefit of a filing date).

We further do not agree with Patent Owner that Petitioner is arguing that "the claims are not entitled to any priority date at all," nor do we agree that the claims are not entitled to a priority date. *See* Prelim. Resp. 7. The asserted priority document (i.e., the '597 PCT) does not provide sufficient written description support for the subject matter recited in claims 4, 11, and 18. As such, claims 4, 11, and 18 are not granted priority and are not entitled to an effective filing date that is the filing date of the '597 PCT. The effective filing date is defined as

> (A) if subparagraph (B) does not apply, the actual filing date of the patent or the application for the patent containing a claim to the invention; or
>
> (B) the filing date of the earliest application for which the patent is entitled, as to such invention, to a right of priority under section 119, 365(a), 365(b), 386(a), or 386(b) or to the benefit of an earlier filing date under section 120, 121, 365(c), or 386(c).

35 U.S.C. § 100(i)(1). In this case, and on the present record, the effective filing date is only as early as the filing date of the '295 application from which the '341 patent matured. The '295 application was filed on January 10, 2020, which is after March 16, 2013, and thus the first-inventor-to-file provisions of AIA apply to our analysis of *all* of the challenged claims. *See Team Worldwide Corp. v. Intex Recreation Corp.*, 2021 WL 4130634, *1 (Fed. Cir. 2021) (non-precedential) (affirming the Board's finding that "the specification [of the application maturing into U.S. Patent No. 9,989,979], shared with an earlier pre-AIA patent application [U.S. Patent Application No. 13/112,847] from which the patent claims priority, lacks adequate written description to support that the inventor possessed the claimed



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'pressure controlling assembly' at the filing date of either application" and the Board's conclusion "that the challenged claims are eligible for post-grant review as they could not claim priority from the pre-AIA application"); *Intex Recreation Corp. v. Team Worldwide Corp.*, PGR2019-00015, (PTAB Apr. 29, 2020) (underlying Board decision). We note that even if these first-inventor-to-file provisions of the AIA are implicated by only dependent claims 4, 11, and 18 of the '341 patent, we still apply the AIA versions (not the pre-AIA versions) of 35 U.S.C. §§ 112, 102, and 103 to our analysis of *all* of the challenged claims in the present proceeding. *See supra* n.4.

For the foregoing reasons and at this stage of the proceeding, we are also persuaded by Petitioner's second basis for PGR eligibility of the '341 patent.

*4. Claims 1–15 of Parent '001 Patent*

Petitioner additionally argues that claims 1–15 of the '001 patent have an effective filing date on or after March 16, 2013 because none of the pre-AIA applications in the priority chain of the '001 patent discloses the subject matter of independent claims 1 and 11 and dependent claims 9 and 15 of the '001 patent. Pet. 21–23. Patent Owner disputes Petitioner's contentions. Prelim. Resp. 8–10. As we determine that the '341 patent is PGR eligible on the basis of the effective filing date of its claims 3, 10, and 17 and independently, on the basis of the effective filing date of its claims 4, 11, and 18, we need not determine whether any of claims 1–15 of the '001 patent have an effective filing date on or after March 16, 2013.



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*B. Discretion to Deny Under 35 U.S.C. § 324(a)*

For the reasons that follow and under the facts and circumstances present in this case, we decline to exercise our discretion under 35 U.S.C. § 324(a) to deny institution of a post-grant review. 35 U.S.C. § 324(a) states:

> The Director may not authorize a post-grant review to be instituted unless the Director determines that the information presented in the petition filed under section 321, if such information is not rebutted, would demonstrate that it is more likely than not that at least 1 of the claims challenged in the petition is unpatentable.

This language provides the Director with discretion to deny institution of a petition for post-grant review. *See Cuozzo Speed Techs., LLC v. Lee*, 136 S. Ct. 2131, 2140 (2016) (addressing parallel language in 35 U.S.C. § 314(a) and explaining that "the agency's decision to deny a petition is a matter committed to the Patent Office's discretion"); Consolidated Trial Practice Guide November 2019 ("TPG") at 55.[10]

In exercising the Director's discretion under 35 U.S.C. §§ 314(a) and 324(a), the Board may consider "events in other proceedings related to the same patent, either at the Office, in district courts, or the ITC." TPG at 58 (footnote omitted). The Board's precedential *NHK* decision explains that the Board may consider the advanced state of a related district court proceeding, among other considerations, as a "factor that weighs in favor of denying the Petition under § 314(a)." *NHK Spring Co. v. Intri-Plex Techs., Inc.*, IPR2018-00752, Paper 8 at 20 (PTAB Sept. 12, 2018) (precedential); *Apple Inc. v. Fintiv, Inc.*, IPR2020-00019, Paper 11 (PTAB Mar. 20, 2020) (precedential) ("*Fintiv*") (The Board articulated a list of factors to consider in determining whether to exercise discretion to deny institution based on an

[10] Available at https://www.uspto.gov/TrialPracticeGuideConsolidated.

advanced stage of a parallel proceeding—the factors include (1) stays, (2) trial dates, (3) investment by the courts and the parties, (4) overlap of issues, (5) petitioner's relationship to defendant, and (6) other considerations.).

The Georgia Litigation (*supra* § II.B) involves patents in the priority chain for the '341 patent, including its parent, the '001 patent. The '001 patent was challenged in IPR2021-01541, in which we instituted trial on all challenged claims and all challenged grounds. *Home Depot U.S.A., Inc. v. Lynk Labs, Inc.*, IPR2021-01541, Paper 10 (PTAB May 16, 2022). In the Institution Decision in IPR2021-01541, we addressed discretion under 35 U.S.C. § 314. *Id.* at 5–7. Although § 314 applies to *inter partes* review proceedings and 35 U.S.C. § 324 applies to post-grant review proceedings, the substance of these sections is substantially similar. The facts and circumstances surrounding the Georgia Litigation were comprehensively discussed in the IPR2021-01540, IPR2021-01541, and IPR2022-00023 proceedings and are substantially similar to the circumstances in this present proceeding as to factors 1, 2, 3, and 5—we incorporate by reference these discussions. *See Home Depot U.S.A., Inc. v. Lynk Labs, Inc.*, IPR2021-01540, Paper 9 (PTAB Apr. 13, 2022); *Home Depot*, IPR2021-01541, Paper 10; *Home Depot U.S.A., Inc. v. Lynk Labs, Inc.*, IPR2022-00023, Paper 10 (PTAB May 13, 2022).

As noted in IPR2021-01540 and IPR2022-00023, the Georgia Litigation is stayed and presently has no trial date. *See* Ex. 1030; *Home Depot*, IPR2021-01540, Paper 9, 7; *Home Depot*, IPR2022-00023, Paper 10, 10; *Fintiv*, Paper 11 at 6 ("A district court stay of the litigation pending resolution of the PTAB trial allays concerns about inefficiency and duplication of efforts. This fact has strongly weighed against exercising the



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authority to deny institution under NHK."); *Precision Planting, LLC v. Deere & Co.*, IPR2019-01052, Paper 19 at 10 (PTAB Jan. 7, 2020) (finding that the district court stay of the parallel district court case rendered moot the patent owner's argument for discretionary denial of the petition). The only differences are related to *Fintiv* factor 4, the overlap of issues factor, and *Fintiv* factor 6, the other considerations factor—these factors do not sufficiently weigh towards denial because the stay of litigation is dispositive.

For the purposes of consistency with the determination to decline to exercise discretion to deny institution in the above-mentioned proceedings, and for substantially the same reasons discussed in those proceedings, we also decline to exercise our discretion to deny institution in the present proceeding.

Patent Owner urges that the Petition should be denied because Petitioner has filed multiple AIA petitions against the same claims of the same patent without justification and in violation of PTAB procedure. Prelim. Resp. 11–13. As for these concerns of redundancy between the present proceeding and the IPR2022-00143 proceeding, we will take up this matter when we render a decision in the IPR2022-00143 proceeding.

### *C. Legal Standards*

"The specification shall contain a written description of the invention, and of the manner and process of making and using it, in such full, clear, concise, and exact terms as to enable any person skilled in the art to which it pertains, or with which it is most nearly connected, to make and use the same." 35 U.S.C. § 112(a). The Federal Circuit "has consistently held that



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§ 112, first paragraph[11], contains a written description requirement separate from enablement." *Ariad*, 598 F.3d at 1351. "[T]he test for sufficiency [of the written description] is whether the disclosure of the application relied upon reasonably conveys to those skilled in the art that the inventor had possession of the claimed subject matter as of the filing date." *Id.*

"To prove that a claim is invalid for lack of enablement, a challenger must show . . . that a person of ordinary skill in the art would not be able to practice the claimed invention without undue experimentation." *Enzo Life Sciences, Inc. v. Roche Molecular Systems, Inc.*, 928 F.3d, 1340, 1345 (Fed. Cir. 2019). Factors to be considered in determining whether a disclosure would require undue experimentation include:

> (1) the quantity of experimentation necessary, (2) the amount of direction or guidance presented, (3) the presence or absence of working examples, (4) the nature of the invention, (5) the state of the prior art, (6) the relative skill of those in the art, (7) the predictability or unpredictability of the art, and (8) the breadth of the claims.

*In re Wands*, 858 F.2d 731, 737 (Fed. Cir. 1988).

In this post-grant review proceeding, we apply the test for indefiniteness approved by the Supreme Court in *Nautilus, Inc. v. Biosig Instruments, Inc.*, 572 U.S. 898 (2014). *See* Memorandum on Approach to Indefiniteness Under 35 U.S.C. § 112 in AIA Post-Grant Proceedings (Jan. 6, 2021), 5 ("The office now clarifies that the Board shall follow Nautilus in AIA post-grant proceedings).[12] Under *Nautilus*, a claim of a patent

[11] The AIA recodified 35 U.S.C. § 112, first paragraph, as 35 U.S.C. § 112(a). Pub. L. No. 112-29, 125 Stat. at 296–97.
[12] Available at https://www.uspto.gov/sites/default/files/documents/



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challenged for indefiniteness is unpatentable for indefiniteness if the claim, read in light of the patent specification and the prosecution history, fails to inform, with reasonable certainty, those skilled in the art about the scope of the invention. *Nautilus*, 572 U.S. at 901.

"A claim is anticipated only if each and every element as set forth in the claim is found, either expressly or inherently described, in a single prior art reference." *Verdegaal Bros., Inc. v. Union Oil Co. of California*, 814 F.2d 628, 631 (Fed. Cir. 1987).

A patent claim is unpatentable under 35 U.S.C. § 103 if the differences between the claimed subject matter and the prior art are such that the subject matter, as a whole, would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. *KSR Int'l Co. v. Teleflex Inc.*, 550 U.S. 398, 406 (2007). The question of obviousness is resolved on the basis of underlying factual determinations including: (1) the scope and content of the prior art; (2) any differences between the claimed subject matter and the prior art; (3) the level of ordinary skill in the art; and (4) when in evidence, objective evidence of nonobviousness.[13] *Graham v. John Deere Co.*, 383 U.S. 1, 17–18 (1966).

In a post-grant review, as in an *inter partes* review, "the petitioner has the burden from the onset to show with particularity why the patent it challenges is unpatentable." *See Harmonic Inc. v. Avid Tech., Inc.*, 815 F.3d 1356, 1363 (Fed. Cir. 2016). This burden of persuasion never shifts to Patent

IndefinitenessMemo.pdf.

[13] Patent Owner does not present objective evidence of nonobviousness at this stage of the proceeding.



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Owner. *Dynamic Drinkware*, 800 F.3d at 1378. In determining whether '341 patent is eligible for post-grant review, we consider the present record in its entirety.

We analyze the challenges presented in the Petition in accordance with the above-stated principles.

### *D. Level of Ordinary Skill in the Art*

Petitioner contends that:

> A person of ordinary skill in the art ("POSITA") as of October 6, 2007 (earliest listed priority date) or January 10, 2020 (actual filing date), would have had a bachelor's degree in electrical engineering, or similar technical filed, with two years of relevant experience in the field of design and/or development of LEDs and circuits in the context of lighting control systems. An increase in experience could compensate for less education.

Pet. 24 (citing Ex. 1002 ¶ 46).

Patent Owner does not dispute the level of ordinary skill in the art. *See generally* Prelim. Resp.

At this stage of the proceeding, we adopt Petitioner's definition as it appears to be consistent with the specification of the '341 patent and the cited references.

### *E. Claim Construction*

In this post-grant review, filed on November 12, 2021,[14] we construe the claims of the '341 patent using the same claim construction standard that

[14] The claim construction standard to be employed in post-grant reviews has changed for proceedings in which the petition was filed on or after November 13, 2018. *See* Changes to the Claim Construction Standard for Interpreting Claims in Trial Proceedings Before the Patent Trial and Appeal Board, 83 Fed. Reg. 51,340, 51,358 (amending 37 C.F.R. § 42.200(b) effective November 13, 2018) (now codified at 37 C.F.R. § 42.200(b) (2019)).



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would be used to construe the claim in a civil action under 35 U.S.C. § 282(b), including construing the claim in accordance with the ordinary and customary meaning of such claim as understood by one of ordinary skill in the art and the prosecution history pertaining to the patent. 37 C.F.R. § 42.200(b); *see Phillips v. AWH Corp.*, 415 F.3d 1303, 1312–1314 (Fed. Cir. 2005) (en banc). In construing claims in accordance with their ordinary and customary meaning, we take into account the specification and prosecution history. *Phillips*, 415 F.3d at 1315–17.

Petitioner sets forth proposed constructions for the terms "forward voltage," "switch," "selectable by a user switching the switch," and "driver." *Id.* at 24–29. According to Petitioner, "[b]ecause the prior art asserted herein discloses the preferred embodiment within the indisputable scope of the claims, the Board need not construe the outer bounds of the claims as part of these proceedings." *Id.* at 24. Patent Owner acknowledges the constructions proposed by Petitioner but "does not acquiesce to these constructions," and further asserts that, at this stage, no claim construction is necessary. Prelim. Resp. 13.

In the present proceeding, we need only construe "forward voltage" in order to decide Petitioner's challenges. At this juncture, we do not need to expressly construe any of the other claim terms. *See Nidec Motor Corp. v. Zhongshan Broad Ocean Motor Co.*, 868 F.3d 1013, 1017 (Fed. Cir. 2017) (citing *Vivid Techs., Inc. v. Am. Sci. & Eng'g, Inc.*, 200 F.3d 795, 803 (Fed. Cir. 1999) ("[O]nly those terms need be construed that are in controversy, and only to the extent necessary to resolve the controversy."))).

For completeness, we reproduce below Petitioner's proposed constructions and arguments for each claim term.



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*1. preamble*

Petitioner represents that "Petitioner and PO agree in the Related Litigation [(the Texas Litigation)] that the preambles are limiting." Pet. 25. We need not address this stipulation for purposes of this Decision, as we agree with Petitioner below that on this record, Petitioner shows that is more likely than not that it will prevail on its art-based challenges. *Infra* n.18 (declining to specifically conclude whether the preambles of any of independent claims 1, 8, and 15 are limiting because Petitioner persuasively shows that the subject matter of the preamble is disclosed by the references).

*2. forward voltage*

Petitioner asserts "'[f]orward voltage' should be construed as 'the minimum voltage difference required between the anode and cathode of the LEDs in the claimed circuit to allow current to flow through the LEDs' based on the [Patent Owner's] express definition in the intrinsic record." Pet. 25. Petitioner urges that, "[i]n the alternative, 'forward voltage' should be construed as 'a voltage in a diode's forward direction.'" *Id.* at 25–26. Petitioner represents that Patent Owner, in the Related Litigation, asserted that this "express definition" should not be applied. *Id.* at 26 (citing Ex. 1022, 35–38).[15]

Petitioner contends that during prosecution of U.S. Application No. 16/274,164 (the application underlying the parent of the '341 patent, the

[15] In the Related Litigation, we note that Patent Owner states that "[t]he passage from the prosecution history referencing the 'Bald Engineer' [webpage] is generally consistent with the plain and ordinary meaning in the context of the claims under the discussion in the '001 patent" and "[t]hus, the term requires no further construction." Ex. 1022, 36 (referring to definition at https://www.baldengineer.com/ledbasics.html).



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'001 patent, "the '164 application"), Patent Owner expressly defined "forward voltage." *Id.* at 25 (citing Ex. 1023, 9 (Amendment)). In this regard, during prosecution of the '164 application, Applicant asserted that:

> Colby fails to disclose that the first operating LED circuit and the at least one additional LED circuit both have a forward voltage of 6V or greater [as amended]. Stating that "US plugs operate on 120V 60Hz," the Office Action essentially relies on the disclosure of 'AC voltage' in Colby having a 'frequency of 60 Hz' as disclosing the forward voltage required by claim 1. *Office Action*, p. 4; *Colby*, 4:26–31. However, Applicant respectfully submits that the disclosure of an AC voltage supplied from a wall outlet does not disclose the forward voltage of an LED.
>
> "the forward voltage" of an LED circuit, as recited in claim 1, is the minimum voltage difference required between the anode and cathode of the LEDs in the claimed circuit to allow current to flow through the LEDs." *(See, e.g., LED Tutorial - Learn the basics,* https://www.baldengineer.com/led-basics.html.) Thus; the recited forward voltage is different from the AC voltage provided by a typical wall outlet.

Ex. 1023, 9.

One exception to the general rule that claim terms are given their ordinary and customary meaning is "when the patentee disavows the full scope of a claim term either in the specification or during prosecution." *Uship Intellectual Props., LLC v. United States*, 714 F.3d 1311, 1313 (Fed. Cir. 2013) (quoting *Thorner v. Sony Computer Entm't Am., LLC*, 669 F.3d 1362, 1365 (Fed. Cir. 2012)). During prosecution, Applicant "ma[de] clear that the invention does not include a particular feature"—that is, made clear that the claimed "forward voltage of 6V *or greater*" excludes a 120V AC voltage from a wall outlet. *GE Lighting Solutions, LLC v. AgiLight, Inc.*, 750 F.3d 1304, 1309 (Fed. Cir. 2014). As the '001 patent is the parent to the '341 we consider arguments made during the prosecution of the application



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underlying the ’001 patent relevant to determining how “forward voltage” should be preliminarily construed in the child patent, the ’341 patent.

Even though, when read in isolation, 120V AC voltage might theoretically fall under the “or greater” portion of the amended claim limitation “forward voltage of 6V or greater,” Applicant distinguished U.S. Patent No. 7,748,877 (Colby) on the basis that the 120V AC voltage from a wall outlet is not “the *minimum voltage* difference required between the anode and cathode of the LEDs in the claimed circuit to allow current to flow through the LEDs.” *See* Ex. 1023, 9 (emphasis added). Applicant’s argument specifically identifies the claim language at issue—“forward voltage of 6V or greater”—and specifically states that it is not disclosed because Colby does not disclose *the minimum voltage* and *instead,* discloses something else—120V AC voltage. Accordingly, we preliminarily conclude that Applicant disclaimed any voltage that is more than “the minimum voltage difference required between the anode and cathode of the LEDs in the claimed circuit to allow current to flow through the LEDs” from the scope of “forward voltage.”

We also agree with Petitioner that the ’341 patent repeatedly uses the term “forward voltage” in connection with “single voltage series LED circuits.” *See* Pet. 25 (citing Ex. 1001, 4:5–7:8; Ex. 1021, 28–30; Ex. 1002 ¶ 47). These disclosures support Petitioner’s position that there is only one “forward voltage” for an *individual* circuit (i.e., a single voltage series LED circuit). In contrast, the forward voltage may differ based on the connection type, i.e., parallel or series, between at least *two* circuits. *See, e.g.*, Ex. 1001, 4:12–27. It is not apparent from the disclosure of the ’341 patent that brightness or light output levels of an LED device are changed based on



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driving an individual circuit (i.e., the single voltage series LED circuit) with different forward voltages. *See generally id.* Instead it appears that brightness levels or light output levels change based on adding or removing one or more individual circuits connected in series or parallel to a "first operating LED circuit." *Id.* at 3:45–49 ("It would further be advantageous to provide multi-brightness LED devices that can be switched to different levels of brightness by simply switching *additional circuits on or off in addition* to a first operating circuit within a single chip and or LED package." (emphasis added)).

Considering all of this together, the intrinsic record—including the disclosures in the '341 patent and the disclaimer made during prosecution of the application underlying the '001 parent patent—persuades us that Petitioner's first construction, "the minimum voltage difference required between the anode and cathode of the LEDs in the claimed circuit to allow current to flow through the LEDs" is supported by the record, at this stage of the proceeding. To the extent that the parties disagree with our preliminary construction of "forward voltage" or disagree with each other over any claim term, the parties are advised to brief such issue during trial.

*3. switch*

As we noted above, for completeness, we now reproduce Petitioner's remaining proposed constructions and arguments for each claim term, although we need not construe any of these remaining terms at this stage.

Petitioner further argues the term "switch" is "entitled to its ordinary meaning and needs no construction." Pet. 26. Petitioner also submits that "'switch' on its own should encompass switches that are controlled solely by sensors and programming, without any 'user' input at all." *Id.* at 26–27.



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Petitioner represents that, "in the Related Litigation[,] [Patent Owner] asserts 'switch' should be construed as 'a device having at least two or more electrical contacts physically configurable by an end user for changing the device from one contact position to another for the purpose of changing a measurable quantity of light output from an LED circuit.'" *Id.* at 26 (citing Ex. 1022, 23; Ex. 1002 ¶ 49). Petitioner contends that "[t]here is no basis for [Patent Owner's] narrow construction." *Id.*

*4. selectable by a user switching the switch*

Petitioner argues the phrase "selectable by a user switching the switch" is "is entitled to its ordinary meaning and needs no construction." Pet. 27–28. Petitioner represents that Patent Owner, "in the Related Litigation asserts 'selectable by a user' in claims 1 and 8 means 'selectable by a user directly'" and that Patent Owner's "attempt to read 'directly' into these limitations should be rejected." *Id.* (citing Ex. 1022; Ex. 1002 ¶¶ 52, 53) (emphasis omitted). Petitioner submits that "[t]he claims' plain language merely requires that the switch be 'selectable by a user' and does not require it be selectable 'directly.'" *Id.* at 27–29. Petitioner takes positions consistent with its argument that there is no requirement for the claimed "switch" to be directly selectable in its third and fourth challenges. *Infra* §§ III.H–I.

*5. driver*

Petitioner argues that the term "driver" need not be construed because the art discloses this term under "each proposed construction." Pet. 29. Petitioner additional urges that "'[d]river' is entitled to its ordinary meaning to a POSITA, which is 'circuitry that supplies an input to another circuit.'" *Id.* (citing Ex. 1028, 3). Petitioner urges that "[t]he Board should reject any construction that the driver is 'a component that converts or conditions



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power for use by an LED circuit'" as Patent Owner argues in the related litigation, because "[t]he driver in the intrinsic record conditions voltage or frequency, not power per se." *Id.* (citing Ex. 1001, 8:20–58; Ex. 1002 ¶ 55; Ex. 1021, 10–11; Ex. 1022, 13–15).

### *F. Challenge 1—Lack of Written Description and Enablement, and Indefiniteness of Claims 3, 10, and 17*

Petitioner contends claims 3, 10, and 17 are invalid because they lack written description and enablement under 35 U.S.C. § 112(a) and because they are indefinite under 35 U.S.C. § 112(b). Pet. 29–32.

*First,* Petitioner contends that, "[u]nder any construction of 'forward voltage,' such as the alternative construction, claims 3, 10 and 17 are not supported by the specification as filed." *Id.* at 31 (citing Ex. 1002 ¶ 59). This is because, Petitioner contends, "none of these embodiments includes a switch, wherein switching the switch provides two different DC forward voltages to an LED circuit." *Id.* at 32 (citing Ex. 1002 ¶ 64); *see id.* at 31–32 (citing Pet. §§ V.A, V.C.1.a; Ex. 1002 ¶¶ 59–64).

*Second,* Petitioner contends that "[u]nder the correct construction of 'forward voltage,' each of the 'first operating LED circuit' and the 'one additional LED circuit' has a single 'forward voltage' because each has a single 'minimum.'" *Id.* at 30 (citing Pet. § V.E.2 (Petitioner arguing that "forward voltage" means "the minimum voltage difference required between the anode and cathode of the LEDs in the claimed circuit to allow current to flow through the LEDs")). According to Petitioner, "[b]ecause each circuit has only a single 'forward voltage,' no switch can provide 'at least two different' forward voltages to either circuit" and "[t]hus, under the correct construction of 'forward voltage,' these claims are to impossible subject matter that is not disclosed in the specification." *Id.* (citing Ex. 1002 ¶ 57).



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We again refer to this argument as the "impossibility of multiple minimum voltages" argument.

Accordingly, Petitioner contends, "because the specification does not describe or enable this impossible subject matter, the claims are invalid for lack of written description and lack of enablement." *Id.* at 30–31 (citing *Process Control Corp. v. HydReclaim Corp.*, 190 F.3d 1350, 1359 (Fed. Cir. 1999) ("when an impossible limitation, such as a nonsensical method of operation, is clearly embodied within the claim, the claimed invention must be held invalid . . . when the claimed subject matter is inoperable, the patent may indeed be invalid for failure to meet the utility requirement of § 101 and the enablement requirement of § 112" (internal quotations omitted)); *Frazier v. Wireline Sols., LLC*, 725 F. Supp. 2d 588, 596 (S.D. Tex. 2010); *Raytheon Co. v. Roper Corp.*, 724 F.2d 951, 956 (Fed. Cir. 1983) ("Because it is for the invention as claimed that enablement must exist, and because the impossible cannot be enabled, a claim containing a limitation impossible to meet may be held invalid under § 112. Moreover, when a claim requires a means for accomplishing an unattainable result, the claimed invention must be considered inoperative as claimed and the claim must be held invalid under either § 101 or § 112 of 35 U.S.C.")).

Petitioner also contends that "[a] claim to impossible subject matter is invalid as indefinite." *Id.* (citing *Koki Holdings Co. v. Kyocera Senco Indus. Tools, Inc.*, 2021 WL 1092579, at *1 (D. Del. Mar. 22, 2021) ("A claim that



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is nonsensical or requires an impossibility is indefinite as a matter of law under § 112(b).")).

Patent Owner argues that "Petitioner focuses exclusively on its definition of 'forward voltage' and fails to explain how the claimed 'switch provid[ing] at least two different DC forward voltages' is not enabled by the '341 Patent." Prelim. Resp. 14–15 (citing Pet. 30) (alteration in original). Patent Owner contends that "the '341 Patent expressly describes the scenario in which a switch providing a second, different forward voltage would not only be possible, but would be beneficial" and that "the second DC forward voltage is different from the first forward DC voltage." *Id.* at 15 (citing Ex. 1001, 4:33–53, 5:16–6:3). Patent Owner further argues that "even under Petitioner's construction of the term 'forward voltage,' the 'minimum voltage difference required between the anode and cathode of the LEDs in the claimed circuit to allow current to flow through the LEDs' would change as the configuration and therefore demands of the LED circuit change" and thus, the claims "are not directed towards 'impossible subject matter' as Petitioner contends." *Id.* at 15–16. Finally, Patent Owner argues that "Petitioner's indirect attempt to read any of the embodiments described in the '341 Patent into Claims 3, 10, and 17 should be rejected" because, "[d]espite Petitioner's assertion that 'none of the four embodiments disclose or enable the full breadth of these claims,' the subject matter is clearly described in the specification sections quoted above." *Id.* at 16 (citing Pet. 31–32; Ex. 1001, 4:33–53, 5:16–6:3).

*1. 35 U.S.C. § 112(a)*

With respect to the *written description requirement*, we are persuaded that under *any* construction of "forward voltage," written description support



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is lacking in the ’295 application underlying the ’341 patent for the reasons substantially similar to those set forth above. *Supra* § III.A.2. Here and below, we consider our discussion of ’597 PCT (e.g., in Section III.A.2 above) relevant to our analysis of the ’295 application because the ’597 PCT and ’295 application have substantially similar disclosures.

Patent Owner’s arguments are unpersuasive because the configuration changes that Patent Owner references in the ’295 application and the ’341 patent are disclosed as being based on the type of wiring connection, parallel or serial, between *two* circuits, i.e., the “at least one of the first operating LED circuit” and the “the at least one additional LED circuit.”[16] For reasons similar to what we discussed above in Section III.A.2, the disclosures of the ’295 application and the ’341 patent do not address the situation in which (1) the two different DC forward voltages are provided to *only* the first operating LED circuit, nor the situation in which (2) two different DC forward voltages are provided to *only* the at least one additional LED circuit.

We further disagree that Petitioner is attempting to read any particular embodiment into claims 3, 10, and 17. *See* Prelim. Resp. 16. None of the embodiments, considered individually or in combination, discloses or enables the full breadth of claims, as Petitioner contends. *See* Pet. 31–32.

For purposes of this Decision, we are persuaded that the Petition shows that it is more likely than not that Petitioner would prevail in demonstrating that claims 3, 10, and 17 lack sufficient written description

[16] Patent Owner cites to portions of the ’341 patent. We cite the corresponding portions of the ’295 application as is relevant to our determinations regarding challenges based on 35 U.S.C. §§ 112(a)–(b).



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support in the '295 application underlying the '341 patent as required by 35 U.S.C. § 112(a).

Separate from the written description requirement, 35 U.S.C. § 112(a) includes an *enablement* requirement. Enablement requires the specification of a patent to "teach those skilled in the art how to make and use the full scope of the claimed invention without 'undue experimentation.'" *Genentech, Inc. v. Novo Nordisk, A/S*, 108 F.3d 1361, 1365 (Fed. Cir. 1997) (quoting *In re Wright*, 999 F.2d 1557, 1561 (Fed. Cir. 1993)). Petitioner's "impossibility of multiple minimum voltages" arguments with respect to the inventions recited in claims 3, 10, and 17 are persuasive at this stage to show a lack of written description, a lack of enablement, indefiniteness as discussed below, as well as PGR eligibility (i.e., the analysis deferred from Section III.A.2 above). That is, on this record we agree with one of Petitioner's claim construction positions that "forward voltage" is expressly defined in the intrinsic record as "the minimum voltage difference required between the anode and cathode of the LEDs in the claimed circuit to allow current to flow through the LEDs." Pet. 25; *supra* § III.E.2.[17] We further agree that, "[b]ecause each circuit has only one such minimum, there is only

[17] Petitioner also argues, "[i]n the alternative, 'forward voltage' should be construed as 'a voltage in a diode's forward direction.'" Pet. 26. According to Petitioner, "[t]he concept of direction, such as 'forward' and 'reverse,' with respect to diodes is well known to a POSITA." *Id.* Petitioner further argues that "[i]f 'forward voltage' is not construed according to its express definition, then it should encompass any voltage in a forward direction, regardless of whether the voltage is so small that no visible light is emitted by the LED, or is so large that the resulting current destroys the LED." *Id.* (citing Ex. 1002 ¶ 48). We need not reach this argument because we agree with Petitioner's first proposed construction as set forth above.

one 'forward voltage' for each circuit, and no switch can provide 'at least two different DC forward voltages' to either [individual] circuit." Pet. 25.

At this stage, Patent Owner's argument that the claims are not directed to impossible subject matter is unavailing because the forward voltage changes as the configuration and therefore, the demands of the LED circuit changes. As we discussed above, the '295 application (and the '341 patent) addresses two different forward voltages based on the type of wiring connection, parallel or serial, between *two* circuits, i.e., the "at least one of the first operating LED circuit" and the "the at least one additional LED circuit." *See* Prelim. Resp. 15–16. Similar to what we discussed above in Section III.A.2, the disclosures of the '295 application and the '341 patent do not address or explain how it would be possible to apply two different minimum voltages for the very same circuit as would be necessary in two of the three situations encompassed by the scope of claims 3, 10, and 17, i.e., the situations in which: (1) the two different DC forward voltages are provided to *only* the first operating LED circuit; and (2) two different DC forward voltages are provided to *only* the at least one additional LED circuit.

We further note that the portions of the '295 application corresponding to the portions of the '341 patent cited by Petitioner refer to the disclosed LED circuits as "single voltage LED circuits." Ex. 1003, 17–19 ('295 application as filed, paragraphs 28 and 30). This disclosure further lends support to a finding that multiple minimum voltages are not applied to individual circuits, the single voltage LED circuits, unless at least two of these single voltage LED circuits are connected together.

For the purposes of this Decision, we are persuaded that it is more likely than not that Petitioner would prevail in demonstrating that the '295



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application underlying the '341 patent lacks enabling disclosure supporting claims 3, 10, and 17 as required by 35 U.S.C. § 112(a).

*2. 35 U.S.C. § 112(b)*

We are persuaded that it is more likely than not that the '295 application underlying the '341 patent "fails to inform, with reasonable certainty, those skilled in the art about the scope of the invention" for reasons similar to those discussed above in Section III.F.1. *Nautilus*, 572 U.S. at 901. That is, it is unclear what the scope of claims 3, 10, and 17 is, given that a POSITA could not possibly apply two different DC forward voltages, under the construction of "forward voltage" that we preliminarily adopted in Section III.E.2, to only one of the two single voltage LED circuits, i.e., (1) *only* the claimed the first operating LED circuit, or (2) *only* the at least one additional LED circuit, as is encompassed by the scope of claims 3, 10, and 17. We are persuaded that it is more likely than not that claims 3, 10, and 17 are indefinite, at this stage of the proceeding, because it would have been impossible to apply two different minimum voltages (i.e, the claimed "two different DC forward voltages") to only one single voltage LED circuit (i.e., only one of the claimed first operating circuit and the at least one additional circuit). *See Synchronoss*, 987 F.3d at 1366–67 (finding the challenged claims indefinite and therefore invalid because they "nonsensical and require an impossibility—that the digital media file contain a directory of digital media files").

For purposes of this Decision, we are persuaded that Petitioner demonstrates that it is more likely than not that Petitioner would prevail in demonstrating that claims 3, 10, and 17 are indefinite under 35 U.S.C. § 112(b).



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### *G. Challenge 2—Lack of Written Description and Enablement, and Indefiniteness of Claims 4, 11, and 18*

Petitioner contends that claims 4, 11, and 18 are invalid (i) because the Specification does not describe or enable the allegedly impossible subject matter and thus, these claims lack written description and enabling support in the '295 application or the '341 patent; and (ii) because claims 4, 11, and 18 are drawn to impossible subject matter, they are also indefinite. Pet. 32–33.

The parties present arguments substantially similar to those discussed above in Section III.A.3. We do not reiterate these arguments and instead, refer to Section III.A.3.

#### *1. 35 U.S.C. § 112(a)*

With regard to the *written description requirement*, Patent Owner's arguments are unavailing for the reasons discussed above in Section III.A.3. Petitioner has the better position because we agree that "[t]he switch cannot be both part of the LED lighting device and connected between that device and something else" and that "these claims are drawn to impossible subject matter that is not described in the specification." Pet. 33 (citing Ex. 1002 ¶ 65); *see id.* at 32–33 (citing Ex. 1001, 12:9–27, 12:34–36, 12:47–65, 13:5–7, 13:18–14:10, 14:17–19). We agree that the portions of the '295 application corresponding to the portions of the '341 patent cited by Patent Owner do not and cannot show the claimed switch as being part of the claimed LED lighting device and at the same time being disposed between the voltage source and the claimed LED lighting device.

For purposes of this Decision, we are persuaded that the Petition shows that it is more likely than not that Petitioner would prevail in demonstrating that claims 4, 11, and 18 lack sufficient written description



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support in the ’295 application underlying ’341 patent as required by 35 U.S.C. § 112(a).

With regard to the *enablement* requirement, we are persuaded that the ’295 application does not “teach those skilled in the art how to make and use the full scope of the claimed invention without ‘undue experimentation’” because it is “impossible” for the switch to be both part of the LED lighting device and between the LED lighting device and the voltage source, as discussed above in this section.

For purposes of this Decision, we are persuaded that the Petition shows that it is more likely than not that Petitioner would prevail in demonstrating that claims 4, 11, and 18 lack sufficient enabling disclosure in the ’295 application underlying ’341 patent as required by 35 U.S.C. § 112(a).

*2. 35 U.S.C. § 112(b)*

We are persuaded that the ’295 application underlying the ’341 patent “fails to inform, with reasonable certainty, those skilled in the art about the scope of the invention” for reasons similar to those discussed above in Section III.G.1. *Nautilus*, 572 U.S. at 901. That is, it is unclear what the scope of claims 4, 11, and 18 is, given that a POSITA could not possibly make the claimed switch both a constituent part of the claimed LED lighting device *and* dispose it between the claimed LED lighting device and the claimed AC voltage power source. As it is impossible to so configure or dispose the switch, we determine that Petitioner has shown it is more likely than not that claims 4, 11, and 18 are indefinite, at this stage of the proceeding.

For purposes of this Decision, we are persuaded that Petitioner



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demonstrates that it is more likely than not that Petitioner would prevail in demonstrating that claims 4, 11, and 18 are indefinite under 35 U.S.C. § 112(b).

### *H. Challenge 3—Anticipation by Bruning*

Petitioner contends that each of claims 1, 3, 5, 7, 8, 10, 12, 14, 15, 17, and 19 is unpatentable as anticipated under 35 U.S.C. § 102 over Bruning. Pet. 33–53. For the reasons that follow, we are persuaded that Petitioner demonstrates that it is more likely than not that Petitioner would prevail with respect its anticipation challenge based on Bruning.

#### *1. Overview of Bruning*

Bruning is titled "Control and Drive Circuit Arrangement for Illumination Performance Enhancement with LED Light Sources." Ex. 1004, code (54) (Title). Bruning "relates to backlighting of display panels, including the backlighting in LCD panels." *Id.* ¶ 1. More particularly, Bruning discloses a backlight for an LCD display comprised of an array of LEDs, the backlight driven and controlled by a fast pulse power converter to provide a response time for the backlight on the order of microseconds. *Id.* at code (57) (Abstract).

Bruning's Figure 4, reproduced below, illustrates an LED backlight. *Id.* ¶ 31.



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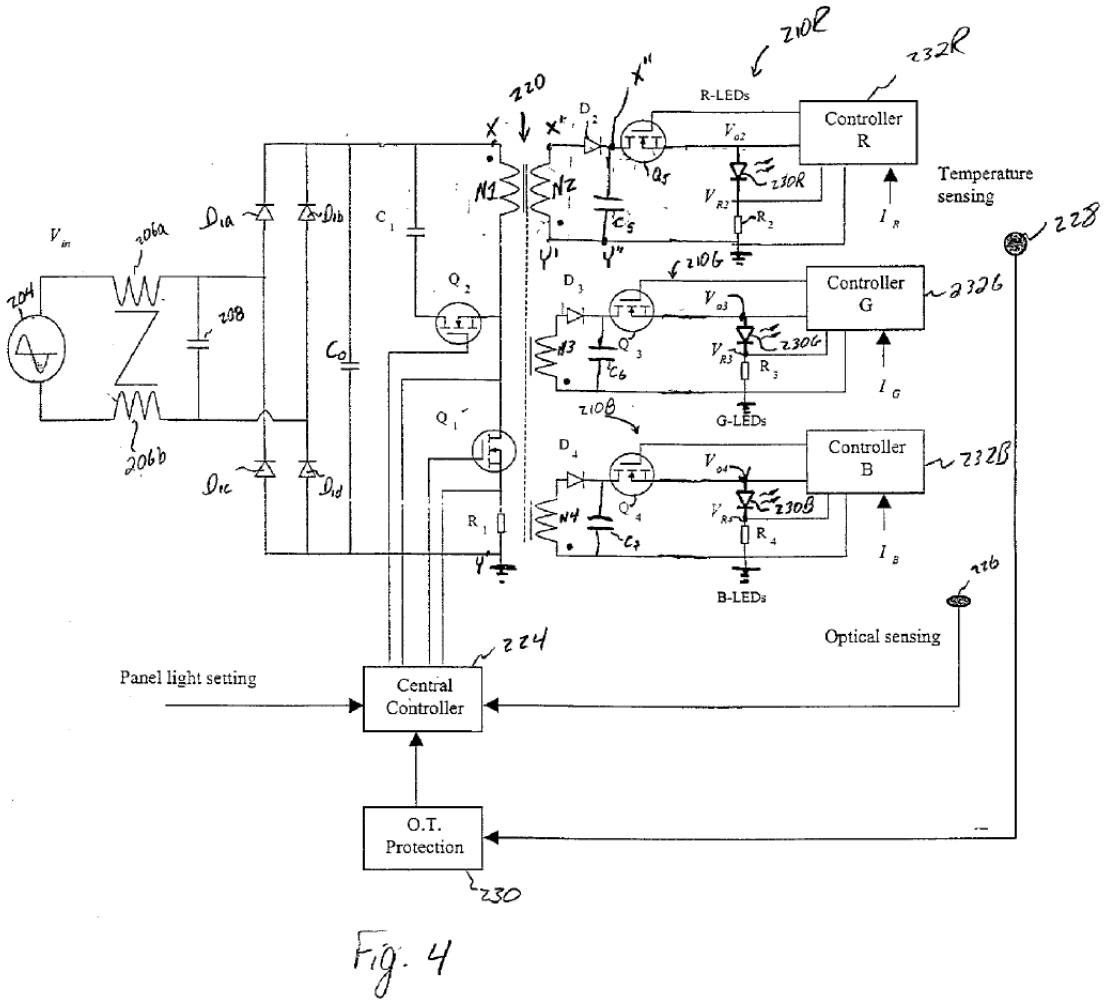



Fig. 4

Figure 4 illustrates an LED backlight. *Id.* ¶ 31.

Figure 4 illustrates drive circuitry for an LED backlight. *Id.* ¶ 31. The drive circuitry includes: an ac voltage source 204 connected to inductors 206a, 206b and capacitor 208; diodes $D_{1a}$, $D_{1b}$, $D_{1c}$, $D_{1d}$ comprising a full wave rectification bridge circuit which provides full wave rectification of the ac input of ac source 204; capacitor $C_o$ for smoothing the rectified ac signal further into a first order dc voltage that is provided across points X–Y in Figure 4; and converter circuitry between points X and Y. *Id.* ¶¶ 31–32. The converter circuitry between points X and Y in Figure 4 includes a multiple output transformer 220, a switch $Q_1$, and a resistor $R_1$. *Id.* ¶ 32. Multiple

output transformer 220 has a primary winding N1 and three secondary windings N2, N3, and N4 each magnetically coupled to the primary winding. *Id.* Secondary windings N2, N3, and N4 are included in LED sub-array circuits 210R, 210G, and 210B of an RGB LED array. *Id.* Switch $Q_1$ is cycled on and off by a central controller 224. *Id.* ¶ 33. When $Q_1$ is on (closed), the rectified voltage applied across X–Y drops across primary winding N1; and when $Q_1$ is off (open), the rectified voltage drops across switch $Q_1$. *Id.* When switch $Q_1$ is "off," the circuit between points X and Y is open. *Id.* ¶ 34. In addition, a negative voltage appears across primary winding N1, induced by secondary windings N2–N4, when $Q_1$ is off. *Id.* During the "on" portions of a switching cycle of switch $Q_1$, a voltage $V_{X'-Y'}$ is created across points X' and Y' in LED sub-array 210R due to the induced voltage in secondary winding N2 created by current $i_{N1}$, in primary winding N1. *Id.* ¶ 35. Similar voltages are created in the other secondary windings (N3 and N4). *Id.*

LED sub-arrays 210R, 210G, and 210B generate the light output of the LED backlight 200 using applied voltages $V_{R0}$, $V_{G0}$, and $V_{B0}$, respectively. *Id.* ¶ 40. Since turns ratios between primary winding N1 and secondary windings N2, N3, and N4 of transformer 220 are fixed, voltages $V_{R0}$, $V_{G0}$, $V_{B0}$ applied to LED sub-arrays 210R, 210G, and 210B, respectively, are controlled by controller 224 by controlling the duty cycle of switch $Q_1$. *Id.* ¶ 38. And, since voltages $V_{R0}$, $V_{G0}$, $V_{B0}$ establish the maximum level of light output of LED sub-arrays 210R, 210G, and 210B, respectively, the maximum level of light output by LED sub-arrays 210R, 210G, and 210B, respectively, are likewise controlled by controller 224, by controlling the duty cycle of switch $Q_1$. *Id.* In addition, a "panel light



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setting" input to central controller 224 (controlled by a user or by other input, including video input) adjusts the duty cycle of $Q_1$ and thus the maximum light output of LED sub-arrays 210R, 210G, and 210B. *Id.*

The drive circuitry in Figure 4 further includes a switch $Q_5$ and controllers 232R, 232G, and 232B. *See* Fig. 4. Switching $Q_5$ on and off in a cyclical manner causes the current through red LED 230R to rise and fall in a cyclical manner, thus resulting in a cyclical rise and fall in the light output of red LED 230. *Id.* ¶ 42. Controller 232R independently controls the switching of switch $Q_5$. *Id.* The duty cycle set by controller 232R controls the amount of time that $Q_5$ is turned on and off in a switching cycle. *Id.* Controller 232R and switch $Q_5$ have response times on the order of microseconds; thus, the duty cycle may be on the order of microseconds. *Id.* Similarly, the light output of green and blue LED sub-arrays 210G and 210B are independently controlled by the independent controllers 232G and 232B. *Id.* ¶ 44. Thus, independent controllers 232R, 232G, and 232B determine the relative output of red, green, and blue light, respectively, output by LED sub-arrays 210R, 210G, and 210B, respectively. *Id.* Since the duty cycle of each controller (and the resulting cyclical change of light output) is on the order of microseconds, the eye integrates the separate color outputs into a resulting color composite. *Id.* Thus, controllers 232R, 232G, and 232B may be used to regulate the color point and/or color content of the generated white light. *Id.*

*2. Independent Claim 1*

*[1.pre] "An LED lighting device comprising:"*

Petitioner contends that "Bruning discloses an LED lighting device (Figs. 2, 4) comprising an LED backlight for a mobile device, including the



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claimed elements as shown below." Pet. 34 (citing Ex. 1004, codes (54) (Title), (57) (Abstract), Figs. 1–5, ¶¶ 4, 7, 9–15, 24–29, 31–51; Pet. § VIII.A (Bruning overview); Ex. 1002 ¶ 67). Patent Owner does not contest Petitioner's evidence and arguments with respect to the preamble. *See* Prelim. Resp. Based upon this preliminary record, we are persuaded that Petitioner demonstrates sufficiently that Bruning discloses the preamble of claim 1.[18]

*[1.a] "a first operating LED circuit and at least one additional LED circuit"*

Petitioner contends "Bruning discloses a first operating LED circuit (LED sub-array circuit 210R) and at least one additional LED circuit (e.g., LED sub-array circuits 210G and 210B)." Pet. 34–35 (citing Ex. 1004 ¶¶ 31–44 (paragraph 40 disclosing "LED sub-array circuits 210R, 210G, 210B")). Patent Owner does not contest Petitioner's evidence and arguments with respect to this limitation. *See* Prelim. Resp. Based upon this preliminary record, we are persuaded that Petitioner demonstrates sufficiently that Bruning discloses limitation 1.a.

*[1.b] "at least one of the first operating LED circuit or the at least one additional LED circuit including at least two LEDs connected in either series or parallel"*

Petitioner contends that "Bruning discloses at least one of the first operating LED circuit (LED subarray circuit 210R) or the at least one additional LED circuit (e.g., LED sub-array circuits 210G and 210B)

[18] We need not determine whether the preamble of any of claims 1, 8, and 15 is limiting because Petitioner persuasively shows that Bruning discloses the subject matter of the preamble in this third challenge and also persuasively shows that the combination of Bruning and Kabel teaches the subject matter of the preamble in the following, fourth challenge.



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including at least two LEDs connected in either series or parallel ('One LED 230R is used in FIG. 4b to represent all of the LEDs in the sub-array 210R.')." Pet. 36 (citing Ex. 1004 ¶¶ 24, 25, 31–44; Ex. 1002 ¶ 69). Petitioner further contends that "Bruning discloses that each of the sub-arrays includes at least two LEDs connected in either series or parallel, and preferably includes redundant connections to minimize the impact of a failure or short of an LED." *Id.* (citing Ex. 1004 ¶¶ 24, 25, 40; Ex. 1002 ¶ 70). Patent Owner does not contest Petitioner's evidence and arguments with respect to this specific limitation. *See* Prelim. Resp. Based upon this preliminary record, we are persuaded that Petitioner demonstrates sufficiently that Bruning discloses limitation 1.b.

*[1.c] "the at least one additional LED circuit being configured to emit a different color light compared to the first operating LED circuit"*

Petitioner contends that Bruning discloses "the at least one additional LED circuit (e.g., sub-array circuits 210G and 210B emitting green and blue light, respectively) being configured to emit a different color light compared to the first operating LED circuit (LED sub-array circuit 210R emitting red light)." Pet. 36 (citing Ex. 1004 ¶¶ 4, 7, 9, 11, 12, 14, 15, 24–29, 37, 40, 48–50, Fig. 4; Ex. 1002 ¶ 71). Patent Owner does not contest Petitioner's evidence and arguments with respect to this limitation. *See* Prelim. Resp. Based upon this preliminary record, we are persuaded that Petitioner demonstrates sufficiently that Bruning discloses limitation 1.c.

*[1.d] "a switch capable of at least one of: (a) switching a voltage level input to at least one of the first operating LED circuit or the at least one additional LED circuit, or (b) switching the at least one additional LED circuit on or off" and*

*[1.e] "wherein (a) or (b) is selectable by a user switching the switch, and"*



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> Petitioner contends:
>
> Each of the "panel light setting" and "switch Q1" individually satisfies this limitation under the proper construction of "switch." . . .
>
> Bruning discloses a switch ("switch Q1") capable of switching a voltage level input to at least one of the first operating LED circuit (LED sub-array circuit 210R) or the at least one additional LED circuit (e.g., LED sub-array circuits 210G and 210B). Switch Q1 controls the voltages VR0, VG0, VB0 that are applied to the red, green, and blue LED sub-arrays 210R, 210G and 210B, respectively. Specifically, switch Q1's duty cycle (controlled by the user via controller 224) controls the voltage applied to the LED circuits . . .
>
> Additionally, Bruning discloses that "the duty cycle of Q1 … may be used to adjust the overall intensity of the LED backlight." This is because Q1's duty cycle controls the applied voltages VR0, VG0, VB0, and the applied voltages VR0, VG0, VB0 determine their respective circuits' maximum current and maximum brightness level.

Pet. 38–39 (citing Ex. 1004 ¶¶ 26, 36–38, 45, Fig. 4a; Ex. 1002 ¶¶ 72–75) (third alteration in original).

> Petitioner alternatively contends that
>
> Bruning also discloses a switch ("panel light setting") capable of switching a voltage level input to at least one of the first operating LED circuit (LED sub-array circuit 210R) or the at least one additional LED circuit (e.g., LED sub-array circuits 210G and 210B). Bruning discloses that the user directly controls the "panel light setting" switch to adjust Q1's duty cycle. The setting of the panel light setting switch controls the voltages (VR0, VG0, VB0) that are applied to the red, green, and blue LED sub-arrays 210R, 210G and 210B, respectively, via controller 224 and switch Q1 as discussed above.

*Id.* at 39–40 (citing Ex. 1004 ¶ 38; Ex. 1002 ¶ 76). Petitioner also contends that Bruning discloses that



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> each of voltages (VR0, VG0, VB0) is selectable by a user switching the switch (panel light setting switch and switch Q1). The voltages are selectable by a user directly operating the panel light setting switch, which effects the change in the voltages via controller 224 and switch Q1 as discussed above. The voltages are selectable by a user indirectly operating switch Q1, which the user indirectly operates via the panel light setting switch and controller 224.

*Id.* at 40 (citing Ex. 1002 ¶ 78); *see* Ex. 1002 ¶ 77.

*Patent Owner's Arguments*

Patent Owner argues the Bruning does not explicitly describe how its "panel light setting" works, nor does it describe the panel light setting as a switch. Prelim. Resp. 20 (citing Pet. 54), 22–23. Rather, Patent Owner contends that the panel light setting is merely an input to central controller 224, which is the component that actually 'adjusts the duty cycle of [transistor] Q1.'" *Id.* at 23 (citing Ex. 1004 ¶ 38) (alteration in original). Patent Owner further argues that "switch Q1 is a transistor 'controlled by controller 224,' and is therefore not capable of being switched by a user." *Id.* at 21 (citing Ex. 1004, 38). According to Patent Owner, "it would be 'impossible' for a user to perform the switching function of transistor Q1, which has cycles 'each having a period on the order of **10 microseconds**.'" *Id.* at 22 (citing Ex. 1004 ¶ 33).

*Analysis of Parties' Arguments*

With regard to Patent Owner's argument about the Bruning's "panel light setting," Petitioner acknowledges, in its fourth challenge applying Bruning in view of Kabel, that Bruning does not explicitly describe how its "panel light setting" is implemented. Pet. 54. We do not view Petitioner's acknowledgment as a deficiency of Petitioner's third challenge because independent claim 1 does not include any limitations specifying how the



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switch should be implemented—rather, claim 1 includes limitations specifying the function(s) that the switch must perform. *See* Prelim. Resp. 20. Patent Owner's argument that Bruning does not explicitly describe the "panel light setting" as a switch is unavailing at this stage because the relevant inquiry is whether a POSITA would have understood Bruning's "panel light setting" to disclose a switch that performs the claimed function(s) recited in independent claim 1.

At this stage of the proceeding, we are persuaded by Petitioner's argument that "Bruning discloses that the user directly controls the 'panel light setting' switch to adjust Q1's duty cycle." Pet. 39 (citing Ex. 1004 ¶ 38); *see* Ex. 1004 ¶¶ 36, 37. Petitioner also persuasively points to Bruning's disclosure of adjusting $Q_1$'s duty cycle to affect "the voltages (VR0, VG0, VB0) that are applied to" and "establish the maximum level of light output" by "the red, green, and blue LED sub-arrays 210R, 210G and 210B." Pet. 39–40 (citing Ex. 1002 ¶ 76); Ex. 1004 ¶ 38.

Patent Owner's second argument implicitly construes the claimed "switch" to be *directly* controlled by the claimed user. *Supra* § III.E.3. We discern no support for this argument in the record. Merely because "switch Q1 is a transistor 'controlled by controller 224'" as Patent Owner contends does not mean that the switch is "not capable of being switched by a user." Prelim. Resp. 21 (citing Ex. 1004 ¶ 38). At this stage of the proceeding, we determine that the claims do not exclude controlling the claimed "switch" *indirectly*, for example, by a user. As such, we agree with Petitioner that switch $Q_1$ also teaches the claimed "switch" because switch $Q_1$ is indirectly controlled by the claimed "user" via controller 224 and/or via Bruning's panel light setting. Because we determine, on this record, that a user can



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*indirectly* control Bruning's panel light setting, for example by using controller 224, the period length of the transistor's cycles (i.e., on the order of microseconds) does not undermine the user's ability to control the switching. *See id.* at 22 (citing Ex. 1004 ¶ 33).

Based upon this preliminary record, we are persuaded that Petitioner demonstrates sufficiently that Bruning discloses limitations 1.d and 1.e.

*[1.f] "wherein the LED lighting device is configured to connect to an AC voltage power source"*

Petitioner points to Bruning's disclosure of an "ac input of ac source 204" as disclosing this limitation. Pet. 40 (citing Ex. 1004 ¶¶ 13, 26, 31–44, Figs. 3, 4). Patent Owner does not contest Petitioner's evidence and arguments with respect to this limitation. *See* Prelim. Resp. Based upon this preliminary record, we are persuaded that Petitioner demonstrates sufficiently that Bruning discloses limitation 1.f.

Based on the current record and for the foregoing reasons, we determine that Petitioner demonstrates that it is more likely than not that Petitioner would prevail on its assertion that claim 1 is anticipated by Bruning.

*3. Dependent Claims 3, 5, and 7*

We do not address whether Bruning discloses the limitation recited in dependent claim 3 because we determine that this limitation is indefinite under 35 U.S.C. § 112(b). *Supra* § III.F.2.

*Claim 5* recites in part, "wherein the switching of the switch changes light output of the LED lighting device." Patent Owner does not specifically address Petitioner's challenge to dependent claim 5. *See generally* Prelim. Resp. Petitioner persuasively cites Bruning's disclosure of voltages VR0, VG0, VB0 that "establish the maximum level of light output of LED sub-



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arrays 210R, 210G and 210B, respectively." Pet. 43 (citing Pet. VIII.B.1 (showing for claim 1); Ex. 1002 ¶ 83; Ex. 1004 ¶¶ 37, 40). Petitioner persuasively contends Bruning additionally "discloses that 'the duty cycle of Q1 … may be used to adjust the overall intensity of the LED backlight." *Id.* (citing Ex. 1004 ¶¶ 26, 45) (alteration in original). Petitioner contends, and we agree, "[a] POSITA would understand that the adjustment of the light output of the LED backlight is an adjustment to the perceived brightness of the laptop screen by a user." *Id.* (citing Ex. 1002 ¶ 84).

*Claim 7* recites in part, "a driver electrically coupled to the switch and at least one of the first operating LED circuit or the at least one additional LED circuit." Patent Owner does not specifically address Petitioner's challenge to dependent claim 7. *See generally* Prelim. Resp. Petitioner persuasively contends that "Bruning discloses the LED lighting device of claim 1, further comprising a driver ('drive circuitry') electrically coupled to the switch ('panel light setting' switch) and at least one of the first operating LED circuit (LED sub-array circuit 210R) or the at least one additional LED circuit (e.g., LED sub-array circuits 210G and 210B)." Pet. 44 (citing Ex. 1004 ¶¶ 13, 31–44, code (57) (Abstract)).

According to Petitioner, "[t]he labeled driver in Figure 4 is circuitry that converts or conditions the power input—ac source 204—and supplies a power output to an LED circuit—the other sides of the transformer N1." *Id.* at 46 (citing Ex. 1004 ¶ 31, Figs. 3–4; Ex. 1002 ¶ 86). Petitioner contends, and we agree, that "Bruning discloses that the driver is electrically coupled to the user-controlled panel light setting switch via central controller 224" and that Bruning's "driver is electrically coupled to each of the LED circuits 210R, 210G, 210B, via secondary windings, diodes, transistors, and



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resistors, as shown in Figure 4." *Id.* (citing Ex. 1004 ¶¶ 32, 33, 38, Fig. 4; Ex. 1002 ¶¶ 87, 88).

Based on the current record and for the foregoing reasons, we determine that Petitioner demonstrates that it is more likely than not that Petitioner would prevail on its assertion that claims 5 and 7 are anticipated by Bruning.

*4. Independent Claim 8*

Independent claim 8 is substantially similar to independent claim 1 except that the claimed "switch" switches a "brightness level" instead of a "voltage level." Claim 8 recites in part, "switching *a brightness level* of at least one of the first operating LED circuit or the at least one additional LED circuit." Petitioner substantially refers to its analysis of independent claim 1 in support of independent claim 8. Pet. 46–48. Petitioner contends that "[e]ach of the 'panel light setting' switch and 'switch Q1' individually satisfies [the "brightness"] limitation under the proper construction of 'switch.'" *Id.* at 47 (citing Petitioner's analysis of limitation 1.d (switches the voltage level) and claim 5 (switches the brightness level); Ex. 1002 ¶ 93).

As set forth above with respect to dependent claim 5 in Section III.H.3, Petitioner persuasively contends Bruning "discloses that 'the duty cycle of Q1 . . . may be used to adjust the overall intensity of the LED backlight" and that "[a] POSITA would understand that the adjustment of the light output of the LED backlight is an adjustment to the perceived brightness of the laptop screen by a user." *Id.* at 43 (citing Ex. 1004 ¶¶ 26, 45; Ex. 1002, ¶ 84). According to Petitioner, the duty cycle of $Q_1$ affects the applied voltages VR0, VG0, and VB0 and "[t]he maximum brightness of



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each circuit is determined by the voltages VR0, VG0, VB0 [which] are selectable by a user directly operating the panel light setting switch, which effects the change in the voltages via controller 224 and switch Q1." *Id.* at 48 (citing Petitioner's analysis of limitation 1.d; Ex. 1002 ¶¶ 94–95).

Patent Owner addresses independent claims 1, 8, and 15 together, and does not appear to make any arguments that are only applicable to independent claim 8. Prelim. Resp. 20–23. As such, in finding Patent Owner's arguments unavailing, we rely on our analysis set forth in Section III.H.2.

Based on the current record and for the foregoing reasons, we determine that Petitioner demonstrates that it is more likely than not that Petitioner would prevail on its assertion that independent claim 8 is anticipated by Bruning.

*5. Dependent Claims 10, 12, and 14*

Dependent claims 10, 12, and 14 recite features substantially similar to dependent claims 3, 5, and 7 respectively. Petitioner refers to its showing for dependent claims 3, 5, and 7 in support of its showing for dependent claims 10, 12, and 14. Pet. 48. We do not address whether Bruning discloses the limitation recited in dependent claim 10 because we determine that it is indefinite under 35 U.S.C. § 112(b). *Supra* § III.F.2. With regard to claims 12 and 14, we adopt our analysis with respect to claims 5 and 7 set forth above. *Supra* § III.H.3.

Based on the current record and for the foregoing reasons, we determine that Petitioner demonstrates that it is more likely than not that Petitioner would prevail on its assertion that claims 12 and 14 are anticipated by Bruning.

*6. Independent Claim 15*

Independent claim 15 is substantially similar to independent claim 1 except that it does not a require a user to interact with the claimed switch. Instead, claim 15, recites in part, "wherein (a) or (b) is selectable by switching the switch." Petitioner cites its showing for independent claim 1 in support of its showing for most limitations. Pet. 49, 53. Petitioner cites additional portions of Bruning to disclose limitations 15.d and 15.e. *Id.*

Petitioner contends that "claim 15 is broader than claim 1 because claim 15 omits 'user'" and "[t]hus, Bruning *additionally* discloses this limitation by disclosing a switch (color specific switches (Q4, Q5)) capable of (b) switching the at least one additional LED circuit (e.g., LED sub-array circuits 210G and 210B, respectively) on or off." *Id.* at 49 (citing Ex. 1004 ¶¶ 41–46, Figs. 4, 4b–4d[19]; Ex. 1002 ¶ 105) (emphasis added). Petitioner further contends that "Bruning discloses the LED circuits can be turned on and off independently." *Id.* at 50 (citing Ex. 1004 ¶¶ 11, 12, 25, 26, 42, 44, 46, Figs. 4, 4b–4d).

Patent Owner addresses independent claims 1, 8, and 15 together, and does not appear to make any arguments that are applicable to only independent claim 15. Prelim. Resp. 20–23. As such, we rely on our analysis set forth in Section III.H.2.

Based on the current record and for the foregoing reasons, we determine that Petitioner demonstrates that it is more likely than not that Petitioner would prevail on its assertion that claim 15 is anticipated by Bruning.

[19] Bruning includes a Figure 4 as well as Figures 4a, 4b, 4c, and 4d.

*7. Dependent Claims 17 and 19*

Dependent claims 17 and 19 recite features substantially similar to 3 and 5 respectively. Petitioner refers to its showing for dependent claims 3 and 5 in support of its showing for dependent claims 17 and 19. We do not address whether the Bruning discloses the limitation recited in dependent claim 17 because we determine, for the purposes of this proceeding, that it is indefinite under 35 U.S.C. § 112(b). *Supra* § III.F.2. With regard to claim we adopt our analysis with respect to claim 7 set forth above. *Supra* § III.H.3.

Based on the current record and for the foregoing reasons, we determine that Petitioner demonstrates that it is more likely than not that Petitioner would prevail on its assertion that claim 19 is anticipated by Bruning.

*I. Challenge 4—Obviousness over Bruning and Kabel*

Petitioner contends that claims 1–3, 5, 7–10, 12, 14–17, and 19 are unpatentable as obvious under 35 U.S.C. § 103 over Bruning and Kabel. Pet. 53–61. For the reasons that follow, we are persuaded that Petitioner demonstrates that it is more likely than not that Petitioner would prevail with respect to this obviousness challenge based on Bruning and Kabel.

*1. Overview of Kabel*

Kabel is titled "Computer Program, Method, and Device for Controlling the Brightness of a Display." Ex. 1005, code (54) (Title). Kabel relates to "displays used in electronic devices such as laptop computers and avionics and marine equipment" and to "a computer program and method for controlling the brightness of a display by proportionally modifying the luminosity of each pixel in the display." *Id.* ¶ 3. More particularly, Kabel



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discloses a technique for controlling the brightness of a display by proportionally varying the voltage delivered to each pixel in the display after a back light for the display has been dimmed to its approximate lowest level. *Id.* at code (57) (Abstract).

Figure 1 of Kabel, reproduced below, shows an exploded isometric view of a display's components. *Id.* ¶ 14.

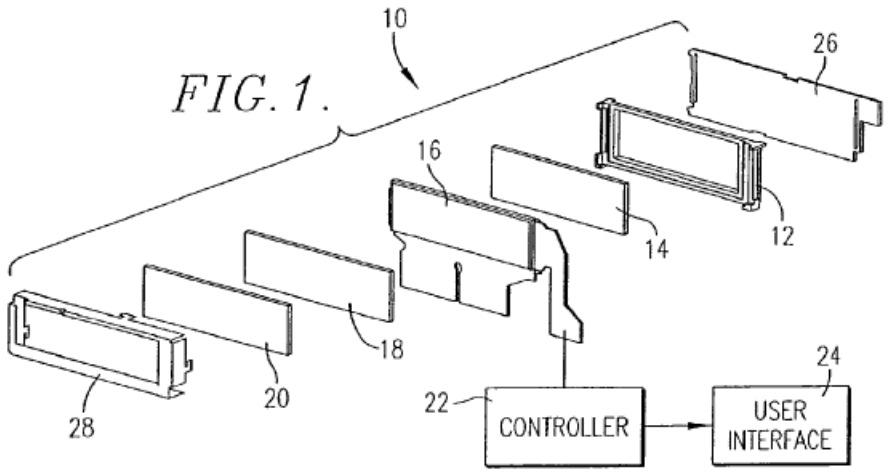



Figure 1 of Kabel, reproduced below, shows an exploded isometric view of the components of a display including a backlight. *Id.* ¶¶ 14, 17–18.

Display 10 illustrated in Kabel's Figure 1 includes: a backlight 12, which may include light-emitting diodes (LEDs), and is used to direct light through a display module 16 to form images on the face thereof; a diffuser panel 14 positioned between backlight 12 and display module 16 for diffusing and uniformly polarizing light emitted from backlight 12; display module 16; a color filter 18 which enables display 10 to display color images; an anti-reflective lens 20 positioned in front of display module 16 and color filter 18, for polarizing light passing through color filter 18 to sharpen images and eliminate glare; a brightness controller 22; and a user interface 24. *Id.* ¶¶ 17–21, 23, 25. Backlight 12, diffuser panel 14, display

module 16, color filter 18, and anti-reflective lens 20 may be sandwiched between a mounting board 26 and a frame 28, while controller 22 and user interface 24 may be integrally mounted with the other components of display 10, or may be mounted in a separate enclosure attached to the other components of the display. *Id.* ¶ 18. Display module 16 may be a thin-film transistor (TFT) liquid crystal display (LCD) display module having an array of pixels arranged on a glass substrate, whereby active matrix technology is used to activate each pixel by a separate transistor. *Id.* ¶ 21. An image is then created on display module 16 by applying an electric charge to certain pixels to change the pixels' light absorption properties, to thereby vary the amount of light from backlight 12 that passes through the pixels. *Id.*

Brightness controller 22 and user interface 24 are electrically coupled to display module 16 and together control the brightness of display module 16. *Id.* ¶ 26. User interface 24 provides input to controller 22, and may be a touch-screen menu display having up/down arrows, or a manually-activatable slider bar. *Id.* Controller 22 and user interface 24 are operated to brighten or dim images created on display module 16. *Id.* ¶ 27. For example, an operator may press an up arrow or operate a slider bar on user interface 24 to increase the intensity of backlight 12. *Id.* Controller 22 and user interface 24 cooperate for dimming the display module 16 in two ways: first by dimming backlight 12, then by proportionally reducing the luminosity of the pixels of display module 16. *Id.* ¶ 28. More specifically, display module 16 is first dimmed by decreasing the brightness of backlight 12, and once backlight 12 has been dimmed to its lowest level before it turns off (or to a selected threshold level), the display may then be further dimmed by



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controlling the luminosity of each pixel of the display to limit the amount of light that passes through display module 16. *Id.*

*2. Independent Claims 1, 8, and 15*

Petitioner's challenge to independent claims 1, 8, and 15 are substantially similar to challenge 3 applying Bruning alone, except that now Petitioner cites Kabel for the switch limitations—limitations 1.d, 1.e, 8.d, 8.e, 15.d, and 15.e. Petitioner contends that "[u]nder [Patent Owner's] narrow construction of 'switch,' it would have been obvious to implement Bruning's 'panel light setting' switch as a 'manually-activatable slider bar' with at least two positions as taught by Kabel." Pet. 58 (citing Pet. § IX.C (Combination Rationale); Ex. 1002 ¶ 129).

*Rationale for Combining*

As rationale for combining, Petitioner contends that "a POSITA would have been motivated to investigate known implementation details for the 'panel light setting,' and been led to Kabel's teachings," which include "a 'user interface' for 'selectively adjusting brightness of the back light.'" Pet. 54 (citing Ex. 1004 ¶ 38, Fig. 4; Ex. 1005, code (57) (Abstract), ¶¶ 9, 26–28, 30; Ex. 1002 ¶ 118). Petitioner further contends that Bruning and Kabel concern analogous art because they both disclose backlit LCD displays having multiple LEDs in a laptop computer, they both disclose "mix[] . . . red, green, and blue light to form different shades and hues of light as perceived by the user," and they both disclose "ways for a user to control of the LCD display's brightness." *Id.* at 54–58.

Petitioner alleges that a POSITA would have "fill[ed] Bruning's gaps with Kabel's additional implementation details," specifically by implementing Bruning's panel light setting using Kabel's slider bar.



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Petitioner contends that Kabel discloses brightening or dimming images on a display in a conventional manner—by using Kabel's slider bar. *Id.* at 57 (citing Ex. 1005 ¶¶ 27, 28, 30; Ex. 1002 ¶ 125).

Petitioner contends that the invention disclosed in Kabel includes "an 'entirely conventional' backlight that incorporates 'any conventional light source such as light-emitting diodes (LEDs),' a 'conventional' LCD display, and a 'conventional controller.'" *Id.* (citing Ex. 1005 ¶¶ 18, 19, 21, 26). Petitioner further contends that "Kabel also indicates that images on the display can be brightened or dimmed 'in a conventional manner' and gives as an example a slider bar." *Id.* (citing Ex. 1005 ¶¶ 27, 28; Ex. 1027 ¶ 30; Ex. 1002 ¶ 126).

Petitioner further contends that

> A POSITA would have found that Bruning and Kabel's teachings could have been predictably combined at least because of LED lighting art's predictability and the various elements' known interchangeability. A POSITA would have had a reasonable expectation of success in combining Kabel and Bruning, at least because the references use known variations of existing technology (physical switches like slider bars as user interfaces) to solve routine and well understood problems (adjust settings of a laptop's display, such as brightness) in predictable ways.

*Id.* at 58 (citing Ex. 1002 ¶ 127).

*Patent Owner's Arguments*

*First*, Patent Owner argues that "transistor Q1 . . . does not allow 'a user [to] switch[ ] the switch'" and that "it would be impossible for a user to perform the switching function of transistor Q1, which has cycles "each having a period on the order of **10 microseconds**." Prelim. Resp. 24 (citing Pet. § VI.B.2, 58; Ex. 1004 ¶ 33) (alterations in original). *Second*, Patent



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Owner argues that "[t]here is nothing in Kabel about using the slider bar to switch on or off an LED circuit, a function claimed in Claims 1, 8, and 15," but that Kabel instead "uses the slider bar exclusively to provide a dimming function." *Id.* at 26 (citing Pet. 59–60; Ex.1005 ¶ 28 (Patent Owner arguing that Kabel "explain[s] low brightness settings are achieved by dimming the back light 12 'to its lowest level **before it turns off**'"). *Third*, Patent Owner argues that "the user interface 24 of Kabel provides input to a controller 22, which is what ultimately performs the function of dimming the display" and therefore, Kabel is distinguishable because it discloses that "the brightness is selected by the controller and not by a user switching the switch." *Id.* (citing Ex. 1005 ¶ 26).

*Analysis of Patent Owner's Arguments and Rationale for Combining*

We addressed Patent Owner's *first* argument in Section III.H.2. We determine that Patent Owner's argument is not persuasive for the reasons set forth in Section III.H.2 and, as such, we adopt our analysis from that section.

With regard to Petitioner's *second* argument, Patent Owner apparently distinguishes Kabel's slider bar on the basis that it performs the function of dimming back light 12, as contrasted with the function of turning on or off back light 12. *See* Prelim. Resp. 26 (Pet. 59–60; Ex. 1005 ¶ 28). Patent Owner takes the position that, because Kabel "explain[s] low brightness settings are achieved by dimming the back light 12 'to its lowest level **before it turns off**,'" this disclosure in Kabel precludes back light 12 from actually turning off. *Id.* (quoting Ex.1005 ¶ 28). Even assuming, *arguendo*, that Kabel does not disclose turning *off* back light 12, the independent claims only require "a switch cable of *at least one of*: (a) switching a brightness level of at least one of the first operating LED circuit or the at least one



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additional LED circuit, *or* (b) switching the at least one additional LED circuit on or off, wherein (a) *or* (b) is selectable by a user switching the switch." That is, the switch need not be capable of both functions (a) and (b)—if the reference or combination of references teaches even one of the following three situations: a switch capable of function (a) only; a switch capable of function (b) only; or a switch capable of functions (a) and (b), then the cited reference(s) teach the subject matter of the claim. Accordingly, even if Kabel's slider bar is used exclusively for dimming, independent claims 1, 8, and 15 are met by the cited teachings of Bruning and Kabel because the combination teaches claimed function (a).

Patent Owner's *third* argument distinguishes Kabel's slider bar from the "switch" recited in independent claims 1, 8, and 15 because it does not directly provide input to dim Kabel's display but instead provides input indirectly via controller 22. As we discussed above, there is no support in the record to limit independent claims 1, 8, and 15 to a switch that is *directly* selectable by a user. At this stage of the proceeding, we determine that none of independent claims 1, 8, and 15 excludes a switch that is *indirectly* selectable by a user. *Id.*

We have reviewed Petitioner's contentions and cited evidence as to claims 1, 8, and 15, summarized above. At this stage of the proceeding, we are persuaded that the Petition's obviousness analysis articulates sufficiently how the teachings of Bruning and Kabel would have been combined, why such a combination would have been desirable to one of skill in the art, and that Petitioner's rationale is supported by sufficient rational underpinning and has a reasonable expectation of success as is set forth above. We are persuaded, at this stage of the proceeding, that, having reviewed the cited



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portions of Bruning and Kabel, the limitations of independent claims 1, 8, and 15 are taught or suggested by the combination.

Based on the current record and for the foregoing reasons, we determine that Petitioner demonstrates that it is more likely than not that Petitioner would prevail on its fourth challenge applying the combination of Bruning and Kabel to independent claims 1, 8, and 15.

*3. Dependent Claims 2, 3, 5, 7, 9, 10, 12, 14, 16, 17, and 19*

As we determine that claim 3, 10, and 17 are indefinite under 35 U.S.C. § 112(b), we do not address prior art challenges with respect to these claims. *Supra* § III.F.2. With respect to claims 2, 5, 7, 9, 12, 14, 16, and 19, we have reviewed Petitioner's contentions and the cited references, and we are persuaded that Petitioner's contentions are supported. *See* Pet. 58–61 (citing-in-part Ex. 1002 ¶¶ 134–142, 144–152). Patent Owner does not specifically contest any of claims 2, 5, 7, 9, 12, 14, 16, and 19. *See generally* Prelim. Resp.

Claim 2 recites "[t]he LED lighting device of claim 1, wherein the switch has at least two positions." Claim depends from claim 8 and recites substantially similar features. Claim 16 depends from claim 15 and recites substantially similar features. Petitioner cites Kabel for these limitations and argues that "it would have been obvious to implement the 'panel light setting' switch as a 'manually-activatable slide bar' with at least two positions as taught by Kabel." Pet. 60–61. Having reviewed the cited portions of Kabel discussing its slider bar, we are persuaded, at this stage of the proceeding, that Kabel teaches that its "manually-activatable slider bar" has at least two positions.

Claim 5 recites "[t]he LED lighting device of claim 1, wherein the



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switching of the switch changes light output of the LED lighting device." Claim 12 depends from claim 8 and recites substantially similar features. Claim 19 depends from claim 15 and recites substantially similar features. Petitioner contends that "Bruning discloses the user can control a 'panel light setting' switch that allows adjustment of the brightness, or maximum light output of the LED backlight for a laptop's display." Pet. 58 (citing Ex. 1004 ¶¶ 17, 38, Figs. 2, 4). Petitioner alternatively contends that Kabel "discloses the user can control user interface 24 to adjust brightness of the laptop display's backlight." *Id.* at 59–60 (citing Ex. 1005 ¶¶ 9, 18, 26–32, code (57) (Abstract), Fig. 1; Ex. 1002 ¶ 131). Petitioner further contends that "Kabel discloses that the user interface 24 may be a 'manually-activatable slider bar'" and that user interface 24 may be "integrally mounted with the other components of the display 10." *Id.* at 60 (citing Ex. 1005 ¶¶ 18, 26, 30). We are persuaded, at this stage of the proceeding, that the cited portions support Petitioner's contentions.

Claim 7 recites, "[t]he LED lighting device of claim 1, further comprising a driver electrically coupled to the switch and at least one of the first operating LED circuit or the at least one additional LED circuit." Claim 14 depends from claim 8 and recites substantially similar features. In its fourth challenge, Petitioner does not specifically point to Kabel as teaching the recited driver limitation. Pet. 58–59. We note, however, that with respect to its third challenge, Petitioner persuasively cites Bruning to disclose the recited driver limitation. *See id.* at 44–46 (citing Ex. 1004 ¶¶ 13, 31–44, code (57) (Abstract), Figs. 3–4; Pet. § V.E.5; Ex. 1002 ¶¶ 86–88); *supra* § III.H.3.



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Based on the current record and for the foregoing reasons, that Petitioner demonstrates that it is more likely than not that Petitioner would prevail on its obviousness challenge applying the combination of Bruning in view of Kabel to dependent claims 2, 5, 7, 9, 12, 14, 16, and 19.

### *J. Challenge 5—Obviousness over Dowling and Mueller*

Petitioner contends that claims 1, 2, 5, 7–9, 12, 14–16, and 19 are unpatentable as obvious under 35 U.S.C. § 103 over Dowling and Mueller. Pet. 61–83.

For the reasons that follow, we are persuaded that Petitioner demonstrates that it is more likely than not that it would prevail with respect to its obviousness challenge based on the combination of Dowling and Mueller.

#### *1. Overview of Dowling*

Dowling is titled "Light-Emitting Diode Based Products." Ex. 1006, code (54) (Title). Dowling describes "[h]igh-brightness LEDs, [which] combined with a processor for control, can produce a variety of pleasing effects for display and illumination." *Id.* ¶ 5. Dowling's "high-brightness, processor-controlled LEDs in combination with diffuse materials . . . produce color-changing effects." *Id.* Dowling's lighting system may also "include an interface to a network, so that the illumination of the LEDs may be controlled via the network." *Id.*

Figure 1 of Dowling, reproduced below, illustrates a lighting system. *Id.* ¶ 38.



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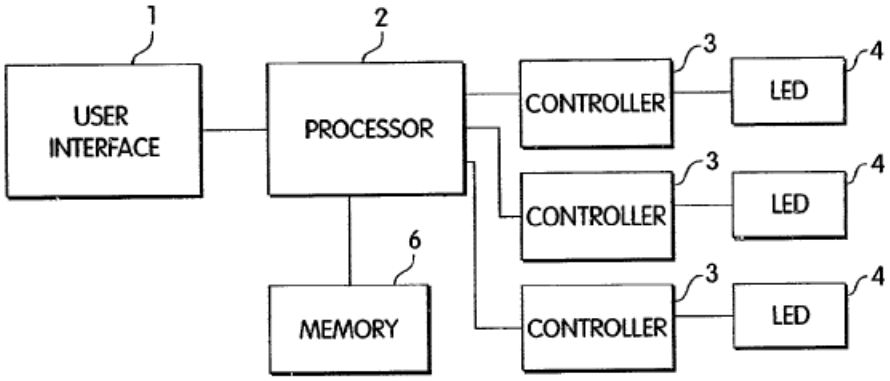



Fig. 1

Figure 1 illustrates a lighting system. *Id.*

The lighting device illustrated in Figure 1 includes: a processor 2 executing a program stored in a memory 6, to generate signals that control stimulation of LEDs 4; one or more controllers 3 receiving signals from the processor and converting the signals into a form suitable for driving the LEDs 4, which may include controlling the current, amplitude, duration, or waveform of the signals impressed on the LEDs 4; one or more LEDs 4 with different spectral output/colors, with each of the colors driven through separate controllers 3; a memory 6 that stores algorithms or control programs for controlling the LEDs 4; and a user interface 1 used to select a program from memory 6, modify a program from the memory, modify a program parameter from the memory, select an external signal for control of the LEDs 4, or initiate a program. *Id.* ¶¶ 38–42. Dowling explains that controller 3 may be a pulse width modulator, pulse amplitude modulator, pulse displacement modulator, resistor ladder, current source, voltage source, voltage ladder, switch, transistor, voltage controller, or other controller. *Id.* ¶ 40. Controller 3 regulates "the current, voltage and/or power through the LED, in response to signals received from the processor



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2." *Id.* Dowling explains that processor 2 and controller 3 "may drive several LEDs 4 in series where it has sufficient power output, or the device may drive single LEDs 4 with a corresponding number of outputs." *Id.*

Figures 7 and 8 of Dowling, reproduced below, illustrate Edison mount light bulbs that include LEDs within the light bulbs. *Id.* ¶¶ 13–14, 61–62.

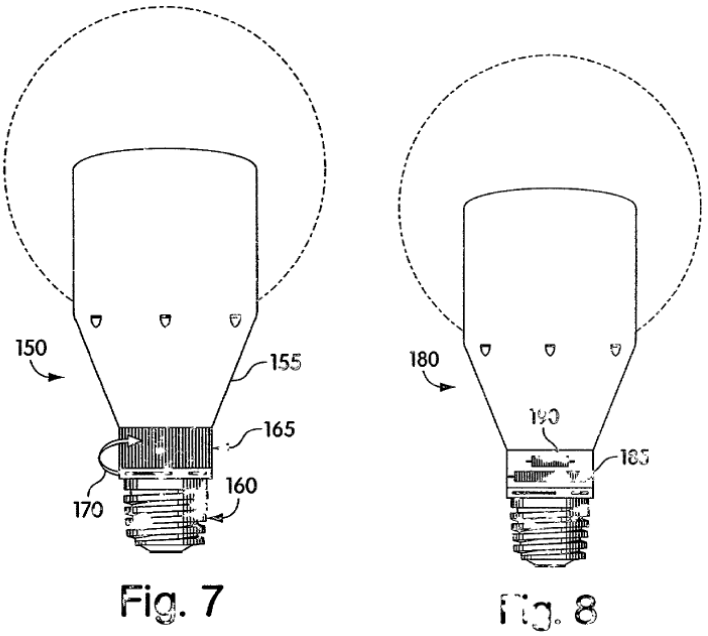



Fig. 7 Fig. 8

Figures 7 and 8 illustrate Edison mount light bulbs that include LEDs within the light bulbs. *Id.*

Light bulb 150 illustrated in Figure 7 includes a system such as that shown in Figure 1, for controlling a plurality of LEDs within light bulb 150. *Id.* ¶ 61. Light bulb 150 also includes a screw base 160, and a user interface 165 in the form of a dial integrated into the body of the light bulb 150. *Id.* The dial may be rotated, as indicated by an arrow 170, to select modes and parameters for operation of the light bulb 150. *Id.* Light bulb 180 in Figure 8 has a different user interface that includes a thumbwheel 185 and a two-way switch 190, with switch 190 used to move forward and backward

through a sequence of available modes. *Id.* ¶ 62. For example, if light bulb 180 has four modes numbered 1–4, sliding switch 190 to the left in the figure would move the mode up one mode (e.g., from mode 1 to mode 2), while sliding switch 190 to the right would move the mode down one mode (e.g., from mode 2 to mode 1). *Id.* Thumbwheel 185 may be constructed to have a predefined span, such as one and one-half rotations. *Id.* In one embodiment in Dowling, switch 190 may control a mode (left) and a parameter (right), while thumbwheel 185 may control a brightness of the light bulb 180. *Id.*

*2. Overview of Mueller*

Mueller is titled "Multicolored LED Lighting Method and Apparatus" and "relates to providing light of a selectable color using LEDs," "providing multicolored illumination," and "providing a computer controlled multicolored illumination network capable of high performance and rapid color selection and change." Ex. 1007, code (54) (Title), 1:5–11. Mueller's LED systems are "capable of generating light, such as for illumination or display purposes" and include "light-emitting LEDs . . . controlled by a processor to alter the brightness and/or color of the generated light, e.g., by using pulse-width modulated signals." *Id.* at code (57) (Abstract).

Mueller's Figure 1, reproduced below, illustrates an electrical schematic representation of a light module 100. *Id.* at 2:40–42, 2:67–3:1.



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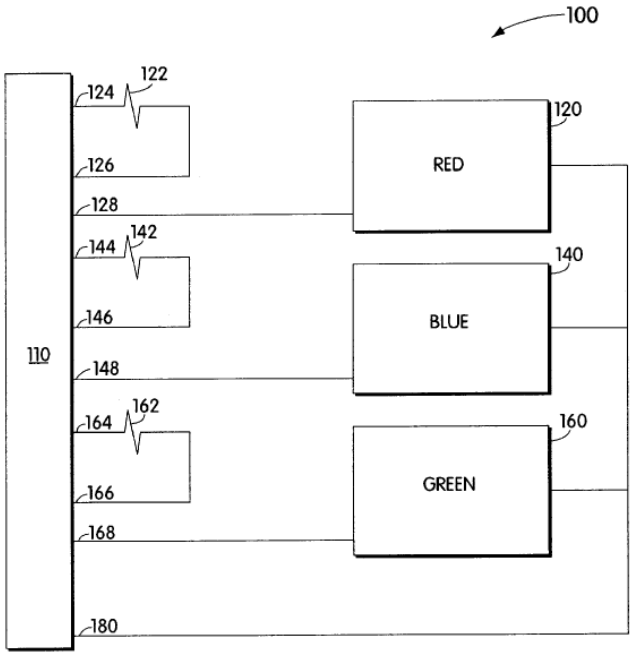



Fig. 1

Figure 1 illustrates an electrical schematic representation of a light module 100. *Id.*

Light module 100 illustrated in Figure 1 includes a ten-pin electrical connector 110 with male pins adapted to fit into a complementary ten-pin connector female assembly, with pin 180 being the power supply. *Id.* at 3:1–35. Light module 100 further includes an LED set 120 containing red LEDs, an LED set 140 containing blue LEDs, and an LED set 160 containing green LEDs. *Id.* A source of DC electrical potential enters module 100 on pin 180, which is electrically connected to the anode end of light emitting diode (LED) sets 120, 140 and 160 to establish a uniform high potential on each anode end. *Id.* LED set 120 may contain three parallel connected rows of nine red LEDs, with LED sets 140 and 160 each containing five parallel connected rows of five blue and green LEDs,

respectively, with "the number of LEDs in each row [being] determined by the amount of voltage drop desired between the anode end at the power supply voltage and the cathode end of the last LED in the row." *Id.* at 3:29–41. Each LED set is associated with a programming resistor that combines with other components, to program a maximum current through each set of LEDs. *Id.* at 3:52–55. For example, resistor 122 programs a maximum current through red LED set 120, resistor 142 programs a maximum current through blue LED set 140, and resistor 162 programs a maximum current through green LED set 160. *Id.* at 3:57–61.

Mueller's Figure 2, reproduced below, illustrates a stylized electrical circuit schematic of a power module 200 for driving the light module illustrated in Figure 1. *Id.* at 2:42–44, 3:66–4:1.

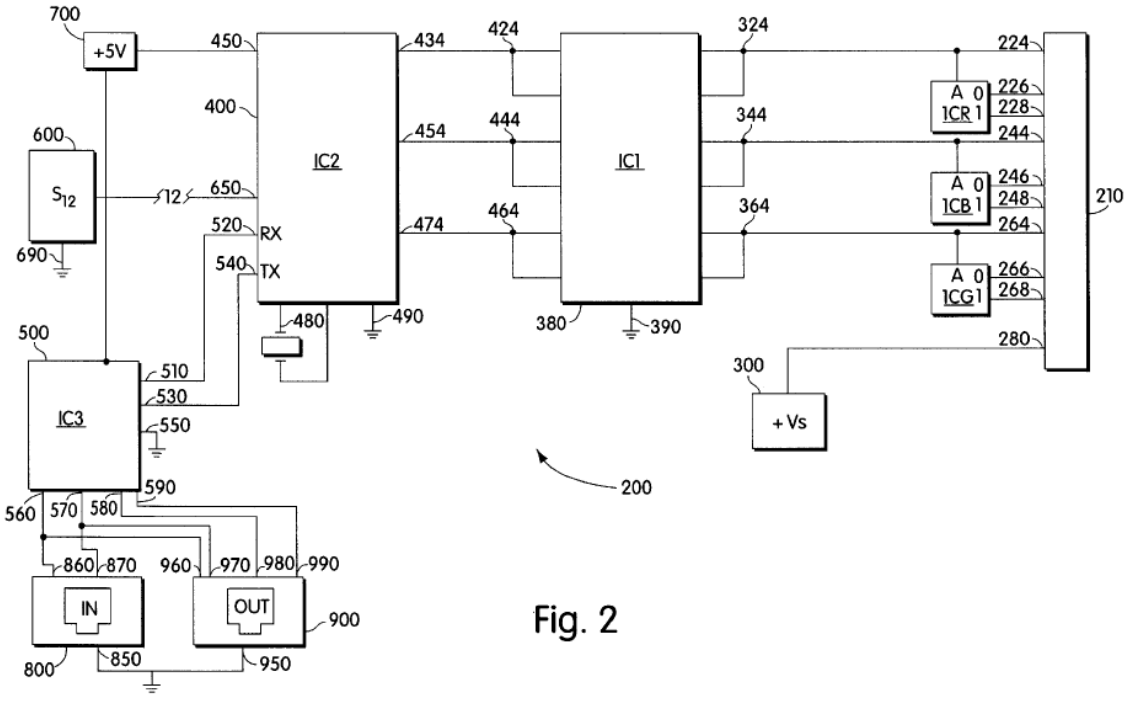



Fig. 2

Figure 2 illustrates a stylized electrical circuit schematic of a power module 200 for driving the light module illustrated in Figure 1. *Id.*

Power module 200 illustrated in Figure 2 includes a pin 228 that is coupled to pin 128 in light module 100, and receives current directly from the cathode end of red LED set 120. *Id.* at 4:35–39. Resistor 122 (*see* Figure 1) and a current programming integrated circuit (1CR, *see* Figure 2) program the maximum current through red LED set 120. *Id.* at 4:17–20, 4:43–47. Similar results are achieved with current programming integrated circuit 1CB (*see* Figure 2) and resistor 142 (*see* Figure 1) for blue LED set 140, and with current programming integrated circuit 1CG (*see* Figure 2) and resistor 162 (*see* Figure 1) for green LED set 160. *Id.* Power module 200 further includes an integrated circuit IC1 380. *Id.* at 4:48–50. The red, blue and green LED currents enter integrated circuit IC1 380 at respective nodes 324, 344 and 364. *Id.* at 4:48–55. IC1 380 is used as a current sink, and functions to switch current between respective LED sets and the ground 390. *Id.*

Power module 200 illustrated in Figure 2 also includes a microcontroller IC2 400 for controlling the light-emitting LEDs of the LED lighting assembly, to alter the brightness and/or color of the generated light by using pulse-width modulated signals. *Id.* at 5:5–40, 6:19–31, code (57) (Abstract). With the pulse width modulated current control, each current-controlled unit is uniquely addressable and capable of receiving illumination color information on a computer lighting network, such that "the resulting illumination may . . . provide complex, predesigned patterns of light in virtually any environment." *Id.* at 2:20–37, code (57) (Abstract).

*3. Independent Claim 1*

*[1.pre] "An LED lighting device comprising:"*



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Petitioner contends that "Dowling discloses its LED bulb's underlying block diagram and state diagram in Figures 1 and 2A-2B" and "discloses 'examples' of LED light bulbs in Figures 3-12." Pet. 67 (citing Ex. 1006 ¶¶ 6–18, 34–70, Figs. 1, 2A, 2B). Patent Owner does not contest Petitioner's evidence and arguments with respect to the preamble. *See* Prelim. Resp. Based upon this preliminary record, we are persuaded that Petitioner demonstrates sufficiently that Dowling teaches the subject matter of the preamble of claim 1.

*[1.a] "a first operating LED circuit and at least one additional LED circuit"*

Petitioner contends that "Dowling discloses a first operating LED circuit (e.g., red or blue LED circuit 4) and at least one additional LED circuit (e.g., green LED circuit 4)." Pet. 68 (citing Ex. 1006 ¶¶ 38–43, Figs. 1, 8; Ex. 1002 ¶ 170). Patent Owner does not contest Petitioner's evidence and arguments with respect to this limitation. *See* Prelim. Resp. Based upon this preliminary record, we are persuaded that Petitioner demonstrates sufficiently that Dowling teaches limitation [1.a].

*[1.b] "at least one of the first operating LED circuit or the at least one additional LED circuit including at least two LEDs connected in either series or parallel"*

Petitioner contends that "Dowling discloses the LED lighting device can 'drive several LEDs 4 in series,' which series of LEDs 4 would constitute an LED circuit 4 having at least two LEDs." Pet. 68 (citing Ex. 1006 ¶ 40, Fig. 1). Petitioner further contends that "Dowling discloses 'an "LED" may refer to a single light emitting diode package having multiple semiconductor dies.'" *Id.* at 68–69 (citing Ex. 1006 ¶ 35). According to Petitioner, "Dowling's reference to LED 4 includes a package having



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multiple semiconductor dies, which is an LED circuit having at least two LEDs." *Id.* at 69. Petitioner further contends that "Dowling discloses LEDs 4 can comprise red, green and blue LEDs, which are independently controlled to create color effects." *Id.* (citing Ex. 1006 ¶¶ 40–43; Ex. 1002 ¶ 171).

Petitioner also contends that "Mueller discloses that each LED circuit comprises a plurality of LEDs connected in series and parallel. *Id.* (citing Pet. §§ X.B–C (Mueller, Combination Rationale); Ex. 1007, Figs. 1, 4–5, 2:63–3:65 (red, blue and green LED circuits in serial/parallel)). Petitioner takes the position that "Mueller teaches that the LED circuits are connected in parallel between the voltage source and, via PWM switches, ground." *Id.* (citing Ex. 1007, Figs. 1–2, 9, 3:66–5:12; Ex. 1002 ¶ 172).

*Rationale for Combining*

According to Petitioner, "[i]t would have been obvious to implement the LED circuits disclosed in Dowling using (1) multiple LEDs connected in series or parallel and (2) the transformer and bridge rectifier of Mueller." Pet. 63 (citing Ex. 1002 ¶ 158). Petitioner reasons that Dowling, Mueller, and the '341 patent are all analogous art "directed to the field of LED lighting devices," Dowling twice incorporates Mueller by reference, Dowling and Mueller share two inventors in common (i.e., Mueller and Lys), and both were originally assigned to the same assignee (i.e., Color Kinetics, Inc.). *Id.* (citing Ex. 1006 ¶¶ 2, 42, 43, cover; Ex. 1007, cover; Ex. 1002 ¶ 159).

Petitioner further contends that

> Dowling incorporates Mueller, and expressly teaches Mueller's color-mixing techniques should be used. EX1006, [0002], [0042]-[0043]. Mueller's color-mixing techniques include using



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> individually controllable colored LED circuits, each of which comprises at least two LEDs. EX1007, Figs. 1, 4-5, 2:63-3:65. Mueller discloses that the colored LED circuits are "preferably" implemented using serial/parallel array of LEDs. EX1007, 3:26-30 (red LED circuit comprising three parallel connected rows of nine red LEDs, and blue and green LED circuits, each having five parallel connected rows of five LEDs). Mueller explains that an LED circuit should be implemented using at least two LEDs in "a serial/parallel array" to maximize reliability in the event of component failure. *Id.*, 3:41-44 ("[T]he parallel arrangement of rows is a fail-safe measure that ensures that the light module 100 will still function even if a single LED in a row fails, thus opening the electrical circuit in that row."); EX1002, ¶160.
>
> Implementing the LED circuits with at least two LEDs either in series or parallel was a known technique that would have produced predictable results. The concepts taught at length by Mueller (filed in 1997) are fundamental electronic concepts in the field of LED lighting and would have been known to a POSITA by the date of invention. It would have been well within a POSITA's knowledge and skill to implement the LED circuits in that manner, and an POSITA would have had a reasonable expectation of success in doing so. It would have been obvious to a POSITA implementing the red, green, and blue LED circuits disclosed in Dowling to implement each of them using at least two LEDs connected in either series or parallel as taught by Dowling and Mueller. EX1002, ¶161.

*Id.* at 63–64.

Patent Owner does not contest Petitioner's evidence and arguments with respect to this limitation. *See* Prelim. Resp. Based upon this preliminary record, we are persuaded that Petitioner demonstrates sufficiently that the combination of Dowling and Mueller teaches limitation [1.b]. We address the rationale for combining below with Patent Owner's arguments.

> *[1.c] "the at least one additional LED circuit being configured to emit a different color light compared to the first operating LED circuit"*



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Petitioner contends that "Dowling discloses the at least one additional LED circuit (e.g., green LED circuit 4) being configured to emit a different color light compared to the first operating LED circuit (e.g., red or blue LED circuit 4)." Pet. 69–70 (citing Ex. 1006, Figs. 1, 8, ¶¶ 38–43; Ex. 1002 ¶ 174).

Patent Owner does not contest Petitioner's evidence and arguments with respect to this limitation. *See* Prelim. Resp.

Based upon this preliminary record, we are persuaded that Petitioner demonstrates sufficiently that Dowling teaches limitation [1.c].

> *[1.d] "a switch capable of at least one of: (a) switching a voltage level input to at least one of the first operating LED circuit or the at least one additional LED circuit, or (b) switching the at least one additional LED circuit on or off" and*
>
> *[1.e] "wherein (a) or (b) is selectable by a user switching the switch, and"*

Petitioner contends that "Dowling discloses a switch ('two-way switch 190') that is capable of switching the at least one additional LED circuit (e.g., green LED circuit) on or off." Pet. 71 (citing Ex. 1006 ¶¶ 38–47, 62–64, Figs. 1, 8). Petitioner further contends that "'[t]wo-way switch 190' can be pushed to the left to select a mode and pushed to the right to select a parameter." *Id.* According to Petitioner, "[m]odes 1-4 each involve independently switching on and off at least one LED circuit." *Id.* (citing Ex. 1006 ¶¶ 44–47, Fig. 2A). "In mode one, a user can select two LED circuits to switch on to provide a color wash," "[i]n mode three, the user can selectively switch on or off a single LED circuit (e.g., green or blue) at a time," and "[i]n modes two and four, the LED circuits will switch on and off in a random or alternating pattern." *Id.* at 71–72 (citing Ex. 1006 ¶¶ 44–47). Petitioner contends that accordingly, "mode switch 190 allows the user



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to independently switch on or off at least one of the first LED circuit (e.g., red or blue LED circuit) or the at least one additional LED circuit (e.g., green LED circuit)." *Id.* at 72 (citing Ex. 1002 ¶ 176).

Petitioner contends that "Dowling discloses wherein (b) is selectable by a user switching the switch (mode switch called 'two-way switch 190'" and further contends that this disclosure "satisfies PO's narrow construction of 'selectable by a user' because it is selectable 'directly' by the user when the user physically moves it." *Id.* at 72–73 (citing Pet. Discussion of limitation 1.d; Ex. 1002 ¶¶ 178, 179).

*Patent Owner's Arguments*

Patent Owner presents the following arguments: (1) Dowling's user interface 1, "which may correspond to two-way switch 190," is capable of receiving input, but it only selects a program from memory 6—the actual switching is performed by controllers 3, not user interface 1 (Prelim. Resp. 31 (citing Ex. 1006 ¶ 42)); (2) Dowling's controllers 3 "are the only alleged switching device in Dowling that are connected to and are capable of switching the LED circuits," but are not "selectable by a user switching the switch" (*id.* at 32); (3) Dowling does not indicate that controllers 3 contain "at least two positions each of which is connected to at least one circuit" (*id.* (citing Ex. 1001, 7:42–45; Ex. 1006, Fig. 1)); (4) Dowling expressly discloses "an AC to DC converter" and as such, there "there was no reason shown for POSITA to look to Mueller for this, much less to Mueller's bridge rectifiers and transformers" (*id.* at 33 (citing Ex. 1006 ¶ 58; *Kinetic Concepts, Inc. v. Smith & Nephew, Inc.*, 688 F.3d. 1342, 1369 (Fed. Cir. 2012); *Ex parte Toy*, Appeal No. 2004-000931, Ser. No. 10/180,355 (BPAI Apr. 21, 2004))).



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*Analysis of Rationale for Combining and Patent Owner's Arguments*

Patent Owner's first and second arguments attempt to distinguish Dowling's two-way switch 190, which Petitioner cited as teaching the claimed "switch," on the basis that it does not *directly* perform switching of Dowling's LED circuits. Prelim. Resp. 31–32. These arguments are unavailing because independent claim 1 does not place restrictions on how the switch is implemented—that is, the claim encompasses an element that *indirectly* performs either of functions (a) and (b).

Patent Owner's third argument is unavailing because independent claim 1 does not recite the language "at least two positions each of which is connected to at least one circuit." In fact, none of the challenged claims recites this language. To the extent that Patent Owner urges us to import this language from the Specification into independent claim 1, Patent Owner does not sufficiently support this argument, nor do we discern support for such an interpretation of independent claim 1, at this stage of the proceeding.

Patent Owner's fourth argument is unavailing. Petitioner's challenge looks to Mueller for details of how to implement Dowling's AC to DC converter, i.e., with Mueller's bridges and rectifiers, because Dowling does not include such details. Pet. 65. This reason is persuasive and supported by the record, at this stage of the proceeding. Patent Owner does not address Petitioner's other reason for combining Dowling and Mueller: Petitioner persuasively points out that "Dowling incorporates Mueller, and expressly teaches Mueller's color-mixing techniques should be used" and that "Mueller's color-mixing techniques include using individually controllable colored LED circuits," which "are 'preferably' implemented using serial/parallel array of LEDs." *Id.* at 63–64 (citing Ex. 1006 ¶¶ 2, 42, 43; Ex.



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1007, Figs. 1, 4–5, 2:63–3:65). "[M]otivation to combine may be found explicitly or implicitly in . . . the '*interrelated teachings of multiple patents*'; 'any need or problem known in the field of endeavor at the time of invention and addressed by the patent'; and the background knowledge, creativity, and common sense of the person of ordinary skill." *Zup, LLC v. Nash Manufacturing, Inc.*, 896 F.3d 1365, 1371 (Fed. Cir. 2018) (emphasis added). Dowling does indeed incorporate Mueller by reference in two instances and points to Mueller's technique of LED control through pulse width modulation, which "can provide, through pulses of varying width, a way to control the intensity of the LEDs as seen by the eye." Ex. 1006 ¶¶ 2, 42, 43. At this stage of the proceeding, we are persuaded that Petitioner's two reasons for combining Dowling and Mueller are supported by sufficient rational underpinnings and Petitioner demonstrates sufficiently that a POSITA would have had a reasonable expectation of success in making the combination.

Based upon this preliminary record, we are persuaded that Petitioner demonstrates sufficiently that Dowling teaches limitations [1.d] and [1.e].

*[1.f] "wherein the LED lighting device is configured to connect to an AC voltage power source"*

Petitioner contends that Dowling "discloses wherein the LED lighting device is configured to connect to an AC voltage power source" because it discloses "various connections for adapting external power," an "Edison mount light bulb," and a connection "to a one-hundred and ten VAC, 60 Hz power supply." Pet. 73 (citing Ex. 1006 ¶¶ 14, 34–43, 58, 62–64, 66, Figs. 1, 8; Ex. 1002 ¶ 180). Patent Owner does not contest Petitioner's evidence and arguments with respect to this limitation. *See* Prelim. Resp. Based upon this



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preliminary record, we are persuaded that Petitioner demonstrates sufficiently that Dowling teaches limitation [1.f].

Petitioner's contentions and cited evidence as to claim 1, summarized above, are persuasive the preliminary record now before us. Based on the current record, we determine that Petitioner demonstrates that it is more likely than not to prevail on its assertion that independent claim 1 is obvious over the combination of Dowling and Mueller.

*4. Independent Claims 8 and 15*

For independent claim 8, Petitioner relies heavily on its showing for independent claim 1. For limitations [8.d] and [8.e], Petitioner presents additional contentions.

With respect to limitation 8.d, Petitioner contends that "Dowling discloses a switch (brightness switch called 'thumbwheel 185') capable of at least one of (a) switching a brightness level of at least one of the first operating LED circuit or the at least one additional LED circuit." Pet. 78 (citing Ex. 1006, Figs. 1, 8, ¶¶ 62–64; Ex. 1002 ¶ 194). Petitioner further contends that "Dowling discloses the LED lighting device may include integrated thumbwheel 185 that is capable of switching a brightness level of at least one of the first operating LED circuit (e.g., red or blue LED circuit 4) or the at least one additional LED circuit (e.g., green LED circuit 4)." *Id.* (citing Ex. 1006, Fig. 8, ¶ 62). According to Petitioner, "Dowling discloses 'thumbwheel 185 may control a brightness of the light bulb 180,' which includes the first operating LED circuit or the at least one additional LED circuit. *Id.* Petitioner also contends that "[t]humbwheel 185 is a user interface 1, which sends input to processor 2, which in turn directs controller 3, which 'regulates the current, voltage and/or power through the LED, in



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response to signals received from the processor 2.'" *Id.* at 78–79 (citing Ex. 1006, Figs. 1, 2A–2B, 4, 6, 8, ¶¶ 6–8, 34–55, 57, 60, 62–64; Ex. 1002 ¶ 195).

With respect to limitation [8.e], Petitioner contends that, in addition to the showing set forth in claim 1, "Dowling discloses (a) is selectable by a user switching the switch (brightness switch called 'thumbwheel 185')" because "Dowling discloses that the user can rotate thumbwheel 185 to control the light bulb's brightness." *Id.* at 80 (citing Ex. 1006 ¶ 62). According to Petitioner, "[t]he thumbwheel switch satisfies PO's narrow construction of 'selectable by a user' and similar terms because it is selectable 'directly' by the user when the user physically moves it." *Id.* (citing Ex. 1002 ¶ 198).

For independent claim 15, Petitioner relies on its showing for independent claim 1. *Id.* at 82–83.

For the reasons set forth in Section III.J.3 with respect to independent claim 1, and for the additional reasons presented in this section for limitations [8.d] and [8.e] of independent claim 8, we determine that Petitioner demonstrates that it is more likely than not to prevail on its assertion that independent claims 8 and 15 are obvious over the combination of Dowling and Mueller, at this stage of the proceeding.

*5. Dependent Claims 2, 5, 7, 9, 12, 14, 16, and 19*

As we preliminarily conclude that Petitioner demonstrates that it is more likely than not to prevail on its obviousness challenge to independent claims 1, 8, and 15 based on Dowling and Mueller, we institute review on all challenged claims on all grounds set forth in the Petition, including Petitioner's obviousness challenge to dependent claims 2, 5, 7, 9, 12, 14, 16,



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and 19 over Dowling and Mueller. *See SAS Inst., Inc. v. Iancu*, 138 S. Ct. 1348, 1354 (2018); *PGS Geophysical AS v. Iancu*, 891 F.3d 1354, 1360 (Fed. Cir. 2018).

We have reviewed the contentions and cited evidence presented by Petitioner, and are persuaded, based on the current record, that Petitioner demonstrates that it is more likely than not to prevail on its assertion that dependent claims 2, 5, 7, 9, 12, 14, 16, and 19 are obvious over the combination of Dowling and Mueller. Pet. 73–77 (claims 2, 5, 7), 80–82 (claims 9, 12, and 14), 83 (claims 16 and 19).

## IV. CONCLUSION

For the foregoing reasons, we conclude that the information presented in the Petition demonstrates that it is more likely than not that Petitioner would prevail in showing that at least one of the challenged claims of the '341 patent is unpatentable.

## V. ORDER

In consideration of the foregoing, it is hereby:

ORDERED that, pursuant to 35 U.S.C. § 314(a), a post-grant review is instituted with respect to all challenged claims and all grounds set forth in the Petition; and

FURTHER ORDERED that, pursuant to 35 U.S.C. § 314(c) and 37 C.F.R. § 42.4(b), *inter partes* review of the '341 patent shall commence on the entry date of this Order, and notice is hereby given of the institution of a trial.



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