

UNITED STATES PATENT AND TRADEMARK OFFICE

BEFORE THE PATENT TRIAL AND APPEAL BOARD

XU PEICHENG (HONG KONG) OPTOELECTRONIC
TECHNOLOGY CO., LIMITED,
Petitioner,

v.

SEMISILICON TECHNOLOGY CORP.,
Patent Owner.

IPR2024-00156
Patent 8,884,546 B2

Before CHARLES J. BOUDREAU, SHEILA F. McSHANE, and
ELIZABETH J. REAGAN, *Administrative Patent Judges*.

REAGAN, *Administrative Patent Judge*.

DECISION
Granting Institution of *Inter Partes* Review
35 U.S.C. § 314

I. INTRODUCTION

Xu Peicheng (Hong Kong) Optoelectronic Technology Co., Limited (“Petitioner”) filed a Petition (Paper 1, “Pet.”) for *inter partes* review of claims 1–6 and 8 of U.S. Patent No. 8,884,546 B2 (Ex. 1001, “the ’546 patent”), along with a declaration of E. Fred Schubert, Ph.D. (Ex. 1003, “the Schubert Declaration”). Semisilicon Technology Corp. (“Patent Owner”) filed a Preliminary Response. Paper 10 (“Prelim. Resp.”).

Institution of an *inter partes* review is statutorily authorized when “the information presented in the petition . . . and any response . . . shows that there is a reasonable likelihood that the petitioner would prevail with respect to at least 1 of the claims challenged in the petition.” 35 U.S.C. § 314(a) (2018). We determine that Petitioner has established a reasonable likelihood of prevailing with respect to the unpatentability of at least one claim of the ’546 patent. Accordingly, we institute an *inter partes* review of claims 1–6 and 8 of the ’546 patent.

We provide the following preliminary findings of fact and conclusions of law for the sole purpose of explaining our reasons for instituting an *inter partes* review. Any final determinations shall be based on the full trial record.

II. BACKGROUND

A. REAL PARTIES IN INTEREST

Petitioner identifies itself, Xu Peicheng (Hong Kong) Optoelectronic Technology Co., Limited, and Shenzhen Yuyixin Lighting Technology Co., Ltd. as real parties in interest. Pet. 84; Paper 6, 1 (Petitioner’s Updated Mandatory Notices Pursuant to 37 C.F.R. § 42.8). Patent Owner identifies itself, Semisilicon Technology Corp., as the owner of the ’546 patent and

real party in interest. Prelim. Resp. 1; Paper 4, 2 (Mandatory Notices by Patent Owner).

B. RELATED MATTER(S)

The parties do not identify any related matters involving the '546 patent. *See* Pet. 84; Paper 4, 2.

C. THE '546 PATENT (EX. 1001)

The '546 patent, titled “Driving Apparatus for Light-Emitting Diode Curtain Lamp,” issued November 11, 2014, from U.S. Patent Application No. 13/232,932. Ex. 1001, codes (54), (45), (21). The '546 patent claims priority to TW099220340, filed October 21, 2010. *Id.* at code (30).

The '546 patent discloses “a driving apparatus for curtain lamp, and especially relates to a driving apparatus for light-emitting diode curtain lamp.” Ex. 1001, 1:6–9. The '546 patent describes two types of conventional driving apparatuses for light-emitting diode (“LED”) curtain lamps and states as objects of the invention to solve certain issues with those conventional apparatuses. *Id.* at 1:11–21, 25–36. First, the '546 patent provides: “1. without microcontroller: this kind of driving apparatus would drive light-emitting diode curtain lamp as long as the driving apparatus receives power, but the light-emitting diode curtain lamp could not light vividly. It is very dull.” *Id.* at 1:13–16. Second, the '546 patent describes: “2. with microcontroller: this kind of driving apparatus usually includes three or four circuit loops to drive a plurality of light-emitting diode light strings. Because there are only three or four circuit loops, the light-emitting diode curtain lamp still could not light vividly. It still has the dull problem.” *Id.* at 1:17–21.

To solve these issues with conventional driving apparatuses for LED curtain lamps, the '546 patent discloses exemplary embodiments related to driving apparatuses for LED curtain lamps that are applied to: 1) a direct current power source; or 2) an alternating current power source. Ex. 1001, 1:25–32, Figs. 1–3 (direct current), Figs. 4–6 (alternating current). The '546 patent also discloses an embodiment providing a driving apparatus for an LED curtain lamp with a single LED in one LED string. *Id.* at 1:33–36, Figs. 7–10.

With respect to the embodiment directed to the direct current power source, the '546 patent describes that the “driving apparatus for light-emitting diode curtain lamp . . . is applied to a direct current power source and at least a light-emitting diode light string,” and that “[t]he driving apparatus for light-emitting diode curtain lamp includes a master control unit, at least a slave control unit, and a transmission line.” Ex. 1001, 1:37–43. The master control unit electrically connects to the direct current power source, and the slave control unit electrically connects to the master control unit and the LED light string. *Id.* at 1:43–46. The master control unit controls the slave control unit to drive the LED light string. *Id.* at 1:48–50. Further, a “transmission line is electrically connected to the master control unit and the slave control unit,” in which “[t]he transmission line is used to transit control signals and synchronous signals.” *Id.* at 1:46–48, 1:50–51.

Figure 1 of the '546 patent, reproduced below, shows a block diagram of the first exemplary embodiment of applying a driving apparatus for an LED curtain lamp to a direct current power source:

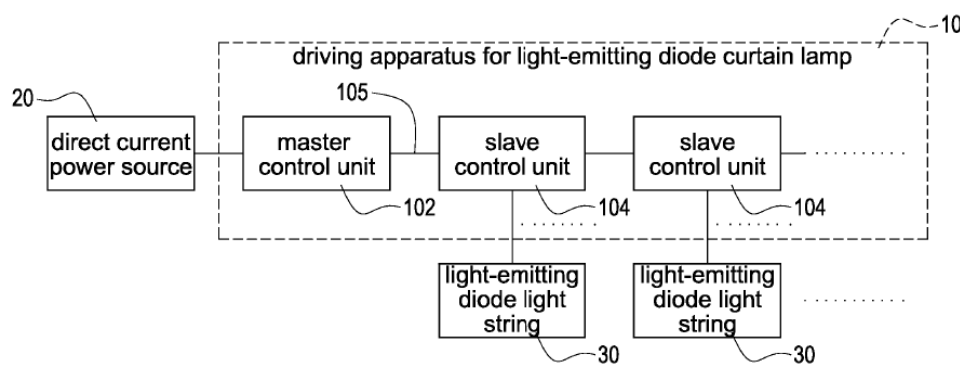


FIG.1

In Figure 1, above, driving apparatus for LED curtain lamp 10 is represented by a dashed-line box. Inside this box is a row of three boxes. From left to right in direction, the first box is labeled “master control unit 102,” followed by two “slave control unit 104” boxes. Below the two boxes labeled “slave control unit 104,” but outside of the dashed-line box, are two boxes that represent LED light strings 30. To the left of the box labeled “master control unit,” but outside of the dashed-line box, is a box that represents direct current power source 20. LED light strings 30 are shown as being electrically connected to slave control units 104 in driving apparatus 10. Slave control units 104 are in turn connected to master control unit 102, also in driving apparatus 10, through transmission line 105. Master control unit 102 is also connected to direct current power source 20. *See Ex. 1001, 2:50–64.*

The master control unit for the direct current power source exemplary embodiment is illustrated in Figure 2, reproduced below:

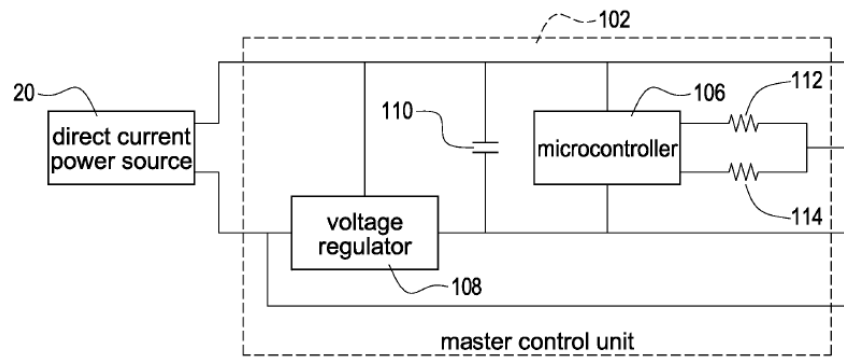


FIG.2

In Figure 2, above, master control unit 102 is represented by a dashed-line box. Inside this dashed-line box is a box labeled voltage regulator 108, and, to the left of voltage regulator 108, is a box labeled microcontroller 106. First resistor 112 and second resistor 114 extend from the right side of the box labeled microcontroller 106. To the left of, and outside of, the dashed-line box labeled “master control unit” is a box that represents direct current power source 20. First capacitor 110 is shown in parallel to microcontroller 106. Microcontroller 106 electrically connects to voltage regulator 108, first capacitor 110, first resistor 112, and second resistor 114. Voltage regulator 108 is also electrically connected to direct current power source 20, in which direct current power source 20 includes upper and lower terminal pins. *See* Ex. 1001, 3:1–9, 3:34–37.

In turn, the slave control unit for the direct current power source exemplary embodiment is illustrated in Figure 3, reproduced below:

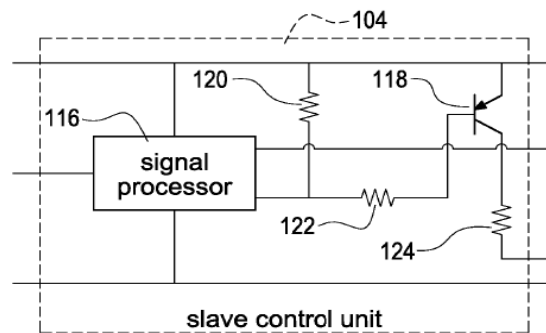


FIG.3

In Figure 3, above, slave control unit 104 is represented by a dashed-line box. Inside this dashed-line box is a box labeled “signal processor,” and transistor 118, third resistor 120, fourth resistor 122, and fifth resistor 124 are positioned to the right of the “signal processor” box. Transistor 118 is shown as being electrically connected to signal processor 116, third resistor 120, fourth resistor 122, and fifth resistor 124. Slave control unit 104 includes three terminal pins in the left side. Viewed from the top to the bottom of slave control unit 104, the first terminal pin receives a direct current voltage, the second terminal pin receives signals from master control unit 102 to drive LED light string 30 (not illustrated in Fig. 3), and the third terminal pin receives a direct current voltage from voltage regulator 108 (not shown in Fig. 3). *See* Ex. 1001, 3:10–17, 3:49–58.

For the exemplary embodiment directed to the alternating current power source, the '546 patent describes that the “driving apparatus for light-emitting diode curtain lamp . . . is applied to an alternating current power source and at least a light-emitting diode light string” and that “[t]he driving apparatus for light-emitting diode curtain lamp includes a master control unit, and at least a slave control unit.” Ex. 1001, 1:52–56. The master control

unit electrically connects to the alternating current power source and includes a power negative terminal pin and a signal output pin. *Id.* at 1:58–61. The slave control unit electrically connects to the master control unit and the LED light string and includes a signal input pin, a signal output pin, a power positive terminal pin, and a power negative terminal pin. *Id.* at 1:62–67. The master control unit controls the slave control unit to drive the LED light string, in which the signal output pin of the master control unit electrically connects to the signal input pin of the slave control unit, and the power negative terminal pin of the master control unit electrically connects to the power positive terminal pin of the slave control unit. *Id.* at 1:67–2:6.

Figure 4, reproduced below, shows a block diagram of the second exemplary embodiment of applying a driving apparatus for an LED curtain lamp to an alternating current power source:

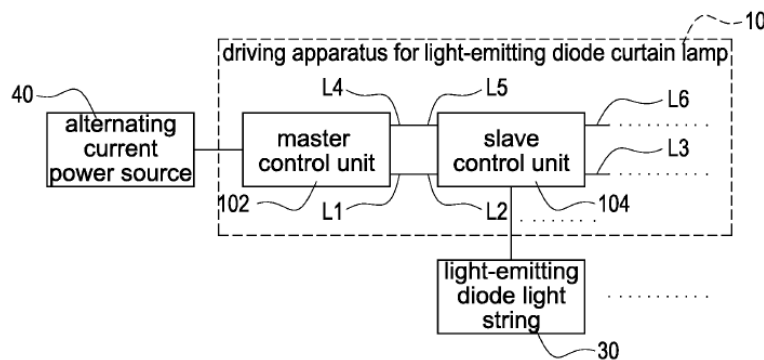


FIG.4

In Figure 4, above, driving apparatus for an LED curtain lamp 10 is represented by a dashed-line box. Inside this dashed-line box are two boxes with a top line and a bottom line extending between the boxes to each other. From left to right in direction, the first box is labeled “master control unit 102,” and the second box is labeled “slave control unit 104.” Below the box

labeled “slave control unit 104,” but outside of the dashed-line box, is a box that represents LED light string 30. To the left of the box labeled “master control unit 102,” but outside of the dashed-line box, is a box that represents alternating current power source 40. LED light string 30 is shown as being electrically connected to slave control unit 104 in driving apparatus 10. In turn, slave control unit 104 electrically connects to master control unit 102, also in driving apparatus 10, and master control unit 102 is electrically connected to alternating current power source 40. Master control unit 102 includes power negative terminal pin of master control unit L1 and signal output pin of master control unit L4. In turn, slave control unit 104 includes signal input pin of slave control unit L5, signal output pin of slave control unit L6, power positive terminal pin of slave control unit L2, and power negative terminal pin of slave control unit L3. Signal input pin of slave control unit L5 electrically connects to signal output pin of master control unit L4. Power positive terminal pin of slave control unit L2 electrically connects to power negative terminal pin of master control unit L1. Further, signal output pin of slave control unit L6 of slave control unit 104 electrically connects to signal input pin of slave control unit L5 of the next slave control unit 104. Power negative terminal pin of slave control unit L3 of slave control unit 104 electrically connects to power positive terminal pin of slave control unit L2 of the next slave control unit 104. *See Ex. 1001, 4:11–37.*

The master control unit and the slave control unit for the alternating current power source exemplary embodiment are illustrated in Figures 5 and 6, respectively, reproduced below:

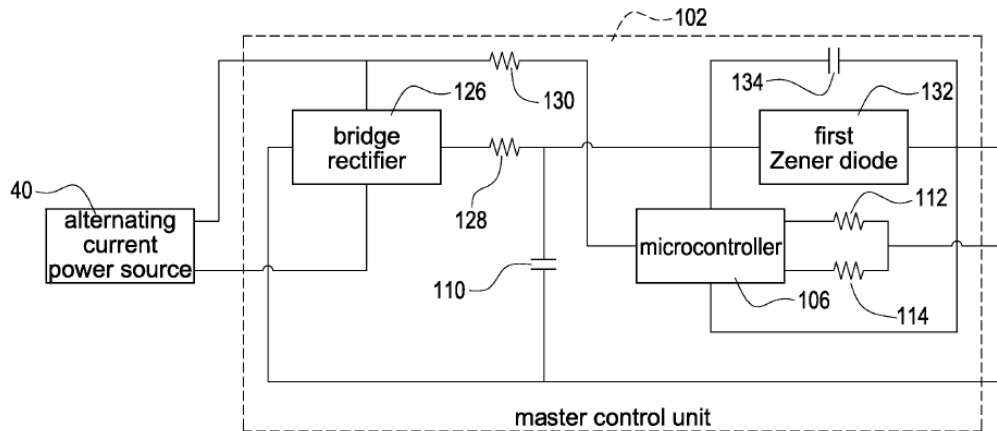


FIG.5

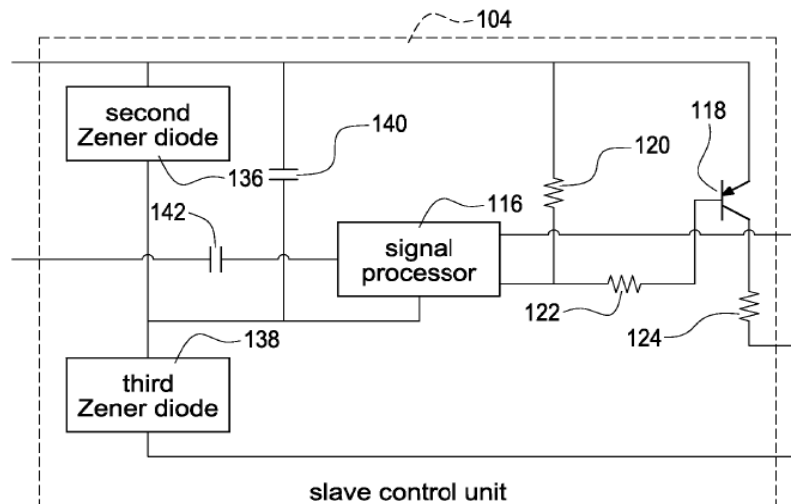


FIG.6

In Figures 5 and 6, above, the components of master control unit 102 and slave control unit 104, respectively, are illustrated. In Figure 5, above, master control unit 102 is represented by a dashed-line box. Inside this dashed-line box are three boxes, labeled, from left to right in direction, as “bridge rectifier 126,” “microcontroller 106,” and “first Zener diode 132.” Microcontroller 106 of master control unit 102 is shown as being electrically connected to second capacitor 134, first Zener diode 132, first resistor 112,

second resistor 114, and seventh resistor 130. Bridge rectifier 126 is electrically connected to first capacitor 110, sixth resistor 128, seventh resistor 130, and alternating current power source 40. The right side of master control unit 102 includes first and second terminal pins, in which the first terminal pin (viewed from the top to bottom direction) transmits power to first slave control unit 104 (not shown in Fig. 5). *See* Ex. 1001, 4:46–52, 6:3–10.

In Figure 6, above, slave control unit 104 is represented by a dashed-line box. Inside this dashed-line box are three boxes labeled “second Zener diode 136,” “third Zener diode 138,” and “signal processor 116.” Also inside the dashed-line box of slave control unit 104 are various components, in which transistor 118 of slave control unit 104 electrically connects to third resistor 120, fourth resistor 122, fifth resistor 124, third capacitor 140, and second Zener diode 136. Signal processor 116 is electrically connected to third Zener diode 138, fourth capacitor 142, and fourth resistor 122. The left and right sides of slave control unit 104 include two terminal pins and three terminal pins, respectively. *See* Ex. 1001, 4:59–64, 5:17–25.

With respect to the embodiment directed to the driving apparatus for an LED curtain lamp with a single LED in one LED string, the ’546 patent describes that the driving apparatus includes a master control unit and at least a slave control unit. Ex. 1001, 2:7–14. The slave control unit electrically connects to the master control unit and the LED. *Id.* at 2:14–16.

Figure 7, reproduced below, shows a circuit diagram of an LED curtain lamp with at least a single LED in one LED string for an alternating current power source:

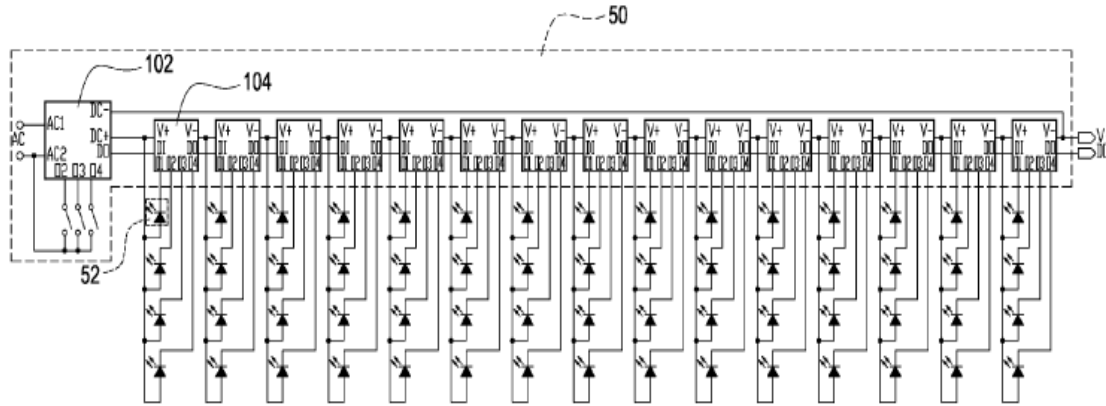


FIG.7

In Figure 7, above, driving apparatus 50 is represented by a dashed-line shape that includes within it a box labeled 102 (master control unit 102) and fifteen boxes labeled 104 (slave control units 104). Master control unit 102 is shown as being electrically connected to multiple slave control units 104 in driving apparatus 50. Each slave control unit 104 is in turn connected to LEDs 52, in which driving apparatus 50 is applied to at least an LED 52. *See* Ex. 1001, 6:21–23, 6:32–40.

Figure 10, reproduced below, illustrates a circuit diagram of the secondary power supply of the LED curtain lamp with single LED in one LED string:

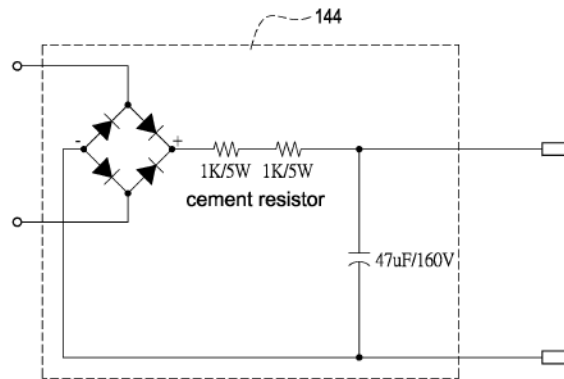


FIG.10

In the circuit diagram of the secondary power supply of the LED curtain lamp with single LED in one LED string, above, alternating current voltage transferring to direct current voltage 144 (represented by a dashed-line box) is illustrated as including a bridge rectifier, a cement resistor(s), and a capacitor. *See* Ex. 1001, 6:41–49.

Referring to Figure 10, the '546 patent describes a “secondary power supply” of the LED curtain lamp with a single LED in one LED string, describing that “[t]he driving apparatus for light-emitting diode curtain lamp with single light-emitting diode in one light-emitting diode string 50 of the present invention only needs a master control unit 102, but an alternating current voltage transferring to direct current voltage circuit 144 (the secondary power supply) is required.” Ex. 1001, 6:41–49. The master control unit includes a microcontroller, and the slave control unit includes a signal processor. *Id.* at 6:51–53. The '546 patent describes that the “driving apparatus for light-emitting diode curtain lamp with single light-emitting diode in one light-emitting diode string 50 further includes an alternating current voltage transferring to direct current voltage circuit 144 and a second curtain lamp 146,” in which the “alternating current voltage transferring to

direct current voltage circuit 144 is electrically connected to the slave control unit 104,” and “[t]he second curtain lamp 146 is electrically connected to the alternating current voltage transferring to direct current voltage circuit 144.” *Id.* at 6:53–62.

D. ILLUSTRATIVE CLAIMS

Of the challenged claims, claims 1, 4, and 8 are independent claims and are reproduced below, with bracketed letters provided by Petitioner added to limitations for reference purposes:

1. [Pre] A driving apparatus for light-emitting diode curtain lamp applied to a direct current power source and at least a light-emitting diode light string, the driving apparatus for light-emitting diode curtain lamp including:

[A] a master control unit electrically connected to the direct current power source, including:

a microcontroller; and

a voltage regulator electrically connected to the microcontroller;

[B] at least a slave control unit electrically connected to the master control unit and the light-emitting diode light string; and

[C] a transmission line electrically connected to the master control unit and the slave control unit,

[D] wherein the slave control unit is controlled by the master control unit to drive the light-emitting diode light string; the transmission line is used to transit control signals and synchronous signals.

4. [Pre] A driving apparatus for light-emitting diode curtain lamp applied to an alternating current power source and at least

a light-emitting diode light string, the driving apparatus for light-emitting diode curtain lamp including:

- [A] a master control unit including a power negative terminal pin of master control unit and a signal output pin of master control unit, the master control unit being electrically connected to the alternating current power source; and
- [B] at least a slave control unit including a signal input pin of slave control unit, a signal output pin of slave control unit, a power positive terminal pin of slave control unit, and a power negative terminal pin of slave control unit, the slave control unit being electrically connected to the master control unit and the light-emitting diode light string,
- [C] wherein the slave control unit is controlled by the master control unit to drive the light-emitting diode light string; the signal output pin of master control unit is electrically connected to the signal input pin of slave control unit;
- [D] the power negative terminal pin of master control unit is electrically connected to the power positive terminal pin of slave control unit.

8. [Pre] A driving apparatus for light-emitting diode curtain lamp with single light-emitting diode in one light-emitting diode string applied to at least a light-emitting diode, the driving apparatus for light-emitting diode curtain lamp with single light-emitting diode in one light-emitting diode string including:

- [A] a master control unit; and
- at least a slave control unit electrically connected to the master control unit and the light-emitting diode,
- [B] wherein the master control unit includes a microcontroller; the slave control unit includes a signal processor;

[C] the driving apparatus for light-emitting diode curtain lamp with single light-emitting diode in one light-emitting diode string further including:

an alternating current voltage transferring to direct current voltage circuit electrically connected to the slave control unit; and

[D] a second curtain lamp electrically connected to the alternating current voltage transferring to direct current voltage circuit.

Ex. 1001, 7:7–24, 7:31–8:7, 8:25–44; Pet. 88–90.

E. ASSERTED GROUNDS OF UNPATENTABILITY

The Petition asserts six grounds of unpatentability based on obviousness under 35 U.S.C. § 103.¹ The grounds identified in the Petition are as follows:

Ground	35 U.S.C. §	Claim(s) Challenged	Reference(s)/Basis
1	103(a)	1, 2	Kuang, ² general knowledge of a person of ordinary skill in the art (“POSITA”)
2	103(a)	3	Kuang, Debevec ³

¹ The Leahy-Smith America Invents Act (“AIA”), Pub. L. No. 112–29, 125 Stat. 284 (Sept. 16, 2011), includes amendments to Section 103 that became effective on March 16, 2013. Because the challenged claims issued from an application filed before March 16, 2013, we apply pre-AIA law. *See* Pet. 2; Ex. 1001, codes (22), (30).

² US 2009/0021955 A1, published January 22, 2009 (Ex. 1004, codes (10), (43)) (“Kuang”). Petitioner contends that Kuang is prior art to the ’546 patent at least under pre-AIA 35 U.S.C. § 102(b). Pet. 2.

³ US 2012/0050606 A1, published March 1, 2012 (Ex. 1005, codes (10), (43)) (“Debevec”). Petitioner avers, and Patent Owner does not contest at this stage of the proceeding, that “[b]ecause Debevec was filed prior to the

Ground	35 U.S.C. §	Claim(s) Challenged	Reference(s)/Basis
3	103(a)	1, 2, 8	Lys, ⁴ general knowledge of a POSITA
4	103(a)	3	Lys, Debevec
5	103(a)	4	Hiroyuki, ⁵ general knowledge of a POSITA
6	103(a)	5, 6, 8	Hiroyuki, Kuang

Pet. 3.

At this stage of the proceeding, Patent Owner does not dispute that each reference qualifies as prior art. *See generally* Prelim. Resp.

III. ANALYSIS

In an *inter partes* review, the petitioner has the burden from the onset to demonstrate, with particularity, the unpatentability of the challenged claim(s). *Harmonic Inc. v. Avid Tech., Inc.*, 815 F.3d 1356, 1363 (Fed. Cir. 2016) (citing 35 U.S.C. § 312(a)(3) (2012) (requiring *inter partes* review petitions to identify “with particularity . . . the evidence that supports the grounds for the challenge to each claim”)).

priority date of the ’546 patent, it qualifies as prior art at least under pre-AIA 35 U.S.C. § 102(e).” Pet. 2.

⁴ US 6,774,584 B2, issued August 10, 2004 (Ex. 1008, codes (10), (45)) (“Lys”). Petitioner contends that Lys is prior art to the ’546 patent at least under pre-AIA 35 U.S.C. § 102(b). Pet. 2–3.

⁵ JP2006-228529, published August 31, 2006 (Ex. 1006, code (43)) (“Hiroyuki”). We refer herein to the certified English translation filed as Exhibit 1007. Petitioner contends that Hiroyuki is prior art to the ’546 patent at least under pre-AIA 35 U.S.C. § 102(b). Pet. 2.

A patent claim is unpatentable based on obviousness 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.” 35 U.S.C. § 103(a). 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 indicia of nonobviousness. *Graham v. John Deere Co.*, 383 U.S. 1, 17–18 (1966).

In addition, the obviousness inquiry typically requires an analysis of “whether there was an apparent reason to combine the known elements in the fashion claimed by the patent at issue.” *KSR Int’l Co. v. Teleflex Inc.*, 550 U.S. 398, 418 (2007) (citing *In re Kahn*, 441 F.3d 977, 988 (Fed. Cir. 2006) (requiring “articulated reasoning with some rational underpinning to support the legal conclusion of obviousness”)). Petitioner cannot satisfy its burden of proving obviousness by employing “mere conclusory statements,” but “must instead articulate specific reasoning, based on evidence of record, to support the legal conclusion of obviousness.” *In re Magnum Oil Tools Int’l Ltd.*, 829 F.3d 1364, 1380 (Fed. Cir. 2016).

For the reasons set forth below, we determine that Petitioner has demonstrated a reasonable likelihood that it would prevail in showing that at least one of claims 1–6 and 8 of the ’546 patent is unpatentable on the grounds asserted in the Petition.

A. LACK OF PARTICULARITY IN PETITION AND RELIANCE ON SCHUBERT
DECLARATION

Patent Owner contends that the Petition should be denied for multiple reasons, including: (1) the Petition fails to articulate the basis for obviousness in grounds 1–6 by not explaining why or how the claims would have been obvious in view of the general knowledge of a person of ordinary skill in the art for grounds 1, 3, and 5, and by having dissimilar reference combinations yet relying on the general knowledge of a person of ordinary skill in the art for grounds 3 and 6; (2) the Petition does not explain any motivation for modifying the primary references; (3) the Petition fails to show a reasonable expectation of success in modifying the primary reference; (4) the Petition relies entirely on the Schubert Declaration that repeats the Petition and deserves no weight; and (5) the Petition does not establish that the challenged claims are unpatentable. *See* Prelim. Resp. 6–36.

Regarding Patent Owner’s contentions that the Petition should be denied because of the Petition’s improper reliance on the general knowledge of a person of ordinary skill in the art (i.e., contentions (1), (2), and (3) above), we have considered these arguments. However, we preliminarily determine, as discussed below, that certain of the cited prior art teaches all limitations of at least some of the claims. Therefore, reliance on the knowledge of a person of ordinary skill in the art is not required to supply any missing claim limitation(s) in at least one of the grounds. Accordingly, we need not expressly address these contentions of Patent Owner at this stage for purposes of our decision to institute trial. However, we invite the parties to provide further briefing on these issues during the course of the trial.

With regard to Patent Owner’s contention that the Petition should be denied because the Schubert Declaration entirely repeats the Petition, and the Petition and Schubert Declaration include only conclusory statements of obviousness (contention (4) above), *see* Prelim. Resp. 20–24, we note that “[v]erbatim duplication between a brief and a declaration does not *require* giving the declarant’s testimony ‘little or no weight’ under *Xerox*,” provided that the testimony itself is sufficiently supported. *Netflix, Inc. v. GoTV Streaming, LLC*, IPR2023-00757, Paper 11 at 67 (PTAB Nov. 7, 2023) (emphasis added) (discussing *Xerox Corp. v. Bytemark, Inc.*, IPR2022-00624, Paper 9 at 15 (PTAB Aug. 24, 2022)) (precedential); *Hum Indus. Tech., Inc. v. Amsted Rail Co.*, IPR2023-00540, Paper 10 at 37 (PTAB Aug. 11, 2023) (“If declaration testimony is supported sufficiently and, in turn, supports contentions in the Petition, we do not give it little to no weight simply because it is repeated in the Petition”). Here, we agree with Patent Owner that Dr. Schubert’s testimony closely mirrors the language in the Petition. Nevertheless, on the record before us, we find that the support, including, for example, prior art citations and/or technical reasoning, provided in the declaration and repeated in the Petition is sufficient for demonstrating a reasonable likelihood that Petitioner would prevail in its challenge to at least one of the claims under at least one of the grounds. While expert testimony that mirrors the language of the petition, without more, may provide little help to the Board, we have evaluated the Schubert Declaration to determine the amount of weight attributable to the testimony therein at this stage of the proceeding, based on the support provided for the testimony. *See* 37 C.F.R. § 42.65(a) (“Expert testimony that does not

disclose the underlying facts or data on which the opinion is based is entitled to little or no weight.”).

We next turn to a discussion of the parties’ arguments (including Patent Owner’s contention (5) above) and the evidence presented regarding whether the challenged claims are unpatentable.

B. LEVEL OF ORDINARY SKILL IN THE ART

The level of ordinary skill in the art at the time of the invention is a factual determination that provides a primary guarantee of objectivity in an obviousness analysis. *Al-Site Corp. v. VSI Int’l Inc.*, 174 F.3d 1308, 1324 (Fed. Cir. 1999) (citing *Graham*, 383 U.S. at 17–18; *Ryko Mfg. Co. v. Nu-Star, Inc.*, 950 F.2d 714, 718 (Fed. Cir. 1991)).

Relying on the Schubert Declaration, Petitioner proposes that a person of ordinary skill in the art “would have had a bachelor’s degree in electrical engineering, physics, materials science, or a related discipline, and 6 years of practical experience in designing or fabricating LED lighting systems, including controlling and driving LEDs,” or “[a]lternatively . . . would have had a master’s degree and four years of experience, or a Ph.D. degree and two years of experience.” Pet. 5 (citing Ex. 1003 ¶ 31). At this stage of the proceeding, Patent Owner does not contest Petitioner’s proposed definition of the ordinarily skilled artisan. *See generally* Prelim. Resp.

In determining the level of ordinary skill in the art, various factors may be considered, including the “type of problems encountered in the art; prior art solutions to those problems; rapidity with which innovations are made; sophistication of the technology; and educational level of active workers in the field.” *In re GPAC Inc.*, 57 F.3d 1573, 1579 (Fed. Cir. 1995) (citation omitted). The level of ordinary skill in the art may also be reflected

by the prior art of record. *See Okajima v. Bourdeau*, 261 F.3d 1350, 1355 (Fed. Cir. 2001). Based on the information presented, we adopt Petitioner’s unopposed definition for purposes of determining whether to institute review because it is consistent, on this record, with the ’546 patent and is reflected by the asserted prior art.

C. CLAIM CONSTRUCTION

In an *inter partes* review, the Board construes the terms of a patent 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. § 42.100(b). In accordance with this standard, claim terms generally are given their plain and ordinary meaning as would have been understood by a person of ordinary skill in the art at the time of the invention and within the context of the entire patent disclosure. *See Phillips v. AWH Corp.*, 415 F.3d 1303, 1313 (Fed. Cir. 2005) (en banc). “In determining the meaning of the disputed claim limitation, we look principally to the intrinsic evidence of record, examining the claim language itself, the written description, and the prosecution history, if in evidence.” *DePuy Spine, Inc. v. Medtronic Sofamor Danek, Inc.*, 469 F.3d 1005, 1014 (Fed. Cir. 2006) (citing *Phillips*, 415 F.3d at 1312–17).

Petitioner contends that “no formal claim constructions are necessary because the challenged claims are invalid under their plain and ordinary meanings.” Pet. 5. Petitioner, however, relies on definitions provided in the Schubert Declaration for several claim terms, asserting that such definitions are based on how “[a] POSITA would have understood” the particular claim term at issue. *See, e.g.*, Pet. 7.

Patent Owner does not present any proposed claim constructions. *See* Prelim. Resp.

We construe terms in controversy only to the extent necessary to resolve the controversy. *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)). For purposes of this Decision, and based on the current record, we determine that no claim term requires express construction at this stage of the proceeding, with the exception of the term “synchronous signals” in limitation 1[D], which requires interpretation to the extent necessary to assess the merits of the parties’ assertions.

The Specification does not expressly define “synchronous signals.” *See generally* Ex. 1001. Petitioner proposes a definition of “synchronous signals” based on how “a POSITA would have understood the term,” as: “signals that are sent to the slave nodes to control their corresponding LED strings at the same time.” Pet. 16–17. Patent Owner argues that there is no support for Petitioner’s definition of “synchronous signals,” but Patent Owner does not propose an express construction of the term. *See* Prelim. Resp. 21–23, 25–26.

In the discussion on the merits below, we discuss the interpretation of the term “synchronous signals.” *See infra* Sec. III.D.2.a.v. As noted below, we invite the parties to present briefing on the interpretation of this term during trial.

D. ASSERTED GROUND 1: OBVIOUSNESS OF CLAIMS 1 AND 2 OVER KUANG
IN VIEW OF THE GENERAL KNOWLEDGE OF A PERSON OF ORDINARY SKILL IN
THE ART

Petitioner contends that claims 1 and 2 are unpatentable under 35 U.S.C. § 103(a) as obvious over Kuang in view of the general knowledge of a person of ordinary skill in the art. Pet. 6–20. In support, Petitioner relies upon the Schubert Declaration. *See id.*; Ex. 1003.

We begin our discussion with a brief summary of Kuang and then address the evidence and arguments presented.

1. *Kuang (Ex. 1004)*

Kuang is a United States patent application publication titled “Control Network for LED-Based Lighting System in a Transit Vehicle,” filed on September 5, 2007, and published on January 22, 2009. Ex. 1004, codes (12), (22), (43), (54). Kuang discloses that the invention “relates to lighting systems and, more particularly, to control networks for lighting systems used in transit vehicles or conveyances such as buses, light rail cars, and the like.” *Id.* ¶ 3; *see id.* at code (57).

Kuang discloses that the transit vehicle lighting system includes “a plurality of LED-based lighting fixtures for providing interior illumination,” in which “[a] control network comprises a plurality of slave nodes for controlling the LED-based lighting fixtures, and a master node for controlling the slave nodes.” Ex. 1004, code (57). The master node and slave nodes are connected by a combined power/communication bus in a daisy-chain fashion. *Id.* The slave node may include “a power regulator and a controller for providing a target current command to the power regulator.” *Id.*

Figure 1 of Kuang, reproduced below, illustrates an example lighting control system, including a master node and slave nodes:

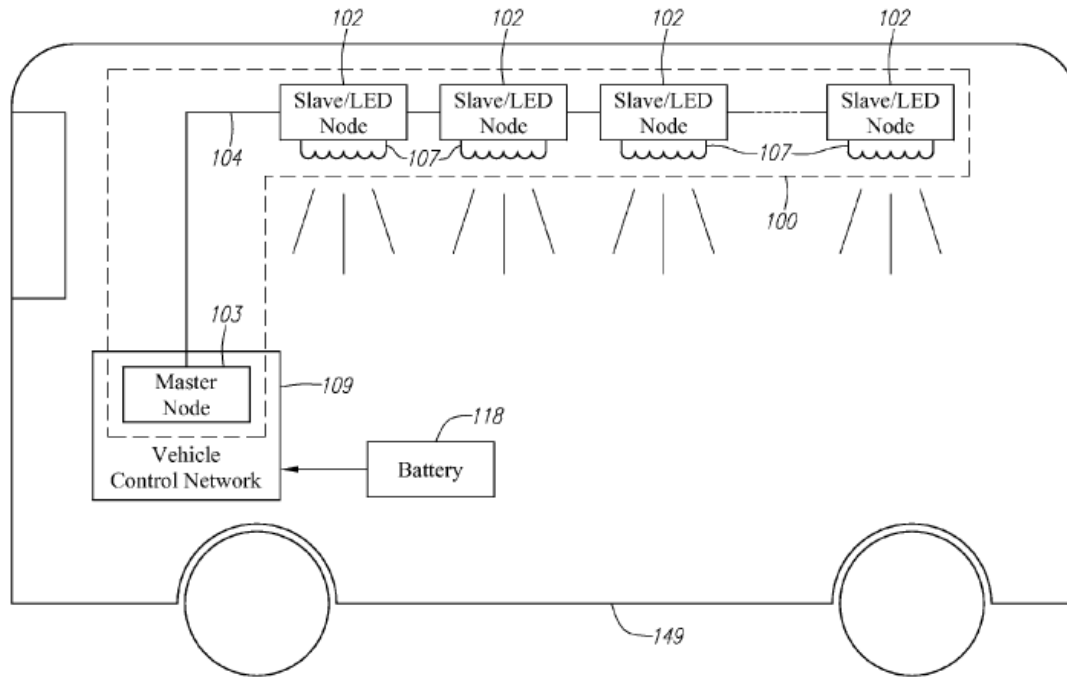


Fig. 1

As shown in the conceptual diagram of Figure 1, above, “lighting control network 100 . . . comprises a plurality of network nodes including a master node 103 and a series of slave/LED nodes 102, each of which constitutes or is associated with an LED-based lighting fixture having local electronic control but responsive to the master node 103.” Ex. 1004 ¶¶ 14, 32. The “power/data bus 104 preferably interconnects the series of slave/LED nodes 102 in a daisy-chain fashion,” in which “[e]ach of the slave/LED nodes 102 may include a plurality of LEDs 107.” *Id.*

Further, Figure 2A of Kuang provides a “high level architectural diagram” of a lighting control system embodiment, *id.* ¶ 15, as reproduced below:

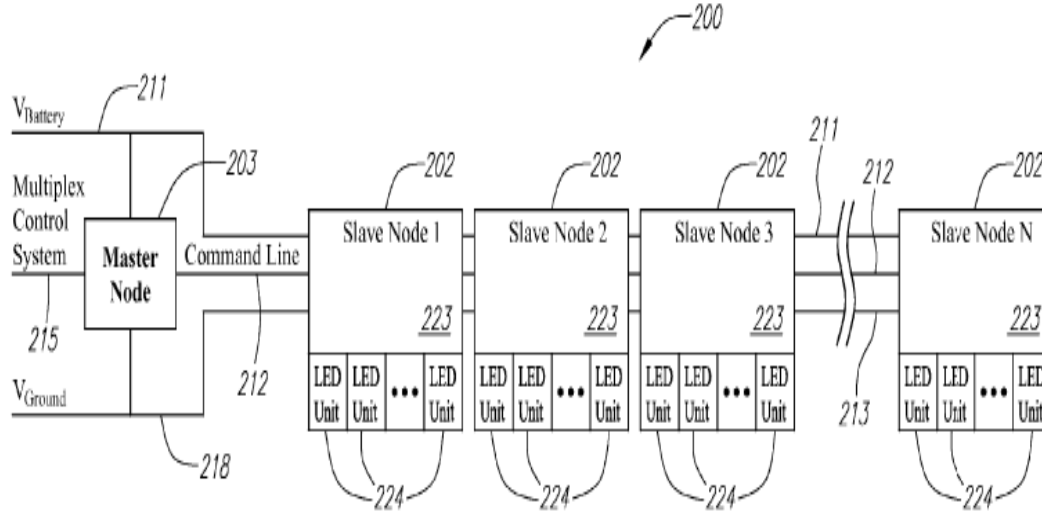


Fig. 2A

As illustrated in the high-level architectural diagram of Figure 2A, above, a “power bus comprising a power supply line 211 from the vehicle battery and a ground line 213 is preferably connected from the master node 203 to each LED-based lighting fixture 202 and slave node 223 thereof, in series,” and “[l]ikewise, a command/data bus 212 may be connected from the master node 203 to each LED-based lighting fixture 202 and slave node 223 thereof, in series.” Ex. 1004 ¶ 33. Kuang describes that “the master node 203 may communicate with the main vehicle control network . . . and may respond to commands or queries therefrom, and/or may send alarm signals, interrupts, or status information to the main vehicle control network,” and that “[t]he master node 203 may also control the various LED-based lighting fixtures 202, and slave nodes 223 thereof, through commands or queries transmitted over the command/data bus 212.” *Id.* ¶ 34. Kuang also describes that “[c]ommands or inquiries may be transmitted from the master node 203 over the command/data bus 212 to the first slave node 223 (Slave Node 1),”

in which first slave node 223 (Slave Node 1) “then propagates the commands or inquiries over the command/data bus 212 to the next slave node 223 (Slave Node 2) in the chain, and so on in sequence until the command or inquiry reaches the last slave node 223 (Slave Node N) if necessary.” *Id.*

Figure 4 of Kuang, reproduced below, provides a block diagram of an LED-based lighting fixture and slave node that may be used in the lighting control system of Figure 2A, Ex. 1004 ¶ 18:

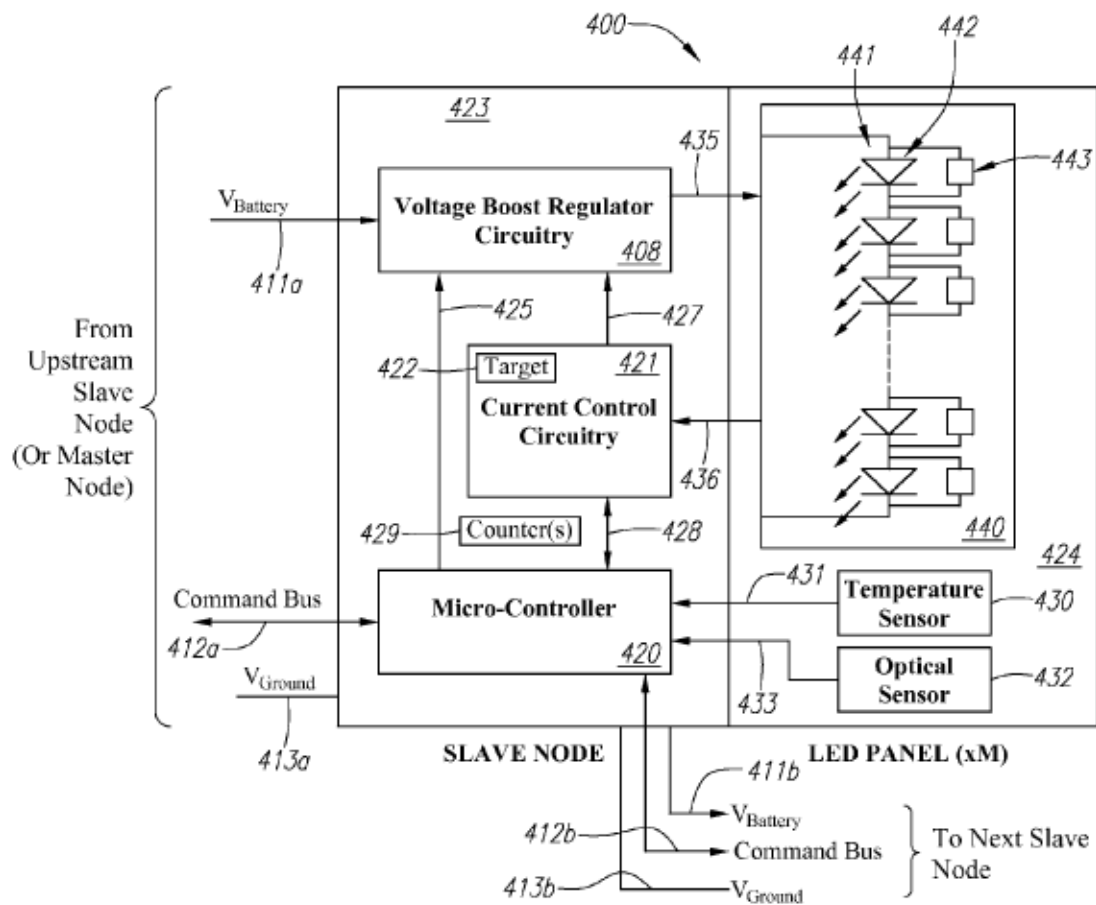


Fig. 4

As illustrated in Figure 4, above, the “LED-based lighting fixture 400 is conceptually divided into a slave node 423, which forms a network node of the lighting control network, and one or more LED units or modules 424.”

Ex. 1004 ¶ 42. Preferably, LED-based lighting fixture 400 includes “a voltage boost regulator 408 which receives a power signal from the power supply line 411a,” and in which voltage boost regulator 408 “converts the input power signal to both a stable low voltage power output signal for digital electronics and other components within the slave node 423, and a regulated boosted voltage level for the LEDs on the various LED units 424.” *Id.* Further, voltage regulator 408 “outputs appropriate internal power supply signals (not shown) to other components of the slave node 223, such as microcontroller 420 and any other components requiring a low voltage source.” *Id.*

In Kuang, micro-controller 420 has a range of capabilities related to LED-based lighting fixture 400. Ex. 1004 ¶ 54. For example, a “master light shutoff command may also be sent from the master node 203 instructing all LED/slave nodes to turn off,” and “[t]he micro-controller 420 may also respond to commands from the master node 203 to dim the LEDs 442 on all or selected ones of the LED units 424.” *Id.*

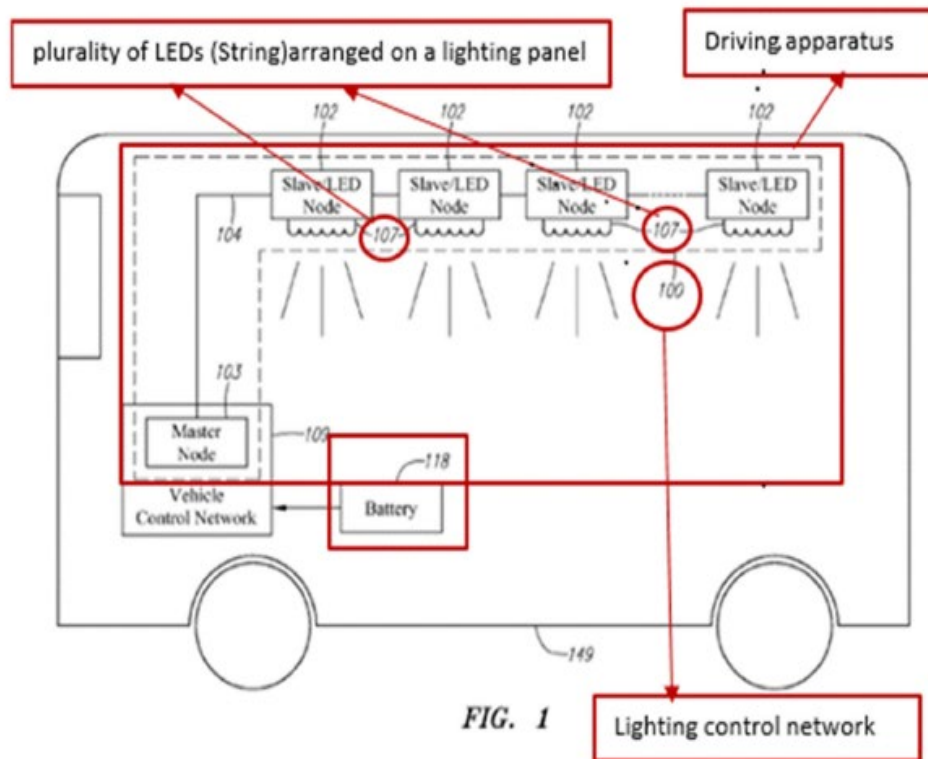
2. Discussion

a. Claim 1

i. Preamble (1[Pre])

The preamble of claim 1 (1[Pre]) recites “[a] driving apparatus for light-emitting diode curtain lamp applied to a direct current power source and at least a light-emitting diode light string.” Ex. 1001, 7:7–10.

Petitioner contends that Kuang teaches claim 1's preamble because it discloses "a 'driving apparatus' for a plurality of LEDs arranged on a lighting panel or other fixture, which are powered by a direct current power source," in illustration of which Petitioner provides an annotated version of Kuang's Figure 1 as reproduced below (Pet. 6–7):



Pet. 7 (annotated version of Ex. 1004, Fig. 1; Ex. 1003 ¶ 34). Annotated Figure 1, above, shows transit vehicle 149, in which power is provided from battery 118 to lighting control network 100 and/or vehicle control network 109. Lighting control network 100 includes master node 103 and a series of slave/LED nodes 102, in which each slave/LED node is shown as including a plurality of LEDs 107 arranged on a lighting panel or fixture to illuminate a region of transit vehicle 149. The series of slave/LED nodes 102 are daisy-chain connected through power/data bus 104. See Pet. 7 (annotated version

of Ex. 1004, Fig. 1); Ex. 1004 ¶ 32. The annotations provided by Petitioner include that Petitioner has identified lighting control network 100 with a red call-out box; added a red box around battery 118; added a red call-out box labeled “plurality of LEDs (String) arranged on a lighting panel” 107; and added a red rectangular box with a red call-out box labeled “Driving apparatus,” in which the red rectangular box includes master node 103, slave/LED nodes 102, the plurality of LEDs 107, power/data bus 104, and lighting control network 100. Pet. 7 (annotated version of Ex. 1004, Fig. 1).

In describing annotated Figure 1, Petitioner points to the following teaching in Kuang: “[P]ower may be provided to the vehicle control network 109 and/or lighting control network 100 via an on-board battery 118.” Pet. 7 (quoting Ex. 1004 ¶ 32). Relying on the Schubert Declaration, Petitioner contends that a “POSITA would have understood” that “battery 118 as disclosed in Kuang functions as a ‘direct current power source’ as claimed because a battery is commonly known as a DC voltage source consisting of two or more cells that convert one form of energy (such as chemical energy) into electrical energy.” *Id.* at 7 (quoting Ex. 1003 ¶ 35).

Citing further to Kuang and the Schubert Declaration, Petitioner asserts that Kuang discloses master node 103 and slave nodes 102. Pet. 7–8 (citing Ex. 1004 ¶ 32; Ex. 1003 ¶ 36). Petitioner contends that “battery 118 in Kuang provides power to a series of LEDs, which a POSITA would have understood constitutes a ‘light-emitting diode light string’ as claimed.” *Id.* at 8 (quoting Ex. 1003 ¶ 36). Petitioner further asserts that “a POSITA would have understood Kuang to disclose a ‘curtain lamp,’ which is commonly understood to be one or more light strings.” *Id.* (quoting Ex. 1003 ¶ 37) (citing Ex. 1004 ¶ 45). Petitioner cites to a portion of the ’546 patent and

Figures 7 and 8 as illustrating circuit diagrams for curtain lamps. *Id.* (citing Ex. 1001, 2:34–40, Figs. 7, 8). Petitioner further cites to Kuang as disclosing that its teachings may be applicable beyond transit vehicles. *Id.* (citing Ex. 1004 ¶ 122; Ex. 1003 ¶ 37).

In addition, Petitioner argues that “[b]ecause the term ‘driving apparatus’ is not further specified in the ’546 patent specification, a POSITA would have understood that various driving circuits can be used to implement the claimed ‘driving apparatus.’” Pet. 8–9. That is, Petitioner argues, “the term ‘driving apparatus’ is a general placeholder in the claim to describe whatever ‘drives’ or powers the claimed LED ‘curtain lamp,’” and “[a]s such, it consists of all the components disclosed in Kuang’s Figure 1 that contribute to powering and operating the plurality of LEDs 107.” *Id.* at 9 (citing Ex. 1003 ¶ 38).

At this stage, Patent Owner presents no arguments specifically related to the preamble. *See generally* Prelim. Resp.

We have reviewed the evidence and argument, and on this current record, we preliminarily determine that Petitioner has presented sufficient evidence that Kuang teaches the preamble of claim 1.⁶

⁶ Neither party takes a position as to whether the preamble is limiting. *See generally* Pet.; Prelim. Resp. For purposes of this Decision, we make no finding as to whether the preamble is limiting because, regardless of whether the preamble is limiting, Petitioner shows sufficiently, for purposes of institution, that the prior art meets the recitation in the preamble.

ii. *Limitation 1[A]*

Limitation 1[A] recites “a master control unit electrically connected to the direct current power source, including a microcontroller and a voltage regulator electrically connected to the microcontroller.” Ex. 1001, 7:11–15.

Petitioner asserts that Kuang’s master node 103 coupled to battery 118 in Figure 1 teaches “a master control unit electrically connected to the direct current power source.” Pet. 9 (citing Ex. 1004, Fig. 1; Ex. 1003 ¶ 39). Petitioner relies on the annotated version of Kuang’s Figure 3 reproduced below:

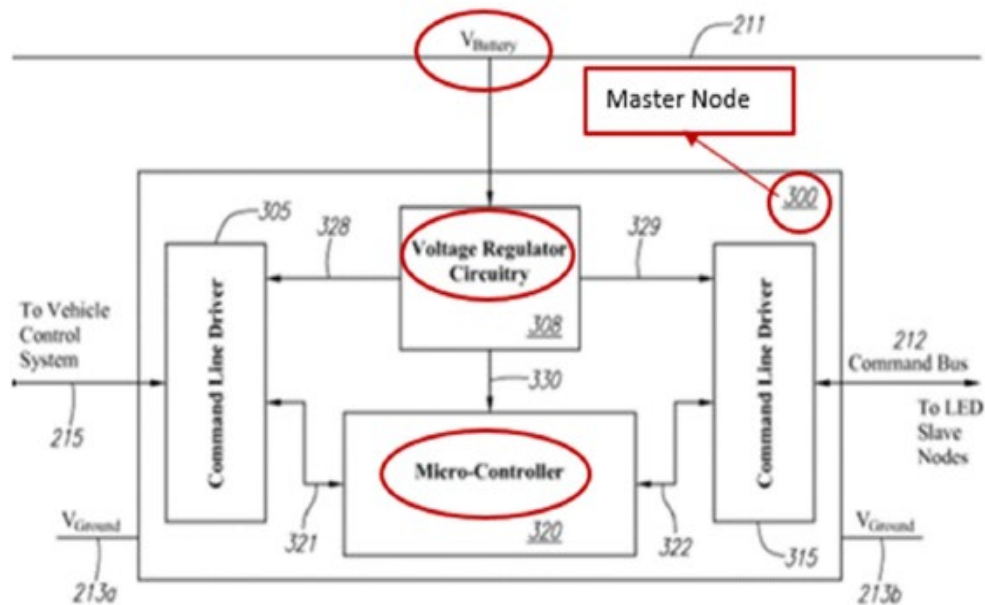


FIG. 3

Pet. 10 (annotated version of Ex. 1004, Fig. 3). Annotated Figure 3 of Kuang, above, shows master node 300 (identified, by Petitioner, by a red box labeled “Master Node”), which includes voltage regulator circuitry 308, micro-controller 320, and power from a battery, all of which are circled in

red by Petitioner. *See id.* Voltage regulator circuitry 308 receives a power signal from power supply line 211, and micro-controller 320 performs supervisory control and logic functioning of the lighting control system. *See* Ex. 1004 ¶¶ 39–40.

In referring to Figure 3 of Kuang, Petitioner states that Kuang’s master node 300 includes voltage regulator 308 and microcontroller 320. Pet. 9–10 (citing Ex. 1004 ¶¶ 39–40; Ex. 1003 ¶ 40). Petitioner asserts that Figure 3 of Kuang shows that voltage regulator 308 is “electrically connected” to microcontroller 320. *Id.* at 10–11 (citing Ex. 1004, Fig. 3, ¶ 39; Ex. 1003 ¶ 41).

At this stage, Patent Owner presents no arguments specifically related to limitation 1[A]. *See generally* Prelim. Resp.

We have reviewed the evidence and argument, and on this current record, we preliminarily determine that Petitioner has presented sufficient evidence that Kuang teaches limitation 1[A].

iii. Limitation 1[B]

Limitation 1[B] recites “at least a slave control unit electrically connected to the master control unit and the light-emitting diode light string.” Ex. 1001, 7:16–18.

Petitioner cites to Figure 1 of Kuang for disclosing a slave/LED node 102 that is electrically connected to master node 103 and LEDs 107. Pet. 11 (citing Ex. 1004, Fig. 1; Ex. 1003 ¶ 42). Further, Petitioner cites to Kuang for teaching “[t]he lighting control network 100 . . . comprises a plurality of network nodes including a **master node 103** and a **series of slave/LED nodes 102**, each of which constitutes or is associated with an LED-based lighting fixture having local electronic control but **responsive to the master**

node 103.” Pet. 12 (quoting Ex. 1004 ¶ 32 (emphasis added)) (citing Ex. 1003 ¶ 43). Petitioner also cites to Kuang for teaching that the “lighting control system 200 comprises a master node 203 and a series of LED-based lighting fixtures 202, each of which constitutes or is associated with *a slave/LED network node having local control electronics responsive to the master node 203.*” *Id.* (quoting Ex. 1004 ¶ 33 (emphasis added)) (citing Ex. 1003 ¶ 43).

Petitioner asserts that Kuang’s slave/LED nodes “must be ‘electrically connected’ to the LEDs . . . because the slave/LED nodes ‘control[] the LED-based lighting fixtures.’” Pet. 12 (citing Ex. 1004 ¶ 11). Petitioner further points to Figure 2B and paragraph 37 of Kuang to show the electrical connections between slave nodes 273 and LED units 274. *Id.* at 12–13. Petitioner relies on the annotated version of Kuang’s Figure 2B, reproduced below:

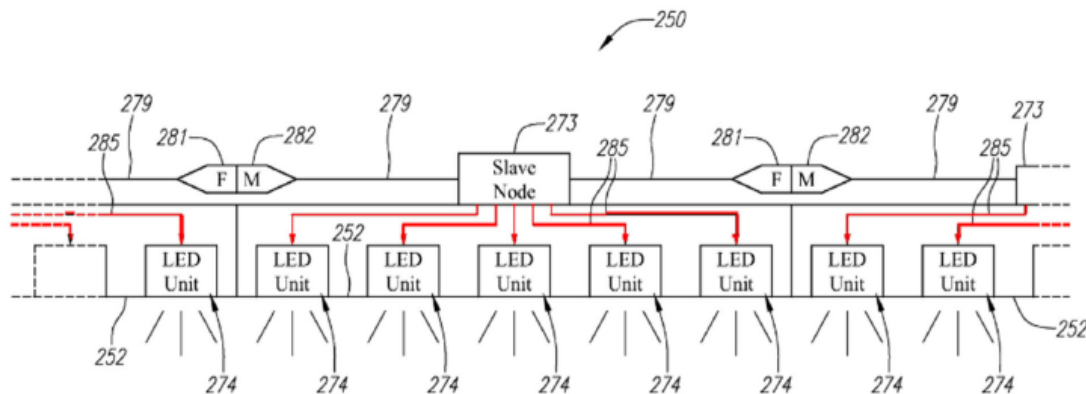


FIG. 2B

Id. at 13 (annotated version of Ex. 1004, Fig. 2B) (citing Ex. 1003 ¶ 44). Annotated Figure 2B of Kuang, above, shows lighting control system 250 including LED-based lighting fixtures 252 connected in series, in which each LED-based lighting fixture 252 includes one or more LED units 274

comprising a plurality of LEDs for illumination. Each LED-based lighting fixture 252 includes slave node 273, in which slave nodes 273 are coupled to LED units 274 through one or more control and/or power signals 285 (shown in red color by Petitioner). *See* Ex. 1004 ¶¶ 36–37.

At this stage, Patent Owner presents no arguments specifically related to limitation 1[B]. *See generally* Prelim. Resp.

We have reviewed the evidence and argument, and on this current record, we preliminarily determine that Petitioner has presented sufficient evidence that Kuang teaches limitation 1[B].

iv. Limitation 1[C]

Limitation 1[C] recites “a transmission line electrically connected to the master control unit and the slave control unit.” Ex. 1001, 7:19–20.

Petitioner cites to Figure 1 and paragraph 32 of Kuang and asserts that “a POSITA would have understood Kuang’s power/data bus 104 as meeting the ‘transmission line’ limitation,” in which Petitioner states that “[f]or example, a POSITA would have understood that a data bus is commonly defined as a wire or group of wires used to transmit data to or from a number of different locations.” Pet. 14 (citing Ex. 1004, Fig. 1, ¶ 32) (quoting Ex. 1003 ¶ 46). Petitioner contends that Figure 1 illustrates that “power/data bus 104 electrically connects the master node to the series of slave/LED nodes.” *See id.* (citing Ex. 1004, Fig. 1) (quoting Ex. 1003 ¶ 46). Petitioner relies on the annotated version of Kuang’s Figure 1, *id.* at 13–14, reproduced below:

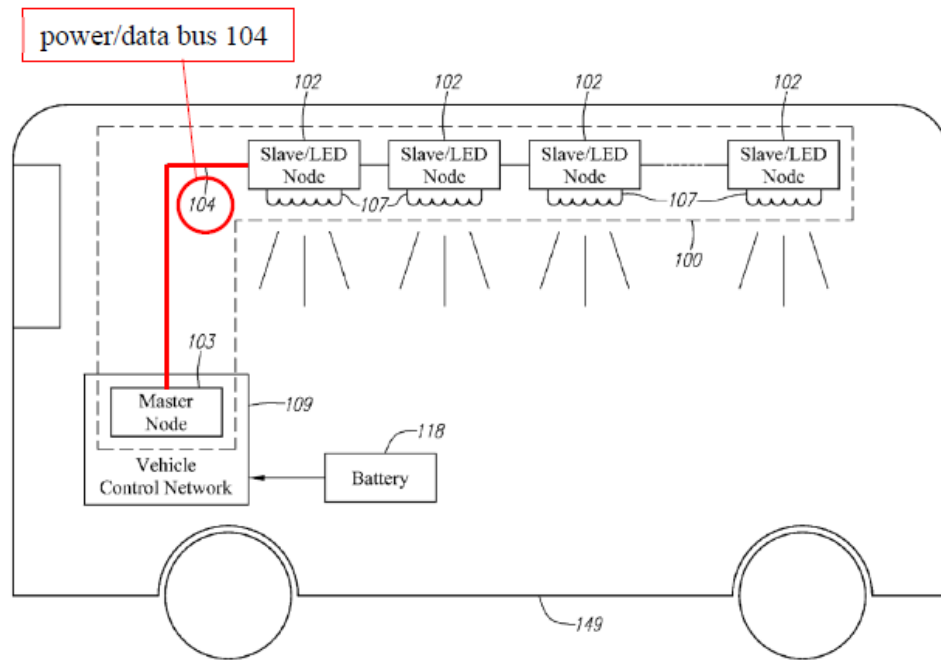


FIG. 1

Pet. 13–14 (annotated version of Ex. 1004, Fig. 1; Ex. 1003 ¶ 45). Annotated Figure 1 of Kuang, above, shows transit vehicle 149 with power/data bus 104 interconnecting the series of slave/LED nodes 102. *See* Ex. 1004 ¶ 32. Petitioner has circled the referenced numeral “104” in red color; added a red call-out box labeled “power/data bus 104”; and identified power/data bus 104 in red color. *See* Pet. 14.

In addition, Petitioner cites to Figure 2A and paragraph 33 of Kuang as illustrating a “transmission line” as “power supply line 211 or a command line 212, either of which are electrically connected to master node . . . and slave nodes 202.” Pet. 15 (citing Ex. 1004, Fig. 2A, ¶ 33) (quoting Ex. 1003 ¶ 47). Petitioner relies on the annotated version of Kuang’s Figure 2A, *id.* at 15, reproduced below:

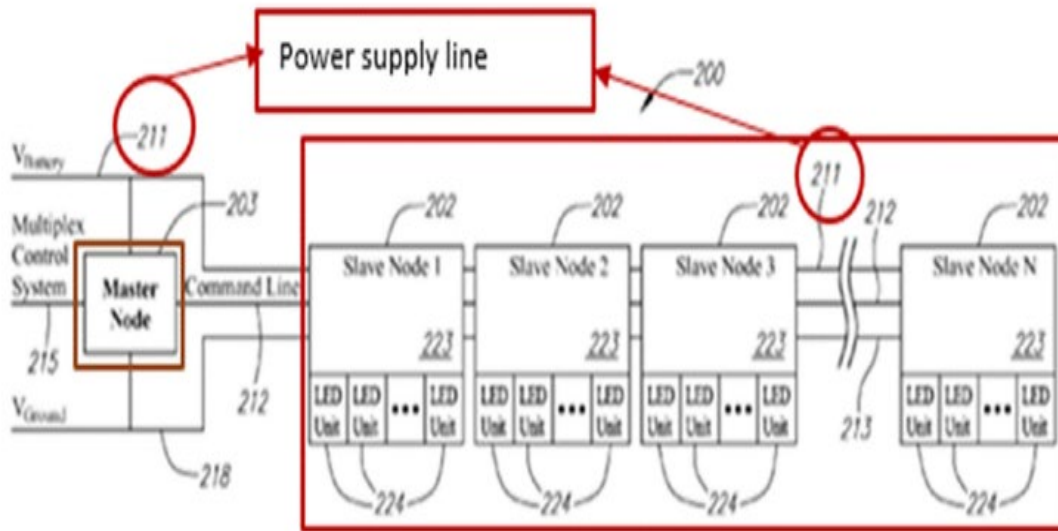


FIG. 2A

Pet. 15 (annotated version of Ex. 1004, Fig. 2A). Annotated Figure 2A of Kuang, above, shows lighting control system 200, which includes master node 203 and a series of LED-based lighting fixtures 202. Each LED-based lighting fixture 202 comprises slave node 223 and one or more LED units 224, in which each LED unit 224 comprises one or more LEDs for providing illumination. A power bus that comprises power supply line 211 from the vehicle battery and a ground line 218/213 is connected from master node 203 to each LED-based lighting fixture 202 and slave node 223 in series. *See* Ex. 1004 ¶ 33. Petitioner has circled in red color reference numerals “211”, and has added a brown rectangular box and a red rectangular box. The brown rectangular box surrounds “Master Node 203,” and the red rectangular box surrounds Slave Nodes 1, 2, 3, and N, including lines 211, 212, and 213 and LED units 224. Petitioner has also added a red call-out box, labeled “Power supply line” with arrows extending from lines 211 to this call-out box. *See* Pet. 15.

At this stage, Patent Owner presents no arguments specifically related to limitation 1[C]. *See generally* Prelim. Resp.

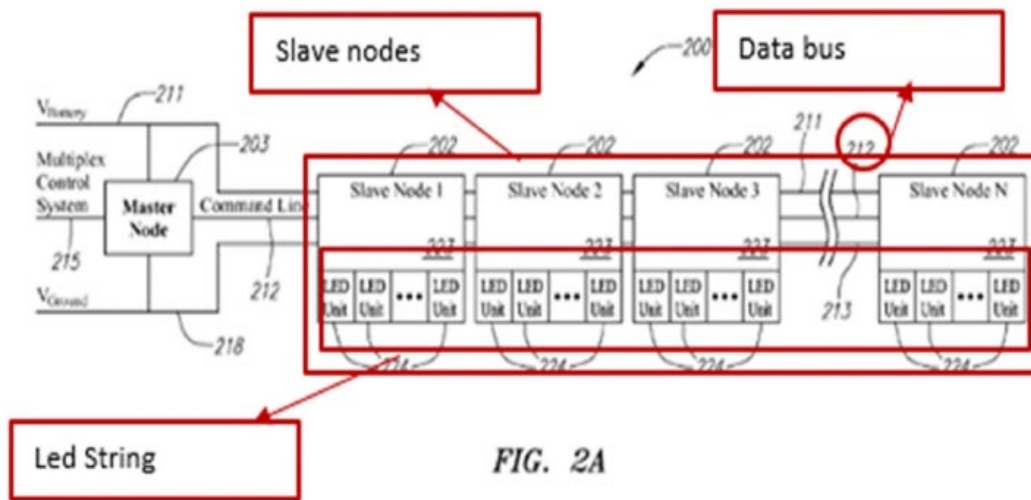
We have reviewed the evidence and argument, and on this current record, we preliminarily determine that Petitioner has presented sufficient evidence that Kuang teaches limitation 1[C]. We note, for instance, that the record reflects that element 104 is a “power/data bus” with the master node communicating and controlling slave nodes, which we preliminarily find to be sufficient to teach the limitation. *See* Ex. 1004 ¶¶ 32, 34, Fig. 1.

v. *Limitation 1[D]*

Limitation 1[D] recites “wherein the slave control unit is controlled by the master control unit to drive the light-emitting diode light string; the transmission line is used to transit control signals and synchronous signals.” Ex. 1001, 7:21–24.

First, we address the limitation “wherein the slave control unit is controlled by the master control unit to drive the light-emitting diode light string,” and then we turn to the limitation “the transmission line is used to transit control signals and synchronous signals.” Ex. 1001, 7:21–24.

Petitioner contends that Kuang’s Figure 2A illustrates “a master node (the claimed ‘master control unit’) driving slave nodes (the claimed ‘slave control units’) to drive the LEDs, including by transmitting control signals and synchronous signals.” Pet. 16 (citing Ex. 1004, Fig. 2A) (quoting Ex. 1003 ¶ 48). Petitioner relies on the annotated version of Kuang’s Figure 2A, *see id.*, reproduced below:



Pet. 16 (annotated version of Ex. 1004, Fig. 2A). Annotated Figure 2A of Kuang, above, depicts a high-level architectural diagram of lighting control system 200, showing master node 203, a series of LED-based lighting fixtures 202 and slave nodes 223, and multiple LED units 224 electrically connected to slave nodes 223. Petitioner identifies command/data bus 212, which is shown as connecting master node 203 to each LED-based lighting fixture 202 and slave node 223. *See* Ex. 1004 ¶ 33. Petitioner has circled in red color the reference numeral “212”; added a red call-out box labeled “Slave nodes” (with a red arrow extending from Slave Node 2 to this box); added a red call-out box labeled “Data bus” (with a red arrow extending from reference numeral 212 to this box); added a red call-out box labeled “Led String” (with a red arrow extending from the left-most reference numeral “224” to this box); and added a red rectangular box surrounding Slave Nodes 1, 2, 3, and N, including lines 211, 212, and 213 and LED units 224. *See* Pet. 16.

At this stage, Patent Owner presents no arguments specifically related to the merits of the arguments and evidence presented in the Petition as to

“wherein the slave control unit is controlled by the master control unit to drive the light-emitting diode light string” of limitation 1[D].

We have reviewed the evidence and argument, and on this current record, we preliminarily determine that Petitioner has presented sufficient evidence that Kuang teaches “wherein the slave control unit is controlled by the master control unit to drive the light-emitting diode light string” of limitation 1[D].

Next, we turn to the recitation that “the transmission line is used to transit control signals and synchronous signals.” Ex. 1001, 7:23–24. As discussed *supra* with respect to limitation 1[C], Petitioner relies on the following from Kuang as meeting the claimed “transmission line”: power/data bus 104 from Figure 1; power supply line 211 from Figure 2A; and/or command line 212 from Figure 2A.

With respect to the claimed “control signals,” Petitioner asserts that “Kuang explains that the master node sends ‘commands or queries’ to the slave nodes” and quotes Kuang: “The master node 203 may . . . **control** the various LED-based lighting fixtures 202, and slave nodes 223 thereof, through commands or queries transmitted over the command/data bus 212.” Pet. 16 (quoting Ex. 1004 ¶ 34 (emphasis added)) (citing Ex. 1003 ¶ 49).

In addition, with respect to the claimed “synchronous signals,” Petitioner states that “Kuang also discloses a master node that sends synchronous signals to all slave nodes, and in turn, all LEDs,” and asserts that “[i]n this context, a POSITA would have understood the term ‘synchronous signals’ to mean signals that are sent to the slave nodes to control their corresponding LED strings at the same time.” Pet. 16–17. Petitioner cites to Kuang at paragraph 54 for teaching “synchronous

signals”: “As explained in Kuang, ‘[a] master light shutoff command may also be sent from the master node 203 instructing *all* LED/slave nodes to turn off.’” *Id.* at 17 (quoting Ex. 1004 ¶ 54 (emphasis added)) (citing Ex. 1003 ¶ 50). Petitioner further cites to Kuang, as follows: “The micro-controller 420 may also respond to commands from the master node 203 to dim the LEDs 442 *on all or selected ones of the LED units 424.*” *Id.* (quoting Ex. 1004 ¶ 54 (emphasis added)) (citing Ex. 1003 ¶ 50).

Patent Owner disputes that Kuang meets limitation 1[D]. Prelim. Resp. 25–26. With respect to the claimed “control signals,” Patent Owner argues that “Petitioner points to the same passage in Kuang discussing commands that are sent over a command/data bus to control LED lighting fixtures,” and contends that “Petitioner errs by failing to explain how these ‘commands’ on a ‘data bus’ teach or amount to the claimed ‘control signals.’” *Id.* at 26 (citing Ex. 1004 ¶ 34). Patent Owner argues that Petitioner relies “on the commands in Kuang as meeting *both* the claimed ‘control signals’ and the ‘synchronous signals’ of 1[D].” *Id.*

Regarding the claimed “synchronous signals,” Patent Owner argues that there is no support for Petitioner’s assertion that “a POSITA would have understood the term ‘synchronous signals’ to mean signals that are sent to the slave nodes to control their corresponding LED strings at the same time.” Prelim. Resp. 25 (quoting Pet. 16–17). Patent Owner contends that “[t]here is no support for this assertion other than Petitioner’s expert declaration, Ex. 1003 at ¶ 50, which says nothing more than the Petition and should be given no weight.” *Id.*

Patent Owner further argues that “[e]ven taking Petitioner’s interpretation of ‘synchronous signals’ at face value, the Petition does not

establish that Kuang discloses the claim limitation or Petitioner’s own definition,” as “Petitioner does not explain how the ‘master light shutoff command’ in Kuang is a command ‘sent to the slave nodes to control their corresponding LED strings *at the same time*.’” Prelim. Resp. 25–26. Patent Owner asserts that “[a] command sent for ‘instructing all LED/slave nodes’ in Kuang says nothing about whether the LED/slave nodes are instructed to turn off *at the same time*.” *Id.* at 26.

On this current record, we determine that Petitioner has presented sufficient evidence that Kuang teaches limitation 1[D]. Specifically, Kuang discloses “a transmission line” at least by command line 212 shown in Figure 2A, and Kuang expressly discloses, as cited by Petitioner, that “master node 203 may also control the various LED-based lighting fixtures 202, and slave nodes 223” and “[c]ommands or inquiries may be transmitted from the master node 203 over the command/data bus 212 to the first slave node 223 (Slave Node 1),” in which first slave node 223 (Slave Node 1) “then propagates the commands or inquiries over the command/data bus 212 to the next slave node 223 (Slave Node 2) in the chain, and so on in sequence until the command or inquiry reaches the last slave node 223.” Ex. 1004 ¶ 34. The propagation of commands or inquiries transmitted over command/data bus 212 from master node 203 to slave node(s) 223 allows the master node to control the slave node(s) to, in turn, control LED-based lighting fixtures 202, as described in paragraph 34 of Kuang. *See* Pet. 16 (citing Ex. 1004 ¶ 34; Ex. 1003 ¶ 49). There is thus support for Petitioner’s contention that Kuang teaches “the transmission line is used to transit control signals.” *See also* Ex. 1004 ¶ 37.

With regard to “synchronous signals,” Kuang discloses, as cited by Petitioner, that “[a] master light shutoff command may also be sent from the master node 203 instructing all LED/slave nodes to turn off,” and “[t]he micro-controller 420 may also respond to commands from the master node 203 to dim the LEDs 442 on all or selected ones of the LED units 424.” Ex. 1004 ¶ 54 (emphases added). As discussed above, Petitioner asserts that “a POSITA would have understood the term ‘synchronous signals’ to mean signals that are sent to the slave nodes to control their corresponding LED strings at the same time.” Pet. 17. While Patent Owner argues that there is no support for this definition of “synchronous signals,” Patent Owner does not offer its own construction of this claim term. *See* Prelim. Resp. 25. Given that we construe terms in controversy only to the extent necessary to resolve the controversy, *see* discussion *supra* (Sec. III.B) (citing *Nidec*, 868 F.3d at 1017), we provide a preliminary interpretation of this term at this stage of the proceeding to determine whether to institute *inter partes* review.

We begin our interpretation of the term “synchronous signals” by examining the intrinsic evidence of record. *See DePuy Spine*, 469 F.3d at 1014 (citing *Phillips*, 415 F.3d at 1312–17). At this juncture, we find that the intrinsic evidence of record does not shed significant light on the meaning of this term. For example, the Specification of the ’546 patent does not expressly define “synchronous signals.” *See generally* Ex. 1001. Rather, throughout the disclosure in the Specification, the phrase “[t]he transmission line is used to transit control signals and synchronous signals” is only repeatedly recited. *See* Ex. 1001, code (57), 1:50–51, 2:66–67. In addition, the prosecution history does not appear to provide an express definition of “synchronous signals.” While we find that neither the Specification nor the

prosecution history provides an express definition of “synchronous signals,” we also do not discern, at this stage of the proceeding, that the Specification or the file history suggests that Petitioner sought to accord a meaning to the term different from its plain and ordinary meaning. Therefore, we consider the ordinary and accustomed meaning of the term.

In order to help determine the plain and ordinary meaning of the term “synchronous signals,” we refer to the definition of “synchronous” as follows:

synchronous:

adj. Occurring at the same time. In computer transmissions, a reference to activity governed by a clock or by synchronized timing.

Ex. 3001,⁷ 506.

In view of this definition, the ordinary meaning of the term “synchronous signals” appears to be transmitting signals related to an activity(ies) occurring at the same time.

As discussed above, Kuang discloses a command sent from master node 203 that instructs all LED/slave nodes to turn off or a command from master node 203 to dim the LEDs on all LED units 424, in which these commands are electrically transmitted over command/data bus 212. *See* Ex. 1004 ¶¶ 34, 54. These commands disclosed in Kuang therefore are for transmitting signals related to the activity of turning off or dimming *all* LED units. Patent Owner argues that Kuang’s “command sent for ‘instructing all LED/slave nodes’ . . . says nothing about whether the LED/slave nodes are instructed to turn off *at the same time*.” Prelim. Resp. 26. However, we note

⁷ *Microsoft Computer Dictionary* 506 (5th ed. 2002).

that Kuang expressly provides for a master light shutoff command to instruct “all” LED/slave nodes to turn off. *See* Ex. 1004 ¶ 54. Turning off “all” LED/slave nodes with a single command, i.e., a master light shutoff command, appears to suggest that all of the LED/slave nodes are turned off at the same time. On this current record, we therefore preliminarily determine that Petitioner has presented sufficient evidence that Kuang teaches “the transmission line is used to transit . . . synchronous signals.”

With regard to Patent Owner’s assertion that Petitioner relies on the same passage, paragraph 34, in Kuang for teaching both the claimed “control signals” and “synchronous signals,” *see* Prelim. Resp. 26, as discussed, Kuang teaches that the master node uses signals for control of slave nodes and the LED lights (Ex. 1004 ¶ 34) and also teaches the use of synchronous signals that turn off all of the LED/slave nodes at the same time (*id.* ¶ 54). On this preliminary record, we determine that Petitioner’s identification of these teachings in Kuang is sufficient. We note, however, that Patent Owner’s arguments potentially raise the issue of the distinction between the terms “control signal” and “synchronous signal,” and, to the extent that applies, we invite the parties to provide briefing on the issue.

We have reviewed the evidence and argument, and on this current record, we preliminarily determine that Petitioner has presented sufficient evidence that Kuang teaches limitation 1[D].

vi. Conclusion for Claim 1

Accordingly, we are persuaded that Petitioner has demonstrated a reasonable likelihood that it would prevail in showing that claim 1 would have been obvious over Kuang.

b. Dependent Claim 2

Claim 2 recites “[t]he driving apparatus for light-emitting diode curtain lamp in claim 1, wherein the slave control unit includes a signal processor.” Ex. 1001, 7:25–27.

Petitioner provides evidence and argument that claim 2 would have been obvious over Kuang in view of the general knowledge of a person of ordinary skill in the art. Pet. 17–20.

For example, Petitioner asserts that Kuang’s slave node 423 of Figure 4 “includes a micro-controller 420 which can serve as the claimed ‘signal processor.’” Pet. 19. Petitioner cites to paragraph 43 of Kuang, which describes Figure 4 as follows: “The micro-controller 420 performs the local control and logic functions required by the lighting control system for causing the LEDs of the LED units 424 to turn on and off, dim, flash if necessary,” and “the micro-controller 420 would be understood to include appropriate memory . . . , interfaces, and drivers, as well as logic circuitry including, for example, a microprocessor, FPGA [Field-Programmable Gate Array], or other programmable logic.” Pet. 19–20 (quoting Ex. 1004 ¶ 43).

At this stage, Patent Owner does not present any arguments specific to claim 2.

We have reviewed the evidence and argument and, on this current record, we preliminarily determine that Petitioner has presented sufficient evidence that the prior art teaches the limitation of claim 2. Specifically, micro-controller 420 in Figure 4 of Kuang is described as performing the “local control and logic functions . . . for causing the LEDs of the LED units 424 to turn on and off, dim, flash.” Ex. 1004 ¶ 43. At a minimum, performing “local control and logic functions” for causing the LEDs of LED

units 424 to “turn on and off, dim, flash,” indicates the use of signals. We therefore preliminarily conclude that Kuang’s micro-controller 420 may therefore be considered a “signal processor,” and Kuang therefore sufficiently teaches claim 2. We thus need not rely on the knowledge of a person of ordinary skill in the art to modify the teachings of Kuang. Accordingly, we conclude Petitioner has shown a reasonable likelihood that it would prevail in its challenge to claim 2 as unpatentable under 35 U.S.C. § 103 over Kuang.

3. *Conclusion Regarding Ground 1*

As discussed, we preliminarily determine that Petitioner has shown a reasonable likelihood that it would prevail in its challenge to at least claims 1 and 2 as unpatentable, which is sufficient for institution. *See* 35 U.S.C. § 314(a). However, to provide guidance to the parties and streamline the issues for trial, we discuss below at least some of the other challenges asserted in the Petition.

E. ASSERTED GROUND 5: OBVIOUSNESS OF CLAIM 4 OVER HIROYUKI IN VIEW OF THE GENERAL KNOWLEDGE OF A PERSON OF ORDINARY SKILL IN THE ART

Petitioner contends that claim 4 is unpatentable under 35 U.S.C. § 103(a) as obvious over Hiroyuki in view of the general knowledge of a person of ordinary skill in the art. Pet. 49–66. In support, Petitioner relies upon the Schubert Declaration. *See id.*; Ex. 1003.

We begin our discussion with a brief summary of Hiroyuki and then address the evidence and arguments presented.

1. Hiroyuki (Ex. 1007)

Hiroyuki is a Japanese patent application publication titled, “Illumination Apparatus,” filed on February 16, 2005, and published on August 31, 2006. Ex. 1007,⁸ codes (12), (22), (43), (54). Hiroyuki discloses that the invention “relates to an illumination apparatus comprising a plurality of lighting units connecting a plurality of LEDs in series.” *Id.* ¶ 3; *see id.* at code (57).

Hiroyuki discloses an illumination apparatus that can achieve “miniaturization, thinness, and low cost.” Ex. 1007 ¶ 9. In an exemplary embodiment, an illumination apparatus performs line lighting, in which the apparatus comprises a master unit 1 and a plurality of slave units 2 connected in sequence. *Id.* ¶ 15. As shown in Figure 1 of Hiroyuki, master unit 1 includes housing 3, panel 4, LED group 5, and master drive unit 6. *Id.* Slave unit 2 is electrically connected to master unit 1, in which slave unit 2 includes housing 3a, panel 4, LED group 5a, and slave drive unit 7. *Id.* An AC power source supplies AC power. *Id.* ¶ 16. Figure 1 of Hiroyuki is reproduced below:

⁸ As noted above, we refer to Exhibit 1007, which is a certified translation of JP2006-228529, published August 31, 2006 (Ex. 1006, code (43)) (“Hiroyuki”).

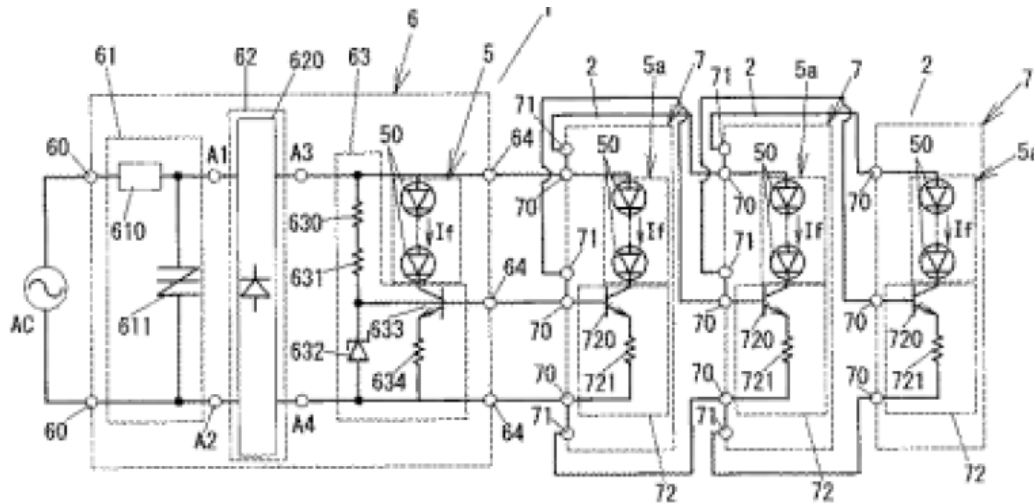


Fig. 1

Figure 1, above, shows “the master drive unit 6 includes the terminal units 60, 60 [sic], a protective circuit unit 61, a conversion circuit unit 62, a constant current circuit unit (lighting circuit unit) 63, and terminal units 64, 64, 64 [sic],” which are shown “in order from the AC power supply side on a circuit board (not shown) different from the LED board (not shown).” *Id.*

¶ 22. Further, Figure 1 illustrates that “terminals 60, 60 are electrically connected to the AC power supply via a cable 32 and an AC outlet 33 (see FIG. 2)” and that “terminal units 64, 64, 64 are electrically connected to the slave unit 2.” *Id.*

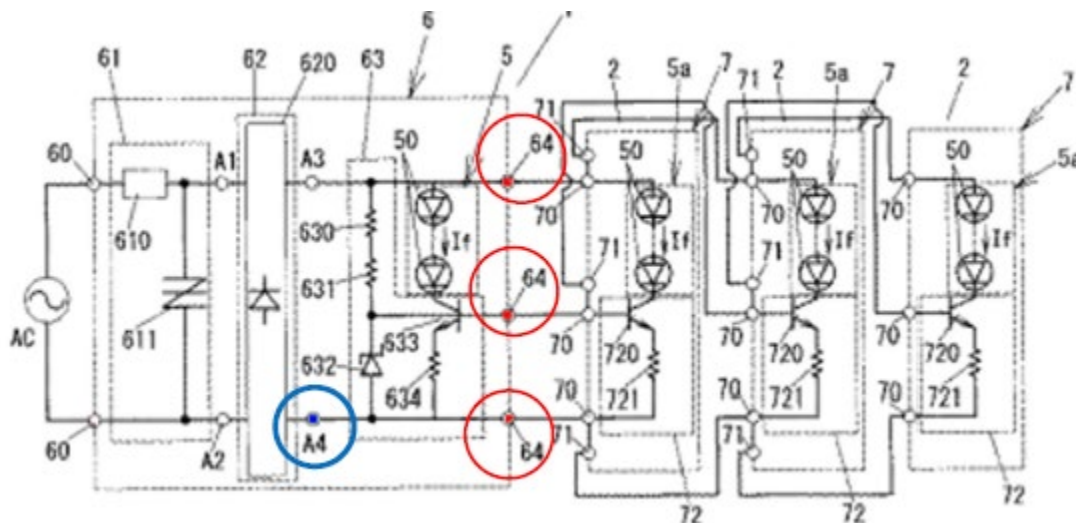
2. Discussion

Petitioner argues that Hiroyuki in view of the general knowledge of a person of ordinary skill in the art discloses the preamble of claim 4 (4[Pre]) and limitations 4[A], 4[B], 4[C], and 4[D]. At this stage, Patent Owner presents no arguments specifically related to the preamble of claim 4 (4[Pre]) or to limitations 4[B], 4[C], or 4[D]. *See generally* Prelim. Resp. While we have considered Petitioner’s contentions in support of the unpatentability of each limitation of claim 4, we direct our discussion here to

the parties' arguments with respect to limitation 4[A].

Limitation 4[A] recites “a master control unit including a power negative terminal pin of master control unit and a signal output pin of master control unit, the master control unit being electrically connected to the alternating current power source.” Ex. 1001, 7:35–39.

Petitioner cites to Figure 1 and paragraph 22 of Hiroyuki for the disclosure of master drive unit 6 that is electrically connected to the AC power source. Pet. 52–53 (citing Ex. 1007 ¶ 22, Fig. 1; Ex. 1003 ¶ 97). Petitioner cites to Figures 1 and 2 and paragraphs 22, 24, and 33 of Hiroyuki for the disclosure of the claimed “signal output pin” and “power negative terminal pin.” Pet. 52–55. Petitioner contends that “[a] POSITA would have understood the terminal units 64 at the master drive unit 6 to represent ‘signal output pins’ and the negative terminal unit A4 at the master drive unit 6 to represent a ‘power negative terminal pin’ as claimed,” and provides an annotated version of Hiroyuki’s Figure 1 as reproduced below:



Id. at 54 (annotated version of Ex. 1007, Fig. 1). Annotated Figure 1 of Hiroyuki, above, shows master drive unit 6 (represented by a dashed-line

box housing multiple components) electrically connected to three slave drive units 7 (represented by three dashed-line boxes, each housing multiple components). Master drive unit 6 includes terminal units 64, 64, 64, which are circled in red color by Petitioner and are located on the right side of the dashed-line box representing master drive unit 6. Terminal units 64, 64, 64 electrically connect to slave drive units 7 depicted in Figure 1. *See* Ex. 1007 ¶ 22. Petitioner has also circled element “A4” in annotated Figure 1 in blue color.⁹

Petitioner further asserts that “a POSITA would have understood Hiroyuki’s ‘terminal’ notation to correspond to ‘terminal pin’ or ‘output pin’ as claimed,” and states that “[f]or example, a POSITA would have understood a ‘pin’ to be ‘[a] **terminal** on a connector, plug, or tube base.’” Pet. 55 (quoting Ex. 1003 ¶ 100; *see* Ex. 1009,¹⁰ 566). Petitioner next contends that “[t]he words ‘terminal’ and ‘pin’ typically imply an electrical end point at which an electrical connection is made to another unit” and that “[a] ‘pin’ can be understood as a pointed terminal, indicating that ‘terminal’ encompasses a ‘pin.’” *Id.* (quoting Ex. 1003 ¶ 100).

On the other hand, Patent Owner asserts that “Hiroyuki does not disclose pins.” Prelim. Resp. 29. Patent Owner argues that “Petitioner’s

⁹ Petitioner refers to “A4” as a “negative terminal unit” in the Petition. Pet. 54. However, Hiroyuki does not expressly describe “A4” as a “negative terminal unit.” *See generally* Ex. 1007. Instead, Hiroyuki refers to A4 in the context of, for example, “[t]he master drive unit 6a of Embodiment 2 has A1, A2, A3 and A4 in FIG. 4 connected to A1, A2, A3 and A4 in FIG. 1, respectively.” *Id.* ¶ 36; *see also id.* at ¶¶ 39, 43.

¹⁰ Excerpts from Rudolf F. Graf, *Modern Dictionary of Electronics* (7th ed. 1999).

proposed definition of ‘pin’ does not make sense in the context of claim 4, because the claim already recites the word ‘terminal’ in the term ‘terminal pin.’” *Id.* at 30. Further, Patent Owner disputes that terminals 60 and terminal units 64 of Hiroyuki disclose the “power negative terminal pin” and the “signal output pin,” respectively, of limitation 4[A]. *Id.* However, Patent Owner does not provide its own definition of these claimed terms on the current record before us.

We have considered the parties’ arguments with respect to Hiroyuki and limitation 4[A]. At a minimum, we note that the Schubert Declaration at paragraph 100 does not offer evidentiary support for its statements that “[t]he words ‘terminal’ and ‘pin’ typically imply an electrical end point at which an electrical connection is made to another unit” and that “[a] ‘pin’ can be understood as a pointed terminal, indicating that ‘terminal’ encompasses a ‘pin.’” *See* Ex. 1003 ¶ 100; Prelim. Resp. 30; *see also* Prelim. Resp. 20 (discussing conclusory assertions in an expert declaration). Because there are therefore questions of claim construction with regard to at least the claimed “power negative terminal pin” and “signal output pin” that are not sufficiently developed on the current record before us at this stage of the proceeding, we preliminarily determine that Petitioner’s showing for claim 4 is deficient. The parties may present additional briefing on issues related to claim 4 during trial.

F. ASSERTED GROUND 6: OBVIOUSNESS OF CLAIM 8 OVER HIROYUKI IN
VIEW OF KUANG

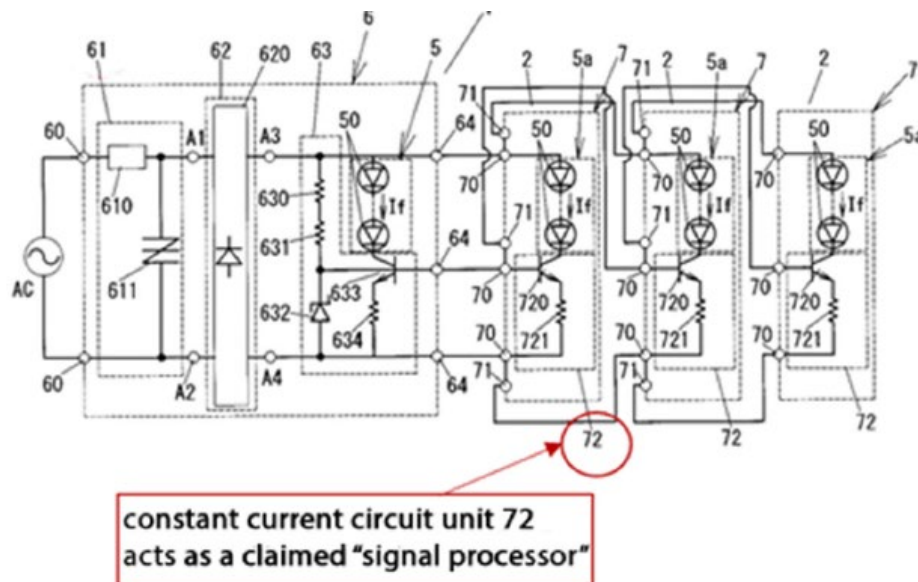
Petitioner contends that claim 8 is unpatentable under 35 U.S.C. § 103(a) as obvious over Hiroyuki in view of Kuang. Pet. 66, 72–82. In support, Petitioner relies upon the Schubert Declaration. *See id.*; Ex. 1003.

Petitioner argues that Hiroyuki in view of Kuang discloses the preamble of claim 8 (8[Pre]) and limitations 8[A], 8[B], 8[C], and 8[D]. At this stage, Patent Owner presents no arguments specifically related to the preamble of claim 8 (8[Pre]) or to limitations 8[A], 8[C], or 8[D]. *See generally* Prelim. Resp. While we have considered Petitioner’s contentions in support of the unpatentability of each limitation of claim 8, we direct our discussion here to the parties’ arguments with respect to limitation 8[B].

Limitation 8[B] recites “wherein the master control unit includes a microcontroller, the slave control unit includes a signal processor.”

Ex. 1001, 8:34–35.

Petitioner asserts that constant current circuit unit 72 shown in Figure 1 of Hiroyuki “acts as a claimed ‘signal processor.’” Pet. 75–76. Petitioner relies on the annotated version of Hiroyuki’s Figure 1, as reproduced below:



Pet. 76 (annotated version of Ex. 1007, Fig. 1). Annotated Figure 1 of Hiroyuki, above, shows constant current circuit unit 72 in slave drive unit 7

of slave unit 2. *See* Ex. 1007, code (57), ¶¶ 24, 30. In annotating Figure 1, Petitioner has circled (in red color) reference numeral “72”, and has added a red call-out box labeled “constant current circuit unit 72 acts as a claimed ‘signal processor,’” in which Petitioner has added a red arrow extending from the call-out box to reference numeral “72”. *See* Pet. 76.

Specifically, Petitioner cites to paragraphs 24 and 30 of Hiroyuki and asserts that “a POSITA would have understood the constant current circuit unit 72 in Hiroyuki to meet the ‘signal processor’ limitation as claimed because it regulates the power supply to keep its output current constant in spite of changes in load, line, or temperature.” Pet. 76–77 (quoting Ex. 1003 ¶ 127). Beyond this indication of why a person of ordinary skill in the art would have understood the constant current circuit unit 72 of Hiroyuki to constitute the claimed “signal processor,” Petitioner does not offer an interpretation of “signal processor,” and neither does the Schubert Declaration. *See generally* Pet.; Ex. 1003.

Patent Owner argues that “[t]here is nothing in Hiroyuki indicating that the constant current circuit unit 72 is a ‘signal processor,’” and asserts that, “[i]nstead, Hiroyuki describes that ‘the constant current circuit unit 72’ includes ‘a transistor 720 and a resistor 721 connected in series.’” Prelim. Resp. 33. Further, Patent Owner contends that “[t]here is no support for [the] purported ‘understanding of a POSITA’ other than Petitioner’s expert declaration, Ex. 1003 at ¶ 127, which says nothing more than the Petition and should be given no weight.” Prelim. Resp. 34. While Patent Owner disputes Petitioner’s interpretation of “signal processor,” Patent Owner does not provide its own interpretation of this claimed term on the current record before us. *See id.* at 33–35.

We have considered the parties' arguments with respect to Hiroyuki and limitation 8[B]. As noted above, Petitioner does not offer an interpretation of "signal processor." It is therefore not clear, at this juncture, why, according to the Schubert Declaration at paragraph 127, "a POSITA would have understood the constant current circuit unit 72 in Hiroyuki to meet the 'signal processor' limitation as claimed because it regulates the power supply to keep its output current constant in spite of changes in load, line, or temperature." *See* Ex. 1003 ¶ 127; *see also* Prelim. Resp. 33–35. Because there are therefore questions of claim construction with regard to at least the claimed "signal processor" that are not sufficiently developed on the current record before us at this stage of the proceeding, we preliminarily determine that Petitioner's showing for claim 8 is deficient. The parties may present additional briefing on issues related to claim 8 during trial.

G. REMAINING CHALLENGES

As set forth in Section II.E above, Petitioner additionally challenges claim 3 as unpatentable over Kuang and Debevec; claims 1, 2, and 8 as unpatentable over Lys in view of the general knowledge of a person of ordinary skill in the art; claim 3 as unpatentable over Lys in view of Debevec; and claims 5 and 6 as unpatentable over Hiroyuki in view of Kuang. *See* Pet. 3, 20–49, 66–74. Patent Owner expressly disputes at least some of these contentions and asserts additional arguments related thereto in support of denying the Petition. *See* Prelim. Resp. 6–35. On the record before us, we have considered the parties' additional challenges and arguments. However, given that Petitioner's showing is sufficient with regard to at least Ground 1, as discussed *supra*, we need not, for purposes of

institution, further address the additional grounds proffered by Petitioner, or Patent Owner’s additional arguments related thereto, at this juncture.

Because we determine above that Petitioner has demonstrated a reasonable likelihood of prevailing in its challenge of at least one claim of the ’546 patent, we institute *inter partes* review on all claims and grounds. *See* 37 C.F.R. § 42.108(a) (“When instituting . . . 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.”).

IV. CONCLUSION

For the above reasons, we have determined that there is a reasonable likelihood that Petitioner would prevail with respect to at least one of claims 1–6 and 8 challenged in the Petition. Accordingly, we institute an *inter partes* review of all challenged claims based on all asserted grounds of unpatentability set forth in the Petition. *See* 35 U.S.C. § 314(a)(1) (2018); 37 C.F.R. § 42.108(a); *SAS Inst., Inc. v. Iancu*, 138 S. Ct. 1348, 1354, 1359–60 (2018); Patent Trial and Appeal Board Consolidated Trial Practice Guide (Nov. 2019)¹¹ at 5 (“The Board will not institute on fewer than all claims or all challenges in a petition.”).

V. ORDER

Upon consideration of the record before us, it is:

ORDERED that, pursuant to 35 U.S.C. § 314(a), an *inter partes* review of claims 1–6 and 8 of the ’546 patent is hereby instituted based on all grounds set forth in the Petition; and

¹¹ Available at <https://www.uspto.gov/TrialPracticeGuideConsolidated>.

FURTHER ORDERED that, pursuant to 35 U.S.C. § 314(c) and 37 C.F.R. § 42.4(b), an *inter partes* review of claims 1–6 and 8 of the '546 patent shall commence on the entry date of this Decision, and notice is hereby given of the institution of trial.

IPR2024-00156
Patent 8,884,546 B2

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