

UNITED STATES PATENT AND TRADEMARK OFFICE

BEFORE THE PATENT TRIAL AND APPEAL BOARD

ADVANCED LIGHTING CONCEPTS LLC,
Petitioner

v.

MATE LLC.,
Patent Owner

Case No. IPR 2023-1266

U.S. Patent No. 8,957,601

PETITION FOR *INTER PARTES* REVIEW OF U.S. PATENT NO. 8,957,601

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PETITIONER'S EXHIBIT LIST

<u>EXHIBIT</u>	<u>DESCRIPTION</u>
Ex. 1001	U.S. Patent No. 8,957,601
Ex. 1002	Declaration of Joseph McAlexander
Ex. 1003	Curriculum Vitae of Joseph McAlexander
Ex. 1004	File Wrapper for U.S. Patent No. 8,957,601
Ex. 1005	U.S. Patent Application No. 20070267984 to Peng
Ex. 1006	U.S. Patent Application No. 20050162101 to Leong
Ex. 1007	U.S. Patent No. 5,640,061 to Bornhurst
Ex. 1008	U.S. Patent Application No. US20080191642 to Slot.
Ex. 1009	March 22, 2023 Case Management Order (Dkt. 35)
Ex. 1010	Time to Trial for the Southern District of California
Ex. 1011	<i>What Is an LED Driver & Which Driver Do I Need?</i> , Ultra LEDs, https://www.ultraleds.co.uk/what-is-led-driver-what-driver-do-i-need (last visited July 29, 2023).
Ex. 1012	Yijie Wang, et al., <i>A Review of LED Drivers and Related Technologies</i> , 64 IEEE TRANSACTIONS ON INDUS. ELECTRONICS 5754, 5754 (July 2017)
Ex. 1013	U.S. Patent No. 7,902,769 to Shteynberg

I. INTRODUCTION

Petitioner requests *Inter Partes* Review (“IPR”) of claims 1-5, 8, 10-12, 14, 15, and 17 (the “Challenged Claims”) of U.S. Patent No. 8,957,601 (“the ‘601 Patent”).

This petition (IPR2023-1266) is part of a set of **six** petitions, including IPR2023-01257, IPR2023-01258, IPR2023-01264, IPR2023-01265, and IPR2023-01259, which challenge claims of related U.S. Patent Nos. 8,525,446 (“the ‘446 Patent”), 8,957,601 (“the ‘601 Patent”), 9,049,759 (“the ‘759 Patent”), 9,078,310 (“the ‘310 Patent”), 9,320,093 (“the ‘093 Patent”) and 9,591,713 (“the ‘713 Patent”) (collectively, the “Challenged Patents”), respectively. Petitioner requests that the USPTO combine the schedule, discovery, and hearing of these six IPRs.

II. MANDATORY NOTICES

A. Real Parties-in-Interest (37 C.F.R. § 42.8(b)(1))

The sole real party-in-interest is Advanced Lighting Concepts LLC (“Petitioner”).

B. Related Matters (37 C.F.R. § 42.8(b)(2))

The ‘601 Patent is related to a district court litigation pending in the Southern District of California. mate, LLC (“Patent Owner”) asserted the ‘601 Patent, ‘759 Patent, ‘310 Patent, ‘093 Patent, and ‘713 Patent, and the ‘446 Patent against

Petitioner in the following case: *mate, LLC v. Advanced Lighting Concepts LLC (dba Environmental Lights)*, 3:22-cv-01095-CAB-DEB (S.D. Cal.).

C. Counsel (37 C.F.R. § 42.8(b)(3)) and Service Information (37 C.F.R. § 42.8(b)(3)-(4))

Petitioner designates Winston O. Huff (Reg. No. 51,825) as lead counsel for this matter and designates Jamil N. Alibhai (*pro hac vice* forthcoming) as backup counsel for this matter.

Postal mailings and hand-deliveries for lead and backup counsel should be addressed to: Winston O. Huff, Munsch Hardt Kopf & Harr, 500 N. Akard, Suite 3800, Dallas, TX 75201 (Telephone: 214.855.7500; Fax 214.855.7584).

Pursuant to 37 C.F.R. § 42.8(b)(4), Petitioner consents to e-mail service at: EL-mate-IPRs@munsch.com. In compliance with 37 C.F.R. § 42.10(b), a Power of Attorney is filed concurrently herewith.

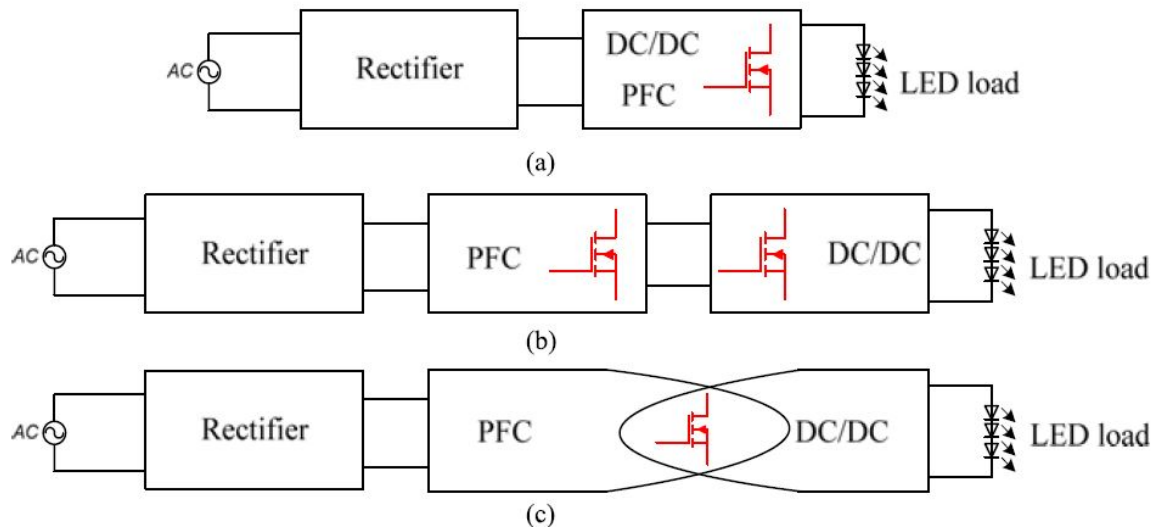
III. CERTIFICATION AND FEES

Petitioner certifies that the ‘601 Patent is available for IPR and that the Petitioner is not barred or estopped from requesting *inter partes* review of claims 1-5, 8, 10-12, 14, 15, and 17 of the ‘601 Patent identified in this Petition.

Any additional fees for this IPR may be charged to Deposit Account No. DA505990.

IV. TECHNOLOGY AT ISSUE

The Challenged Patents relate to LED drivers. “LED drivers are devices that regulate and supply the power used to ‘drive’ runs of LED strip lights. Similar to traditional transformers, they convert mains voltage (240v AC) into a lower value (usually 12 or 24v).” *What Is an LED Driver & Which Driver Do I Need?*, ULTRA LEDs, <https://www.ultraleds.co.uk/what-is-led-driver-what-driver-do-i-need> (last visited July 29, 2023) (Ex. 1011). “Generally speaking, the driver circuit plays a significant role in dominating the energy efficiency, which means the system efficiency can be further improved via an appropriate driver circuit. Traditional LED systems are based on single-stage or two-stage LED drivers.” Yijie Wang, et al., *A Review of LED Drivers and Related Technologies*, 64 IEEE TRANSACTIONS ON INDUS. ELECTRONICS 5754, 5754 (July 2017) (Ex. 1012). A single-stage LED driver is a DC/DC converter with a constant output current that can obtain power factor (PF) correction (PFC), while a two-stage system consists of a PFC circuit and a DC/DC converter as shown below. *Id.*



Id. at 5756, fig. 3.

[D]ue to the unique characteristics of LEDs, a current loop is always included in the [DC/DC stage] in order to acquire constant current control. Moreover, in practical applications when several strings of LEDs are adopted, a current balance stage may also be required. The advantage of the above two LED drivers is that they are easy to design with more accurate control. However, one of the drawbacks of single stage converters is the high value of the storage capacitor, which also increases the volume of the driver. As for the two-stage system, more devices are needed, which means the cost is quite high and reliability is relatively low.

Id. at 5754-55.

“In recent years, many integrated-stage topologies are designed for the sake of efficiency and cost.” *Id.* at 5755. “In order to obtain high PF and low total harmonic distortion (THD), a topology which performs PFC characteristics as PFC

stage is usually chosen, and a [DC/DC] stage is selected according to the power level of the system.” *Id.* Due to the integration technology, the PFC stage and DC/DC stage can be simplified into one stage by sharing active power switches and control circuits. Therefore, the cost and size of the system are reduced while ensuring high efficiency, high reliability, and fast output dynamics. *Id.*

V. OVERVIEW OF THE ‘601 PATENT

The ‘601 Patent describes a “configurable light emitting diode (LED) driver/dimmer for controlling a set of light fixture loads.” Ex. 1001, Abstract. The ‘601 Patent purports to address the considerable challenges faced by lighting companies “in adopting SSL technology due to their unfamiliarity and lack of expertise in the driving and dimming requirements for LEDs.” Ex. 1001, 1:34-37.

The ‘601 Patent further notes:

With the rapid increase in light emitting diode (LED) efficacies for high powered LEDs, the latest technologies have exceeded incandescent and halogen sources and are now starting to compete with fluorescent, mercury vapour, metal halide and sodium lighting. In addition to better energy usage, LEDs also have considerable advantages over traditional light sources such as long life, better durability, and improved color generating abilities.

Ex. 1001, 1:16-23.

“In recent years, controllable power sources for Solid State Lighting (“SSL”) applications have entered the market with integrated features. In addition, digital

controllers within power sources have enabled the development of configurable options to provide a wider flexibility of solutions for [SSL] applications.” Ex. 1001, 1:27-32. The ‘601 Patent states “[t]he ability to dim the light output of LEDs is also important to reduce energy consumption.” Ex. 1001, 1:32-33.

VI. THE ALLEGED INVENTION

The claims of the ‘601 Patent are generally directed to a configurable LED driver for controlling a set of light fixture loads. Ex. 1001, Abstract.

VII. SUMMARY OF PROSECUTION HISTORY

The application that issued as the ‘601 Patent (US13/466,509) was filed on May 8, 2012, and is a continuation-in-part of U.S. Patent Application No. 13/059,336 filed September 17, 2009, which claims the benefit of U.S. Provisional Application No. 61/097,963 filed on September 18, 2008.

In a first Office Action, several claims were rejected as being obvious in view of (1) Reisenauer et al. (US 2010/0231136) in view of Meyer (US2010/0066267) and (2) Reisenauer et al. To accelerate prosecution, Applicant amended claim 1 to include the subject matter of the break out module being “electronically” connected to the output of the LED driver. Ex. 1004 at 151. With respect to independent claim 19, the applicant argued that “neither ‘136 nor ‘267 disclose the subject matter of splitting or regrouping constant current outputs. Further amendments have been

made to claim 19 to more clearly identify the claimed subject matter.” Ex. 1004 at 151.

In a second Office Action, several claims were rejected as being anticipated or obvious. Applicant amended independent claim 2 to include the subject matter of the break out module including power connectors to more clearly differentiate the claimed subject matter from Lo. Ex. 1004 at 115. Claim 19 was amended to be directed a method of configuring and powering a set of light fixture loads in a LED low voltage distribution system. Ex. 1004 at 71.

On June 19, 2014, the Applicant file a Request for Continued Examination (RCE) in response to an April 23, 2014 Advisory Action. Ex. 1004 at 110. In the RCE, the Applicant amended claim 2 to recite that the break out module receives power from the LED driver via a set of input channels and delivers power to the set of light fixture loads via a set of output channels: and splits the set of input channels into individual output channels and added new claim 21 which further recital that the break out module changes the number of output channels from the number of input channels. Ex. 1004 at 11.

In a third Office Action, several claims were rejected as being anticipated by or obvious. Applicant yet again amended claim 2 to note that the break out module includes power connectors. Ex. 1004 at 115. After an Examiner’s interview, the pending claims were allowed. Ex. 1004 at 55. In the Notice of Allowance allowing

claims 2-5, 8-18, 20-22, 24, and 25, the Examiner noted that the prior art did not teach a breakout module electrically connected to an output of the LED driver and the set of light fixture loads, the break-out module including power connectors; wherein the break-out module receives power from the LED driver via a set of input channels and delivers power to the set of light fixture loads via a set of output channels. Ex. 1004 at 52-53.

VIII. OVERVIEW OF THE PRIOR ART

A. Peng (Ex. 1005)

U.S. Patent Application No. 2007/0267984 A1 (“Peng”) was filed on August 18, 2006, and was published on November 22, 2007. Peng is prior art to the ‘601 Patent under pre-AIA § 102(a). Peng teaches a system and method for dimming a LED and more particularly, an isolated dimmable LED ballast driver. Ex. 1005, 1[0002], figs. 3-5.

B. Leong (Ex. 1006)

U.S. Patent Application No. 2005/0162101 A1 (“Leong”) was filed on February 7, 2005, and is a continuation-in-part of application No. 10/822,579, filed on April 12, 2004, now Patent No. 6,853,151, which is a continuation-in-part of application No. 10/299,870, filed on November 19, 2002, now Patent No. 6,762,562. Leong was published on July 28, 2005, and is prior art to the ‘601 Patent under pre-AIA § 102(a). Leong teaches:

A power saving device for a light emitting diode (LED) lamp mounted to an existing fixture for a fluorescent lamp having a ballast assembly and LEDs positioned within a tube and electrical power delivered from the ballast assembly to the LEDs. The LED lamp includes means for controlling the delivery of the electrical power from the ballast assembly to the LEDs wherein the use of electrical power can be reduced or eliminated automatically during periods of non-use. Such means for controlling can include an on-off switch mounted in the tube or can also include a current driver dimmer mounted in the tube that regulates the amount of power delivered to the LEDs.

Ex. 1006, Abstract, figs. 5, 14A-E, 15-17, 31-32, 76A-79B.

C. Bornhorst (Ex. 1007)

U.S. Patent No. 5,640,061 (“Bornhorst”) was filed on November 5, 1993, and issued on June 17, 2005. Bornhorst is prior art to the ‘601 Patent under pre-AIA § 102(b). Bornhorst teaches a:

Modular lamp power supply system comprising a rack-mountable chassis accepting lamp power supply modules which may be either controlled-voltage power supplies (dimmers) for incandescent lamps or, alternatively, controlled-power lamp power supplies for arc lamps. Each rack-mountable chassis includes an output connector that provides a plurality of lamp power circuits, each consisting of at least two conductors for lamp power and at least one conductor for a ground connection; each of the conductors may be doubled or tripled to provide

adequate current carrying capability while utilizing a smaller and more flexible gauge of wire.

Ex. 1007, 2:6-17.

D. Slot (Ex. 1008)

U.S. Patent Application No. 2008/0191642 (“Slot”) was filed on April 7, 2006, and was published on August 14, 2008. Slot is prior art to the ‘601 Patent under pre-AIA § 102(b). Slot teaches “methods and apparatuses for electronically driving LEDs for lighting applications.” Ex. 1008, 1[0001]. Slot provides:

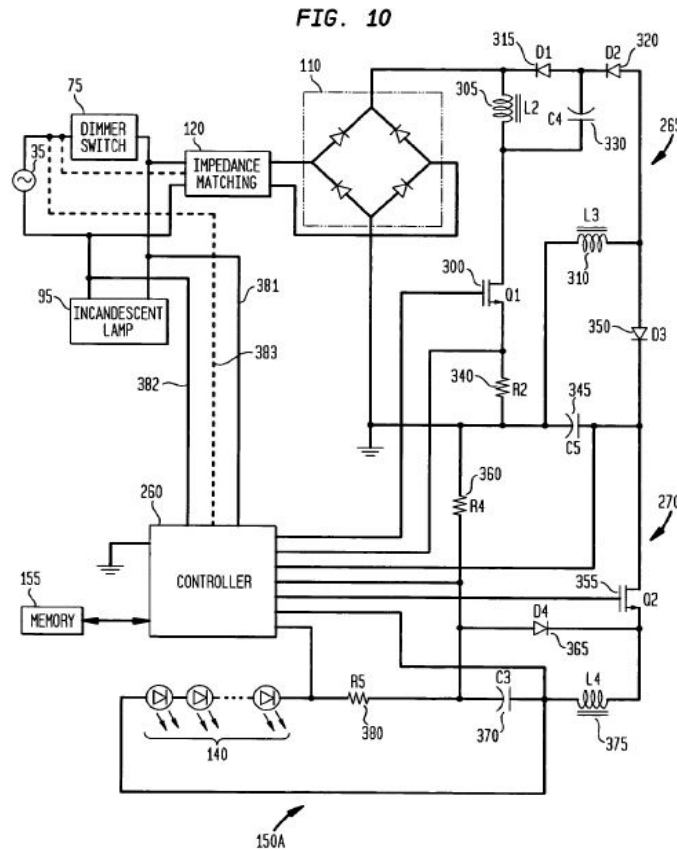
[t]he object of the invention is to implement an energy-efficient, compact, and cost-effective solution for driving a number of high-power LED groups for lighting applications, by using a single switching power supply together with LEDs connected in series and/or in parallel and pulse width-controlled switches in parallel across the individually controllable LED groups.

Ex. 1008, Abstract.

E. Shteynberg (Ex. 1013)

U.S. Patent No. 7,902,769 (“Shteynberg”) was filed on January 19, 2007, and claims priority to provisional application No. 60/760,157 filed on January 20, 2006. Shteynberg was issued on March 8, 2011, and is prior art to the ‘601 Patent under pre-AIA § 102(a). Shteynberg teaches a “system, apparatus, and method for supplying power to solid state lighting devices, such as for providing power to light

emitting diodes ('LEDs') and LEDs integrated with digital controllers or processors." Ex. 1013, 1:19-22, fig. 7, 8, & 10.



Ex. 1013, fig. 10.

As illustrated in Figure 10 of Shteynberg,

the switching power supply 150A is coupled via impedance matching circuit 120 to a phase modulation module/dimmer, such as a dimmer switch 75, and is intended to operate in the second mode of operation mentioned above. The switching power supply 150A is implemented in two stages, an AC/DC converter 265 and a buck converter 270. The AC/DC converter 265 is utilized to provide a high input impedance,

thereby eliminating the high input capacitance that the single stage approaches have (and which can cause triacs of dimmers to misfire, as previously mentioned). This first stage will convert a relatively poor, phased modulated AC voltage into a manageable DC voltage, while the second stage (buck converter 270) will perform LED driving using current PWM, through switching transistor 355 (Q2).

The quadratic AC/DC converter 265 portion of switching power supply 150A is connected to the dimmer switch 75 via an impedance matching circuit 120. The AC/DC converter 265 comprises major elements such as switch Q1 (300), inductors L2 (305) and L3 (310), capacitors C4 (330) and C5 (345), diodes D1 (315) and D2 (320), and current sense resistor R2 (340). Buck converter 270 portion of switching power supply 150A generally comprises a switching transistor Q2 (355) (for dimming), inductor L4 (375), capacitor C3 (370), and current sense resistor R4 (360). The switching power supply 150A also comprises controller 260, which provides the functionality of the controller 160 previously discussed, and the additional functionality discussed below.

Ex. 1013, 13:61-14:21.

As examined above,

the controller 260 may determine V_{RMS} using measurements from connections to the output of dimmer switch 75 on lines 381 and 382; may determine $V_{NOMINAL}$ using measurements from connections to the output of dimmer switch 75 on lines 381 and 382, using measurements from connections to the AC line voltage 35 on lines 382 and 383

(dashed line), or using stored parameter values. The controller 260 correspondingly adjusts the duty cycle of the pulse-width modulation of current provided to the LEDs 140 through switching transistor 355 (Q2).

Ex. 1013, 14:22-31.

Importantly, Shteynberg discloses:

[A] “controller” or “processor” 160, 260 may be any type of controller or processor, and may be embodied as one or more controllers 160, 260, adapted to perform the functionality discussed in the ‘759 Patent specifically Shteynberg discloses that a controller 160, 260 may include use of a single integrated circuit (“IC”), or may include use of a plurality of integrated circuits or other components connected, arranged or grouped together, such as controllers, microprocessors, digital signal processors (“DSPs”), parallel processors, multiple core processors, custom ICs, application specific integrated circuits (“ASICs”), field programmable gate arrays (“FPGAs”), adaptive computing ICs, associated memory (such as RAM, DRAM, and ROM), and other ICs and components. As a consequence, as used herein, the term controller (or processor) should be understood to equivalently mean and include a single IC, or arrangement of custom ICs, ASICs, processors, microprocessors, controllers, FPGAs, adaptive computing ICs, or some other grouping of integrated circuits which perform the functions discussed below, with associated memory, such as microprocessor memory or additional RAM, DRAM, SDRAM, SRAM, MRAM, ROM, FLASH, EPROM or E²PROM.

...

Equivalently, when the controller 160, 260 may be implemented in whole or part as FPGAs, custom ICs, and/or ASICs, the FPGAs, custom ICs, or ASICs also may be designed, configured and/or hard-wired to implement the methodology of the invention. For example, the controller 160, 260 may be implemented as an arrangement of controllers, microprocessors, DSPs, and/or ASICs, collectively referred to as a “controller”, which are respectively programmed, designed, adapted, or configured to implement the methodology of the invention, in conjunction with a memory 155.

Ex. 1005, 18:8-29, 39-49

These references were not previously considered by the Office.

IX. CLAIM CONSTRUCTION

“In an *inter partes* review proceeding, a claim of a patent . . . shall be construed using the same claim construction standard that would be used to construe the claim in a civil action . . . , including construing the claim in accordance with the ordinary and customary meaning of such claim as is understood by” a person of ordinary skill in the art (“POSITA”). 37 C.F.R. § 42.100(b). Each claim term challenged by this Petition should be construed in accordance with its ordinary and customary meaning for the purposes of resolving the issues raised in this Petition.

X. GROUNDS FOR PETITION

A. Ground 1: Peng anticipates Claims 1, 10, 11, 14, and 15

Independent claims 1 and 15 and dependent claims 10, 11, 14, and 15 of the ‘601 Patent are anticipated by Peng under 35 U.S.C. § 102.

1. Claim 1

- a. 1[p] - Apparatus for configuring and powering a set of light fixture loads in a light emitting diode (LED) low voltage distribution system comprising:**

To the extent that the Board finds that the preamble is limiting, Peng discloses:

[e]mbodiments of the present disclosure include an LED ballast circuit for dimming one or more LEDs using a phase controlled dimmer switch. The LED ballast circuit has a power conditioning unit which includes a substantially fixed duty cycle clock for outputting a clock cycle and a transformer configured to store energy and discharge a substantial portion of the stored energy once per clock cycle in order to power one or more LEDs. The LED ballast circuit and load collectively behaves like a resistor.

Ex. 1005, Abstract.

Peng further discloses “[t]he present invention relates to a system and method for dimming a light emitting diode (LED). More particularly, the present invention relates to an isolated dimmable LED ballast driver.” Ex. 1005, 1[0002].

A POSITA would understand that the ballast assembly described in Peng functions as an LED driver which is configurable and can provide power to the

LEDs. Ex. 1002, ¶¶58-59. A POSITA would further understand that the LED ballast circuit is analogous to the apparatus for configuring and powering a set of light fixture loads. *Id.* Peng thus discloses an apparatus for configuring and powering a set of light fixture loads in a light emitting diode (LED) low voltage distribution system.

- b. 1(a) - an LED driver including a power circuit having at least one power limit and a set of output current drivers connected to the at least one power limit in the power circuit**

Peng discloses the power circuit having a power limit and a set of output currents connected to the power limit.

Peng discloses:

a method of dimming an LED using a phase control-based dimmer is disclosed. The method includes the steps of providing an LED; providing an LED driver comprising a constant duty cycle and constant frequency clock and a transformer; providing a phase control-based dimmer adapted to alter power supplied to the LED driver by a power supply; and supplying power to the transformer as a function of the duty cycle so as to charge the transformer.

Ex. 1005, 2[0019].

Peng further describes:

[The] “overload-protection feature enables the circuit to limit the voltage supplied to the LEDs to prevent the remaining LEDs, or the rest of the circuit, from being damaged. When the voltage across the

primary windings 351, and thus the LEDs, rises, the voltage increase is reflected across the second secondary windings 353. This will cause the Voltage across capacitor 330 to increase approximately proportional with the second secondary winding 353 output voltage. Resistor 319 and 325 divide this voltage down to a lower level and compare with the IC 324 reference voltage 378. If the divided voltage on VFB 372 exceeds the internal reference voltage, the IC 324 will automatically reduce the VCOMP371 voltage output, which will, in turn, reduce the duty cycle, reducing the amount of time the MOSFET 333 is gated on.

Ex. 1005, 5[0052]-[0053].

A POSITA would understand that the overload-protection feature employing IC 324 to reduce the VCOMP of Peng is equivalent to the power limit of the ‘601 Patent. Ex. 1002, ¶60.

With respect to the output circuit drivers, Peng discloses: “the driver 605 comprises a case 901 that encloses electrical components and circuitry for power conditioning, such as, for example, a ballast circuit.” Ex. 1005, 3[0072].

Finally, Peng discloses “[i]n yet another embodiment, the power conditioning unit comprises an over-Voltage protector configured to automatically adjust the duty cycle to prevent damage due to a non-normal operating condition in which the load voltage exceeds a rated voltage of the fixture.” Ex. 1005, 1[0007].

A POSITA would understand power conditioning unit comprises including the driver 605 of Peng is equivalent to the set of output circuit drivers of the ‘601 Patent.

Ex. 1002, ¶¶60-61. A POSITA would further understand from the disclosure above that a power conditioning unit discloses an over voltage protection circuit (i.e., a power limit). Id. Thus, Peng discloses an LED driver including a power circuit having at least one power limit and a set of output current drivers connected to the at least one power limit in the power circuit.

c. 1(b) - a break-out module electrically connected to an output of the LED driver and the set of light fixture loads, the break-out module including power connectors;

Peng discloses the break out module electrically connected to an output of the LED driver and the set of light fixture loads, the break-out module including power connectors of the '601 Patent. For example, Peng discloses

FIG. 1 illustrates one embodiment of a phase controlled dimmer-LED lighting scheme. A phase controlled dimmer 101 has a user adjustable control lever 103. The phase controlled dimmer 101 is operably connected to an LED ballast 105 which is operably connected to a lighting unit 106 comprising one or more LEDs 107. In operation, the LEDs 107 are responsive to the LED ballast circuit 105. The LED ballast circuit is responsive to the output of the phase controlled dimmer 101. The output of the phase controlled dimmer 101 is responsive to the lever 103 position. Thus, the LEDs 107 produce an amount of light responsive to the user adjusted position of the lever 103.

Ex. 1005, 3[0038].

A POSITA would understand that the LED ballast circuit of Peng is analogous to the break-out module of the '601 Patent because a POSITA would know that a ballast regulates current and separately produces regulated current to each connected light. Ex. 1002, ¶62. Moreover, a POSITA would understand, based on the disclosure in Peng, that the LED ballast is connected to LEDs which serves as a light fixture load. *Id.* Therefore, Peng discloses a break-out module electrically connected to an output of the LED driver and the set of light fixture loads.

- d. 1(c) - wherein the break-out module receives power from the LED driver via a set of input channels and delivers power to the set of light fixture loads via a set of output channels; and**

Peng discloses the break out module receives power from the LED driver via a set of input channels and delivers power to the set of light fixture loads via a set of output channels. As discussed above, Peng discloses a break out module that delivers power to a set of light fixture loads. *Supra* Section X.A.1.c. Peng additionally discloses:

The phase controlled dimmer 101 is operably connected to an LED ballast 105 which is operably connected to a lighting unit 106 comprising one or more LEDs 107. In operation, the LEDs 107 are responsive to the LED ballast circuit 105. The LED ballast circuit is responsive to the output of the phase controlled dimmer 101.

Ex. 1005, 3[0038].

Further, Peng discloses “[a]s the switch on the phase controlled dimmer is adjusted, more or less of the waveform is effectively removed by the phase controlled dimmer. These outputted phase controlled waveforms are then supplied to the inputs of an LED ballast circuit.” Ex. 1005, 3[0040]. Finally, Peng discloses:

[t]he driver 605 comprises a case 901 that encloses electrical components and circuitry for power conditioning, such as, for example, a ballast circuit. A pair of flexible conductors 903 are configured to connect to line voltage such as 120 VAC and to communicate such line voltage to the driver circuitry. In one embodiment, the flexible conductors 903 connect to the output of a phase controlled dimmer switch which is connected to a voltage. The circuitry within the driver steps down the voltage and rectifies it into a DC voltage that is appropriate for the module.

Ex. 1005, 7[0072].

A POSITA would understand that the outputted phase controlled waveforms supplied to the inputs of an LED ballast circuit are analogous to the break out module receiving power from the LED driver. Ex. 1002, ¶63. Similarly, a POSITA would understand that the LED ballast 105 being operably connected to a lighting unit 106 is analogous to the break out module delivering power to the set of light fixture loads. *Id.* Thus, Peng discloses the break-out module receives power from the LED driver via a set of input channels and delivers power to the set of light fixture loads via a set of output channels.

e. 1(d) - splits the set of input channels into individual output channels;

Peng discloses the splitting the set of input channels into individual output channels of the '601 Patent. For example, Peng discloses:

[f]or example, instead of single LED modules arranged in parallel, one, two, three or more groups of one or more serially-arranged LED modules may be arranged so that the groups are in parallel. In still further embodiments, groups may not necessarily include only LED modules but can include other electrically-powered devices corresponding to the fixture, such as lighting sensors, RF generators and/or receivers, a controller, or the like. Such devices may be provided alone or in combination with other devices and/or LED modules. As discussed above, preferably one model of a ballast circuit may appropriately power a plurality of fixtures/loads that are configured to work with the ballast's rated voltage. After an initial adjustment for the particular load, the ballast operates normally, providing a constant duty cycle and switching frequency, and thus behaves substantially like a resistor.

Ex. 1005, 6[0058].

A POSITA would understand that Peng's disclosure of using one model of a ballast circuit to power a plurality of fixtures/loads is analogous to splitting the set of input channels into individual output channels. Ex. 1002, ¶64. As such, Peng

discloses splitting the set of input channels into individual output channels as required by claim 1 of the '601 Patent.

f. 1(e) - wherein the LED driver is located remotely from the set of light fixture loads.

Peng discloses a LED driver located remotely from the set of light fixture loads. For example, Peng discloses:

FIG. 1 illustrates one embodiment of a phase controlled dimmer-LED lighting scheme. A phase controlled dimmer 101 has a user adjustable control lever 103. The phase controlled dimmer 101 is operably connected to an LED ballast 105 which is operably connected to a lighting unit 106 comprising one or more LEDs 107. In operation, the LEDs 107 are responsive to the LED ballast circuit 105. The LED ballast circuit is responsive to the output of the phase controlled dimmer 101. The output of the phase controlled dimmer 101 is responsive to the lever 103 position.

Ex. 1005, 3[0038].

A POSITA would recognize that the LED driver is located a distance away from the lights and can be controlled by the lever. Ex. 1002, ¶65. As such, Peng discloses the LED driver is located remotely from the set of light fixture loads as required by Claim 1 of the '601 Patent.

2. Claim 11

Claim 11 depends from independent claim 1. Peng anticipates claim 1 for the reasons discussed above and incorporated herein. *Supra* Section X.A.1. Claim 11 of the '601 Patent requires that "the LED driver and the break-out module are integrated together." Ex. 1001, 15:25-26. The additional limitation of claim 11 is disclosed by Peng.

For example, Peng discloses "[t]he driver 605 comprises a case 901 that encloses electrical components and circuitry for power conditioning, such as, for example, a ballast circuit." Ex. 1005, 7[0072]. Therefore, Peng discloses the LED driver and the break-out module are integrated together. As such, claim 11 is anticipated by Peng.

3. Claim 14

Claim 14 depends from independent claim 1. Peng anticipates claim 1 for the reasons discussed above and incorporated herein. *Supra* Section X.A.1. Claim 14 of the '601 Patent requires that "[t]he apparatus of claim 1 further comprising a DC/DC converter." Ex. 1001, 16:1-2. The additional limitation of claim 14 is disclosed by Peng.

For example, Peng discloses

FIG. 3A illustrates an example of the rectified phase controlled waveform of FIG. 2D. FIG. 3B illustrates the rectified waveform after

being regulated by the input capacitor 310. The voltage then feeds through transistor 314, regulated by zener 315, and charges storage capacitor 330. Resistors 312 and 313 are used to modify the current provided to charge the capacitor 330. Storage capacitor 330 provides a substantially constant DC voltage to IC 324. This allows the IC 324 to have a proper supply voltage even at lower, including zero voltage, voltage portions of each AC cycle.

Ex. 1005, 3[0042].

Peng further discloses “[i]n one embodiment, IC 324 is a standard current mode control PWM. In one embodiment, the IC 324 is a UC3845 IC commercially available from Fairchild Semiconductor™, Motorola™, or Texas Instruments™ among other IC manufacturers.” Ex. 1005, 3[0043].

A POSITA would understand that the UC3845 IC is a high-performance fixed-frequency current-mode controller designed for DC-to-DC converter applications. Ex. 1002, ¶66. Therefore, Peng discloses the primary and secondary controllers are digital controllers. As such, claim 14 is anticipated by Peng.

4. Claim 15

- a. 15[p] - Apparatus for configuring and powering a set of light fixture loads in a light emitting diode (LED) low voltage distribution system comprising:**

To the extent that the Board finds that the preamble is limiting, Peng discloses:

[e]mbodiments of the present disclosure include an LED ballast circuit for dimming one or more LEDs using a phase controlled dimmer switch. The LED ballast circuit has a power conditioning unit which includes a substantially fixed duty cycle clock for outputting a clock cycle and a transformer configured to store energy and discharge a substantial portion of the stored energy once per clock cycle in order to power one or more LEDs. The LED ballast circuit and load collectively behave like a resistor.

Ex. 1005, Abstract.

Peng further discloses “[t]he present invention relates to a system and method for dimming a light emitting diode (LED). More particularly, the present invention relates to an isolated dimmable LED ballast driver.” Ex. 1005, 1[0002].

A POSITA would readily understand that the LED ballast circuit is analogous to the apparatus for configuring and powering a set of light fixture loads. Ex. 1002, ¶¶ 58-59 A POSITA would further understand that the LED ballast circuit is analogous to the apparatus for configuring and powering a set of light fixture loads. *Id.* Peng thus discloses an apparatus for configuring and powering a set of light fixture loads in a LED low voltage distribution system.

- b. 15(a) - an LED driver including a power circuit having at least one power limit and a set of output current drivers connected to the at least one power limit in the power circuit;**

Peng discloses the power circuit having a power limit and a set of output currents connected to the power limit. Peng discloses:

a method of dimming an LED using a phase control-based dimmer is disclosed. The method includes the steps of providing an LED; providing an LED driver comprising a constant duty cycle and constant frequency clock and a transformer; providing a phase control-based dimmer adapted to alter power supplied to the LED driver by a power supply; and supplying power to the transformer as a function of the duty cycle so as to charge the transformer.

Ex. 1005, 2[0019].

Peng further describes:

[t]he overload-protection feature enables the circuit to limit the voltage supplied to the LEDs to prevent the remaining LEDs, or the rest of the circuit, from being damaged. When the voltage across the primary windings 351, and thus the LEDs, rises, the voltage increase is reflected across the second secondary windings 353. This will cause the Voltage across capacitor 330 to increase approximately proportional with the second secondary winding 353 output voltage. Resistor 319 and 325 divide this voltage down to a lower level and compare with the IC 324 reference voltage 378. If the divided voltage on VFB 372 exceeds the internal reference voltage, the IC 324 will automatically reduce the

VCOMP371 voltage output, which will, in turn, reduce the duty cycle, reducing the amount of time the MOSFET 333 is gated on.

Ex. 1005, 5[0052]-[0053].

A POSITA would understand that the overload-protection feature employing IC 324 to reduce the VCOMP of Peng is equivalent to the power limit of the ‘601 Patent. Ex. 1002, ¶67.

With respect to the output circuit drivers, Peng discloses “[t]he driver 605 comprises a case 901 that encloses electrical components and circuitry for power conditioning, such as, for example, a ballast circuit.” Ex. 1005, 3[0072].

Finally, Peng discloses “[i]n yet another embodiment, the power conditioning unit comprises an over-voltage protector configured to automatically adjust the duty cycle to prevent damage due to a non-normal operating condition in which the load voltage exceeds a rated voltage of the fixture.” Ex. 1005, 1[0007].

A POSITA would understand power conditioning unit comprises including the driver 605 of Peng is equivalent to the set of output circuit drivers of the ‘601 Patent. Ex. 1002, ¶68. A POSITA would further understand from the disclosure above that a power conditioning unit discloses an over voltage protection circuit (i.e., a power limit). *Id.* Thus, Peng discloses an LED driver including a power circuit having at least one power limit and a set of output current drivers connected to the at least one power limit in the power circuit.

- c. 15(b) - a break-out module electrically connected to an output of the LED driver and the set of light fixture loads, the break-out module including power connectors;**

Peng discloses the break-out module electrically connected to an output of the LED driver and the set of light fixture loads, the break-out module including power connectors of the '601 Patent. For example, Peng discloses:

FIG. 1 illustrates one embodiment of a phase controlled dimmer-LED lighting scheme. A phase controlled dimmer 101 has a user adjustable control lever 103. The phase controlled dimmer 101 is operably connected to an LED ballast 105 which is operably connected to a lighting unit 106 comprising one or more LEDs 107. In operation, the LEDs 107 are responsive to the LED ballast circuit 105. The LED ballast circuit is responsive to the output of the phase controlled dimmer 101. The output of the phase controlled dimmer 101 is responsive to the lever 103 position. Thus, the LEDs 107 produce an amount of light responsive to the user adjusted position of the lever 103.

Ex. 1005, 3[0038].

A POSITA would understand that the LED ballast circuit of Peng is analogous to the break-out module of the '601 Patent because a POSITA would know that a ballast regulates current and separately produces regulated current to each connected light. Ex. 1002, ¶62. Moreover, a POSITA would understand, based on the disclosure in Peng, that the LED ballast is connected to LEDs which serves as a light fixture

load. *Id.* Therefore, Peng discloses a break-out module electrically connected to an output of the LED driver and the set of light fixture loads.

- d. **15(c) - wherein the break-out module receives power from the LED driver via a set of input channels and delivers power to the set of light fixture loads via a set of output channels; and**

Peng discloses the break-out module receives power from the LED driver via a set of input channels and delivers power to the set of light fixture loads via a set of output channels. As discussed above, Peng discloses a break out module that delivers power to a set of light fixture loads. *Supra* Section X.A.1.c. Peng additionally discloses:

[t]he phase controlled dimmer 101 is operably connected to an LED ballast 105 which is operably connected to a lighting unit 106 comprising one or more LEDs 107. In operation, the LEDs 107 are responsive to the LED ballast circuit 105. The LED ballast circuit is responsive to the output of the phase controlled dimmer 101.

Ex. 1005, 3[0038].

Further, Peng discloses “[a]s the switch on the phase controlled dimmer is adjusted, more or less of the waveform is effectively removed by the phase controlled dimmer. These outputted phase controlled waveforms are then supplied to the inputs of an LED ballast circuit.” Ex. 1005, 3[0040]. Finally, Peng discloses:

The driver 605 comprises a case 901 that encloses electrical components and circuitry for power conditioning, such as, for example,

a ballast circuit. A pair of flexible conductors 903 are configured to connect to line voltage such as 120 VAC and to communicate such line voltage to the driver circuitry. In one embodiment, the flexible conductors 903 connect to the output of a phase controlled dimmer switch which is connected to a voltage. The circuitry within the driver steps down the voltage and rectifies it into a DC voltage that is appropriate for the module.

Ex. 1005, 7[0072].

A POSITA would understand that the outputted phase controlled waveforms supplied to the inputs of an LED ballast circuit are analogous to the break out module receiving power from the LED driver. Ex. 1002, ¶63. Similarly, a POSITA would understand that the LED ballast 105 being operably connected to a lighting unit 106 is analogous to the break out module delivering power to the set of light fixture loads. *Id.* ¶¶63-64. Thus, Peng discloses the break-out module receives power from the LED driver via a set of input channels and delivers power to the set of light fixture loads via a set of output channels.

e. 15(d) – wherein the break-out module regroups the number of output channels from the number of input channels;

Peng discloses the regrouping the set of input channels into individual output channels of the '601 Patent. For example, Peng discloses:

[f]or example, instead of single LED modules arranged in parallel, one, two, three or more groups of one or more serially-arranged LED modules may be arranged so that the groups are in parallel. In still

further embodiments, groups may not necessarily include only LED modules but can include other electrically-powered devices corresponding to the fixture, such as lighting sensors, RF generators and/or receivers, a controller, or the like. Such devices may be provided alone or in combination with other devices and/or LED modules. As discussed above, preferably one model of a ballast circuit may appropriately power a plurality of fixtures/loads that are configured to work with the ballast's rated voltage. After an initial adjustment for the particular load, the ballast operates normally, providing a constant duty cycle and switching frequency, and thus behaves substantially like a resistor.

Ex. 1005, 6[0058].

A POSITA would understand that Peng's disclosure of using one model of a ballast circuit to power a plurality of fixtures/loads is analogous to regrouping the number of output channels from the number of input channels. Ex. 1002, at ¶64. As such, Peng discloses regrouping the number of output channels from the number of input channels as required by claim 1 of the '601 Patent.

f. 15(e) - wherein the LED driver is located remote from the set of light fixture loads.

Peng discloses a LED driver located remotely from the set of light fixture loads. For example, Peng discloses:

FIG. 1 illustrates one embodiment of a phase controlled dimmer-LED lighting scheme. A phase controlled dimmer 101 has a user adjustable

control lever 103. The phase controlled dimmer 101 is operably connected to an LED ballast 105 which is operably connected to a lighting unit 106 comprising one or more LEDs 107. In operation, the LEDs 107 are responsive to the LED ballast circuit 105. The LED ballast circuit is responsive to the output of the phase controlled dimmer 101. The output of the phase controlled dimmer 101 is responsive to the lever 103 position.

Ex. 1005, 3[0038].

Peng further discloses:

[T]he transformer provides isolation to the lighting/load unit 106 so that a user who touches the LEDs, or portions of the circuit in the lighting/load unit, will not receive a dangerous electrical shock from the Voltage flowing through the circuit and LEDs, because the load unit is isolated from the relatively high voltage within the main ballast circuit. This provides a significant safety measure for the user.

Ex. 1005, 5[0051].

A POSITA would recognize that the LED driver is located remotely from the set of light fixture loads as required by claim 1 of the '601 Patent. Ex. 1002, ¶65.

B. Ground 2: Leong anticipates Claims 1, 11-12, 15, 17

Independent claims 1 and 15 and dependent claims 10-12, 14, and 17 of the '601 Patent are anticipated by Leong under 35 U.S.C. § 102.

1. Claim 1

- a. 1[p] - Apparatus for configuring and powering a set of light fixture loads in a light emitting diode (LED) low voltage distribution system comprising:**

To the extent that the Board finds that the preamble is limiting, Leong discloses:

[a] power saving device for a light emitting diode (LED) lamp mounted to an existing fixture for a fluorescent lamp having a ballast assembly and LEDs positioned within a tube and electrical power delivered from the ballast assembly to the LEDs. The LED lamp includes means for controlling the delivery of the electrical power from the ballast assembly to the LEDs wherein the use of electrical power can be reduced or eliminated automatically during periods of non-use.

Ex. 1006, Abstract.

Leong further discloses, “a current driver dimmer mounted in the tube that regulates the amount of power delivered to the LEDs.” Ex. 1006, Abstract.

Leong discloses an apparatus for configuring and powering a set of light fixture loads in a light emitting diode (LED) low voltage distribution system.

- b. 1(a) - an LED driver including a power circuit having at least one power limit and a set of output current drivers connected to the at least one power limit in the power circuit;**

Leong discloses an LED driver including a power circuit having at least one power limit and a set of output current drivers connected to the at least one power limit in the power circuit. For example, Leong discloses “[p]ower control modules

and other components can be incorporated into the electrical circuits used in the LED lamp of the present invention. The first circuit module may be a dimming module placed in between the DC voltage input to the LED array.” Ex. 1006, 8[0077] (emphasis added). It further discloses “[t]he dimming current driver module will contain the necessary electronics to decipher data input control signals and provide the current driver power to operate the LED arrays.” Ex. 1006, 8[0077]. And, “[t]he **dimming controller** can be used to program presets during the day or have a manual adjustment to dim the LED lamp down to full off or anywhere between 0% and 100% brightness.” Ex. 1006, 9[0077] (emphasis added).

A POSITA would recognize that the power control modules and dimming controller of Leong are equivalent to the power circuit and power limit of the ‘601 Patent. Ex. 1002, ¶¶70-71.

Leong further discloses the “LED lamps of the present invention using computers, a self-contained program stored in the computer operates the current driver outputs of each dimmer controlling each LED array depending on the condition of the sensor and timer outputs.” Ex. 1006, 57[0547]. Moreover, “[a]n external and remote data control signal can be imposed on the power line to provide instructions to computer to operate the *current driver outputs* of dimmer to control the LED arrays.” Ex. 1006, 57[0547]-58[0547] (emphasis added).

A POSITA would recognize that the current driver outputs of Leong are equivalent to the output current drivers of the '601 Patent. Ex. 1002, ¶72. Therefore, Leong discloses an LED driver including a power circuit having at least one power limit and a set of output current drivers connected to the at least one power limit in the power circuit.

- c. 1(b) - a break-out module electrically connected to an output of the LED driver and the set of light fixture loads, the break-out module including power connectors;**

Leong discloses a break-out module electrically connected to an output of the LED driver and the set of light fixture loads, the break-out module including power connectors of the '601 Patent. For example, Leong discloses “[a] light emitting diode (LED) lamp for mounting to an existing fixture for a fluorescent lamp having a ballast assembly including ballast opposed electrical contacts, comprising: a tube having tube ends, at least one LED.” Ex. 1006, 58[Claim 1]. Leong further discloses “[b]allasts can be connected or wired between the input power line and the lamp in a number of configurations.” Ex. 1006, 6[0056].

A POSITA would understand that the ballast assembly is equivalent to the break out module of the '601 Patent. Ex. 1002, ¶62. Thus, Leong discloses the ballast assembly is connected to the LED driver and a lamp.

Finally, Leong discloses:

A pair of end caps 252A and 252B secured to tubular ends 250A and 250B, respectively, are provided with bi-pin electrical connectors 254A and 254B that are electrically connected to ballast double contact electrical sockets 256A and 256B in a manner previously described herein with regard to LED lamp 124.

Ex. 1006, 27[0334].

A POSITA would understand that bi-pin electrical connectors 254A and 254B are power connectors that are electrically connected to ballast double contact electrical sockets 256A and 256B. Ex. 1002, ¶73. Therefore, Leong discloses a break out module electrically connected to an output of the LED driver and the set of light fixture loads, the break out module including power connectors.

- d. 1(c) - wherein the break-out module receives power from the LED driver via a set of input channels and delivers power to the set of light fixture loads via a set of output channels; and**

Leong discloses the break out module receives power from the LED driver via a set of input channels and delivers power to the set of light fixture loads via a set of output channels. For example, Leong discloses “[a] light emitting diode (LED) lamp for mounting to an existing fixture for a fluorescent lamp having a ballast assembly including ballast opposed electrical contacts.” Ex. 1005, 58[Claim 1]. Further, Leong discloses “means for suppressing ballast voltage being delivered

from the ballast assembly, said means for suppressing ballast voltage being in electrical connection with said electrical circuit means and means for controlling the delivery of said electrical power from said ballast assembly to said at least one LED.”

Ex. 1006, 58[Claim 1]. Leong also discloses “means for controlling includes a current driver dimmer positioned in said LED lamp and in operative signal and power association with said at least one LED.” Ex. 1006, 58[Claim 22]. Moreover, Leong explains:

Ballasts can be connected or wired between the input power line and the lamp in a number of configurations. Multiple lamp ballasts for rapid start or instant start lamps can operate lamps connected in series or parallel depending on the ballast design. When lamps are connected in series to a ballast and one lamp fails or is removed from the fixture, the other lamp(s) connected to that ballast would not light. When the lamps are connected in parallel to a ballast and one lamp fails, or are removed, the other lamp(s) will continue to light.

Ex. 1006, 6[0056].

A POSITA would recognize that Leong’s disclosure of the current driver dimmer controlling the degree of illumination and ballast assembly transmitting power to the LED lamp is analogous to the break-out module receiving power and delivering power to the set of output channels. Ex. 1002, ¶74. Therefore, Leong

discloses a ballast out module that receives power from the set of input channels and delivers power to the set of light fixture loads via a set of output channels.

e. 1(d) - splits the set of input channels into individual output channels;

Leong discloses splitting the set of input channels into individual output channels of the '601 Patent. For example, Leong discloses:

the output current of ballast assembly 16 divided by the forward drive current gives the exact number of parallel strings of LEDs 52 in the particular LED array, here LED array 40. The total number of LEDs in series within each LED string 80 is arbitrary since each LED 52 in each LED string 80 will see the same current.

Ex. 1006, 17[0256].

The output current of the ballast assembly is divided to provide regulated current to individual LED arrays. Therefore, Leong discloses splitting the set of input channels into individual output channels.

f. 1(e) - wherein the LED driver is located remotely from the set of light fixture loads.

Leong discloses the LED driver is located remotely from the set of light fixture loads. For example, Leong discloses “[t]his dimming module can take a control input either from a hard-wired sensor like an occupancy motion occupancy sensor, a timer, a computer or from a hand-held or wall mounted remote control box

that sends the dimming signal to the dimming module located within the LED lamp.”
Ex. 1006, 8[0077].

Leong’s disclosure makes clear that the dimming module (i.e., the LED driver) can be located in varying locations. *See* Ex. 1006, 8[0077]. As such, Leong discloses the LED driver is located remotely from the set of light fixture loads.

2. Claim 11

Claim 11 depends from independent claim 1. Leong anticipates claim 1 for the reasons discussed above and incorporated herein. *Supra* Section X.B.1. Claim 11 of the ‘601 Patent requires that the LED driver and “the breakout module are integrated together.” Ex. 1001, 15:25-26. The additional limitation of claim 11 is disclosed by Leong.

Leong discloses:

[t]he LED lamp includes means for controlling the delivery of the electrical power from the ballast assembly to the LEDs wherein the use of electrical power can be reduced or eliminated automatically during periods of non-use. Such means for controlling can include an on-off switch mounted in the tube or can also include a dimmer current driver mounted in the tube that regulates the amount of power delivered to the LEDs.

Ex. 1006, Abstract.

A POSITA would understand that the dimmer current driver and the ballast assembly are analogous to the LED driver and break out module and are located in

the same tube. Ex. 1002, ¶75. Therefore, Leong discloses the LED driver and the break-out module are integrated together. As such, claim 11 is anticipated by Leong.

3. Claim 12

Claim 12 depends from independent claim 1. Leong anticipates claim 1 for the reasons discussed above and incorporated herein. *Supra* Section X.B.1. Claim 12 discloses “the LED driver further comprises a communication interface for receiving data from an external transmitter.” Ex. 1001, 15:27-29. The additional limitation of claim 12 is disclosed by Leong.

For example, Leong discloses:

[a]n external and remote data control signal can be imposed on the power line to provide instructions to computer to operate the current driver outputs of dimmer to control the LED arrays. . . . An on-board computer constantly runs a monitoring program that looks at the PLC data input line or wireless data communications input line or direct hard-wired data line.

Ex. 1006, 57[0547]-58[0547].

A POSITA would understand that a communications interface is necessary to receive the external and remote data control signal. Ex. 1002, ¶76. Therefore, Leong discloses the LED driver further comprises a communication interface for receiving data from an external transmitter. As such, claim 12 is anticipated by Leong.

4. Claim 15

- a. 15[p] - Apparatus for configuring and powering a set of light fixture loads in a light emitting diode (LED) low voltage distribution system comprising:**

To the extent that the Board finds that the preamble is limiting, Leong discloses:

[a] power saving device for a light emitting diode (LED) lamp mounted to an existing fixture for a fluorescent lamp having a ballast assembly and LEDs positioned within a tube and electrical power delivered from the ballast assembly to the LEDs. The LED lamp includes means for controlling the delivery of the electrical power from the ballast assembly to the LEDs wherein the use of electrical power can be reduced or eliminated automatically during periods of non-use.

Ex. 1006, Abstract.

Leong further discloses, “a current driver dimmer mounted in the tube that regulates the amount of power delivered to the LEDs.” Ex. 1006, Abstract. Leong also discloses an apparatus for configuring and powering a set of light fixture loads in a light emitting diode (LED) low voltage distribution system.

- b. 15(a) - an LED driver including a power circuit having at least one power limit and a set of output current drivers connected to the at least one power limit in the power circuit**

Leong discloses an LED driver including a power circuit having at least one power limit and a set of output current drivers connected to the at least one power

limit in the power circuit. For example, Leong discloses “[p]ower control modules and other components can be incorporated into the electrical circuits used in the LED lamp of the present invention. The first circuit module may be a dimming module placed in between the DC voltage input to the LED array.” Ex. 1006, 8[0077]. Additionally, “[t]he dimming current driver module will contain the necessary electronics to decipher data input control signals and provide the current driver power to operate the LED arrays.” Ex. 1006, 8[0077]. Leong further discloses “[t]he dimming controller can be used to program presets during the day or have a manual adjustment to dim the LED lamp down to full off or anywhere between 0% and 100% brightness.” Ex. 1006, 9[0077].

A POSITA would recognize that the power control modules and dimming controller of Leong are equivalent to the power circuit and power limit of the ‘601 Patent. Ex. 1002, ¶¶67-68.

Leong further discloses the “LED lamps of the present invention using computers, a self-contained program stored in the computer operates the current driver outputs of each dimmer controlling each LED array depending on the condition of the sensor and timer outputs.” Ex. 1006, 57[0547]. In addition, “[a]n external and remote data control signal can be imposed on the power line to provide instructions to computer to operate the current driver outputs of dimmer to control the LED arrays.” Ex. 1006, 57[0547]-58[0547].

A POSITA would recognize that the current driver outputs of Leong are equivalent to the output current drivers of the '601 Patent. Ex. 1002, ¶68. Therefore, Leong discloses an LED driver including a power circuit having at least one power limit and a set of output current drivers connected to the at least one power limit in the power circuit.

c. 15(b) - a break-out module electrically connected to an output of the LED driver and the set of light fixture loads, the break-out module including power connectors;

Leong discloses a break-out module electrically connected to an output of the LED driver and the set of light fixture loads, the break-out module including power connectors of the '601 Patent. For example, Leong discloses “[a] light emitting diode (LED) lamp for mounting to an existing fixture for a fluorescent lamp having a ballast assembly including ballast opposed electrical contacts, comprising: a tube having tube ends, at least one LED.” Ex. 1006, 58[Claim 1]. Leong further discloses “[b]allasts can be connected or wired between the input power line and the lamp in a number of configurations.” Ex. 1006, 6[0056].

A POSITA would understand that the ballast assembly is equivalent to the break out module of the '601 Patent. Ex. 1002, ¶62. Leong discloses the ballast assembly is connected to the LED driver and a lamp.

Finally, Leong discloses:

[a] pair of end caps 252A and 252B secured to tubular ends 250A and 250B, respectively, are provided with bi-pin electrical connectors 254A and 254B that are electrically connected to ballast double contact electrical sockets 256A and 256B in a manner previously described herein with regard to LED lamp 124.

Ex. 1006, 27[0334].

A POSITA would understand that bi-pin electrical connectors 254A and 254B that are electrically connected to ballast double contact electrical sockets 256A and 256B are power connectors. Ex. 1002, ¶73. Therefore, Leong discloses a break-out module electrically connected to an output of the LED driver and the set of light fixture loads, the break out module including power connectors.

d. 15(c) - wherein the break-out module receives power from the LED driver via a set of input channels and delivers power to the set of light fixture loads via a set of output channels; and

Leong discloses the break-out module receives power from the LED driver via a set of input channels and delivers power to the set of light fixture loads via a set of output channels. For example, Leong discloses “[a] light emitting diode (LED) lamp for mounting to an existing fixture for a fluorescent lamp having a ballast assembly including ballast opposed electrical contacts.” Ex. 1006, 58[Claim 1]. It further discloses “means for suppressing ballast voltage being delivered from the ballast assembly, said means for suppressing ballast voltage being in electrical connection with said electrical circuit means, and means for controlling the delivery

of said electrical power from said ballast assembly to said at least one LED.” Ex. 1006, 59[Claims 22-23].

Further, Leong discloses “means for controlling includes a current driver dimmer positioned in said LED lamp and in operative signal and power association with said at least one LED.” Ex. 1006, 59[Claim 22]. Leong also discloses:

[b]allasts can be connected or wired between the input power line and the lamp in a number of configurations. Multiple lamp ballasts for rapid start or instant start lamps can operate lamps connected in series or parallel depending on the ballast design. When lamps are connected in series to a ballast and one lamp fails or is removed from the fixture, the other lamp(s) connected to that ballast would not light. When the lamps are connected in parallel to a ballast and one lamp fails, or are removed, the other lamp(s) will continue to light.

Ex. 1006, 6[0056].

A POSITA would recognize that Leong’s disclosure of the current driver dimmer controlling the degree of illumination and ballast assembly transmitting power to the LED lamp is analogous to the break out module receiving power and delivering power to the set of output channels. Ex. 1002, ¶74.

e. 15(d) – wherein the break-out module regroups the number of output channels from the number of input channels;

Leong discloses regrouping the number of output channels from the number of input channels of the ‘601 Patent. For example, Leong discloses:

the output current of ballast assembly 16 divided by the forward drive current gives the exact number of parallel strings of LEDs 52 in the particular LED array, here LED array 40. The total number of LEDs in series within each LED string 80 is arbitrary since each LED 52 in each LED string 80 will see the same current.

Ex. 1006, 17[0256].

The output current of the ballast assembly is divided to provide current to individual LED arrays. Therefore, Leong discloses regrouping the number of output channels from the number of input channels.

f. 15(e) - wherein the LED driver is located remotely from the set of light fixture loads.

Leong discloses the LED driver is located remotely from the set of light fixture loads. For example, Leong discloses “[t]his dimming module can take a control input either from a hard-wired sensor like an occupancy motion occupancy sensor, a timer, a computer or from a hand-held or wall mounted remote control box that sends the dimming signal to the dimming module located within the LED lamp.”

Ex. 1006, 8[0077].

Leong’s disclosure makes clear that the dimming module (i.e., the LED driver) can be located remotely. As such, Leong discloses the LED driver is located remotely from the set of light fixture loads.

5. Claim 17

Claim 17 depends from independent claim 15. Leong anticipates claim 15 for the reasons discussed above and incorporated herein. *Supra* Section X.B.4. Claim 17 discloses “the break-out module comprises at least one printed circuit board (PCB)” Ex. 1001, 16:22-23. The additional limitation of claim 17 is disclosed by Leong.

Leong discloses “[a]s seen in FIG. 62, circuit boards 708A and 708B are preferably manufactured each from a Metal Core Printed Circuit Board (MCPCB) consisting of a circuit layer 716A, a dielectric layer 716B, and a metal base layer 716C.” Ex. 1006, 42[0434].

Therefore, Leong discloses the break-out module comprises at least one printed circuit board (PCB). Claim 13 is anticipated by Leong.

C. Ground 3: Peng or Leong in view of Bornhurst renders Claims 2- 5, 8 and 10 obvious

Claims 2-5, 8 and 10 of the ‘601 patent are rendered obvious under 35 U.S.C. § 103 by Peng or Leong in view of Bornhurst. Claim 2, claim 5, and claim 8 are dependent on claim 1, claim 3 and claim 4 are dependent on claim 2 and claim 10 is dependent on claim 3. Peng and Leong anticipate independent claim 1 for the reasons discussed above which are incorporated here. *Supra* Section X.A.1, B.2.

1. Claim 2

Claim 2 depends from independent claim 1. Peng and Leong anticipate claim 1 for the reasons discussed above and incorporated herein. *Supra* Section X.A.1, B.2. Claim 2 requires that “[t]he apparatus of claim 1 wherein the set of output current drivers are connected to the break-out module via cabling.” Ex. 1001, 14:65-67. The additional limitations of claim 2 are disclosed by Bornhurst.

For example, Bornhurst discloses “[a]s shown in FIG. 3, one multiple circuit trunk cable 50 coupled to output connector 48 conducts the six lamp power circuits to a break-out box 52 in a lighting rig, which box connects to six luminaires 56A-56F via six individual lamp cables 54A-54F.” Ex. 1007, 4:53-57. Bornhurst further discloses “[i]n the present example, arc-lamp luminaires are connected to first, third and fifth outputs of the break-out box via lamp cables 54A, 54C, and 54E while incandescent-lamp luminaires are connected to second, fourth and sixth outputs of the break-out box via lamp cables 54B, 54D, and 54F.” Ex. 1007, 4:61-66.

The Peng-Bornhurst and Leong-Bornhurst combinations thus disclose the set of output current drivers that are connected to the break-out module via cabling and render claim 2 obvious. Ex. 1002, ¶79.

2. Claim 3

Claim 3 depends from dependent claim 2 which depends from independent claim 1. The additional limitations of claim 3 are disclosed by Bornhurst and Leong.

Claim 3 of the '601 patent states that "[t]he apparatus of claim 2 further comprising a set of series connect modules, each of the set of series connect modules associated with one of the set of light fixture loads and connected to an output of the break-out module.

The '601 patent further states that "[a]s shown in FIG. 12, the output current drivers or the set of output current drivers 52 are connected via the cabling 202, 204, 206, directly or indirectly, to breakout modules 51, and series connect modules 53 to the LED loads 56, and such connectivity may be referred to as individual channels or a set of channels respectively." Ex. 1001, 11:31-37. The series connect modules discussed herein are designed to facilitate the connection of LED/OLED loads to the break out module.

Like the '601 patent, Bornhurst and Leong disclose a set of series connect modules, each of the set of series connect modules associated with one of the set of light fixture loads and connected to an output of the break-out module. For example, Bornhurst describes, inter alia, that the

[a]s shown in FIG. 3, one multiple circuit trunk cable 50 coupled to output connector 48 conducts the six lamp power circuits to a break-out box 52 in a lighting rig, which box connects to six luminaires 56A-56F via six individual lamp cables 54A-54F. Lamp power modules 30A-30F are loaded into the chassis 10 depending upon the configuration and arrangement of incandescent wash luminaires (56B, 56D, 56F) or

arc-lamp spot luminaires (56A, 56C, 56E) connected to the corresponding break-out box 52. In the present example, arc-lamp luminaires are connected to first, third and fifth outputs of the break-out box via lamp cables 54A, 54C, and 54E while incandescent-lamp luminaires are connected to second, fourth and sixth outputs of the break-out box via lamp cables 54B, 54D, and 54F.

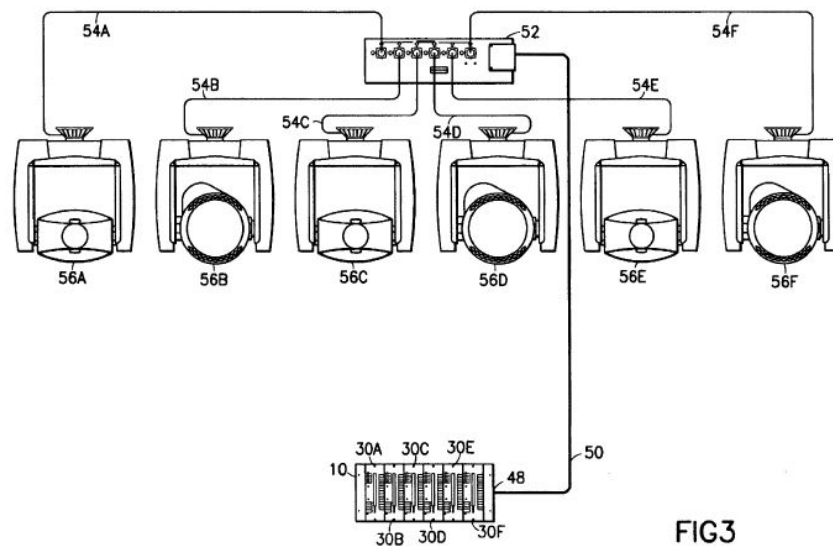


FIG3

Ex. 1007, 4:53-66. Fig. 3

A POSITA would understand that the ballast opposed electrical contacts of Leong are equivalent to the series connect modules because they share the same function, namely, facilitating connections between light fixture loads and break out modules.

The Peng-Bornhurst combination thus discloses a set of series connect modules, each of the set of series connect modules associated with one of the set of

light fixture loads and connected to an output of the break-out module and renders claim 3 obvious.

3. Claim 4

Claim 4 depends from dependent claim 2. Bornhurst anticipates claim 2, and Peng and Leong anticipate claim 1 for the reasons discussed above and incorporated herein. *Supra* Section X.A.1, B.2, C.1. Claim 4 discloses “the power cabling includes the set of input channels.” Ex. 1001, 15:6-7. The additional limitations of claim 4 are disclosed by Bornhurst.

For example, Bornhurst discloses the “[l]amp power output from each module 30 is conducted to the output connector 48 via six individual lamp power circuits 111 thru 116.” Ex. 1007, 6:3-5. The Peng-Bornhurst and Leong-Bornhurst combinations thus disclose the power cabling includes the set of input channels and render claim 4 obvious.

4. Claim 5

Claim 5 depends from independent claim 1. Peng and Leong anticipate claim 1 for the reasons discussed above and incorporated herein *Supra* Section X.A.1, B.2. Claim 5 discloses “the break-out module connects to multiple light fixture loads via cabling.” Ex. 1001, 15: 8-9. The additional limitations of claim 5 are disclosed by Bornhurst.

For example, Bornhurst discloses “[a]s shown in FIG. 3, one multiple circuit trunk cable 50 coupled to output connector 48 conducts the six lamp power circuits to a break-out box 52 in a lighting rig, which box connects to six luminaires 56A-56F via six individual lamp cables 54A-54F.” Ex. 1007, 4:53-57. Bornhurst further discloses “[i]n the present example, arc-lamp luminaires are connected to first, third and fifth outputs of the break-out box via lamp cables 54A, 54C, and 54E while incandescent-lamp luminaires are connected to second, fourth and sixth outputs of the break-out box via lamp cables 54B, 54D, and 54F.” Ex. 1007, 4:61-66.

The Peng-Bornhurst and Leong-Bornhurst combinations thus disclose the power cabling includes the set of input channels and render claim 5 obvious.

5. Claim 8

Claim 8 depends from independent claim 1. Peng and Leong anticipate claim 1 for the reasons discussed above and incorporated herein. *Supra* Section X.A.1, B.2. Claim 8 discloses “the power connectors include apparatus to enable quick connection and release of the cabling.” Ex. 1001, 15:16-18. The additional limitations of claim 8 are disclosed by Bornhurst.

For example, Bornhurst discloses “[a]s shown in FIG. 3, one multiple circuit trunk cable 50 coupled to output connector 48 conducts the six lamp power circuits to a break-out box 52 in a lighting rig, which box connects to six luminaires 56A-56F via six individual lamp cables 54A-54F.” Ex. 1007, 4:53-57. Bornhurst further

discloses “[i]n the present example, arc-lamp luminaires are connected to first, third and fifth outputs of the break-out box via lamp cables 54A, 54C, and 54E while incandescent-lamp luminaires are connected to second, fourth and sixth outputs of the break-out box via lamp cables 54B, 54D, and 54F.” Ex. 1007, 4:61-66.

The Peng-Bornhurt and Leong-Bornhurst combinations thus disclose the power cabling includes the set of input channels and render claim 5 obvious.

6. Claim 10

Claim 10 depends from dependent claim 3. Dependent claim 3 depends on independent claim 1 and dependent claim 2. Peng anticipates claims 1 and 2 for the reasons discussed herein. *Supra* Section X.A.1; *infra* Section X.C.1. Claim 10 discloses “the break-out module and the set of series connect modules are integrated.” Ex. 1001, 15:23-24. The additional limitation of claim 10 is disclosed by Peng.

For example, Peng discloses:

the ballast circuit of the present disclosure is incorporated into a housing to form part of a Luminaire. In one embodiment, the LED luminaire has a modular construction. The load unit comprises LEDs disposed on one or more modules, and the modules and ballast circuit housing are attached to a mounting structure to construct the luminaire.

Ex. 1005, 7[0067].

Therefore, Peng discloses the break-out module and the set of series connect modules are integrated. As such, claim 10 is anticipated by Peng.

D. Ground 4: Peng or Leong in view of Slot renders Claim 12 obvious

Claim 12 of the '601 Patent is rendered obvious under 35 U.S.C. § 103 by Peng or Leong in view of Slot. Claim 12 depends on independent claim 1. Peng and Leong anticipate independent claim 1 for the reasons discussed above and incorporated here. *Supra* Section X.A.1, B.2.

Claim 12 requires a “communication interface for receiving data from an external transmitter.” Ex. 1001, 15:28-29. The additional limitations of claim 12 are disclosed by Slot.

For example, Slot discloses:

[a] further option is to provide “bridges”, for example to wireless control elements or DMX networks, as LED setting information for the fittings or for reading sensor elements (temperature, smoke sensor, and the like), see FIG. 17 for a DMX interface linked to CPU1, where CPU1 then serves as a “bridge” between the DMX channels and the settings for CPU1 and CPU2 in this example.

Ex. 1008, 10[0107].

A POSITA would understand that the bridges of slot function are a communication interface. Ex. 1002, ¶80. The Peng-Slot and Leong-Slot combinations thus disclose a communication interface for receiving data from an

external transmitter and as such, render claim 12 obvious.

E. Ground 5: Shteynberg anticipates Claim 1

Independent claim 1 of the '601 Patent is anticipated by Shteynberg under 35 U.S.C. § 102.

1. Claim 1

- a. 1[p] - Apparatus for configuring and powering a set of light fixture loads in a light emitting diode (LED) low voltage distribution system comprising:**

To the extent that the Board finds that the preamble is limiting, Shteynberg discloses “[i]n accordance with the present invention, therefore, an LED driver circuit is provided which is compatible for operation with the existing lighting infrastructure, such as dimmer switches, and may be coupled directly to and controlled by such dimmer switches.” Ex. 1013, 8:9-13. Shteynberg, thus, discloses a configurable LED driver/dimmer for powering a set of light fixture loads.

- b. 1(a) - an LED driver including a power circuit having at least one power limit and a set of output current drivers connected to the at least one power limit in the power circuit**

Shteynberg discloses a power circuit having a set of output current drivers connected to the at least one power limit in the power circuit of the '601 Patent. For example, claim 28 of Shteynberg discloses “[a] power converter for providing variable brightness levels for solid state lighting, the power converter couplable to a phase-modulating switch which is couplable to an AC line voltage.” Ex. 1013,

22:26-29. A power circuit generally is any circuit used to carry electricity that operates a load. Ex. 1002, ¶82. As demonstrated by the above excerpt, the power converter carries electricity from the AC line voltage to provide variable brightness levels for solid state lighting. As such, a POSITA would readily understand that the power converter of Shteynberg is analogous to the power circuit of the ‘601 Patent. *Id.* ¶82.

Additionally, Shteynberg discloses at least one power limit. For example, Shteynberg discloses “the controller 160 (and 260, FIG. 10) is programmed, adapted or configured to emulate the brightness or intensity control provided by the dimmer switch 75, to control the switching power supply 150 and correspondingly modify the brightness (or intensity) provided by the LEDs 140.” Ex. 1013, 9:21-26.

A POSITA would understand that emulated brightness or intensity is equivalent to establishing a power limit. Ex. 1002, ¶84. A POSITA would further understand that the controller is programmed to limit power provided by the dimmer switch and is connected to the switching power supply 150, which as discussed above, is equivalent to the regulated output voltage bus. *Id.*

Finally, Shteynberg discloses a set of output current drives connected to the power limit. For example, Shteynberg discloses:

LED driver circuits and LEDs [(i.e., light fixture loads)] will be wired within existing lighting infrastructure, such as replacing an

incandescent bulb (placed within an Edison socket) or replacing an incandescent lamp, with wiring to existing switches, such as dimmer switches. In a second phase, existing switching connections may be re-wired, allowing LED driver circuits to be co-located in the same junction or wall box as the switches, but wired directly to the AC line voltage, with existing switching (such as dimmers) generating only a control signal to regulate LED brightness.

Ex. 1013, 8:20-29.

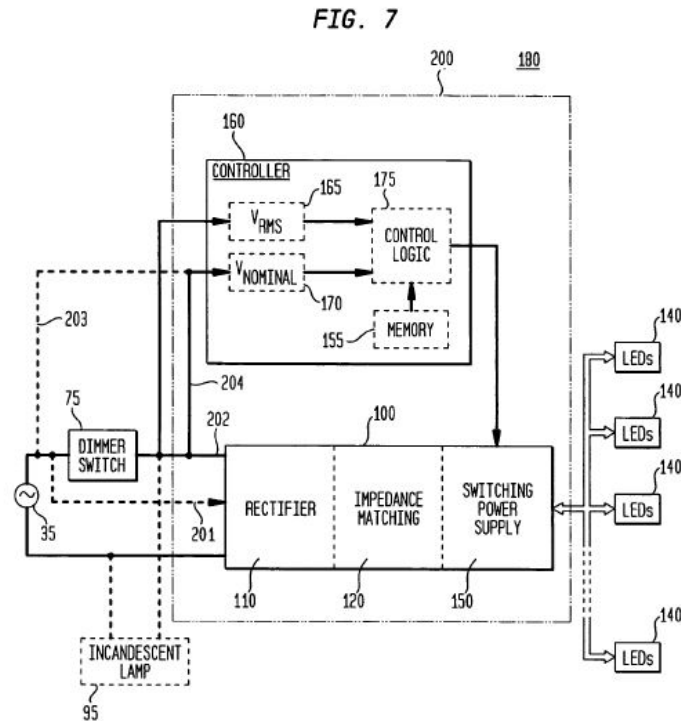
A POSITA would understand that the LED driver circuits and driver circuits contained in the switching power supply are equivalent to the set of output circuit drivers of the '601 Patent. Ex. 1002, ¶85.

Thus, Shteynberg discloses an LED driver including a power circuit having at least one power limit and a set of output current drivers connected to the at least one power limit in the power circuit.

c. 1(b) - a break-out module electrically connected to an output of the LED driver and the set of light fixture loads, the break-out module including power connectors

Shteynberg discloses the break-out module electrically connected to an output of the LED driver and the set of light fixture loads, the break-out module including power connectors of the '601 Patent. As discussed above, the switching power supply contains multiple LED drivers. *Supra*, Section X.E.1.b. As shown in Figure

7, the switching power supply takes the output from the multiple LED drivers and sends it to the LEDs 140.



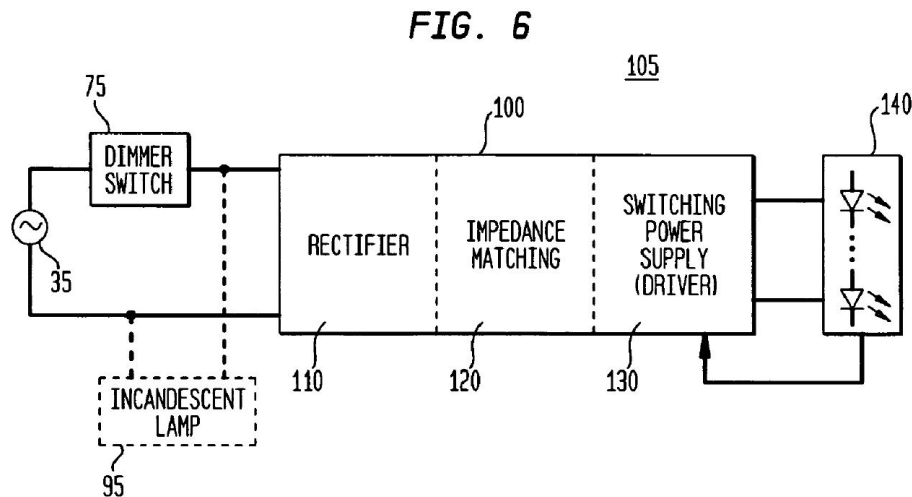
Ex. 1013, fig. 7

A POSITA would understand that the switching power supply 150 connected the output of the LED driver and LEDs is equivalent to a break out module connected to a set of light fixture loads. Ex. 1002, ¶88.

As such, Shteynberg discloses a break-out module electrically connected to an output of the LED driver and the set of light fixture loads, the break-out module including power connectors as required by claim 1 of the '601 Patent.

- d. **1(c) - wherein the break-out module receives power from the LED driver via a set of input channels and delivers power to the set of light fixture loads via a set of output channels; and**

Shteynberg discloses the break out module receives power from the LED driver via a set of input channels and delivers power to the set of light fixture loads via a set of output channels. As discussed above, Shteynberg discloses a break out module that delivers power to a set of light fixture loads. *Supra* Section X.A.1.c. As disclosed in Figure 6, the switching power supply receives power from the LED drivers contained within via the rectifier.



Ex. 1013, fig. 6

Finally, Figures 6 and 7 disclose the switching power supply supplies power to the multiple LEDs via a set of output channels.

A POSITA would understand that the break-out module receives power from the LED drivers in the switching power supply via a set of input channels and

delivers power to the LEDs via a set of output channels. Ex. 1002, ¶89. As such, Shteynberg discloses the break-out module receives power from the LED driver via a set of input channels and delivers power to the set of light fixture loads via a set of output channels.

e. 1(d) - splits the set of input channels into individual output channels;

Shteynberg discloses the splitting the set of input channels into individual output channels of the '601 Patent. For example, Shteynberg discloses the current regulator provides power to one or more LEDs 140 which may also be an array or multiple arrays of LEDs. Ex. 1013, 9:9-12. A POSITA would understand that in order to power multiple LEDs or multiple arrays of LEDs individual output channels are needed. Thus, Shteynberg discloses the splitting of the set of input channels into individual output channels.

f. 1(e) - wherein the LED driver is located remotely from the set of light fixture loads.

Shteynberg discloses a LED driver located remotely from the set of light fixture loads. For example, Shteynberg discloses:

LED driver circuits and LEDs [(i.e., light fixture loads)] will be wired within existing lighting infrastructure, such as replacing an incandescent bulb (placed within an Edison socket) or replacing an incandescent lamp, with wiring to existing switches, such as dimmer switches. In a second phase, existing switching connections may be re-

wired, allowing LED driver circuits to be co-located in the same junction or wall box as the switches, but wired directly to the AC line voltage, with existing switching (such as dimmers) generating only a control signal to regulate LED brightness.

Ex. 1013, 8:20-29.

A POSITA would recognize that locating the LED driver in the same junction or wall box as the switches would necessarily mean that the LED drivers are a distance away from the lights and can be controlled by the lever. Ex. 1002, ¶¶90. As such, Shteynberg discloses the LED driver is located remotely from the set of light fixture loads as required by Claim 1 of the ‘601 Patent.

F. Motivation to Combine Peng, Leong, Bornhurst, and Slot

A POSITA would have been motivated to combine Peng, Leong, Bornhurst, and Slot for several reasons. Ex. 1002, 91-90.

First, Peng, Leong, Bornhurst, and Slot are analogous art to the ‘601 Patent because they are in the same field of endeavor—namely, LED Drivers. *In re Bigio*, 381 F.3d 1320, 1325 (Fed. Cir. 2004). The ‘601 Patent defines its “Technical Field” as a “novel LED Driver/dimmer for solid state lighting applications.” Ex. 1001, 1:38-39. Like the ‘601 Patent, Peng, Leong, Bornhurst, and Slot are directed to powering and controlling solid state lighting applications. Ex. 1005, 1:18; Ex. 1006, Abstract; Ex. 1007, 4:53-61; Ex. 1008, 10:0107.

Moreover, for the reasons provided in Section VIII. D, incorporated here, Peng, Leong, Bornhurst, and Slot are analogous to the '601 Patent because it they reasonably pertinent to the technical problem allegedly addressed by the claimed invention. *In re Bigio*, 381 F.3d at 1325.

Finally, a POSITA would have had a reasonable expectation of success in making this modification. Ex. 1002, ¶95. The LED Driver components described in Peng, Leong, Bornhurst, and Slot were well-known at the time. *Id.*; Ex. 1013, 1:25 (“A wide variety of off-line LED drivers are known”). As such, it would also have been straightforward for a POSITA to modify the LED driver of Peng, Leong, Bornhurst, and Slot’s cabling, quick connection, and release apparatus and communication interface, and that such a system would work.

G. The Board Should Not Discretionarily Deny Institution

The PTAB should not exercise its discretion to deny review where, as here, the Petition is strong on the merits. *See, e.g., Apple Inc. v. RFCyber Corp.*, No. IPR2022-00412, Paper 11, at 33-34 (P.T.A.B. July 21, 2022); Interim Procedure for Discretionary Denials In AIA Post Grant Proceedings With Parallel District Court Litigation (Discretionary Denial Memorandum), USPTO Dir.’s Memorandum 9 (June 21, 2022).

Apple Inc. v. Fintiv, Inc., No. IPR2020-00019, Paper 11 (P.T.A.B. Mar. 20, 2020), articulated an additional standard, under which the PTAB may decline to

institute IPR based on a number of factors (“*Fintiv* factors”) related to the existence of a parallel district court proceeding on the same challenged patents. The PTAB considers the following non-exclusive *Fintiv* factors:

- (1) whether the court granted a stay or evidence exists that one may be granted if a proceeding is instituted;
- (2) proximity of the court’s trial date to the Board’s projected statutory deadline for a final written decision;
- (3) investment in the parallel proceeding by the court and the parties;
- (4) overlap between issues raised in the petition and in the parallel proceeding;
- (5) whether the petitioner and the defendant in the parallel proceeding are the same party; and
- (6) other circumstances that impact the Board’s exercise of discretion, including the merits.

Id. In this instance, the stage of the parallel district court litigation does not support denying institution based on the *Fintiv* factors.

1. Factor 1: Whether the Court Granted a Stay

Neither party has requested a stay in this case, nor has one been ordered by the District Court. Factor 1 is, therefore, neutral because no party has requested a stay (yet).

2. Factor 2: Proximity of Trial Date

Factor 2 favors institution or is neutral. *Intel Corp. v. PACT XPP Schweiz AG*, No. IPR2020-00542, Paper 11, at 14 (P.T.A.B. Sept. 9, 2020); Discretionary Denial

Memorandum 8 (explaining that when other factors weigh against denial or are neutral, proximity to trial should not alone control). The U.S. District Court for the Southern District of California issued a scheduling order on March 22, 2023, setting a final pretrial conference on August 22, 2024. Ex. 1009. Based on the most recent statistics showing a median time from filing to trial in a civil proceeding to be 46 months, disposition of this case can occur as late as April 2026, which will be 17 months after the Final Written Decision. Ex. 1010.

3. Factor 3: Investment in Parallel Proceedings

Factor 3 favors institution. The district court litigation is still in its early stages where discovery has begun, but no claim construction briefs have been filed.

4. Factor 4: Overlap of Issues

Factor 4 favors institution because the Final Written Decision here will likely trigger estoppel. Additionally, in the district court litigation, all of mate's asserted claims are subject to Advanced Lighting Concepts' IPRs.

5. Factor 5: Whether Petitioner and Defendant are the Same Party

Factor 5 is neutral because "[a]ll parties to this proceeding are included in the related [] proceeding." *Cast Lighting, LLC v. Wangs Alliance Corp.*, PGR2021-00012, Paper 12, at 36 (P.T.A.B. June 7, 2021).

6. Factor 6: Other Circumstances

Factor 6 favors institution and is dispositive under the Discretionary Denial Memorandum because the unpatentability challenges here are compelling and rely on references that Petition for IPR of U.S. Patent No. 8,525,446 were not before the Office. Additionally, Advanced Lighting Concepts' IPRs are the only challenges to the Asserted Patents that have been before the Board, which favors institution. And, there is a strong public interest against "leaving bad patents enforceable," which also favors institution. *Thryv, Inc. v. Click-To-Call Techs., LP*, 140 S. Ct. 1367, 1374 (2020).

Because all *Fintiv* factors favor institution or are neutral, Advanced Lighting Concepts respectfully requests that the Board decline to discretionarily deny review.

XI. CONCLUSION

Trial should be instituted, and the Challenged Claims should be canceled as unpatentable.

August 4, 2023

Respectfully submitted,

By: / Winston O. Huff /

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**ATTORNEYS FOR PETITIONER
ADVANCED LIGHTING CONCEPTS
LLC**

U.S. PATENT NO. 8,957,601 – LISTING OF CHALLENGED CLAIMS

<u>CLAIM NO.</u>	<u>CLAIM ELEMENTS</u>
1[p]	Apparatus for configuring and powering a set of light fixture loads in a light emitting diode (LED) low voltage distribution system comprising:
1[a]	an LED driver including a power circuit having at least one power limit and a set of output current drivers connected to the at least one power limit in the power circuit; and
1[b]	a break-out module electrically connected to an output of the LED driver and the set of light fixture loads, the break-out module including power connectors;
1[c]	wherein the break-out module receives power from the LED driver via a set of input channels and delivers power to the set of light fixture loads via a set of output channels; and
1[d]	splits the set of input channels into individual output channels;
1[e]	wherein the LED driver is located remotely from the set of light fixture loads.
2	The apparatus of claim 1 wherein the set of output current drivers are connected to the break-out module via cabling.
3	The apparatus of claim 2 further comprising: a set of series connect modules, each of the set of series connect modules associated with one of the set of light fixture loads and connected to an output of the break-out module.
4	The apparatus of claim 2 wherein the power cabling includes the set of input channels.
5	The apparatus of claim 1 wherein the break-out module connects to multiple light fixture loads via cabling.
8	The apparatus of claim 1 wherein the power connectors include apparatus to enable quick connection and release of the cabling.
10	The apparatus of claim 3 wherein the break-out module and the set of series connect modules are integrated together.
11	The apparatus of claim 1 wherein the LED driver and the break-out module are integrated together.
12	The apparatus of claim 1 wherein the LED driver further comprises a communication interface for receiving data from an external transmitter.

<u>CLAIM NO.</u>	<u>CLAIM ELEMENTS</u>
14	The apparatus of claim 1 further comprising a DC/DC converter.
15[p]	Apparatus for configuring and powering a set of light fixture loads in a light emitting diode (LED) low voltage distribution system comprising:
15[a]	an LED driver including a power circuit having at least one power limit and a set of output current drivers connected to the at least one power limit in the power circuit; and
15[b]	a break-out module electrically connected to an output of the LED driver and the set of light fixture loads, the break-out module including power connectors;
15[c]	wherein the break-out module receives power from the LED driver via a set of input channels and delivers power to the set of light fixture loads via a set of output channels;
15[d]	wherein the break-out module regroups the number of output channels from the number of input channels and
15[e]	wherein the LED driver is located remote from the set of light fixture loads.
17	The apparatus of claim 15 wherein the break-out module comprises: at least one printed circuit board (PCB).

CERTIFICATION OF COMPLIANCE WITH TYPE-VOLUME LIMITS

This Petition includes 13,890 words, as counted by Microsoft Word, and is therefore in compliance with the 14,000-word limit established by 37 C.F.R. 42.24(a)(1)(i). Accordingly, pursuant to 37 C.F.R. 42.24(d), lead counsel for the Petitioner hereby certifies that this Petition complies with the type-volume limits established for a petition requesting IPR.

Dated: August 4, 2023

Respectfully Submitted,

/ Winston O. Huff /

Winston O. Huff (Reg. No. 51, 825)

CERTIFICATE OF SERVICE

Pursuant to 37 C.F.R. 42.6(4) and 42.105, lead counsel for Petitioners hereby certifies that on August 4, 2023, copies of this Petition, Power of Attorney, and all supporting exhibits were sent via Federal Express to the correspondence address of record for the '601 Patent:

Bruce Young
12205 NW 85th Ave
Grimes, IA 50111

A courtesy copy of this Petition and supporting exhibits was also served via email on Patent Owner's counsel of record in the district court litigation.

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