

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 2023-01265

U.S. Patent No. 9,320,093

PETITION FOR *INTER PARTES* REVIEW OF U.S. PATENT NO. 9,320,093

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PETITIONER'S EXHIBIT LIST

<u>EXHIBIT</u>	<u>DESCRIPTION</u>
Ex. 1001	U.S. Patent No. 9,320,093
Ex. 1002	Declaration of Joseph McAlexander
Ex. 1003	Curriculum Vitae of Joseph McAlexander
Ex. 1004	File Wrapper for U.S. Patent No. 9,320,093
Ex. 1005	U.S. Patent No. 7,490,957 to Leong
Ex. 1006	U.S. Patent No. US2015097484 to Lee
Ex. 1007	March 22, 2023 Case Management Order (Dkt. 35)
Ex. 1008	Time to Trial for the Southern District of California
Ex. 1009	<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. 1010	Yijie Wang, et al., <i>A Review of LED Drivers and Related Technologies</i> , 64 IEEE TRANSACTIONS ON INDUS. ELECTRONICS 5754, 5754 (July 2017)

I. INTRODUCTION

Petitioner requests *Inter Partes* Review (“IPR”) of claims 1-2, 5-7, 9-13, 15-17, and 19-20 (the “Challenged Claims”) of U.S. Patent No. 9,320,093 (“the ‘093 Patent”).

This petition (IPR 2023-01265) is part of a set of **six** petitions, including IPR 2023-01257, IPR 2023-01266, IPR 2023-01258, IPR 2023-01264, and IPR 2023-01259, which challenge claims of 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 9,597,713 (“the ‘713 Patent”) (collectively, the “Challenged Patents”), respectively. Petitioner requests that the PTO 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 ‘093 Patent is related to a district court litigation pending in the Southern District of California. mate, LLC (“Patent Owner”) asserted the ‘093 Patent, ‘310 Patent, ‘446 Patent, ‘601 Patent, ‘713 Patent, and ‘759 Patent against Petitioner in

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.

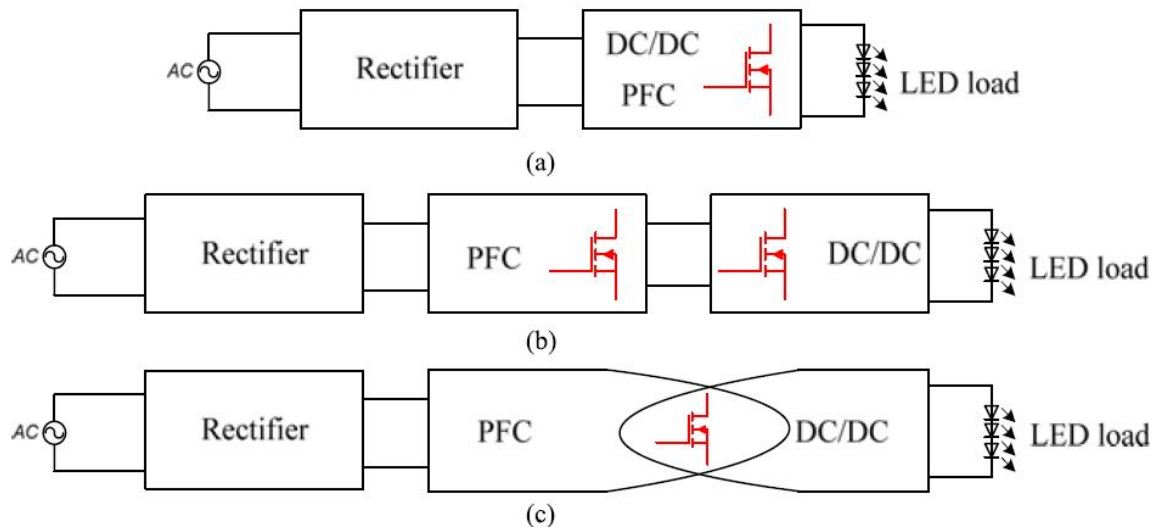
III. CERTIFICATION AND FEES

Petitioner certifies that the ‘093 Patent is available for IPR and that the Petitioner is not barred or estopped from requesting *inter partes* review of 1-2, 5-7, 9-13, 15-17, and 19-20 of the ‘093 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. 1009). “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. 1010). 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. *Id.* Therefore, the cost and size of the system is reduced while ensuring high efficiency, high reliability, and fast output dynamics. *Id.*

V. OVERVIEW OF THE ‘093 PATENT

The ‘093 Patent describes a configurable light emitting diode (LED) driver/dimmer for controlling a set of light fixture loads. Ex. 1001, Abstract. The ‘093 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, 1:38-41.

The ‘093 Patent further notes:

With the rapid increase in [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, 1:20-27.

“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, 1:31-36. Finally, the ‘093 Patent states “[t]he ability to dim the light output of LEDs is also important to reduce energy consumption.” Ex. 1001, 1:36-37.

VI. THE ALLEGED INVENTION

The claims of the ‘093 Patent are generally directed to a configurable LED driver for configuring and powering light fixture loads for a LED low voltage distribution system. The LED driver of the ‘093 Patent includes converting power being supplied for powering the set of light fixture loads and then limiting this converted power to a set of multiple current outputs supplied to the light fixture loads. The multiple current outputs are then split or regrouped prior to being delivered to the light fixture loads.

A. Summary of Prosecution History

The application that issued as the ‘093 Patent (US14/590,045) was filed on January 6, 2015, and is a continuation of U.S. Patent Application No. 13/466,509, filed May 8, 2012, which is itself a continuation-in-part of U.S. Patent Application No. 13/059,336, now U.S. Patent No. 8,525,446, filed February 16, 2011, which is a national stage filing under 35 U.S.C. § 371 of International Patent Application

PCT/CA2009/001295, filed on September 17, 2009, which claims the benefit of priority of U.S. Provisional Application No. 61/097,963, filed September 18, 2008, all of which are incorporated herein by reference.

In a first Office Action, several claims were rejected on the ground of nonstatutory double patenting as being unpatentable over claim 15 of the ‘601 Patent. Additionally, several claims were rejected as anticipated by U.S. Patent No. 7,233,115 (“Lys”). To overcome the double patenting rejection, the Applicant combined original claims 1, 4, 13, and 14 to recite a new claim directed to a method for configuring and powering a set of light fixture loads focused on translating a data stream to LED control information and using the control information to control power. Ex. 1001, 15:38-46.

A Notice of Allowance was mailed on January 21, 2016, allowing pending claims 2, 5-12, and 15-25. Ex. 1004 at 34. In the Notice, the Examiner noted that the prior art did not disclose the claim element of “wherein the LED control information is used for controlling the limited power.” Ex. 1004 at 36.

VII. OVERVIEW OF THE PRIOR ART

The challenged claims are anticipated by or are obvious over the following prior art.

A. Leong (Ex. 1005)

U.S. Patent No. 7,490,957 (“Leong”) was filed on August 5, 2005, and is a continuation-in-part of application No. 10/822,579, filed on Apr. 12, 2004, now Pat. No. 6,853,151, which is a continuation of patent application Ser. No. 11/052,328 filed on Feb. 7, 2005, now U.S. Pat. No. 7,067,992 entitled “Power Controls for Tube Mounted LEDs with Ballast”, which is a continuation-in-part of Ser. No. 10/822,579 filed Apr. 12, 2004, now U.S. Pat. No. 6,853,151, entitled “LED Retrofit Lamp” issued Feb. 8, 2005, which is a continuation-in-part of Ser. No. 10/299,870 filed Nov. 19, 2002, now U.S. Pat. No. 6,762,562, entitled “Tubular Housing with Light Emitting Diodes” issued Jul. 13, 2004.

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. 1005, 9:39-51.

B. Lee (Ex. 1006)

U.S. Patent Application No. 20050097484A1 (“Lee”) was filed on October 6, 2014, and was published on April 9, 2015. Lee is directed to:

[A] dimmable alternating current (AC) driven light emitting diode (LED) illuminating apparatus, and more particularly, to an AC driven light emitting diode (LED) illuminating apparatus capable of displaying an appropriate dimming level over an entire section of the dimming level using a TRIAC dimmer configured to perform dimming control via phase control.

Ex. 1006, 1[0003].

VIII. 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 purposes of resolving the issues raised in this Petition.

IX. GROUNDS FOR PETITION

A. Ground 1: Leong Anticipates Claims 1-2, 9-13, and 19-20

Independent claims 1 and 11 and dependent claims 2-3, 9-10, 12-13, and 19-20 of the '093 Patent are anticipated by Leong under 35 U.S.C. § 102.

1. Claim 1

- a. **1[p] – A method of 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:

Electrical compensation of daylight can be controlled either by dimming (varying the light output to provide the desired brightness) or by switching (turning individual lamps or fixtures in different areas of a building or room on or off as necessary). Just as a typical two-lamp fixture containing the LED retrofit lamps of the present invention can be switched to illuminate both LED retrofit lamps, one LED retrofit lamp, or neither LED retrofit lamp, multiple fixtures all containing the LED retrofit lamps of the present invention can be turned on or off individually to illuminate each part of a room in just the needed amount of light.

Ex. 1005, 18:3-13.

Leong further discloses:

[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. 1005, 9:39-47.

Leong discloses LED lamps contain a means for controlling the delivery of electrical power from the ballast assembly to the LEDs. Ex. 1005, 18:3-13. A POSITA would understand that Leong's disclosure of the electrical power delivery means is equivalent to the method of configuring (i.e. controlling) and powering (i.e., delivery of electrical power) a set of light fixture loads in a light emitting diode (LED). Ex. 1002, ¶ 53. Leong thus discloses a method of configuring and powering a set of light fixture loads in a light emitting diode (LED) low voltage distribution system.

b. 1(a) – converting power for powering the set of light fixture loads;

Leong discloses the step of converting power for powering the set of light fixture loads. For example, Leong discloses:

Given these various voltage considerations, the present invention is designed to work with all existing ballast output configurations. The improved LED lamp does not require the pre-heating of a filament like a fluorescent lamp and does not need the ignition voltage to function. The circuit is designed so that the electrical contact pins of the two lamp base end caps of the LED lamp may be reversed, or the entire lamp assembly can be swapped end for end and still function correctly similar to a fluorescent lamp. In the preferred electrical design, a single LED circuit board array can be powered by two separate power electronics at either end of the improved LED lamp consisting of bridge rectifiers to convert the AC voltage to DC voltage.

Ex. 1005, 14:16-28.

As such, a POSITA would readily understand that using a bridge rectifier to perform an AC to DC voltage conversion is analogous to the power conversion step of the '093 Patent. Ex. 1002, ¶ 54. Therefore, Leong discloses the step of converting power for powering the set of light fixture loads.

c. 1(b) – limiting converted power to multiple current outputs supplied to the set of light fixture loads;

Leong discloses the step of limiting converted power to multiple current outputs supplied to the set of light fixture loads of the '093 Patent. For example, Leong discloses:

In the preferred electrical design, a single LED circuit board array can be powered by two separate power electronics at either end of the

improved LED lamp consisting of bridge rectifiers to convert the AC voltage to DC voltage. Voltage surge absorbers are used to limit the high voltage to a workable voltage, and optional resistor(s) may be used to limit the current seen by the LEDs. The current limiting resistor(s) is purely optional because the existing fluorescent ballast is already a current limiting device. The resistor(s) then serve as a secondary protection device. In a normal fluorescent lamp and ballast configuration, the ignition voltage travels from one end of the lamp to the other end.

Ex. 1005, 14:24-36.

Voltage surge absorbers are devices or circuit components designed to protect electrical equipment from over-voltage transients caused by external (lightning) or internal (switching) events. Ex. 1002, ¶55. Surge absorbers reduce the steepness of the wave front of a surge. *Id.* Surge absorbers are used for protection against low-voltage high-frequency oscillations. *Id.* A POSITA would readily understand that using the voltage surge absorbers to limit the voltage to a “workable voltage” is equivalent to limiting converted power. *Id.* Therefore, Leong discloses the step of limiting converted power to multiple current output supplied to the set of light fixture loads.

d. 1(c) – splitting or regrouping the multiple current outputs prior to delivery of the multiple current outputs to the set of light fixture loads;

Leong discloses the step of splitting or regrouping the multiple current outputs prior to delivery of the multiple current outputs to the set of light fixture loads of the '093 Patent. For example, Leong discloses:

Ballast assembly 16 regulates the electrical current through LEDs 52 to the correct value of 20 mA for each LED 52. The fifteen LED strings 80 equally divide the total current applied to LED array circuitry 72. Those skilled in the art will appreciate that different ballasts provide different current outputs.

Ex. 1005, 32:55-59.

Moreover, Leong explains:

If the forward drive current for LEDs 52 is known, then 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. Again in this example, ten LEDs 52 are shown connected in series within each LED string 80 because of the fact that only ten LEDs 52 of the 5 mm discrete type of LED will fit around the circumference of a 1.5-inch diameter lamp housing. Ballast assembly 16 provides 300 mA of current, which when divided by the fifteen LED strings 80 of ten LEDs 52 per LED string 80 gives 20 mA

per LED string 80. Each of the ten LEDs 52 connected in series within each LED string 80 sees this 20 mA.

Ex. 1005, 32:60-33:7.

A POSITA would understand that the ballast assembly described in Leong functions as an LED driver which regulates power to the LEDs. Ex. 1002, ¶57. A POSITA would further understand that using the ballast assembly in the manner described in Leong to supply current to individual LED strings before providing power to the individual LEDs is equivalent to splitting or regrouping the multiple current outputs necessary to power the LEDs. Ex. 1002, ¶¶ 58-59. Therefore, Leong discloses the step of splitting or regrouping the multiple current outputs prior to delivery of the multiple current outputs to the set of light fixture loads.

e. 1(d) – receiving a protocol from an external transmitter;

Leong discloses the step of receiving a protocol from an external transmitter of the '093 Patent. For example, Leong discloses:

The 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. This dimming controller will send the control signal directly to the LED lamp itself and not change the AC voltage to the light fixture like conventional dimmers do. A data control signal to a computer based control system driving the dimming controller can be wireless, including using IR (Infra-Red), RF (Radio-Frequency), WiFi/802.11, FHSS (Frequency Hopping Spread

Spectrum, or Bluetooth technology. The data control signal can also be a direct hard-wire connection including DMX512, RS232, Ethernet, DALI, Lonworks, RDM, TCPIP, CEBus Standard EIA-600, X10, and other Power Line Carrier Communication (PLC) protocols.

Ex. 1005, 18:17-31.

A POSITA would understand that receiving a wireless data control signal using WiFi/802.11 or Bluetooth technology or receiving a data control signal from a direct hard-wire connection including DMX512, RS232, Ethernet, DALI, Lonworks, RDM, TCPIP, or CEBus Standard EIA-600, X10 is equivalent to receiving a protocol. Ex. 1002, ¶¶ 60-61. Moreover, a POSITA would understand that the data control signal must be from an external source in order to be received wirelessly or from a direct hard-wire connection. *Id.* As such, Leong discloses the step of receiving a protocol from an external transmitter as required by claim 1 of the '093 Patent.

f. 1(e) – converting the protocol into a data stream; and

Leong discloses the step of converting the protocol into a data stream. For example, Leong discloses:

A data control signal to a computer based control system driving the dimming controller can be wireless, including using IR (Infra-Red), RF (Radio-Frequency), WiFi/802.11, FHSS (Frequency Hopping Spread Spectrum, or Bluetooth technology. The data control signal can also be

a direct hard-wire connection including DMX512, RS232, Ethernet, DALI, Lonworks, RDM, TCP/IP, CEBus Standard EIA-600, X10, and other Power Line Carrier Communication (PLC) protocols.

Ex. 1005, 18:17-31.

Leong further discloses:

Computer 1106 continuously compares the sensor data signals received in accordance with a computer monitoring program and transmits computer signals to dimmers 1102A and 1102B in accordance with a computer program, so as to control the current output of dimmers 1102A and 1102B, so as to prevent flickering of LED lamps 1086A and 1086B.

Ex. 1005, 99:26-31.

A POSITA would understand that the data signals would need to be converted upon receipt from the external transmitter into a form usable by the LED controller/dimmer. Ex. 1002, ¶62. A POSITA would further understand that comparison of the sensor data signals received in accordance with a computer monitoring program and transmits computer signals to dimmers is analogous a converting into a data stream. *Id.* As such, Leong discloses converting the protocol into a data stream as required by claim 1 of the '093 Patent.

g. 1(f) – translating the data stream to LED control information;

Leong discloses the step of translating the data stream to LED control information of the '093 Patent. Specifically, Leong discloses:

An electrical connection 900 connects dimmer 898 to LED array 884. Dimmer 898 will contain the necessary electronics needed to decode the data control signals sent by computer 894 and will provide the proper current drive power required to operate LED array 884. Single LED array 884 controlled by dimmer 898 can represent multiple LED arrays 884 each correspondingly controlled by one of a plurality of dimmers 898 (not shown), wherein the plurality of dimmers 898 are each independently controlled by computer 894. Computer 894 includes a microprocessor, a program installed therein, memory, input/output means, and addressing means.

Ex. 1005, 91:56-67.

Leong further discloses:

Computer 1106 continuously compares the sensor data signals received in accordance with a computer monitoring program and transmits computer signals to dimmers 1102A and 1102B in accordance with a computer program, so as to control the current output of dimmers 1102A and 1102B, so as to prevent flickering of LED lamps 1086A and 1086B. Thus signaling dimmers 1102A and 1102B either to maintain full power to LED arrays 1088A and 1088B in accordance with preset power reductions, so that LED arrays 1088A and 1088B emit full

capacity light, or on the other hand to reduce power after a set time delay to LED arrays 1088A and 1088B with the result that as a person walks about the illumination areas of LED lamps 1086A and 1086B, both lamps emit the same less than full capacity illumination with the result that continuous flickering caused by different power controls at dimmers 1102A and 1102B is avoided.”

Ex. 1005, 99:26-41.

As discussed above, a POSITA would understand that the data signals would need to be converted into a form usable by the dimmer. Ex. 1002, ¶62. A POSITA would further understand that using the dimmer to decode the data control signals sent by computer 894 and to provide the proper current drive power required to operate LED array 884 is analogous to converting data streams to LED control information. Ex. 1002, ¶63. As such, Leong discloses the step of translating the data stream to LED control information by claim 1 of the ‘093 Patent.

h. 1(g) – wherein the LED control information is used for controlling the limited power.

Leong discloses the LED control information is used for controlling the limited power. For example, Leong discloses:

An electrical connection 900 connects dimmer 898 to LED array 884. Dimmer 898 will contain the necessary electronics needed to decode the data control signals sent by computer 894 and will provide the proper current drive power required to operate LED array 884. Single

LED array 884 controlled by dimmer 898 can represent multiple LED arrays 884 each correspondingly controlled by one of a plurality of dimmers 898 (not shown), wherein the plurality of dimmers 898 are each independently controlled by computer 894. Computer 894 includes a microprocessor, a program installed therein, memory, input/output means, and addressing means.”

Ex. 1005, 91:56-67.

Leong further discloses:

Computer 1106 continuously compares the sensor data signals received in accordance with a computer monitoring program and transmits computer signals to dimmers 1102A and 1102B in accordance with a computer program, so as to control the current output of dimmers 1102A and 1102B, so as to prevent flickering of LED lamps 1086A and 1086B. Thus signaling dimmers 1102A and 1102B either to maintain full power to LED arrays 1088A and 1088B in accordance with preset power reductions, so that LED arrays 1088A and 1088B emit full capacity light, or on the other hand to reduce power after a set time delay to LED arrays 1088A and 1088B with the result that as a person walks about the illumination areas of LED lamps 1086A and 1086B, both lamps emit the same less than full capacity illumination with the result that continuous flickering caused by different power controls at dimmers 1102A and 1102B is avoided.

Ex. 1005, 99:26-41.

A POSITA would understand from Leong's disclosure of using a computer program to control the current output of dimmers 1102A and 1102B in order to prevent flickering of LED lamps 1086A and 1086B is equivalent to using the LED control information to limit power. Ex. 1002, ¶64. As such, Leong discloses the LED control information is used for controlling the limited power.

2. Claim 2

Claim 2 depends from independent claim 1. Leong anticipates Claim 1 for the reasons discussed above and incorporated herein. *Supra* IX.A.1. Claim 2 discloses limiting converted power to the multiple current outputs being supplied to a set of Organic LED (OLED) or LED light fixture loads. Ex. 1001, 14:66-15:3. The additional limitation of claim 2 is disclosed by Leong.

For example, Leong discloses:

In the preferred electrical design, a single LED circuit board array can be powered by two separate power electronics at either end of the improved LED lamp consisting of bridge rectifiers to convert the AC voltage to DC voltage. Voltage surge absorbers are used to limit the high voltage to a workable voltage, and optional resistor(s) may be used to limit the current seen by the LEDs.

Ex. 1005, 14:24-30.

Leong further discloses “[t]he individual LEDs within the LED circuit board array can be electrically connected in series, in parallel, or in a combination of series and/or parallel configurations.” Ex. 1005, 14:42-45.

A POSITA would understand that Leong’s disclosure of using voltage absorbers to limit converted power and its disclosure of the use of individual LEDs within a LED circuit board is analogous to supplying limited converted power to the LEDs. Ex. 1002, ¶55. Therefore, Leong discloses limiting converted power to the multiple current outputs being supplied to a set of LED light fixture loads. As such, claim 2 is anticipated by Leong.

3. Claim 9

Claim 9 depends from independent claim 1. Leong anticipates claim 1 for the reasons discussed above and incorporated herein. *Supra* Section IX.A.1. Claim 9 of the ‘093 Patent requires converting the AC power to a low voltage direct current (DC) power and converting the low voltage DC power to the multiple current outputs. Ex. 1001, 15:25-31. The additional limitation of claim 9 is disclosed by Leong.

Leong discloses:

In the preferred electrical design, a single LED circuit board array can be powered by two separate power electronics at either end of the improved LED lamp consisting of bridge rectifiers to convert the AC voltage to DC voltage. Voltage surge absorbers are used to limit the

high voltage to a workable voltage, and optional resistor(s) may be used to limit the current seen by the LEDs.

Ex. 1005, 14:24-30.

Leong further discloses the “individual LEDs within the LED circuit board array can be electrically connected in series, in parallel, or in a combination of series and/or parallel configurations.” Ex. 1005, 14:43-45. Finally, Leong discloses:

Ballast assembly 16 regulates the electrical current through LEDs 52 to the correct value of 20 mA for each LED 52. The fifteen LED strings 80 equally divide the total current applied to LED array circuitry 72. Those skilled in the art will appreciate that different ballasts provide different current outputs.

Ex. 1005, 32:55-59.

The above disclosures show that Leong discloses receiving an alternating current (AC) power; converting the AC power to a low voltage direct current (DC) power; and converting the low voltage DC power to the multiple current outputs.

Ex. 1002, ¶65. As such, claim 9 is anticipated by Leong.

4. Claim 10

Claim 10 depends from independent claim 1. Leong anticipates claim 1 for the reasons discussed above and incorporated herein. *Supra* IX.A.1. Claim 10 discloses adjusting at least one of the multiple current outputs in accordance with the protocol and delivering the adjusted at least one current output to an associated

light fixture load. Ex. 1001, 18:31-36. The additional limitation of claim 10 is disclosed by Leong.

For example, Leong discloses “[b]allast assembly 16 regulates the electrical current through LEDs 52 to the correct value of 20 mA for each LED 52. The fifteen LED strings 80 equally divide the total current applied to LED array circuitry 72.”

Ex. 1005, 32:55-58. Leong further discloses:

[T]he 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. 1005, 32:60-66. Still further, Leong discloses:

Ballast assembly 16 provides 300 mA of current, which when divided by the fifteen LED strings 80 of ten LEDs 52 per LED string 80 gives 20 mA per LED string 80. Each of the ten LEDs 52 connected in series within each LED string 80 sees this 20 mA.

Ex. 1005, 33:3-33:7.

Finally, Leong discloses:

An electrical connection 892A positioned in tube 886 is powered from ballast 890 and transmits AC power to AC-DC power converter 891, which in turn transmits DC power to a computer 894 by way of electrical connection 892B and to dimmer 898 by way of a similar

electrical connection (not shown). Both computer 894 and dimmer 898 are also positioned in tube 886. Power from ballast 890 can be either AC or DC voltage. In the case of DC power going into AC-DC power converter 891, DC power will continue to be sent to computer 894 and dimmer 898. Computer 894 is electrically and operatively connected by an electrical control connection 896 to dimmer 898. An electrical connection 900 connects dimmer 898 to LED array 884. Dimmer 898 will contain the necessary electronics needed to decode the data control signals sent by computer 894 and will provide the proper current drive power required to operate LED array 884. Single LED array 884 controlled by dimmer 898 can represent multiple LED arrays 884 each correspondingly controlled by one of a plurality of dimmers 898 (not shown), wherein the plurality of dimmers 898 are each independently controlled by computer 894. Computer 894 includes a microprocessor, a program installed therein, memory, input/output means, and addressing means.

Ex. 1005, 91:45-67.

A POSITA would understand that Leong's discussion of using the dimmers 898 (which contain the necessary electronics needed to decode the data control signals) to control the multiple LED arrays is analogous to adjusting at least one of the multiple current outputs and providing the adjusted output current to at least one LED in the LED array. Ex. 1002, ¶68. Therefore, Leong discloses adjusting at least one of the multiple current outputs in accordance with the protocol; and delivering

the adjusted at least one current output to an associated light fixture load. As such, claim 10 is anticipated by Leong.

5. Claim 11

- a. 11[p] – A method of 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:

Electrical compensation of daylight can be controlled either by dimming (varying the light output to provide the desired brightness) or by switching (turning individual lamps or fixtures in different areas of a building or room on or off as necessary). Just as a typical two-lamp fixture containing the LED retrofit lamps of the present invention can be switched to illuminate both LED retrofit lamps, one LED retrofit lamp, or neither LED retrofit lamp, multiple fixtures all containing the LED retrofit lamps of the present invention can be turned on or off individually to illuminate each part of a room in just the needed amount of light.

Ex. 1005, 18:3-13.

Leong further discloses:

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. 1005, 9:39-47.

Leong discloses LED lamps contain a means for controlling the delivery of electrical power from the ballast assembly to the LEDs. Ex. 1005, 18:3-13. A POSITA would understand that Leong's disclosure of the electrical power delivery means is equivalent to the method of configuring (i.e. controlling) and powering (i.e., delivery of electrical power) a set of light fixture loads in a LED). Ex. 1002, ¶57. Leong thus discloses a method of configuring and powering a set of light fixture loads in a LED low voltage distribution system. *Id.*

b. 11(a) – converting power for powering the set of light fixture loads;

Leong discloses the step of converting power for powering the set of light fixture loads. For example, Leong discloses:

Given these various voltage considerations, the present invention is designed to work with all existing ballast output configurations. The improved LED lamp does not require the pre-heating of a filament like a fluorescent lamp and does not need the ignition voltage to function. The circuit is designed so that the electrical contact pins of the two lamp base end caps of the LED lamp may be reversed, or the entire lamp assembly can be swapped end for end and still function correctly similar

to a fluorescent lamp. In the preferred electrical design, a single LED circuit board array can be powered by two separate power electronics at either end of the improved LED lamp consisting of bridge rectifiers to convert the AC voltage to DC voltage.

Ex. 1005, 14:16-28.

As such, a POSITA would readily understand that using a bridge rectifier to perform an AC to DC voltage conversion is analogous to the power conversion step of the '093 Patent. Ex. 1002, ¶54. Therefore, Leong discloses the step of converting power for powering the set of light fixture loads.

c. 11(b) – limiting converted power to multiple current outputs supplied to the set of light fixture loads;

Leong discloses the step of limiting converted power to multiple current outputs supplied to the set of light fixture loads of the '093 Patent. For example, Leong discloses:

In the preferred electrical design, a single LED circuit board array can be powered by two separate power electronics at either end of the improved LED lamp consisting of bridge rectifiers to convert the AC voltage to DC voltage. Voltage surge absorbers are used to limit the high voltage to a workable voltage, and optional resistor(s) may be used to limit the current seen by the LEDs. The current limiting resistor(s) is purely optional because the existing fluorescent ballast is already a current limiting device. The resistor(s) then serve as a secondary protection device. In a normal fluorescent lamp and ballast

configuration, the ignition voltage travels from one end of the lamp to the other end.

Ex. 1005, 14:24-36.

A POSITA would readily understand that using the voltage surge absorbers to limit the voltage to a “workable voltage” is equivalent to limiting converted power.

Ex. 1002, ¶55. Therefore, Leong discloses the step of limiting converted power to multiple current output supplied to the set of light fixture loads.

d. 11(c) – splitting or regrouping the multiple current outputs prior to delivery of the multiple current outputs to the set of light fixture loads;

Leong discloses the step of splitting or regrouping the multiple current outputs prior to delivery of the multiple current outputs to the set of light fixture loads of the ‘093 Patent. For example, Leong discloses:

Ballast assembly 16 regulates the electrical current through LEDs 52 to the correct value of 20 mA for each LED 52. The fifteen LED strings 80 equally divide the total current applied to LED array circuitry 72. Those skilled in the art will appreciate that different ballasts provide different current outputs.

Ex. 1005, 32:55-59. Further,

If the forward drive current for LEDs 52 is known, then 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. Again in this example, ten LEDs 52 are shown connected in series within each LED string 80 because of the fact that only ten LEDs 52 of the 5 mm discrete type of LED will fit around the circumference of a 1.5-inch diameter lamp housing. Ballast assembly 16 provides 300 mA of current, which when divided by the fifteen LED strings 80 of ten LEDs 52 per LED string 80 gives 20 mA per LED string 80. Each of the ten LEDs 52 connected in series within each LED string 80 sees this 20 mA.

Ex. 1005, 32:60-33:7.

A POSITA would understand that the ballast assembly described in Leong functions as an LED driver which regulates power to the LEDs. Ex. 1002, ¶57. A POSITA would further understand that using the ballast assembly in the manner described in Leong to supply current to individual LED strings before providing power to the individual LEDs is equivalent to splitting or regrouping the multiple current outputs necessary to power the LEDs. *Id.* ¶59. Therefore, Leong discloses the step of splitting or regrouping the multiple current outputs prior to delivery of the multiple current outputs to the set of light fixture loads.

**e. 11(d) – receiving a data stream from an external transmitter;
and**

Leong discloses the step of receiving a data stream from an external transmitter of the '093 Patent. For example, Leong discloses:

The 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. This dimming controller will send the control signal directly to the LED lamp itself and not change the AC voltage to the light fixture like conventional dimmers do. A data control signal to a computer based control system driving the dimming controller can be wireless, including using IR (Infra-Red), RF (Radio-Frequency), WiFi/802.11, FHSS (Frequency Hopping Spread Spectrum, or Bluetooth technology. The data control signal can also be a direct hard-wire connection including DMX512, RS232, Ethernet, DALI, Lonworks, RDM, TCPIP, CEBus Standard EIA-600, X10, and other Power Line Carrier Communication (PLC) protocols.

Ex. 1005, 18:17-31.

A POSITA would understand that receiving a wireless data control signal using WiFi/802.11 or Bluetooth technology or receiving a data control signal from a direct hard-wire connection including DMX512, RS232, Ethernet, DALI, Lonworks, RDM, TCPIP, or CEBus Standard EIA-600, X10 is equivalent to receiving a data stream. Ex. 1002, ¶¶61-62. Moreover, a POSITA would understand that the data control signal must be transmitted from an external source in order to be

received wirelessly or from a direct hard-wire connection. *Id.* As such, Leong discloses the step of receiving a protocol from an external transmitter as required by claim 1 of the '093 Patent.

f. 11(e) – translating the data stream to LED control information;

Leong discloses the step of translating the data stream to LED control information of the '093 Patent. Specifically, Leong discloses:

An electrical connection 900 connects dimmer 898 to LED array 884. Dimmer 898 will contain the necessary electronics needed to decode the data control signals sent by computer 894 and will provide the proper current drive power required to operate LED array 884. Single LED array 884 controlled by dimmer 898 can represent multiple LED arrays 884 each correspondingly controlled by one of a plurality of dimmers 898 (not shown), wherein the plurality of dimmers 898 are each independently controlled by computer 894. Computer 894 includes a microprocessor, a program installed therein, memory, input/output means, and addressing means.

Ex. 1005, 91:56-67.

Leong further discloses:

Computer 1106 continuously compares the sensor data signals received in accordance with a computer monitoring program and transmits computer signals to dimmers 1102A and 1102B in accordance with a computer program, so as to control the current output of dimmers

1102A and 1102B, so as to prevent flickering of LED lamps 1086A and 1086B. Thus signaling dimmers 1102A and 1102B either to maintain full power to LED arrays 1088A and 1088B in accordance with preset power reductions, so that LED arrays 1088A and 1088B emit full capacity light, or on the other hand to reduce power after a set time delay to LED arrays 1088A and 1088B with the result that as a person walks about the illumination areas of LED lamps 1086A and 1086B, both lamps emit the same less than full capacity illumination with the result that continuous flickering caused by different power controls at dimmers 1102A and 1102B is avoided.

Ex. 1005, 99:26-41.

As discussed above, a POSITA would understand that the data signals would need to be converted into a form usable by the dimmer. Ex. 1002, ¶62. A POSITA would further understand that using the dimmer to decode the data control signals sent by computer 894 and to provide the proper current drive power required to operate LED array 884 is analogous to converting data streams to LED control information. *Id.* ¶63. As such, Leong discloses the step of translating the data stream to LED control information by claim 1 of the '093 Patent.

g. 11(f) – wherein the LED control information is used for controlling the limited power.

Leong discloses the LED control information is used for controlling the limited power. For example, Leong discloses:

An electrical connection 900 connects dimmer 898 to LED array 884. Dimmer 898 will contain the necessary electronics needed to decode the data control signals sent by computer 894 and will provide the proper current drive power required to operate LED array 884. Single LED array 884 controlled by dimmer 898 can represent multiple LED arrays 884 each correspondingly controlled by one of a plurality of dimmers 898 (not shown), wherein the plurality of dimmers 898 are each independently controlled by computer 894. Computer 894 includes a microprocessor, a program installed therein, memory, input/output means, and addressing means.

Ex. 1005, 91:56-67.

Leong further discloses:

Computer 1106 continuously compares the sensor data signals received in accordance with a computer monitoring program and transmits computer signals to dimmers 1102A and 1102B in accordance with a computer program, so as to control the current output of dimmers 1102A and 1102B, so as to prevent flickering of LED lamps 1086A and 1086B. Thus signaling dimmers 1102A and 1102B either to maintain full power to LED arrays 1088A and 1088B in accordance with preset power reductions, so that LED arrays 1088A and 1088B emit full capacity light, or on the other hand to reduce power after a set time delay to LED arrays 1088A and 1088B with the result that as a person walks about the illumination areas of LED lamps 1086A and 1086B, both lamps emit the same less than full capacity illumination with the

result that continuous flickering caused by different power controls at dimmers 1102A and 1102B is avoided.

Ex. 1005, 99:26-41.

A POSITA would understand that Leong's disclosure of using a computer program to control the current output of dimmers 1102A and 1102B in order to prevent flickering of LED lamps 1086A and 1086B is equivalent to using the LED control information to limit power. Ex. 1002, ¶64. As such, Leong discloses the LED control information is used for controlling the limited power.

6. Claim 12

Claim 12 depends from independent claim 11. Leong anticipates claim 11 for the reasons discussed above and incorporated herein. *Supra* Section IX.A.5. Claim 12 of the '093 Patent discloses limiting converted power to the multiple current outputs being supplied to a set of Organic LED (OLED) or LED light fixture loads. Ex. 1001, 16:5-9. The additional limitation of claim 12 is disclosed by Leong.

For example, Leong discloses:

In the preferred electrical design, a single LED circuit board array can be powered by two separate power electronics at either end of the improved LED lamp consisting of bridge rectifiers to convert the AC voltage to DC voltage. Voltage surge absorbers are used to limit the high voltage to a workable voltage, and optional resistor(s) may be used to limit the current seen by the LEDs.

Ex. 1005, 14:24-30.

Leong further discloses “[t]he individual LEDs within the LED circuit board array can be electrically connected in series, in parallel, or in a combination of series and/or parallel configurations.” Ex. 1005, 14:42-45.

A POSITA would understand that Leong’s disclosure of using voltage absorbers to limit converted power and its disclosure of the use of individual LEDs within a LED circuit board is analogous to supplying limited converted power to the LEDs. Ex. 1002, ¶55. Therefore, Leong discloses limiting converted power to the multiple current outputs being supplied to a set of LED light fixture loads. As such, claim 12 is anticipated by Leong.

7. Claim 13

Claim 13 depends from independent claim 11. Leong anticipates claim 11 for the reasons discussed above and incorporated herein. *Supra* Section IX.A.5. Claim 13 of the ‘093 Patent requires limiting power to a calibrated value when an event failure occurs. Ex. 1001, 16:11-14. The additional limitation of claim 13 is disclosed by Leong.

For example, Leong discloses:

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. 1005, 13:57-61.

Leong further discloses:

The occupancy sensor can be preset to dim the LED lamp to perhaps 50% brightness to conserve energy when no one is in a room, for example, while a light level photosensor can switch on and off the power to the ballast or LED array. The LED retrofit lamp would be programmed to turn the LED arrays on when luminance on the photocell drops below a certain value, and turn the LED arrays off when the luminance due to sunlight reaches a higher cut-off value. This value could be adjustable depending on the user's needs. Instead of turning on and off the LED arrays, the LED arrays can likewise be dimmed.

Ex. 1005, 17:59-18:2.

A POSITA would understand that Leong's disclosure of using a photocell when luminance on the photocell drops below a certain value to manipulate the brightness of the LEDs is equivalent to limiting power to a calibrated value when an event failure occurs. Ex. 1002, ¶67. The event failure here is equivalent to the photocell not receiving enough luminance. *Id.* Therefore, Leong discloses limiting power to a calibrated value when an event failure occurs. As such, claim 13 is anticipated by Leong.

8. Claim 19

Claim 19 depends from independent claim 11. Leong anticipates claim 11 for the reasons discussed above and incorporated herein. *Supra* Section IX.A.5. Claim 19 of the '093 Patent requires the step of receiving an alternating current (AC) power; converting the AC power to a low voltage direct current (DC) power; and converting the low voltage DC power to the multiple current output. Ex. 1001, 16:32-38. The additional limitation of claim 19 is disclosed by Leong.

Leong discloses:

In the preferred electrical design, a single LED circuit board array can be powered by two separate power electronics at either end of the improved LED lamp consisting of bridge rectifiers to convert the AC voltage to DC voltage. Voltage surge absorbers are used to limit the high voltage to a workable voltage, and optional resistor(s) may be used to limit the current seen by the LEDs.

Ex. 1005, 14:24-30.

Leong further discloses “[s]ince these new devices require more current to drive them and run on low voltages, the high current available from existing fluorescent ballast outputs with current outputs of 300 mA and higher, along with their characteristically higher voltage outputs provide the perfect match for the present invention.” Ex. 1005, 83:60-65.

The above disclosures show that Leong discloses receiving an alternating current (AC) power; converting the AC power to a low voltage direct current (DC) power; and converting the low voltage DC power to the multiple current outputs. Ex. 1002, ¶65. Therefore, Leong discloses receiving an alternating current (AC) power; converting the AC power to a low voltage direct current (DC) power; and converting the low voltage DC power to the multiple current output. As such, claim 19 is anticipated by Leong.

9. Claim 20

Claim 20 depends from independent claim 11. Leong anticipates claim 11 for the reasons discussed above and incorporated herein. *Supra* Section IX.A.5. Claim 20 of the '093 Patent requires adjusting at least one of the multiple current outputs in accordance with the data stream and delivering the adjusted at least one current output to the associated light fixture. Ex. 1001, 16:39-44. The additional limitation of claim 20 is disclosed by Leong.

Leong discloses “[b]allast assembly 16 regulates the electrical current through LEDs 52 to the correct value of 20 mA for each LED 52. The fifteen LED strings 80 equally divide the total current applied to LED array circuitry 72.” Ex. 1005, 32:55-58. Leong further discloses:

[T]he 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. 1005, 32:61-66. Still further, Leong discloses:

Ballast assembly 16 provides 300 mA of current, which when divided by the fifteen LED strings 80 of ten LEDs 52 per LED string 80 gives 20 mA per LED string 80. Each of the ten LEDs 52 connected in series within each LED string 80 sees this 20 mA.

Ex. 1005, 33:3-7.

Finally, Leong discloses:

An electrical connection 900 connects dimmer 898 to LED array 884. Dimmer 898 will contain the necessary electronics needed to decode the data control signals sent by computer 894 and will provide the proper current drive power required to operate LED array 884. Single LED array 884 controlled by dimmer 898 can represent multiple LED arrays 884 each correspondingly controlled by one of a plurality of dimmers 898 (not shown), wherein the plurality of dimmers 898 are each independently controlled by computer 894. Computer 894 includes a microprocessor, a program installed therein, memory, input/output means, and addressing means.

Ex. 1005, 91:56-67.

A POSITA would understand that Leong's discussion of using the dimmers 898 (which contain the necessary electronics needed to decode the data control

signals) to control the multiple LED arrays is analogous to adjusting at least one of the multiple current outputs and providing the adjusted output current to at least one LED in the LED array. Ex. 1002, ¶¶68. Therefore, Leong discloses adjusting at least one of the multiple current outputs in accordance with the protocol; and delivering the adjusted at least one current output to an associated light fixture load.

Further, a POSITA would understand that the disclosure of dimmers containing the necessary electronics needed to decode the data control signals sent by the computer described above are digital devices because they each process data as a sequence of discrete values. Ex. 1002, ¶¶68-69. Therefore, Leong discloses the primary and secondary controllers are digital controllers. As such, claim 20 is anticipated by Leong.

B. Ground 2: Leong in View of Lee Renders Claims 5-7 and 15-17 Obvious

For the reasons stated below, claims 5-7 and 15-17 of the '093 Patent are rendered obvious under 35 U.S.C. § 103 by Leong in view of Lee. Leong anticipates independent claims 1 and 11 for the reasons discussed above and incorporated herein. *Supra* Sections IX.A.1, 5.

1. Claim 5

Claim 5 depends from independent claim 1. Leong anticipates claim 1 for the reasons discussed above and incorporated herein. *Supra* Section IX.A.1. The additional limitations of claim 5 are disclosed by Lee.

Claim 5 of the ‘093 Patent requires the additional step of receiving power via a set of input channels. Ex. 1001, 15:11-13. Like the ‘093 Patent, Lee discloses the step of receiving power via a set of input channels. For example, Lee describes:

In addition, the LED driving module 200 may be implemented as an integrated circuit (IC) and may include a driving voltage input terminal VP to which the driving voltage VP is input, a dimming level signal input terminal Adim to which the dimming level signal Adim is input, a connection terminal Rset to which a maximum driving current setting resistor RS is connected, a ground terminal GND to which a ground is connected

Ex. 1006, 5[0067].

A POSITA would understand that the voltage input terminal VP and dimming level signal input terminal Adim are a set of input channels. Ex. 1002, ¶71. The Leong-Lee combination thus discloses the step of receiving power via a set of input channels and renders claim 5 obvious.

2. Claim 6

Claim 6 depends from dependent claim 5. Claims 1 and 5 are anticipated for the reasons discussed above and incorporated herein. *Supra* Sections IX.A.1, B.1. The additional limitations of claim 6 are disclosed by Lee.

Claim 6 of the ‘093 Patent further requires “delivering power to the set of light fixture loads via a set of output channels.” Ex. 1001, 15:13-15. Lee describes:

[A] connection terminal ST4 to which a fourth current path P4 connected to a cathode terminal of the fourth LED group 340 is connected, a connection terminal ST3 to which a third current path P3 between a cathode terminal of the third LED group 330 and an anode terminal of the fourth LED group 340 is connected, a connection terminal ST2 to which a second current path P2 between a cathode terminal of the second LED group 320 and an anode terminal of the third LED group 330 is connected, and a connection terminal ST1 to which a first current path P1 between a cathode terminal of the first LED group 310 and an anode terminal of the second LED group 320 is connected, as shown in FIG. 3. Although the LED driving module 200 includes eight terminals as shown in FIG. 3, the number of terminals may be changed as needed.

Ex. 1006, 5[0067].

A POSITA would understand that the current paths connected between the cathode and anode terminals of the LED group is analogous to delivering power to the set of light fixture loads via a set of output channels. Ex. 1002, ¶72. The Leong-Lee combination thus discloses the step of further comprising delivering power to the set of light fixture loads via a set of output channels and renders claim 6 obvious.

3. Claim 7

Claim 7 depends from dependent claim 6. Claims 1, 5, and 6 are anticipated for the reasons discussed above and incorporated herein. *Supra* Sections IX.A.1, B.1-2. The additional limitations of claim 7 are disclosed by Lee.

Claim 7 of the '093 Patent further requires splitting the set of input channels into output channels. Ex. 1001, 15:17-20. Like the '093 Patent, Lee discloses splitting the set of input channels into the set of output channels. For example, Lee describes:

[A] connection terminal ST4 to which a fourth current path P4 connected to a cathode terminal of the fourth LED group 340 is connected, a connection terminal ST3 to which a third current path P3 between a cathode terminal of the third LED group 330 and an anode terminal of the fourth LED group 340 is connected, a connection terminal ST2 to which a second current path P2 between a cathode terminal of the second LED group 320 and an anode terminal of the third LED group 330 is connected, and a connection terminal ST1 to which a first current path P1 between a cathode terminal of the first LED group 310 and an anode terminal of the second LED group 320 is connected, as shown in FIG. 3. Although the LED driving module 200 includes eight terminals as shown in FIG. 3, the number of terminals may be changed as needed.

Ex. 1006, 5[0067].

A POSITA would understand that the multiple input and outputs described above is analogous to splitting the set of input channels into the set of output channels. Ex. 1002, ¶73. The Leong-Lee combination thus discloses the step of splitting the set of input channels into the set of output channels and renders claim 7 obvious.

4. Claim 15

Claim 15 depends from independent claim 11. Leong anticipates claim 11 for the reasons discussed above and incorporated herein. *Supra* Section IX.A.5. The additional limitations of claim 15 are disclosed by Lee.

Claim 15 of the '093 Patent requires the step of receiving power via a set of input channels. Ex. 1001, 16:18-20. Like the '093 Patent, Lee makes a similar disclosure. For example, Lee describes "[a]s shown in FIG. 3, the LED driving module 200 may include LED group driving units 220, a LED driving control unit 210, and an internal power generating unit 230, in order to drive and control the LED groups 310 to 340." Ex. 1001, 5:0067.

For example, Lee describes that:

In addition, the LED driving module 200 may be implemented as an integrated circuit (IC) and may include a driving voltage input terminal VP to which the driving voltage VP is input, a dimming level signal input terminal Adim to which the dimming level signal Adim is input, a connection terminal Rset to which a maximum driving current setting resistor RS is connected, a ground terminal GND to which a ground is connected

Ex. 1006, 5[0067].

A POSITA would understand that the voltage input terminal VP and dimming level signal input terminal Adim are a set of input channels. Ex. 1002, ¶74. The

Leong-Lee combination thus discloses the step of receiving power via a set of input channels and renders claim 15 obvious.

5. Claim 16

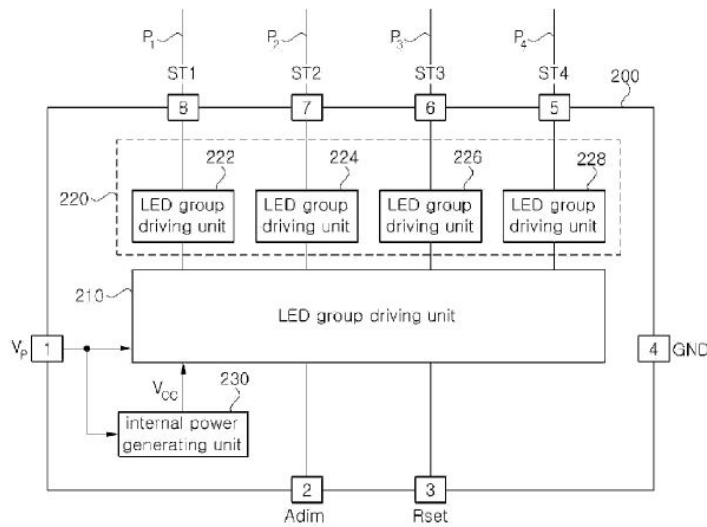
Claim 16 depends from dependent claim 15. Claims 11 and 15 are anticipated for the reasons discussed above and incorporated herein. *Supra* Sections IX.A.5, B.4. The additional limitations of claim 16 are disclosed by Lee.

Claim 16 of the '093 Patent requires the step of delivering power to the set of light fixture loads via a set of output channels. Ex. 1001, 16:21-23. Lee describes:

[A] connection terminal ST4 to which a fourth current path P4 connected to a cathode terminal of the fourth LED group 340 is connected, a connection terminal ST3 to which a third current path P3 between a cathode terminal of the third LED group 330 and an anode terminal of the fourth LED group 340 is connected, a connection terminal ST2 to which a second current path P2 between a cathode terminal of the second LED group 320 and an anode terminal of the third LED group 330 is connected, and a connection terminal ST1 to which a first current path P1 between a cathode terminal of the first LED group 310 and an anode terminal of the second LED group 320 is connected, as shown in FIG. 3. Although the LED driving module 200 includes eight terminals as shown in FIG. 3, the number of terminals may be changed as needed.

Ex. 1006, 5[0067].

Fig. 3



Ex. 1006, fig. 3.

A POSITA would understand that the current paths connected between the cathode and anode terminals of the LED group and further connected to internal power generating unit 230 is analogous to delivering power to the set of light fixture loads via a set of output channels. Ex. 1002, ¶75. The Leong-Lee combination thus discloses the step of further comprising delivering power to the set of light fixture loads via a set of output channels and renders claim 16 obvious.

6. Claim 17

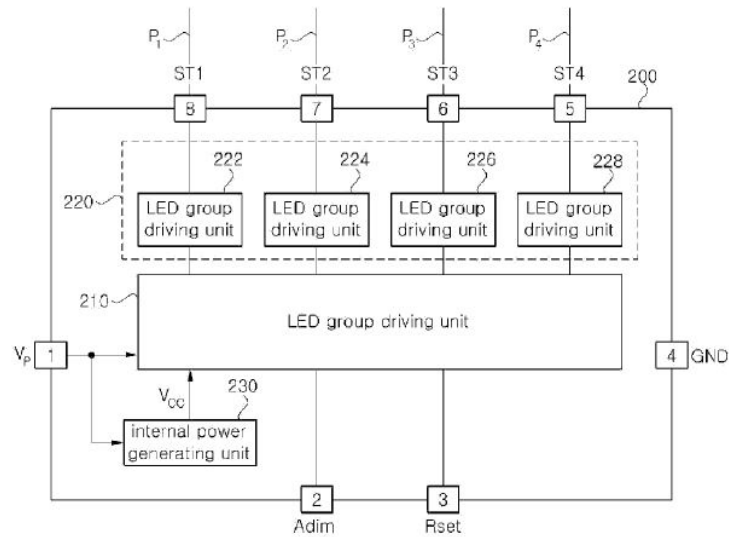
Claim 17 depends from dependent claim 16. Claims 11 and 15-16 are anticipated for the reasons discussed above and incorporated herein. *Supra* Sections IX.A.5, B.4-5. The additional limitations of claim 17 are disclosed by Lee.

Claim 17 of the '093 Patent requires the additional step of splitting the set of input channels into the set of output channels. Like the '093 Patent, Lee discloses splitting the set of input channels into the set of output channels. For example, Lee describes:

[A] connection terminal ST4 to which a fourth current path P4 connected to a cathode terminal of the fourth LED group 340 is connected, a connection terminal ST3 to which a third current path P3 between a cathode terminal of the third LED group 330 and an anode terminal of the fourth LED group 340 is connected, a connection terminal ST2 to which a second current path P2 between a cathode terminal of the second LED group 320 and an anode terminal of the third LED group 330 is connected, and a connection terminal ST1 to which a first current path P1 between a cathode terminal of the first LED group 310 and an anode terminal of the second LED group 320 is connected, as shown in FIG. 3. Although the LED driving module 200 includes eight terminals as shown in FIG. 3, the number of terminals may be changed as needed.

Ex. 1006, 5[0067].

Fig. 3



Ex. 1006, fig. 3.

A POSITA would understand that the multiple input and outputs described above are analogous to splitting the set of input channels into the set of output channels. Ex. 1002, ¶76. The Leong-Lee combination thus discloses the step of splitting the set of input channels into the set of output channels and renders claim 17 obvious.

C. Motivation to Combine Leong and Lee

A POSITA would have been motivated to combine Leong and Lee for several reasons. *See* Ex. 1002, ¶77-88.

First, Leong and Lee are analogous art to the ‘093 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 ‘093 Patent defines its “Technical Field” as a “novel LED

Driver/dimmer for solid state lighting applications.” Ex. 1001, 1:40-41. Like the ‘093 Patent, Leong and Lee are directed to powering and controlling solid state lighting applications. Ex. 1005, 1:18; Ex. 1006, Abstract; *supra* Sections IX.A-B.

Moreover, for the reasons provided in Sections IX.A-B, Leong and Lee are analogous to the ‘093 Patent because they are 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, ¶80. The LED Driver components described in Leong and Lee were well-known at the time. *Id.* As such, it would also have been straightforward for a POSITA to modify the LED driver of Leong to include Lee’s steps of delivering power to a set of light fixture loads via a set of output channels, splitting the set of input channels into the set of output channels and receiving power via a set of input channels and that such a system would work.

D. 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. 1007. 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. 1008.

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 were not before the Office. Additionally, Advanced Lighting Concepts’s 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.

X. CONCLUSION

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

Dated: August 3, 2023

Respectfully submitted,

By: / Winston O. Huff /

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**ATTORNEYS FOR PETITIONER
ADVANCED LIGHTING CONCEPTS
LLC**

U.S. PATENT NO. 8,525,093 – LISTING OF CHALLENGED CLAIMS

<u>CLAIM NO.</u>	<u>CLAIM ELEMENTS</u>
1[p]	A method of configuring and powering a set of light fixture loads in a light emitting diode (LED) low voltage distribution system comprising:
1[a]	converting power for powering the set of light fixture loads;
1[b]	limiting converted power to multiple current outputs supplied to the set of light fixture loads;
1[c]	splitting or regrouping the multiple current outputs prior to delivery of the multiple current outputs to the set of light fixture loads;
1[d]	receiving a protocol from an external transmitter;
1[e]	converting the protocol into a data stream; and
1[f]	translating the data stream to LED control information;
1[g]	wherein the LED control information is used for controlling the limited power.
2	The method of claim 1 wherein limiting converted power comprises: limiting converted power to the multiple current outputs being supplied to a set of Organic LED (OLED) or LED light fixture loads.
5	The method of claim 1 wherein converting power for powering comprises: receiving power via a set of input channels.
6	The method of claim 5 further comprising delivering power to the set of light fixture loads via a set of output channels.
7	The LED driver/dimmer of claim 1 further comprises a housing portion for housing the components of the driver.
9	The method of claim 1 wherein converting power comprises: receiving an alternating current (AC) power;

<u>CLAIM NO.</u>	<u>CLAIM ELEMENTS</u>
	converting the AC power to a low voltage direct current (DC) power; and converting the low voltage DC power to the multiple current outputs.
10	The method of claim 1 further comprising, after receiving the protocol: adjusting at least one of the multiple current outputs in accordance with the protocol; and delivering the adjusted at least one current output to an associated light fixture load.
11[p]	A method of configuring and powering a set of light fixture loads in a light emitting diode (LED) low voltage distribution system comprising:
11[a]	converting power for powering the set of light fixture loads;
11[b]	limiting converted power to multiple current outputs supplied to the set of light fixture loads;
11[c]	splitting or regrouping the multiple current outputs prior to delivery of the multiple current outputs to the set of light fixture loads;
11[d]	receiving a data stream from an external transmitter; and
11[e]	translating the data stream to LED control information;
11[f]	wherein the LED control information is used for controlling the limited power.
12	The method of claim 11 wherein limiting converted power comprises: limiting converted power to the multiple current outputs being supplied to a set of Organic LED (OLED) or LED light fixture loads.
13	The method of claim 11 wherein limiting converted power comprises: limiting power to a calibrated value when an event failure occurs.
15	The method of claim 11 wherein converting power for powering comprises: receiving power via a set of input channels.
16	The method of claim 15 further comprising delivering power to the set of light fixture loads via a set of output channels.

<u>CLAIM NO.</u>	<u>CLAIM ELEMENTS</u>
17	The method of claim 16 wherein splitting or regrouping comprises: splitting the set of input channels into the set of output channels.
19	The method of claim 11 wherein converting power comprises: receiving an alternating current (AC) power; converting the AC power to a low voltage direct current (DC) power; and converting the low voltage DC power to the multiple current outputs.
20	The method of claim 11 further comprising, after receiving the data stream: adjusting at least one of the multiple current outputs in accordance with the data stream; and delivering the adjusted at least one current output to the associated light fixture.

CERTIFICATION OF COMPLIANCE WITH TYPE-VOLUME LIMITS

This Petition includes 11,275 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 3, 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 3, 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 '093 Patent:

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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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