

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. IPR2023-01257

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

DECLARATION OF JOSEPH C. McALEXANDER IN SUPPORT OF
PETITIONER'S PETITION FOR *INTER PARTES* REVIEW OF U.S. PATENT
NO. 8,957,601 UNDER 35 U.S.C. §§311-319 AND 37 C.F.R. §42.100 ET SEQ.

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INTRODUCTION

1. My name is Joseph C. M^cAlexander III, President of M^cAlexander Sound, Inc., located at 101 W. Renner Rd., Suite 350, Richardson, TX 75082. I have been retained by Munsch Hardt Kopf and Harr, Counsel for Advanced Lighting Concepts LLC d/b/a Environmental Lights (“EL”) in connection with the above-captioned matter, to provide my analyses and conclusions in this *inter partes* review proceeding before the United States Patent and Trademark Office regarding U.S. Patent No. 8,957,601 (“the ‘601 Patent”).

2. I understand that mate., LLC is the Plaintiff and that EL is the Defendant in a patent infringement case filed in the United States District Court for the Southern District of California, Civil Action No. 3:22-cv-0195-CAB-DEB.

3. I submit this declaration based on my personal knowledge and experience, as well as the materials that I reviewed and considered in formulating my opinions.

QUALIFICATIONS AND EXPERIENCE

4. I am a technical expert in the subject matter areas relevant to the ‘601 Patent, including the design and testing of LED drivers and dimmers. I am qualified to reach the opinions and conclusions stated in this Declaration. I address my background and qualifications in Section I below and provide additional detail in my CV submitted with this report.

5. I am the Founder and President of M^cAlexander Sound, Inc., formerly IP Director of CCI and Vice President of EPI Technologies, Inc.

6. I am a Registered Professional Engineer (#79454) in the State of Texas and am also a senior lifetime member of the Institute of Electrical and Electronics Engineers, Inc. (IEEE) and, in particular, have joined the Computer, Electron Devices, and Solid State Circuits societies of IEEE. I hold a Bachelor of Science degree in Electrical Engineering from North Carolina State University and completed 1.5 years of graduate level studies in Neurophysiology at the University of Texas Graduate School of Biomedical Science. I have been associated with the integrated circuit and electronics industry as a designer and consultant for the past 50 years and am a named inventor on 31 U.S. patents and a number of foreign patents, some of which are related to LED systems.

7. My skills and experience are in the areas of circuit design and analysis, device fabrication and assembly, testing, marketing, control system design and analysis, manufacturing operations, software development, management, and respective areas of quality, reliability, and defect/failure analysis. Specifically, I have:

- designed memories, including Dynamic Random Access Memories (DRAMs), Static Random Access Memories (SRAMs), Charge Coupled Devices (CCDs), Shift Registers (SRs), and functional circuits including I/O buffers for address and data, decoders, clocks, sense amplifiers, fault tolerant (incorporating both non-volatile EPROM and random access memory components), parallel-to-serial data paths for video applications,

level shifters, converters, pumps, and logic, as well as wireless communication systems and MEMs;

- managed operations including engineering, training, and quality assurance for device fabrication, assembly, test, analysis, and reliability assessment, as well as manufacturing control, each of which involved both volatile and non-volatile memory; testing, analysis, and control involved use of mechanical calibration and measuring equipment, including optical, scanning e-beam, IR, capacitive, and laser using phase contrast and Fast Fourier Transform (FFT) for High Aspect Ratio Inspection (HARI) applications;
- taught courses in solid-state device physics, integrated circuit design, integrated circuit fabrication, and statistical control; provided expert services, investigating both process and design technologies of various devices (microprocessor and controller, volatile and non-volatile memory, programmable logic, card, tag, module, mixed signal, custom, and other), systems (PC and peripheral, computer, control, laser measurement, switch, architecture, software, and other), and consumer products (medical, TV, telephone, VCR, facsimile, copier, lighting, game, and other); and designed and managed development, testing, and evaluation of memory devices and systems incorporating such devices, including simulation of operation. I have also had experience in programming, erasing, and wearout of electrically programmable and erasable non-volatile memories.

8. Of particular relevance is my experience as an integrated circuit designer, manager, and consultant. I spent nine years designing integrated circuit products at Texas Instruments, Inc., and an additional five years there managing wafer fabrication operations and assembly (packaging), test, and reliability analysis facilities. As such, I participated directly in the strategic design and process decisions required to bring competitive products to market and managed cost and revenue (both projected and actual) associated with those marketed products. I also worked directly with clients regarding product manufacturer-to-customer

integration, implementing direct-ship-to-customer productivity enhancements and establishing and executing product reliability and performance assessment studies. Often, such analyses suggested that certain modifications be made to design, fabrication, or assembly structures or methods, or to product flow and distribution. It was my responsibility to implement selected improvements to achieve the designated goals without negatively impacting the revenue models and time-to-market projections while maintaining and improving product yield and reliability.

9. As a designer and design manager, for example, I developed new, leading edge technology designs from conception to production. As such, my designs were always created in parallel with innovations in design simulation, in wafer processing, and in packaging architecture. I had to develop simulation behavioral models, tested against actual prototype designs, to determine the most appropriate fit between design, process, and assembly to deliver the best product to the market. In each case, my product prototype and production designs worked the first time; and the memory products were widely accepted in the market by major OEM companies.

10. I also worked with consumers evaluating performance of my designs in system applications to better match those designs to the consumers' requirements. New outgoing test methods and algorithm test patterns were designed to improve overall performance and reliability and to provide feedback for design and process

improvements. I thus developed a comprehensive understanding of the key factors, such as design, process, assembly, cost, equipment, facility, personnel resources, and timing necessary to bring a product from conception to market. These factors have continued to be key contributors to the success of products throughout the history of integrated circuits, even to the present.

11. Additionally, I have evaluated and provided expert services related to memory technology, both as standalone components and as components integrated into memory modules and systems, and also process and design technologies of various devices including microprocessors, controllers, memory, and programmable logic. I have also provided expert services related to product procurement and contract purchase order fulfillment according to contract agreement deliverables. I am also knowledgeable of communication control, addressing, and data transfer protocol as it relates to system architecture.

12. Additionally, I have innovations in the areas of LED technology, as embodied in a number of my patents, including LED drivers.

13. Because of my background, education, training, and experience, I am qualified as an expert to opine on the technology and other, related technical factors. A more detailed account of my work experience and other qualifications is listed in my Curriculum Vitae. Ex. 1003.

I. METHODOLOGY AND MATERIALS CONSIDERED

14. I further understand that this application 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, and that the Patents all but the '713 Patent share the same specification. My opinions are also based on my technical experience, knowledge, and expertise in the area of LED drivers and dimmers.

15. My opinions expressed herein are based on my review of the 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"), their respective prosecution histories (including several patents listed within those prosecution histories), extrinsic evidence relating to the technology of the Challenged Patents, and other evidence cited in this declaration.

16. More specifically, for this work, I have been asked to review the '601 Patent including the specification and claims, the '601 Patent's prosecution history (file history). In developing my opinions related to the '601 Patent, I have considered the materials cited herein, including those items itemized in the Exhibit Table below.

<u>EXHIBIT</u>	<u>DESCRIPTION</u>
Ex. 1001	U.S. Patent No. 8,957,601
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. US 20080191642 to Slot.
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

17. This declaration contains my opinions with respect to the subject matter of this proceeding and with the understandings as set forth herein. I specifically reserve the right to formulate and offer additional or supplemental opinions based on any additional information, depositions, discovery, or evidence that may be provided or derived, future court rulings, or agreements between the parties, to the extent permitted by the Board.

II. OVERVIEW OF LEGAL STANDARDS

18. I do not have any formal legal training, and I am not an attorney. EL's counsel has informed me of certain legal principles that I applied in my analysis. Those legal principles are summarized below.

19. I understand that patent claims are presumed valid and cannot be invalidated unless there is a showing the preponderance of the evidence demonstrates that the claim is invalid.

20. The following section summarizes the law as I have been instructed to apply it in formulating and rendering my opinions found later in this declaration. I understand that, in an *inter partes* review proceeding, patent claims may be deemed unpatentable if it is shown that they were anticipated or rendered obvious in view of the prior art. I understand that prior art in an *inter partes* review is limited to patents or printed publications that predate the priority date of the patent at issue.

A. Person of Ordinary Skill in the Art

21. I was asked to provide my opinion as a person of skill in the art as it relates to the '601 Patent during the period leading up to the earliest claimed priority date. I considered several factors, including the types of problems encountered in the art, the solutions to those problems, the pace of innovation in the field, the sophistication of the technology, and the education level of active workers in the field. I provide that level below in Section V.

B. Anticipation

22. I understand that when determining whether a claim is anticipated is based on underlying factual issues including the content of the prior art and the level of ordinary skill in the art. I further understand that, for a single reference to

anticipate a claim, “the four corners of [that] document describes every element of the claimed invention, either expressly or inherently, such that a person of ordinary skill in the art could practice the invention without undue experimentation.” *In re Hodges*, 882 F.3d 1107, 1111 (Fed. Cir. 2018) (citing *Spanston, Inc. v. Int’l Trade Comm’n*, 629 F.3d 1331, 1356 (Fed. Cir. 2010)).

23. Invalidity for anticipation requires that “[t]he identical invention must be shown in as complete detail as contained in the patent claim.” *TF3 Ltd. v. Tre Milano, LLC*, 894 F.3d 1366, 1374 (Fed. Cir. 2018).

C. Obviousness

24. I understand that, when determining whether a claim is “obvious,” the analysis is based on underlying factual issues including the content of the prior art and the level of ordinary skill in the art. I further understand that for a single reference or a combination of references to render the claimed invention obvious, a POSITA must have been able to arrive at the claims by modifying or combining the references.

25. I have further been informed and understand that a claim is unpatentable as obvious if the difference between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a POSITA.

26. I also have been informed and understand that the combination of familiar elements according to known methods is obvious when it does no more than yield predictable results. However, I further understand that a patent claim composed of several elements is not proved obvious merely by demonstrating that each of its elements was, independently, known in the prior art. I understand that to prove a claim would have been obvious, one must demonstrate that a POSITA would have been motivated to combine or modify the prior art to achieve the claimed invention, while having a reasonable expectation of success in doing so.

27. I further understand that a claim may be obvious if common sense directs one to combine multiple prior art references or add missing features to reproduce the alleged invention recited in the claims. I also understand that if a POSITA could implement a predictable variation, then the claim is likely unpatentable. For the same reason, if a technique has been used to improve one device and a POSITA would recognize that it would improve similar devices in the same way, then using the technique is obvious. I further understand that a claim can be obvious if it combines old elements with no change to their respective functions or alters prior art by merely substituting one element for another known in the field to yield a predictable result.

D. Claim Construction

28. I have been advised that “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.

29. I have followed these principles in my analysis throughout this declaration.

III. LEVEL OF ORDINARY SKILL IN THE ART

30. In determining the characteristics of a person of ordinary skill in the art at the time of the claimed invention, several things should be considered, including the factors discussed below, as well as (1) the levels of education and experience of the inventor and other persons actively working in the relevant field; (2) the types of problems encountered in the field; (3) prior art solutions to these problems; (4) the rapidity in which innovations are made; and (5) the sophistication of the relevant technology.

31. All of the opinions that I provide herein are provided through the lens of a person having ordinary skill at the relevant time (prior to 2006, which I understand is the priority date claimed by the ‘601 Patent). In my opinion, a person

having ordinary skill in the art (“POSITA”) at the time of the alleged invention would have had at least a bachelor’s degree in electrical engineering, computer science, or a related field and significant experience with power regulation devices, like LED drivers and dimmers.

32. I am prepared to testify as an expert in this field and also as someone who had at least the knowledge of a POSITA, and someone who worked with other POSITAs at the time of the alleged invention.

IV. TECHNICAL BACKGROUND AND THE ‘601 PATENT

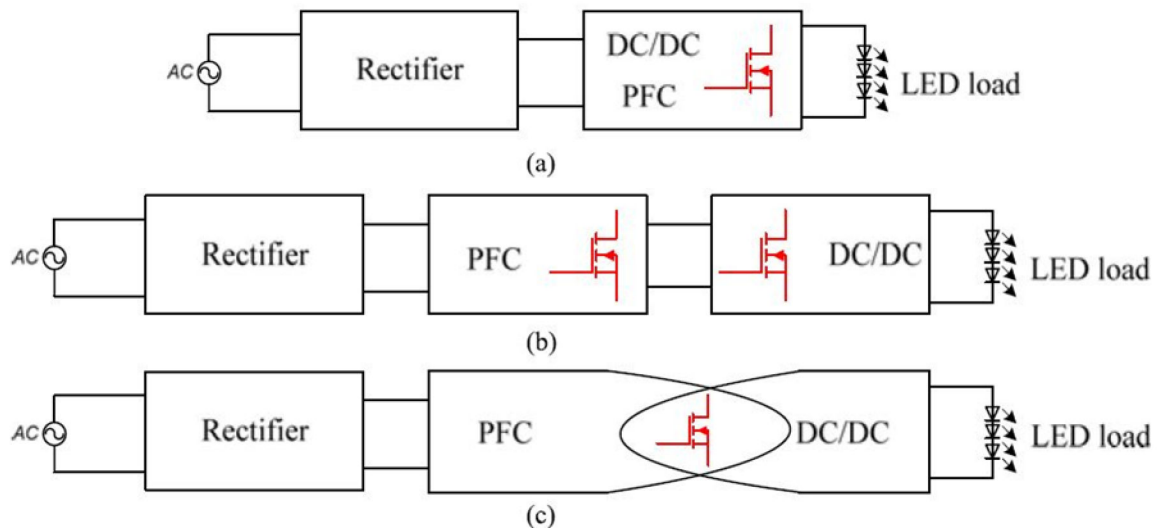
A. Background of the Relevant Technology

33. 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).

34. “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).

35. A single-stage LED driver is a DC/DC converter with 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.

36. “[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.

37. “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 a control circuit. Therefore, cost and size of the system is reduced while ensuring high efficiency, high reliability, and fast output dynamics. *Id.*

B. Overview of the ‘601 Patent

38. 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.

39. The ‘601 Patent further notes that “[w]ith 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.

40. “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.

C. The Alleged Invention

41. The claims of the ‘601 Patent are generally directed to a configurable LED driver for controlling a set of light fixture loads. The LED driver/dimmer of the ‘601 Patent includes “[t]he disclosure is directed at a configurable light emitting diode (LED) driver/dimmer for controlling a set of light fixture loads comprising: a power circuit; a primary digital controller for controlling the power circuit; a set of output current drivers, each of the set of output current drivers connected to one of the set of light fixture loads for controlling the associated light fixture load; a secondary digital controller for controlling the set of output current drivers; wherein the secondary controller transmits LED control information to control outputs of the

set of output current drivers; and wherein the secondary digital controller provides digital feedback control information to the primary digital controller.” Ex. 1001, Abstract

D. Summary of Prosecution History

42. 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. Ex. 1001, Cover Page.

43. 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. in view of Meyer and further in view of Kastner (US2008/0018261). In order 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.

44. In a second Office Action, several claims were rejected as being anticipated by or obvious in view of (1) Lo et al. (US 2011 /0018464), (2) Lo et al.

in view of Meyer (US 2010/0066267) and Lo et al. in view of Kastner (US2008/0018261). 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 et al. 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.

45. 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. New claim 21 was added which further recited that the break out module changes the number of output channels from the number of input channels. Ex. 1004, at 11.

46. In a third Office Action, several claims were rejected as being anticipated by or obvious in view of (1) Lo et al. (US 2011 /0018464), (2) Lo et al. in view of Meyer (US 2008/0066267) and Lo et al. in view of Kastner (US 2008/0018261). 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. The Notice of Allowance allowing

claims 2-5, 8-18, 20-22, and 24-25 was mailed on October 6, 2014. Ex. 1004, at 52. In the Notice, 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 53.

47. For the reasons discussed below, each of the purportedly inventive elements of the claimed LED driver were known in the prior art at least since 2006.

E. Overview of the Prior Art

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

49. U.S. Patent Application No. 2007/0267984 A1 to Peng (“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 an LED and, more particularly, an isolated dimmable LED ballast driver. Ex. 1005, 1[0002], figs. 3-5.

50. U.S. Patent Application No. 2005/0162101 A1 to Leong (“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). Ex. 1006, Cover Page.

51. 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.

52. U.S. Patent No. 5,640,061 to Bornhorst (“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 “[m]odular 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.

53. U.S. Patent Application No. 2008/0191642 to Slot (“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.

54. 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. Ex. 1005, Cover Page. Shteynberg was issued on March 8, 2011, and is prior art to the ‘446 Patent under pre-AIA § 102(a). Ex. 1005, Cover Page. 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. 1005, 1:19-22, fig. 7, 8, and 10.

55. More specifically, Shteynberg discloses the invention allows “for solid state lighting, such as LEDs, to be utilized with the currently existing lighting infrastructure and to be controlled by any of a variety of switches, such as phase modulating dimmer switches, which would otherwise cause significant operation problems for conventional switching power supplies or current regulators. The exemplary embodiments further allow for sophisticated control of the output brightness or intensity of such solid state lighting, and may be implemented using fewer and comparatively lower cost components.” Ex. 1005, 1:46-57.

V. SUMMARY OF MY OPINIONS

56. Having reviewed the ‘601 Patent and the prior art discussed herein, I have formed the following opinions:

- Peng discloses all limitations of claims 1, 10-11 and 14-15 and these claims are anticipated by Peng.
- Leong discloses all limitations of claims 1, 11-12, 15 and 17 and these claims are anticipated by Leong.
- The combination of Peng or Leong and Bornhurst discloses all limitations of claims 2, 4, 5, and 8, and these claims are rendered obvious by this combination.
- The combination of Peng or Leong and U.S. Patent Application No. 2008/0191642 to Slot (“Slot”) discloses all limitations of claim 12 and this claim is rendered obvious by this combination.
- Shteynberg discloses all limitations of claim 1 and this claim is anticipated by Leong.
- In support, I have attached a chart to this declaration establishing the prior art teaches the limitations of each claim. Ex. A.

A. Opinions

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

57. 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. In reaching this conclusion, I provide the opinions as one of ordinary skill in the art below:

58. LED drivers, or LED power supplies, provide LED light bulbs with the electricity they require to function and perform at their best, much like a ballast does for a fluorescent lamp and a transformer does for low-voltage bulbs. *LED Drivers, 1000BULBS*, https://www.1000bulbs.com/fil/categories/led-drivers?gclid=EAIaIQobChMIp96h-tS9gAMV0TbUAR1CXgptEAAYASAAEgLqNfD_BwE (last visited August 2, 2023). 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.

59. Fluorescents use ballasts while LEDs use drivers. (LED drivers can be considered ballasts as well, but most documentation prefers ‘drivers’ or ‘power supply’ to avoid confusion with fluorescent ballasts.) Both ballasts and drivers do more than simply charge up their respective lights. They are an essential element to triggering and controlling your light fixtures, from the first flip of a switch through tens of thousands of hours of performance. Dan Stout, *What Ignites Your Lights? Ballasts vs. Drivers*, NEEDHAM ELEC. SUPPLY, <https://www.needhamelectric.com/>

index.jsp?path=blog&cat=Articles&ID=1599855056315#:~:text=Fluorescents%20use%20ballasts%2C%20while%20LEDs,charge%20up%20their%20respective%20lights (last visited August 2, 2023). A POSITA would further understand that the LED driver or ballast circuit is analogous to the apparatus for configuring and powering a set of light fixture loads.

60. Electronic power circuits are designed to protect either the power supply from being forced to deliver excessive current into an overload or short circuit condition or to protect the connected circuit from a reverse connected power supply or a voltage that exceeds the circuit design voltage. Graham Lambert, *Complete Guide to Electronic Protection Circuits*, CIR. BASICS, <https://www.circuitbasics.com/protection-circuits/> (last visited on August 2, 2023). 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.

61. Power conditioners are electrical components that are designed to improve the quality of power supplied to computer components by supplying an adequate amount of voltage that is required by the component to function properly. *Surge Protection and Power Conditioning*, SCHNEIDER ELEC., <https://www.se.com/in/en/product-category/7900-surge-protection-and-power-conditioning> (last visited August 2, 2023)

62. A ballast circuit (LED driver) can provide a constant current for driving multiple LEDs. Michael Day, *LED Drivers – Paralleled Outputs Provide High-Current Outputs*, TEX. INSTRUMENTS (Sept. 2006), https://www.ti.com/lit/an/slva253/slva253.pdf?ts=1690918810777&ref_url=https%253A%252F%252Fwww.google.com%252F; Taylor Scully, *Understanding LED Drivers and How to Choose the Right One*, LED SUPPLY (June 10, 2020), <https://www.ledsupply.com/blog/understanding-led-drivers/>. 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. 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.

63. Phase control or phase-angle control is a method applied in Power electronics to regulate the power of electrical consumers and consumers operated with alternating voltage. Only parts of the alternating voltage are used to generate power. *Phase Control (Electrical Engineering)*, ITEM, <https://glossar.item24.com/en/glossary-index/article/item//phase-control-electrical-engineering.html#:~:text=Phase%20control%20or%20phase%2Dangle,are%20used%20to%20generate%20power> (last visited on August 2, 2023). 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 because the ballast receives a portion of the alternating voltage supplied by the waveform and outputs the appropriate current to the load. 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. Thus, Peng discloses 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.

64. 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. As such, Peng discloses splitting the set of input channels into individual output channels as required by claim 1 of the '601 Patent.

65. LED drivers can be located remotely from other lighting system components and can be controlled by remote dimmer units. In some cases, manufacturers offer multiple components in a single product line, which can provide operational efficiency, simplify the purchasing process, and speed up installation. *LED Drivers: Installation for Performance & Reliability*, GREALPHA, [https://www.grealpha.com/resources/articles/led-drivers-installation-for-performance --reliability/](https://www.grealpha.com/resources/articles/led-drivers-installation-for-performance--reliability/) (last visited August 2, 2023). A POSITA would recognize that the

LED driver is located a distance away from the lights and can be controlled by the lever. As such, Peng discloses that the LED driver is located remotely from the set of light fixture loads as required by Claim 1 of the ‘601 Patent.

66. The UC3845 IC is a high-performance fixed-frequency current-mode controller designed for DC-to-DC converter applications. *UC3845 PWM Controller: Circuit, Pinout, and Datasheet*, UTMEL ELEC., <https://www.utmel.com/components/uc3845-pwm-controller-circuit-pinout-and-datasheet?id=648> (last visited on August 2, 2023). Therefore, Peng discloses that the primary and secondary controllers are digital controllers. As such, claim 14 is anticipated by Peng.

67. Electronic power circuits are designed to protect either the power supply from being forced to deliver excessive current into an overload or short circuit condition or to protect the connected circuit from a reverse connected power supply or a voltage that exceeds the circuit design voltage. Graham Lambert, *Complete Guide to Electronic Protection Circuits*, CIR. BASICS, <https://www.circuitbasics.com/protection-circuits/> (last visited on August 2, 2023). 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.

68. A power conditioning unit is required to convert fuel cell generated DC power to usable AC power. A power conditioning unit typically consists of DC–DC converter and a DC–AC inverter. A DC–DC converter is used to step up the low-

magnitude DC voltage to higher voltage (at least 400 V) to produce usable 120 V/240 V AC. Manoj K. Mahapatra & Prabhakar Singh, *Fuel Cells: Energy Conversion Technology*, in FUTURE ENERGY 511 (2d ed. 2014). A POSITA would understand that a power conditioning unit would include the driver 605 of Peng and is equivalent to the set of output circuit drivers of the ‘601 Patent. 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). 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.

2. Ground 2: Leong anticipates Claims 1, 11-12, 14-15, 17

69. 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.

70. The term power system control describes actions taken in response to unplanned disturbances (e.g., changes in demand or equipment failures) in order to provide reliable electric supply of acceptable quality. S. Sivanagaraju, POWER SYSTEM OPERATION AND CONTROL 557 (2009). Additionally, a dimming controller allows control of light intensity and reduction of power consumption of the LED.

71. An LED dimmer is the term for a device that performs a dimming control operation within such an LED lighting device. The dimmer allows control of light intensity and reduction of power consumption of the LED. 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. *How LED Dimmers Work*, LIGHTING MANUFACTURER, <https://www.manufacturer.lighting/info/57/> (last visited August 2, 2023).

72. A constant current LED driver is an LED power supply that regulates the current flowing through an LED array so as to maintain a desired level of light output. Conventional power supplies provide an output that is regulated to deliver a constant voltage. A current-regulated LED driver is an AC-DC or DC-DC converter with output tailored to the electrical characteristics of the array of LEDs. It provides accurate output current control regardless of the supply-voltage fluctuations and the changes in other operating conditions. *Constant Current LED Drivers*, OPEN LIGHTING PRODUCT DIRECTORY, <https://www.shine.lighting/products/constant-current-led-drivers/> (last visited August 2, 2023). A POSITA would recognize, based on their identical functions, that the current driver outputs of Leong are equivalent to the output current drivers of the '601 Patent. 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.

73. 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. 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.

74. 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. 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.

75. With respect to Claim 11, 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. Therefore, Leong discloses that the LED driver and the break-out module are integrated together.

76. With respect to Claim 12, a communication interface is any wireless or wired technologies that is used to connect devices to one another, such as the Internet remote servers, etc. Vlasios Tsiatsis, INTERNET OF THINGS (2d ed. 2019). A POSITA would understand that a communications interface is necessary to receive the external and remote data control signal. Therefore, Leong discloses that the LED driver further comprises a communication interface for receiving data from an external transmitter.

3. Ground 3: Peng or Leong in view of Bornhurst renders Claims 2, 4, 5, and 8 obvious

77. Claims 2, 4, 5, and 8 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 and claim 4 is dependent on claim 2.

a. Claim 2

78. Claim 2 depends from independent claim 1. Peng and Leong anticipate claim 1 for the reasons discussed above. 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.

79. With respect to Claim 2, each of the Peng-Bornhurst and Leong-Bornhurst combinations disclose the set of output current drivers that are connected to the break-out module via cabling and thus renders claim 2 obvious.

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

80. A communication interface is any wireless or wired technologies that are used to connect devices to one another, the Internet remote servers, etc. Vlasios Tsiatsis, INTERNET OF THINGS (2d ed. 2019). Further, bridge interfaces connect two different interfaces (bridge ports). Bridging two interfaces causes every Ethernet frame that is received on one bridge port to be transmitted to the other port. Thus,

the two bridge ports participate in the same Broadcast domain (different from router port behavior). *Bridge Interfaces*, CHECK POINT, https://sc1.checkpoint.com/documents/R81/WebAdminGuides/EN/CP_R81_Gaia_AdminGuide/Topics-GAG/Bridge-Interfaces.htm#:~:text=Bridge%20interfaces%20connect%20two%20different,different%20from%20router%20port%20behavior (last visited August 2, 2023). A POSITA would understand that the bridges of Slot function as a communication interface. The Peng-Slot and Leong-Slot combinations thus disclose a communication interface for receiving data from an external transmitter and as such, renders claim 12 obvious.

5. Ground 5: Shteynberg anticipates Claim 1

81. Independent claim 1 of the '601 Patent is anticipated by Shteynberg under 35 U.S.C. § 102. In reaching this conclusion, I provide the opinions as one of ordinary skill in the art below.

82. A power circuit generally is any circuit used to carry electricity that operates a load. *Everything About Power Distribution Board Manufacturing*, DAS & Co. (Feb. 22, 2022), available at <https://www.dasnko.net/blog/post/1670466/electrical-power-distribution-panel-board-in-kolkata#:~:text=A%20power%20circuit%20is%20any,electricity%20that%20operates%20a%20load>.

83. Similarly, a power converter processes and controls the flow of electrical energy by supplying voltages and currents in a form that is optimally suited

for user loads, in this case, to provide variable brightness levels for solid-state lighting. R. Petrocelli, *One-Quadrant Switched-Mode Power Converters*, CAS–CERN ACCELERATOR SCH. (2015), available at <http://cds.cern.ch/record/2038620>; Roger Bailey, *Proceedings of the CAS–CERN Accelerator School: RF for Accelerators*, CAS–CERN ACCELERATOR SCH. (2012), at 15, available at <https://cdsweb.cern.ch/record/1231364>. As such, a POSITA would readily understand that the power converter of Shteynberg is analogous to the power circuit of the ‘601 Patent.

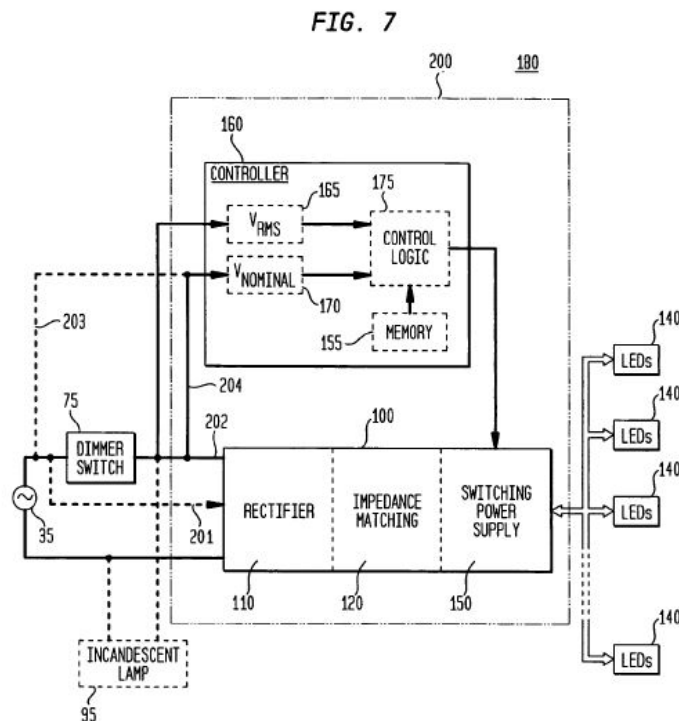
84. The rectifier (110) that provides a regulated output voltage connected with impedance matching network (120) and switching power supply (buck converter)(150) as disclosed in Shteynberg is the equivalent of the regulated output voltage bus of the ‘601 Patent. Further, controlling the switching power supply 150 and modifying the brightness (or intensity) provided by the LEDs 140 is equivalent to establishing a power limit. 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.

85. 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 based on their identical stated functions of

providing current to LED loads.

86. 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.

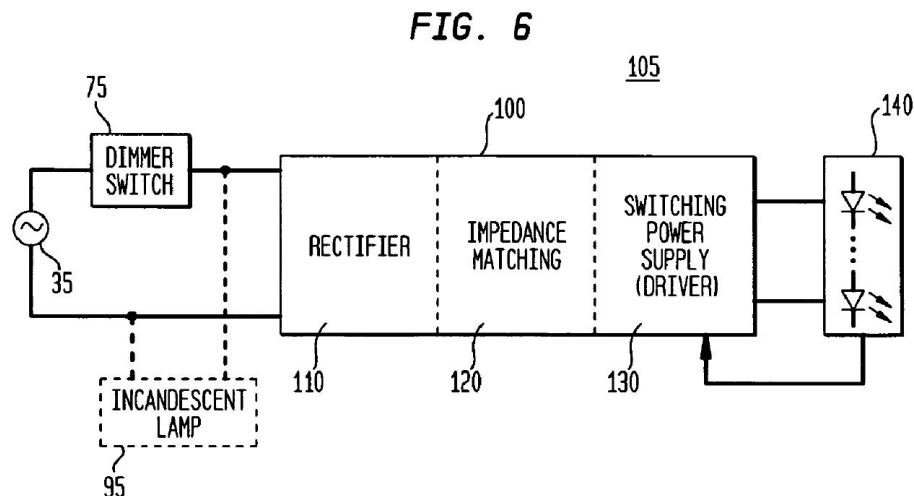
87. Shteynberg discloses the break-out module electrically connected to an output of the LED driver and the set of light fixture loads, the break-out module including power connectors of the '601 Patent. As discussed above, the switching power supply contains multiple LED drivers. As shown in Figure 7, the switching power supply takes the output from the multiple LED drivers and sends it to the LEDs 140.



Ex. 1013, fig. 7

88. 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 because as shown in Fig 7 (and in the discussion of LED drivers), the switching power supply is capable of providing power to several LEDs simultaneously.

89. 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.



Ex. 1013, fig. 6

90. 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. As such, Shteynberg discloses that the LED driver is located remotely from the set of light

fixture loads as required by Claim 1 of the ‘601 Patent.

VI. MOTIVATION TO COMBINE PENG OR LEONG WITH BORNHURST OR SLOT

91. In my opinion, a POSITA would have been motivated to combine Peng or Leong with Bornhurst and Peng or Leong with Slot for several reasons.

92. 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. The ‘601 Patent defines its “Technical Field” as a “novel LED Driver/dimmer for solid state lighting applications.” Ex. 1001, 1:39-40. Like the ‘601 Patent, Peng, Leong, Bornhurst and Slot are directed to improved systems and methods for improving driving and dimming solid state lighting applications. For example, Peng discloses that its embodiments “an LED ballast circuit for dimming one or more LEDs using a phase controlled dimmer switch.” Ex. 1005, Abstract. Further, Leong discloses that the claimed power saving device includes “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.

93. Still further, Bornhurst discloses “a modular lamp power supply is adapted to provide lamp power supply signals to a plurality of different lamps, each lamp having different power requirements. The power supply can be reconfigured to supply power to a new group of lamps simply by replacing the power circuit

modules within the supply chassis.” Ex. 1007, Abstract. Finally, Slot discloses that “[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.

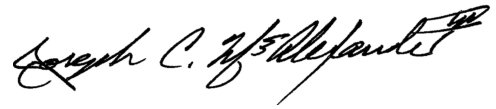
94. Moreover, Peng, Leong, Bornhurst and Slot are analogous to the ‘601 Patent because they are reasonably pertinent to the technical problem allegedly addressed by the claimed invention. For example, the ‘601 Patent describes that a novel LED Driver/dimmer is needed to address the lack of expertise by lighting companies in the driving and dimming requirements for LEDs. Ex. 1001, 1:34-37. Peng notes that “[t]his means that LEDs generally are not connectable directly with existing lighting fixtures. Ballast circuits are used to make existing lighting fixtures operable with LEDs. Ballast circuitry is often complex and expensive, making LED lighting expensive to operate. Another drawback of current ballast circuits is that they generally do not work consistently with conventional phase-modulated dimmer switches.” Ex. 1005, 1:0003. Additionally, Leong states that “prior art LED lamp designs used thus far still do not provide sufficiently bright and uniform illumination for general lighting applications, nor can they be used strictly as direct and simple LED retrofit lamps for existing fluorescent lighting fixtures and ballast

configurations.” Ex. 1006, 3:0037. Still further, Slot discloses that, “in certain implementations, a high-bandwidth switching power supply will still have a limited dV/dt (with respect to component limitations, but also in terms of control stability), and the response rate of a power supply will differ depending on how many LEDs are actuated simultaneously. For example: turning two LEDs on takes e.g. 5 μs , whereas 20 μs is required to turn four LEDs on, since twice the output voltage has to be built up before the desired current is achieved. The fact that there is interaction between the number of LEDs simultaneously actuated and the total effective current through these LEDs (i.e. light yield) results in undesirable cross-links and possibly in oscillation between the drive arrangements of the various LED groups, a result of which is that it will not provide a properly operating circuit.” Ex. 1007, 2[0013]-[0014].

95. Finally, a POSITA would have had a reasonable expectation of success in making this modification. The LED Driver components described in Peng, Leong, Bornhurst, and Slot were well-known at the time. As such, it would also have been straightforward to modify the LED driver of Peng or Leong to include the chassis and power supply modules of Bornhurst and to include the modulation techniques of Slot and that such a system would work.

96. Therefore, a POSITA would be motivated to combine Shteynberg with Morgan.

I declare under penalty of perjury that the foregoing is true and accurate.

A handwritten signature in black ink, reading "Joseph C. McAlexander III". The signature is written in a cursive style with a prominent "J" and "M".

Joseph C. McAlexander III

Exhibit A
Prior Art to U.S. Patent No. 8,957,601.

Claims	Prior Art References		
U.S. Patent No 8,957,601	U.S. Patent Application No. 2007/0267984A1 to Peng	U.S. Patent Application No. 2005/0162101 A1 to Leong	U.S. Patent No. 7,902,769 to Shteynberg
1[p] - Apparatus for configuring and powering a set of light fixture loads in a light emitting diode (LED) low voltage distribution system comprising:	“Embodiments 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.” Peng, Abstract. “The present invention relates to a system and	“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.” Leong, Abstract.	“In 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.” Shteynberg, 8:9-13.

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	method for dimming a light emitting diode (LED). More particularly, the present invention relates to an isolated dimmable LED ballast driver.” Peng, 1[0002].		
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	“[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	“Power 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.” Leong, 8[0077] “The dimming current driver module will contain	“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.” Shteynberg, 22:26-29. “[T]he controller 160 (and 260, FIG. 10) is programmed, adapted or configured to emulate the brightness or intensity

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Claims	Prior Art References		
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	transformer as a function of the duty cycle so as to charge the transformer.” Peng, 2[0019]. “[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	the necessary electronics to decipher data input control signals and provide the current driver power to operate the LED arrays.” Leong, 8[0077]. “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.” Leong 9[0077] “LED lamps of the present invention using computers, a self-contained program stored in the computer operates the current driver outputs	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.” Shteynberg, 9:21-26. “LED driver circuits and LEDs 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-

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Claims	Prior Art References		
U.S. Patent No 8,957,601	U.S. Patent Application No. 2007/0267984A1 to Peng	U.S. Patent Application No. 2005/0162101 A1 to Leong	U.S. Patent No. 7,902,769 to Shteynberg
	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.” Peng, 5[0052]-[0053]. “[T]he driver 605 comprises a case 901 that encloses electrical components and circuitry for power conditioning, such as, for example, a ballast circuit.” Peng, 3[0072].	of each dimmer controlling each LED array depending on the condition of the sensor and timer outputs.” Leong, 57[0547]. “An 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.” Leong, 57[0547]-58[0547]	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.” Shteynberg, 8:20-29.

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Claims	Prior Art References		
U.S. Patent No 8,957,601	U.S. Patent Application No. 2007/0267984A1 to Peng	U.S. Patent Application No. 2005/0162101 A1 to Leong	U.S. Patent No. 7,902,769 to Shteynberg
	“In 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.” Peng, 1[0007].		
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;	“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	“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.” Leong, 58[Claim 1].	“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.” Shteynberg, 22:26-29.

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	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.” Peng, 3[0038].	“Ballasts can be connected or wired between the input power line and the lamp in a number of configurations.” Leong, 6[0056]. “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.” Leong, 27[0334].	“[T]he 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.” Shteynberg, 9:21-26. “LED driver circuits and LEDs 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,

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			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.” Shteynberg, 8:20-29.

Prior Art to U.S. Patent No. 8,957,601.

Shteynberg, fig. 7

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Claims	Prior Art References		
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	the phase controlled dimmer 101.” Peng, 3[0038]. “As 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.” Peng, 3[0040]. “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	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.” Leong, 58[Claim 1]. “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.” Leong, 58[Claim 22]. “Ballasts can be connected or wired between the input	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.” Shteynberg, 9:21-26. “LED driver circuits and LEDs 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

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Claims	Prior Art References		
U.S. Patent No 8,957,601	U.S. Patent Application No. 2007/0267984A1 to Peng	U.S. Patent Application No. 2005/0162101 A1 to Leong	U.S. Patent No. 7,902,769 to Shteynberg
	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.” Peng, 7[0072].	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.” Leong, 6[0056].	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.” Shteynberg, 8:20-29. FIG. 6 Shteynberg, fig. 6

Exhibit A
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1[d] - splits the set of input channels into individual output channels;	“For 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	“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” Leong, 17[0256].	“The current regulator 200 also provides power to one or more LEDs 140, which also may be an array or multiple arrays of LEDs 140 or any type or color, with the regulator 200 and LEDs 140 forming a system 180.” Shteynberg, 9:9-12.

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	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." Peng, 6[0058].		
1[e] - wherein the LED driver is located remotely from the set of light fixture loads.	"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	"This 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	"LED driver circuits and LEDs 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,

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	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.” Peng, 3[0038].	to the dimming module located within the LED lamp.” Leong, 8[0077].	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.” Shteynberg, 8:20-29.
10 - The apparatus of claim 3 wherein the break-out module and the set of series connect modules are integrated together.	“[T]he 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		

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	modules, and the modules and ballast circuit housing are attached to a mounting structure to construct the luminaire.” Peng, 7[0067].		
11 - The apparatus of claim 1 wherein the LED driver and the break-out module are integrated together.	“[T]he driver 605 comprises a case 901 that encloses electrical components and circuitry for power conditioning, such as, for example, a ballast circuit.” Peng, 7[0072].	“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 dimmer current driver mounted in the tube that regulates the amount of power delivered	

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Claims	Prior Art References		
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		to the LEDs.” Leong, Abstract.	
12 - The apparatus of claim 1 wherein the LED driver further comprises a communication interface for receiving data from an external transmitter.		“An 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.” Leong, 57[0547]-58[0547].	
14 - The apparatus of claim 1 further comprising a DC/DC converter.	“FIG. 3A illustrates an example of the rectified phase controlled waveform of FIG. 2D. FIG. 3B		

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	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.” Peng, 3[0042]. “On one embodiment, IC 324 is a standard current		

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	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.” Peng, 3[0043].		
15[p] - Apparatus for configuring and powering a set of light fixture loads in a light emitting diode (LED) low voltage distribution system comprising:	“Embodiments 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	“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	

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	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.” Peng, Abstract. “The 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.” Peng, 1[0002].	from the ballast assembly to the LEDs wherein the use of electrical power can be reduced or eliminated automatically during periods of non-use.” Leong, Abstract. “[A] current driver dimmer mounted in the tube that regulates the amount of power delivered to the LEDs.” Leong, 58[Claim 22].	
15[a] - an LED driver including a power circuit having at least one power limit and a set of output current	“[A] method of dimming an LED using a phase control-based dimmer is disclosed. The method includes the steps of providing an LED;	“Power control modules and other components can be incorporated into the electrical circuits used in the LED lamp of the	

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drivers connected to the at least one power limit in the power circuit; and	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.” Peng, 2[0019]. “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	present invention. The first circuit module may be a dimming module placed in between the DC voltage input to the LED array.” Leong, 8[0077]. “The 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.” Leong, 8[0077]. “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%	

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	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	brightness.” Leong, 9[0077]. “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.” Leong, 57[0547]. “An 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.” Leong, 57[0547]-58[0547].	

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	the MOSFET 333 is gated on.” Peng, 5[0052]-[0053]. “The driver 605 comprises a case 901 that encloses electrical components and circuitry for power conditioning, such as, for example, a ballast circuit.” Peng, 3[0072]. “In 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.” Peng, 1[0007].		

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Claims	Prior Art References		
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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;	“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	“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.” Leong, 58[Claim 1]. “Ballasts can be connected or wired between the input power line and the lamp in a number of configurations.” Leong, 6[0056]. “A pair of end caps 252A and 252B secured to tubular ends 250A and 250B, respectively, are provided with bi-pin	

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Claims	Prior Art References		
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	light responsive to the user adjusted position of the lever 103.” Peng, 3[0038].	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.” Leong, 27[0334].	
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;	“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	“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.” Leong, 58[Claim 1]. “[M]eans for suppressing ballast voltage being delivered from the ballast	

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	the phase controlled dimmer 101.” Peng, 3[0038]. “As 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.” Peng, 3[0040]. “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	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.” Leong, 59[Claims 22-23]. “[M]eans 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.” Leong, 59[Claim 22]. “Ballasts can be connected or wired between the input	

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	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.” Peng, 7[0072].	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.” Leong, 6[0056].	

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15[d] - wherein the break-out module regroups the number of output channels from the number of input channels;	“For 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	“[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.” Leong, 17[0256].	

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	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." Peng, 6[0058].		
15[e] - wherein the LED driver is located remote from the set of light fixture loads.	"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	"This 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	

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	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.” Peng, 3[0038]. “[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	to the dimming module located within the LED lamp.” Leong, 8[0077].	

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	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.” Peng, 5[0051].		
17 - The apparatus of claim 15 wherein the break-out module comprises: at least one printed circuit board (PCB).		“[T]he break-out module comprises at least one printed circuit board (PCB)” Ex. 1001, 16:22-23. “As 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	

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		base layer 716C.” Leong, 42[0434].	

Asserted Claims:	Prior Art References:
U.S. Patent No. 8,957,601	U.S. Patent No. 5,640,061 to Bornhurst
2 - The apparatus of claim 1 wherein the set of output current drivers are connected to the break-out module via cabling.	“As 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.” Bornhurst, 4:53-57. “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.” Bornhurst, 4:61-66.
3 - The apparatus of claim 2 further comprising: a set of series connect modules, each of the set of series connect	“As 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

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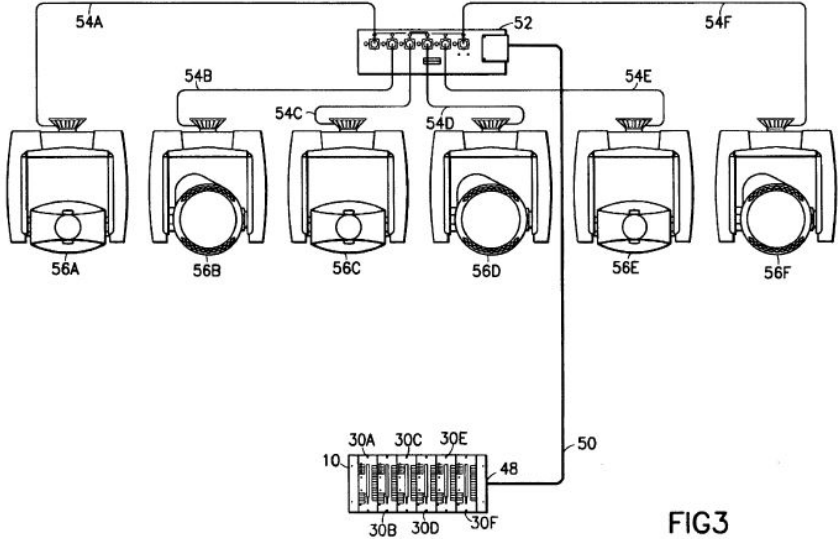
Asserted Claims:	Prior Art References:
U.S. Patent No. 8,957,601	U.S. Patent No. 5,640,061 to Bornhurst
modules associated with one of the set of light fixture loads and connected to an output of the break-out module.	box 52. In the present example, arc-lamp luminaires are connected to first, third and 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.” Bornhurst, 4:53-66.  FIG3 Bornhurst, fig. 3.
4 - The apparatus of claim 2 wherein the power cabling includes	“Lamp power output from each module 30 is conducted to the output connector 48 via six individual lamp power circuits 111 thru 116.” Bornhurst, 6:3-5.

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Asserted Claims:	Prior Art References:
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the set of input channels.	
5 - The apparatus of claim 1 wherein the break-out module connects to multiple light fixture loads via cabling.	“As 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.” Bornhurst, 4:53-57. “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.” Bornhurst, 4:61-66.
8 - The apparatus of claim 1 wherein the power connectors include apparatus to enable quick connection and release of the cabling.	“As 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.” Bornhurst, 4:53-57. “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.” Bornhurst, 4:61-66.

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Asserted Claims:	Prior Art References:
U.S. Patent No. 8,957,601	U.S. Patent Application No. 2008/0191642 to Slot
12 - The apparatus of claim 1 wherein the LED driver further comprises a communication interface for receiving data from an external transmitter.	“[C]ommunication interface for receiving data from an external transmitter.” Ex. 1001, 15:28-29. “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.” Slot, 10[0107].