

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 2023-01257

U.S. Patent No. 9,049,759

DECLARATION OF JOSEPH C. McALEXANDER IN SUPPORT OF
PETITIONER'S PETITION FOR *INTER PARTES* REVIEW OF U.S. PATENT
NO. 9,049,759 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. 9,049,759 (“the ‘759 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 ‘759 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 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 all the Patents 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 ‘759 Patent including the specification and claims, and the ‘759 Patent’s prosecution history (file history). In developing my opinions related to the ‘759 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. 9,049,759
Ex. 1004	File Wrapper for U.S. Patent No. 9,049,759
Ex. 1005	U.S. Patent No. 7,902,769 to Shteynberg
Ex. 1006	U.S. Patent Application No. US20120007512A1 to Kim
Ex. 1007	U.S. Patent Application No. US20060022214A1 to Morgan

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 '759 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.

23. I understand that invalidity for anticipation requires that the identical invention must be shown in as complete detail as contained in the patent claim.

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 to a POSITA at the time the invention was made.

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 in the ‘759 Patent should be construed in accordance with its ordinary and customary meaning for the purposes of resolving the issues raised in the 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 '759 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.

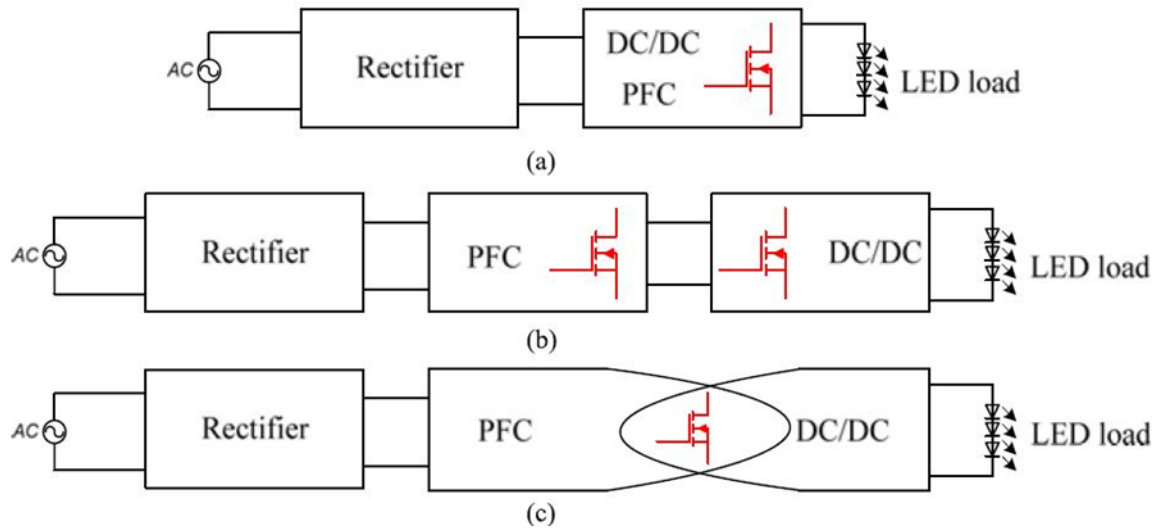
IV. TECHNICAL BACKGROUND AND THE ‘759 PATENT

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) (Ex. 1010).

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) (Ex. 1011).

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] 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 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 ‘759 Patent

38. The ‘759 Patent describes a configurable light emitting diode (LED) driver/dimmer for controlling a set of light fixture loads. Ex. 1001, Abstract. The ‘759 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, 1:36-39.

39. The ‘759 Patent further notes that “[w]ith 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, 1:20-24.

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, 1:31-36.

41. “Finally, the ‘759 Patent states “[t]he ability to dim the light output of LEDs is also important to reduce energy consumption.” Ex. 1001, 1:36-37.

C. The Alleged Invention

42. The claims of the ‘759 Patent are generally directed to a configurable LED driver for powering a set of light fixture loads. The LED driver of the ‘759 Patent includes: a power circuit which includes an inrush current limit and a DC/DC convertor, a power factor correction (PFC) boost connected to the inrush current limit and the DC/DC converter, a regulated output voltage bus connected to the DC/DC converter, and a primary digital controller for controlling the power circuit. The driver further includes 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 powering the associated light fixture load. The driver also includes an apparatus for configuring the set of output current drivers to an output current set point and at least one power limit connected to the regulated output voltage bus. Ex. 1001, Abstract.

D. Summary of Prosecution History

43. The application that issued as the ‘759 Patent (US13/941,871) was filed on July 15, 2013 and is a continuation of U.S. patent application Ser. No. 13/059,336,

filed March 22, 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. Ex. 1001, Cover Page.

44. In a first Office Action, all of the filed claims were rejected on the ground of nonstatutory double patenting as being unpatentable over claims 1-20 of U.S. Patent 8,525,446. According to the Office Action, although the claims at issue are not identical, they are not patentably distinct from each other because, regarding independent claims 1 and 20, they contain substantially similar subject matter, including: a power circuit including: an inrush current limit; a DC/DC converter; a power factor correction (PFC) boost connected to the inrush current limit and the DC/DC converter; a regulated output voltage bus connected to the DC/DC converter; 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 powering the associated light fixture load; and an apparatus for configuring the set of output current drivers to an output current set point. Ex. 1001, 10:42-55; *see id.* 12:4-17.

45. In response, the Applicant amended the Abstract to note that the LED driver includes an apparatus for configuring the set of output current drivers to an output current set point and at least one power limit connected to the regular output

voltage bus. Ex. 1001, Abstract. The Applicant filed a terminal disclaimer limiting the term of the '601 Patent to that of the '446 Patent. Ex. 1004, Prosecution History.

46. In the Notice of Allowance, the Examiner noted that claims were allowable over the prior art because it does not disclose a configurable light emitting diode (LED) driver for powering a set of light fixture loads comprising: a power circuit including: an inrush current limit; a DC/DC converter; a power factor correction (PFC) boost connected to the inrush current limit and the DC/DC converter; a regulated output voltage bus connected to the DC/DC converter; a primary 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 powering the associated light fixture load, and; an apparatus for configuring the set of output current drivers to an output current set point. Ex. 1004 at 39-40.

47. As discussed below, each of the purportedly inventive elements was 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 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 ‘759 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.

50. More specifically, Shteynberg discloses that 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.

51. U.S. Patent Application No. US20120007512 (“Kim”) was filed on July 12, 2011, and was published on January 12, 2012. Kim is prior art to the ‘759 Patent under AIA § 102(b). Kim teaches a power supply device and, more particularly, a power supply device for driving a light emitting diode (LED) capable of controlling the switching of multiple output powers, in synchronization with the

frequency of one of the multiple output powers and simplifying a power conversion stage in supplying power for driving an LED. Ex. 1006, 1[0003].

52. U.S. Patent Application No. US20060022214 (“Morgan”) was filed on July 8, 2005, and claims priority to Application No. 60/586,939, filed July 8, 2004, entitled “Integrated LED Systems and Methods;” and to Ser. No. 60/588,090, filed July 15, 2004, entitled “LED Package Methods and Systems.” Morgan was published on February 2, 2006. Morgan is prior art to the ‘759 Patent under pre-AIA § 102(b). Morgan teaches a method for providing a light source including providing at least one LED in an LED die and packaging the LED die with a submount, wherein the submount incorporates an electronic component for controlling the LED, wherein the electronic component facilitates control of at least one of the intensity and the apparent intensity of the LED die. Ex. 1007, 1[0014].

V. SUMMARY OF MY OPINIONS

53. Having reviewed the ‘759 Patent and the prior art discussed herein, I have formed the following opinions:

- U.S. Patent No. 7,902,769 to Shteynberg (“Shteynberg”) discloses all limitations of claims 1, 6, 13, 19, and 20 and these claims are anticipated by Shteynberg.
- The combination of Shteynberg and U.S. Patent Application No. 2006/0022214 to Morgan discloses all limitations of 2, 5, 15, and 19, and these claims are rendered obvious by this combination.

- The combination of Shteynberg and US20120007512 to Kim (“Kim”) discloses all limitations of claims 8-9, 16-17, 19 and 24, and these claims are rendered obvious by this combination.
- I have attached a chart to this declaration establishing that the prior art teaches the limitations of each claim. Ex. A.

A. Opinions

1. Ground 1: Shteynberg anticipates Claims 1, 6, 13, and 19-20

54. Independent claims 1 and 20 and dependent claims 6, 13, and 19 of the ‘759 Patent are 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.

55. In my opinion, the power converter of Shteynberg is analogous to the power circuit of the ‘759 Patent because both the power converter and power circuit are designed to carry electricity to supply a load, in this case a LED load. Therefore, Shteynberg discloses a power circuit.

56. Inrush current occurs when a device is turned on and, during the initial stage, a huge amount of current rushes into the circuit. Sourav Gupta, *Inrush Current – Causes, Effects Protection Circuits and Design Techniques*, CIR. DIG. (Nov. 27, 2019), <https://circuitdigest.com/tutorial/inrush-current-causes-effects-protection-circuits-and-design-techniques>. An inrush current limiter is a component used to limit inrush current to avoid gradual damage to components and avoid blowing fuses or tripping circuit breakers. Using a resistor in series with a capacitor to limit inrush current as described in Shteynberg is analogous to the inrush current limit of the

‘759 Patent because the resistor when used as described limits current to an amount that is proportional to the amount of the resistance.

57. A buck topology power converter is equivalent to a buck converter. A buck converter or step-down converter is a DC-to-DC converter that steps down voltage (while stepping up current) from its input (supply) to its output (load). *What is a Buck Converter?*, CIRCUITBREAD (Nov. 12, 2020), <https://www.circuitbread.com/ee-faq/what-is-a-buck-converter>. It would be readily understood that the buck converter of Shteynberg is equivalent to the DC/DC converter disclosed in the ‘759 Patent.

58. The switching power supply (150) that provides a regulated output voltage connected to the rectifier (110) 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 ‘759 Patent because the switching power supply takes the rectified voltage from rectifier 110 and provides current to the LEDs 140.

59. 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 because the brightness level is determined by limiting power to the LED. 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.

60. Controller 160, disclosed in Shteynberg, is equivalent to the primary controller required by the ‘759 Patent. Additionally, controller 260 disclosed in Shteynberg is the secondary controller required by the ‘759 Patent. Shteynberg describes the use of multiple controllers (processors) capable of performing discrete functions in its circuit design. From this disclosure, it is readily understood that one controller can serve as the primary controller capable of performing a certain function and another controller can server as the secondary controller capable of performing a separate function.

61. A POSITA would understand that controllers, such as microprocessors, digital signal processors (“DSPs”), parallel processors, multiple core processors, custom ICs, application specific integrated circuits (“ASICs”), field programmable gate arrays (“FPGAs”), adaptive computing ICs, and other ICs and components disclosed in the Shteynberg are digital because they each operate using a binary system as opposed to having to modify specific components as with analog controllers.

62. An electronic load is a device which takes electrical energy. *Electrical Load*, Circuit Globe (June 13, 2019), <https://circuitglobe.com/electrical-load.html>.

A load converts electricity into heat, light, or motion. *Types of Electrical Loads*, SCIENCING, (April 30, 2018) <https://sciencing.com/types-electrical-loads-8367034.html>. In this way, an LED can be an electronic load. With respect to Claim 13, it is my opinion the electronic load 250 and LEDs 140 of Shteynberg are equivalent to the LED load of the ‘759 Patent.

63. A digital controller is a that can be system used for controlling closed-loop feedback systems. The controller implements algebraic algorithms such as filters and compensatory to regulate, correct, or change the behavior of the controlled system. Edmund Lai, PRACTICAL DIGITAL SIGNAL PROCESSING FOR ENGINEERS AND TECHNICIANS 10 (1st ed. 2004).

2. Ground 2: Shteynberg in view of Kim renders Claims 2, 5, 15, and 19 obvious

64. Claims 2, 5, 15, and 19 of the ‘759 Patent are rendered obvious under 35 U.S.C. § 103 by Shteynberg in view of Kim.

65. A set point is the desired or target value for an essential variable, or process value (PV) of a control system, which may differ from the actual measured value of the variable. B. Wayne Bequette, PROCESS CONTROL: MODELING, DESIGN, AND SIMULATION 5 (2002). As such, an output current set point is a desired or target value of the output current. Additionally, regulating the constant current flowing to a load lamp is analogous to programming the output current set point. Output current set point can be set by accessing a port in the LED driver.

66. Power factor correction is the process of compensating for the lagging current by creating a leading current, such as by connecting capacitors to the supply. A sufficient capacitance is connected so that the power factor is adjusted to be as close to unity as possible. John Ware, *Power Factor Correction*, IEE Wiring Matters, Spring 2006, at 22, <https://electrical.theiet.org/media/1687/power-factor-correction-pfc.pdf>. A POSITA would understand that the power factor correction unit correcting the power factor, by correcting the phase difference between, a current balancing unit, is analogous to the output voltage bus connected to a power limit.

67. An electronic load is a device which takes electrical energy. A load converts electricity into heat, light, or motion. *Electrical Load*, CIRCUIT GLOBE (June 13, 2019), <https://circuitglobe.com/electrical-load.html>. In this way, an LED can be an electronic load.

3. Ground 3: Shteynberg in view of Morgan renders Claims 8-9, 16-17, 19 and 24 obvious

68. Claims 8-9 and 16-17, 19 and 24 of the '759 Patent are rendered obvious under 35 U.S.C. § 103 by Shteynberg in view of Morgan. Shteynberg anticipates independent claim 1 for the reasons discussed above and incorporated here.

69. A DMX interface permits a computer to transmit raw DMX frames over the USB interface, which are turned into serial data by a USB to UART chip. That

data is passed onto an RS485 driver that outputs differential signals. The DMX devices receive the signals with another RS485 transceiver and their microcontroller uses the serial data to turn the lights on and off. *Building a Simple DMX Interface*, MEDUSALIX' BLOG (August 26, 2019) <https://medusalix.github.io/posts/dmx-interface/>. DMX512A is a communication protocol used to remotely control lighting dimmers and intelligent fixtures. It is designed to provide a common communications standard between these lighting devices regardless of the manufacturer. *DMX512A Protocol*, LUMENETIX (June 28, 2017).

70. Examples of DMX connectors are provided below:

FIGURE 1: DMX512A CONNECTORS – RJ45 AND 5-PIN XLR



Michael Pearce, *DMX512A*, MICROCHIP TECH. INC. (2014).

71. A POSITA would understand that the DMX interfaces of Morgan are equivalent to the DMX512A communication interface of the '759 Patent.

72. A POSITA would know that the LED driver of Shteynberg would require a container or housing in which to protect the sensitive electronic components from dust, water, etc.

VI. MOTIVATION TO COMBINE SHTEYNBERG AND KIM AND SHTEYNBERG AND MORGAN

73. In my opinion, a POSITA would have been motivated to combine the teachings of Shteynberg and Kim and Shteynberg and Morgan because each of the references is in the same field of endeavor—namely, configurable LED drivers capable of varying luminesce in solid state lighting. The ‘759 Patent defines its “Technical Field” as a “novel LED Driver/dimmer for solid state lighting applications.” Ex. 1001, 1:39-40.

74. Like the ‘759 Patent, Shteynberg, Kim, and Morgan are directed to powering and controlling solid state lighting applications. Shteynberg discloses that its “Field of the Invention” is in general related to power conversion and more specifically, to a system, apparatus and method for supplying power to solid state lighting devices, such as providing power to light emitting diodes (“LEDs”) and LEDs integrated with digital controllers or processors. Ex. 1005, 1:18-22.

75. Similarly, Kim discloses that it relates to a power supply device and, more particularly, to a power supply device for driving a light emitting diode (LED) capable of controlling the switching of multiple output powers, in synchronization with the frequency of one of the multiple output powers, and simplifying a power conversion stage in supplying power for driving an LED. Ex. 1006, 1:0003.

76. Still further, Morgan discloses that its systems and methods “that include an LED die integrated in an LED package with a submount that includes an

electronic component for controlling the light emitted by the LED die. The electronic component integrated in the submount may include drive hardware, a network interface, memory, a processor, a switch-mode power supply, a power facility, or another type of electronic component.” Ex. 1006, 1:0012.

77. Moreover, Shteynberg and Morgan are each analogous to the ‘759 Patent because they are reasonably pertinent to the technical problem allegedly addressed by the claimed invention. For example, the ‘759 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, namely in the area of driving and dimming LEDs. Ex. 1001, 1:34-37. Similarly, Shteynberg discloses that “a need remains for an LED driver circuit which can operate consistently with a typical or standard dimmer switch of the existing lighting infrastructure and avoid the problems discussed above (including perceptible LED flicker) while providing the environmental and energy-saving benefits of LED lighting.” Ex. 1005, 25:29.

78. Kim likewise discloses that “when the power supply device is employed to drive LEDs, a boost circuit (or a voltage step-up circuit) or a buck circuit (or a voltage step-down circuit) is required to compensate for a voltage deviation among the LEDs after the primary power conversion, which also degrades power conversion efficiency and increases the number of required components, thereby increasing fabrication costs.” Ex. 1006, 1[0008].

79. Morgan likewise discloses “that LED packages have been developed that include an LED die and a submount that includes a diode, such as an ESD diode. However, current LED packages require manufacturers to develop and implement many separate electronic components in order to power the LED dies and to control the light coming from the LED dies. A need exists to simplify the challenges of powering and controlling LED packages. Power supplies used in LED lighting systems have often been based on power supplies for conventional lighting systems or other electronic devices, leading to problems of inefficiency, lack of reliability and lack of longevity. Accordingly, a need exists for power supplies designed and optimized for LED lighting systems.” Ex. 1007, 1[0005]-[0006].

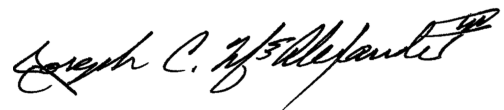
80. Finally, a POSITA, would have had a reasonable expectation of success in making this modification. The LED Driver components described in Shteynberg, Kim and Morgan were well-known at the time (“A wide variety of off-line LED drivers are known. For example, a capacitive drop off-line LED driver from On Semiconductor (Application Note AND8146/D) is a non-isolated driver with low efficiency, is limited to deliver relatively low power, and at most can deliver a constant current to the LED with no temperature compensation, no dimming arrangements, and no voltage or current protection for the LED.”) Ex. 1005, 26-33.

81. As such, a POSITA would have recognized it would have been straightforward to modify the LED driver of Shteynberg to include Kim’s LED and

feedback units and Morgan's set of in-circuit serial programming (ICSP) ports, external transmitters, communication interfaces (DMX512A, 0-10 Vdc analog control, Zigbee wireless or Remote Device Management (RDM) compatible) in order to increase the programmable nature of the LED drive from external source. A POSITA would have further recognized that it would have been straightforward to modify the LED driver of Shteynberg to Morgan's housings to protect the internal circuitry, any mechanical interfaces and the heat dissipation facilitates.

82. Therefore, a POSITA would be motivated to combine Shteynberg with Kim and combine Shteynberg with Morgan.

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



Joseph C. McAlexander III

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Claims	Prior Art References		
U.S. Patent No 9,591,759: Asserted Claims	Prior Art Reference: U.S. Patent No 7,902,769 to Shteynberg	Prior Art Reference: U.S. Patent Application No US20120007512 to Kim	Prior Art Reference: U.S. Patent Application No US20060022214 to Morgan
1[p]. A configurable light emitting diode (LED) driver for powering a set of light fixture loads comprising:	“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.		
1(a). a power circuit including: an inrush current limit; a DC/DC converter:	“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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	“For example, as illustrated in FIG. 5, a switching off-line LED driver 90 typically includes a full wave rectifier 20 with a capacitive filter 15, which allows current to flow to the filter capacitor (C) 15, when the input Voltage is greater than the Voltage across the capacitor. The inrush current to the capacitor is limited by the resistance in series with the capacitor. Under normal operating conditions, there may be a Negative Temperature Coefficient resistor (NTC) or thermistor in series with the capacitor to minimize inrush current during initial charging.”		

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	Shteynberg, 3:42-51. “The switching power supply 150A is implemented in two stages, an AC/DC converter 265 and a buck converter 270.” Shteynberg, 13:65-67.		
1(b). a power factor correction (PFC) boost connected to the inrush current limit and the DC/DC converter	“[T]he current regulator 100 comprises a rectifier 10, an impedance matching circuit 120, and a switching power supply (or driver) 130.” Shteynberg, 8:65-67. “FIG. 7 is a block diagram of an exemplary second embodiment of a current regulator (or converter) 200 in accordance with the teachings of the present invention. The current regulator 200		

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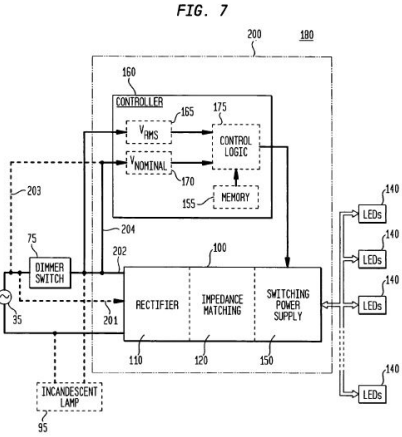
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	comprises a rectifier 110, an impedance matching circuit 120, a switching power supply (or driver) 150, and further includes a controller 160 coupled to receive an output from the dimmer switch 75.” Shteynberg, 7:29-31. FIG. 7  Shteynberg, fig. 7.		

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	“[The] built-in capability to deliver power factor correction without additional power components.” Shteynberg, 16:50-65. “The second stage of the switching power supply 150, converter 270, however, continues to operate and provide LEDs 140 with a regulated current (i.e., operates continuously, during both Ta and B time intervals). As mentioned above, when capacitor C5 (345) has a sufficient capacitance value, it has sufficient stored energy to continue to provide PWM current to LEDs 140, with the PWM also controlled by		

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	controller 260 through switch Q2 (355)” Shteynberg, 14:60-15:1.		
1(c). a regulated output voltage bus connected to the DC/DC converter;	“The current regulator 200 comprises a rectifier 110, an impedance matching circuit 120, a switching power supply (or driver) 150, and further includes a controller 160 coupled to receive an output from the dimmer switch 75.” Shteynberg, 9:5-9. “The switching power supply 150A is implemented in two stages, an AC/DC converter 265 and a buck converter 270. . . . This first stage will convert a relatively poor, phased modulated AC voltage into a manageable DC voltage, while		

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	the second stage (buck converter 270) will perform LED driving using current PWM, through switching transistor 355 (Q2).” Shetyenberg, 13:65-14:8. “The proposed power stage 265 of the converter 100, 200 has the following features making it compatible with the phase modulated input voltage: . . . (3) it uses a relatively small, low filtering capacitor for low frequency ripple, or can allow this ripple to be comparatively high (with filtering in the second stage 270), so smaller and/or a non-electrolytic capacitor may be used (such as a film or ceramic		

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	capacitor), decreasing costs and extending the life of the driver; [and] (4) it has built-in capability to deliver power factor correction without additional power components.” Shteynberg, 16:50-63,		
1(d). a primary controller for controlling the power circuit;	“[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, 9:13-26.		

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	“[T]he control block 215 (e.g., controller 160, 260) may be coupled (lines 211, 212) to detect or otherwise receive feedback of the voltage across current sense resistor 220.” Shteynberg, 10:57-59. Shteynberg, fig. 8.		
1(e). a set of output current drivers, each of the set of output current drivers connected to one of the	“LED driver circuits and LEDs will be wired within existing lighting infrastructure, such as replacing an incandescent bulb		

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set of light fixture loads for powering the associated light fixture load, and;	(placed within an Edison socket) or replacing an incandescent lamp, with wiring to existing switches, such as dimmer switches. In a second phase, existing switching connections may be re-wired, allowing LED driver circuits to be co-located in the same junction or wall box as the switches, but wired directly to the AC line voltage, with existing switching (such as dimmers) generating only a control signal to regulate LED brightness.” Shetyenberg, 8:20-29.		
1(f). an apparatus for configuring the set of output current drivers	“LED driver circuits and LEDs will be wired within existing lighting infrastructure, such as		

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to an output current set point	replacing an incandescent bulb (placed within an Edison socket) or replacing an incandescent lamp, with wiring to existing switches, such as dimmer switches.” Shteynberg, 8:20-24. “[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.		

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2. The LED driver of claim 1 wherein the apparatus for configuring comprises at least one port associated with at least one of the set of output current drivers for configuration of the output current drivers.		“[A]n LED driving unit supplying the plurality of first powers maintained in current balancing by the current balancing unit to a plurality of LED units.” Kim, 1[0010]-2[0010]. “For example, when the power Supply device for driving an LED according to an exemplary embodiment of the present invention is employed for a display device, the operating unit 160 may perform an operation to provide an image, a sound, and the like, required for the display device.” Kim, 5[0061].	

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5. The LED driver of claim 2 wherein the apparatus for configuring programs the output current set point.		“[B]ecause driving power is supplied to the LED lamps of multiple channels by the single transformer and the current balancing of the driving powers supplied to the respective LED lamps is maintained, the constant current flowing at the respective LED lamps can be controlled.” Kim, 8[0119].	
6. The LED driver of claim 1 wherein the apparatus for configuring is integrated with a secondary controller.	“[T]he controller 160 . . . 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)		

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	provided by the LEDs 140.” Shteynberg, 9:22-26. “As the term ‘controller’ or ‘processor’ is used herein, a controller 160, 260 may include use of a single integrated circuit (‘IC’), or may include use of a plurality of integrated circuits or other components connected, arranged or grouped together, such as controllers, microprocessors, digital signal processors (‘DSPs’), parallel processors, multiple core processors, custom ICs, application specific integrated circuits (‘ASICs’), field programmable gate arrays (‘FPGAs’), adaptive computing ICs, associated		

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	memory (such as RAM, DRAM and ROM), and other ICs and components. As a consequence, as used herein, the term controller (or processor) should be understood to equivalently mean and include a single IC, or arrangement of custom ICs, ASICs, processors, microprocessors, controllers, FPGAs, adaptive computing ICs, or some other grouping of integrated circuits which perform the functions discussed below, with associated memory, such as microprocessor memory or additional RAM, DRAM, SDRAM, SRAM, MRAM, ROM, FLASH, EPROM or		

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	E ² PROM.” Shetyenberg, 18:11-29. “[T]he controller 160, 260 may be implemented as an arrangement of controllers, microprocessors, DSPs and/or ASICs, collectively referred to as a ‘controller’, which are respectively programmed, designed, adapted or configured to implement the methodology of the invention, in conjunction with a memory 155.” Shteynberg, 18:43-49.		
8. The LED driver of claim 6 further comprising a communication interface for receiving data from an external transmitter.			“A lights/interfaces pane lists lighting units or lighting unit interfaces that are capable of being managed by the management tool. Interfaces may include

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			power/data supplies (PDS) 1758 for one or more lighting systems, DMX interfaces, DALI interfaces, interfaces for individual lighting units, interfaces for a tile lighting unit, or other suitable interfaces.” Morgan, 31[0433].
9. The LED driver of claim 8 wherein the communication interface is either DMX512A. 0-10Vdc analog control, Zig bee wireless or Remote Device Management (RDM) compatible.			“A lights/interfaces pane lists lighting units or lighting unit interfaces that are capable of being managed by the management tool. Interfaces may include power/data supplies (PDS) 1758 for one or more lighting systems, DMX interfaces, DALI

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			interfaces, interfaces for individual lighting units, interfaces for a tile lighting unit, or other suitable interfaces.” Morgan, 31[0433].
13. The LED driver of claim 6 wherein the primary and secondary controllers are digital controllers.	“[The] ‘controller’ or ‘processor’ 160, 260 may be any type of controller or processor, and may be embodied as one or more controllers 160, 260, adapted to perform the functionality discussed herein. As the term controller or processor is used herein, a controller 160, 260 may include use of a single integrated circuit (‘IC’), or may include use of a plurality of integrated circuits or other components connected,		

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	arranged or grouped together, such as controllers, microprocessors, digital signal processors ('DSPs'), parallel processors, multiple core processors, custom ICs, application specific integrated circuits ('ASICs'), field programmable gate arrays ('FPGAs'), adaptive computing ICs, associated memory (such as RAM, DRAM and ROM), and other ICs and components." Shetyenber, 18:8-21. "[T]he present invention in general is related to power conversion, and more specifically, to a system, apparatus and method for		

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	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. Shetyenberg, 1:18-22.		
15. The LED driver of claim 1 wherein the output voltage bus is connected to at least one power limit.		“With reference to FIG. 1, the power supply device 100 for driving a light emitting diode (LED) may include a filter unit 110 canceling electromagnetic interference (EMI) included in commercial AC power, a rectifying unit 120 rectifying the filtered power from the filter unit 110, a power factor correction unit 130 correcting a power factor by correcting a phase	

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		difference between the current and voltage of the rectified power from the rectifying unit 120, a power conversion unit 140, an LED driving unit 150, an operating unit 160, a power conversion controller 170, a feedback unit 180, and a current balancing unit 190.” Kim, 4:55.	
16. The LED driver of claim 1 wherein the set of output current drivers comprise a buck topology power converter.			“The electronic component may be a buck converter, a flyback converter, or a current regulator.” Morgan, 3:0035.
17. The LED driver of claim 1 further comprising a housing portion for housing the			“Referring to FIG. 9, housings 800 may include a housing for an architectural lighting

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components of the driver.			fixture 810, such as a wall-washing fixture. Housings 800 may be square, rectangular 810, circular, cylindrical 812, or linear 814. A linear housing 814 may be equipped with a diffuser 502 to simulate a neon light of various shapes, or it may be provided without a diffuser, such as to light an alcove or similar location. A housing 800 may be provided with a watertight seal, to provide an underwater lighting system 818.” Morgan, 12[0256].

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19. The LED driver of claim 1 wherein the light fixture load is one of an Organic LED (OLED) load or an LED load.	“[T]he ‘electronic’ load 250, for example, is a system 105, 180, such as a current regulator (or converter) 100, 200 coupled to LEDs 140.” Shteynberg, 10:45-47	“A power supply device for driving a light emitting diode (LED) capable of controlling the switching of multiple output powers, in synchronization with the frequency of one of the multiple output powers and simplifying a power conversion stage in supplying power for driving an LED.” Kim, 1[0003].	“Methods and systems are provided for LED modules that include an LED die integrated in an LED package with a submount that includes an electronic component for controlling the light emitted by the LED die. The electronic component integrated in the submount may include drive hardware, a network interface, memory, a processor, a switch-mode power supply, a power facility, or another type of electronic component.” Morgan, 1[0012].
20[p]. A configurable light emitting diode	“In accordance with the present invention, therefore,		

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(LED) driver for powering a set of light fixture loads comprising:	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, 8:9-17.		
20(a). power circuit including:	“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.		
20(b). inrush current limit;	“It may also be assumed during a first phase that dimmer switches generally and initially will not be changed or rewired, so all of		

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	their existing performance characteristics will be maintained, such as power harmonics, inrush currents during initial powering on, electromagnetic interference, and audio harmonics (such as buzzing).” Shetyenberg, 8:44-49. “The exemplary embodiments are also more power efficient, reducing the supplemented current (and therefore I²R power loss) when there are other loads providing or sinking currents or when the phase angle α is small.” Shetyenberg, 10:37-39.		
20(c). DC/DC converter;	“The switching power supply 150A is implemented in two		

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	stages, an AC/DC converter 265 and a buck converter 270. The AC/DC converter 265 is utilized to provide a high input impedance, thereby eliminating the high input capacitance that the single stage approaches have (and which can cause triacs of dimmers to misfire, as previously mentioned). This first stage will convert a relatively poor, phased modulated AC voltage into a manageable DC voltage, while the second stage (buck converter 270) will perform LED driving using current PWM, through switching transistor 355 (Q2).” Shetyenberg, 13:65-14:8.		

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Prior Art U.S. Patent No. 9,049,759

Claims	Prior Art References		
U.S. Patent No 9,591,759: Asserted Claims	Prior Art Reference: U.S. Patent No 7,902,769 to Shteynberg	Prior Art Reference: U.S. Patent Application No US20120007512 to Kim	Prior Art Reference: U.S. Patent Application No US20060022214 to Morgan
20(d). a power factor correction (PFC) boost connected to the inrush current limit and the DC/DC converter;	“The current regulator 100 comprises a rectifier 10, an impedance matching circuit 120, and a switching power supply (or driver) 130.” Shetyenberg, 8:65-67. “FIG. 7 is a block diagram of an exemplary second embodiment of a current regulator (or converter) 200 in accordance with the teachings of the present invention. The current regulator 200 comprises a rectifier 110, an impedance matching circuit 120, a switching power supply (or driver) 150, and further includes a controller 160 coupled to receive an output		

Exhibit A
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	from the dimmer switch 75.” Shetyenberg, 9:3-9. “[B]uilt-in capability to deliver power factor correction without additional power components.” Shetyenberg, 16:61-63.		
20(e). a regulated output voltage bus connected to the DC/DC converter;	“FIG. 7 is a block diagram of an exemplary second embodiment of a current regulator (or converter) 200 in accordance with the teachings of the present invention. The current regulator 200 comprises a rectifier 110, an impedance matching circuit 120, a switching power supply (or driver) 150, and further includes a controller 160 coupled to receive an output		

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	from the dimmer switch 75. 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.” Shetyenberg, 9:3-12. “[S]witching power supply 150A is implemented in two stages, an AC/DC converter 265 and a buck converter 270.” Shetyenberg, 13:65-67, fig. 10		
20(f). at least one power limit connected to the output voltage bus;	“FIG. 10 is a circuit diagram of an exemplary embodiment of a switching power supply 150A for a current regulator (or converter) 100, 200 in		

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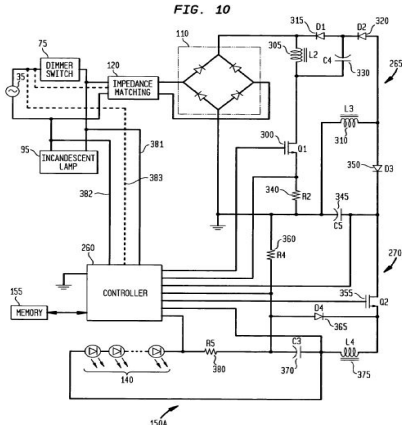
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	accordance with the teachings of the present invention.” Shetyenberg, 13:34-37.  Shetyenberg, fig. 10. “[T]he controller 160 (and 260, FIG. 10) is programmed, adapted or configured to emulate the brightness or		

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	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.” Shetynberg, 9:21-26.		
20(g). 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 powering the associated light fixture load, and;	“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		

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	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.” Shetyenberg, 8:20-29.		
24. The LED driver of claim 20 wherein the regulated output Voltage bus and at least one power limit are enclosed within a housing.			“The system 100 may optionally include a housing 800, which in embodiments may hold the board 204, the electrical facility 202, the mechanical interface 3200, and the thermal facility 2500.” Morgan, 6[0184].