

Petition for IPR of U.S. Patent No. 9,591,713
Case No. IPR 2023-01259

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 2023-01259

U.S. Patent No. 9,591,713

PETITION FOR *INTER PARTES* REVIEW OF U.S. PATENT NO. 9,591,713

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PETITIONER'S EXHIBIT LIST

<u>EXHIBIT</u>	<u>DESCRIPTION</u>
Ex. 1001	U.S. Patent No. 9,591,713
Ex. 1002	Declaration of Joseph McAlexander
Ex. 1003	Curriculum Vitae of Joseph McAlexander
Ex. 1004	File Wrapper for U.S. Patent No. 9,591,713
Ex. 1005	U.S. Patent 9,173,273 to Zudrell-Koch
Ex. 1006	U.S. Patent Application No. US20140103804A1 to Zhdanau
Ex. 1007	U.S. Patent Application No. US20130063047A1 to Veskovic
Ex. 1008	March 22, 2023 Case Management Order (Dkt. 35)
Ex. 1009	Time to Trial for the Southern District of California
Ex. 1010	<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
Ex. 1011	Yijie Wang, et al., <i>A Review of LED Drivers and Related Technologies</i> , 64 IEEE TRANSACTIONS ON INDUS. ELECTRONICS 5754, 5754 (July 2017)

I. INTRODUCTION

Petitioner requests *Inter Partes* Review (“IPR”) of claims 1-2, 5, 10, and 12-13 (the “Challenged Claims”) of U.S. Patent No. 9,591,713 (“the ‘713 patent”).

This petition (IPR 2023-01259) is part of a set of six petitions, including IPR 2023-01257, IPR 2023-01266, IPR 2023-01258, IPR 2023-01264, and IPR 2023-01265, which challenge claims of U.S. Patent Nos. 8,525,446 (“the ‘446 Patent”), 8,957,601 (“the ‘601 Patent”), 9,049,759 (“the ‘759 Patent”), 9,078,310 (“the ‘310 Patent”), 9,320,093 (“the ‘093 Patent”), and 9,597,713 (“the ‘713 Patent”) (collectively, “the Challenged Patents”), respectively. Petitioner requests that the USPTO combine the schedule, discovery, and hearing of these six IPRs.

II. MANDATORY NOTICES

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

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

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

The ‘713 Patent is related to a district court litigation pending in the Southern District of California. *mate, LLC* (“Patent Owner”) asserted the ‘713 Patent, ‘601 Patent, ‘759 Patent, ‘310 Patent, ‘093 Patent, and ‘446 Patent against Petitioner in the following case: *mate, LLC v. Advanced Lighting Concepts LLC (dba Environmental Lights)*, 3:22-cv-01095-CAB-DEB (S.D. Cal.).

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

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

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

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

III. CERTIFICATION AND FEES

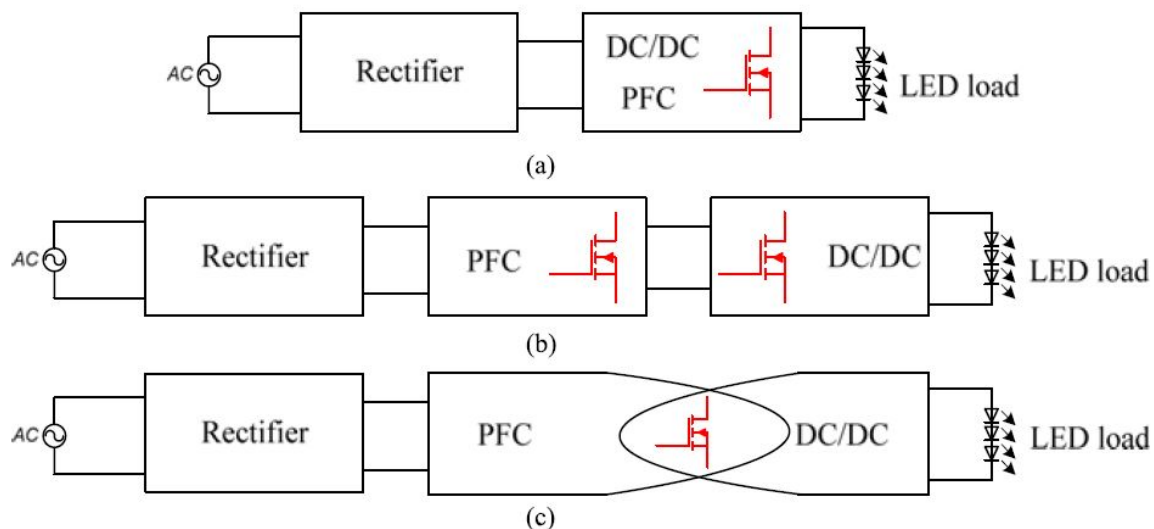
Petitioner certifies that the ‘713 Patent is available for IPR and that the Petitioner is not barred or estopped from requesting *inter partes* review of claims 1-2, 5, 10, and 12-13 of the ‘713 Patent identified in this Petition.

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

IV. TECHNOLOGY AT ISSUE

The Challenged Patents relate to light emitting diode (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). “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). 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.

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

Id. at 5754-55.

“In recent years, many integrated-stage topologies are designed for the sake of efficiency and cost.” *Id.* at 5755. “In order to obtain high PF and low total harmonic distortion (THD), a topology which performs PFC characteristics as PFC stage is usually chosen, and a [DC/DC] stage is selected according to the power level of the system.” *Id.* Due to the integration technology, the PFC stage and DC/DC stage can be simplified into one stage by sharing active power switches and control circuit. *Id.* Therefore, cost and size of the system is reduced while ensuring high efficiency, high reliability, and fast output dynamics. *Id.*

V. OVERVIEW OF THE ‘713 PATENT

The ‘713 Patent describes a system, method, and apparatus for monitoring and limiting power supplied to a solid state lighting (SSL) device when an operational

fault condition is sensed such as when the power level being supplied to the device is sensed to be meeting or higher than an expected or predetermined level. Ex. 1001, Abstract. The ‘713 Patent purports to address the need to “limit power within predetermined limits to [LED] devices to mitigate or reduce over-temperature or abnormal operation of these SSL devices.” Ex. 1001, 1:18-20.

The ‘713 Patent further notes that in terms of fault conditions, “OLEDs may have failure mechanisms that include an increase in impedance. In this failure mode, the increased impedance results in increased power dissipation for a fixed LED drive current, which may, however, increase the risk of the SSL device being a fire hazard.” Ex. 1001, 1:24-29.

Approaches exist to limit power and current to an LED load as a result of an external failure of the LED load or an internal failure of a component within an LED power source. One common approach is to disable or turn off the LED power source if an over power or over current condition is detected. Another approach is to implement a “hiccup” mode whereby the output of the LED power source is continually cycled on and off in an over power or over current condition. However, it is not always ideal to immediately disconnect power to a LED load under transient conditions caused by a potential fault, an AC mains transient, a load transient or a temporary overload condition.

Ex. 1001, 1:46-59

VI. THE ALLEGED INVENTION

The claims of the '713 Patent are generally directed to a "system, method, and apparatus for monitoring and limiting power supplied to a solid state lighting (SSL) device when an operational fault condition is sensed such as when the power level being supplied to the device is sensed to be meeting or higher than an expected or predetermined level." Ex. 1001, Abstract. The LED device of the '759 Patent further includes a power circuit; "at least one power limit connected to the power circuit; at least one output current driver for supplying a load power to the SSL device load, the at least one output current driver connected to the at least one power limit; and a power limit controller." Ex. 1001, 12:23-28. "The power circuit transmits the power to the at least one power limit which, in turn, transmits a current to the at least one output current driver." Ex. 1001, 12:29-31. Further, "the power limit controller directly or indirectly monitors a level of the load power and controls the at least one power limit to reduce the level of the load power for a predetermined period of time when the load power exceeds a predetermined power limit." Ex. 1001, 12:32-36. "If the load power exceeds the predetermined power limit, the power limit controller internally generates and transmits a signal to the current source controller to control the load power to the load where the signal is based on internal controls." Ex. 1001, 12:37-41.

VII. SUMMARY OF PROSECUTION HISTORY

The application that issued as the '713 Patent (US14/893,375) was filed on June 25, 2014 and claims the benefit of priority of U.S. Provisional Patent Application No. 61/838,965 filed June 25, 2013.

In a first Office Action, several claims were rejected as being anticipated by or obvious in view of (1) Tikkanen et al. (US 2011/0204820, now U.S. Patent No. 8,525,446) and (2) Tikkanen et al. (US 2011/0204820, now U.S. Patent No. 8,525,446) in view of Xie et al. (U.S. Patent No. 9,024,541). Ex. 1004, at 27.

In response, the applicant amended claim 1 to add the additional limitations of wherein if the load power exceeds the predetermined power limit, the power limit controller internally generates and transmits a signal to the current source controller to control the load power to the load and wherein the signal is based on internal controls. Ex. 1004, at 36.

In a second Office Action, several claims were rejected as being anticipated by Burlak et al. (U.S. Patent No. 7,671,571). Ex. 1004, at 50. The Examiner noted that certain claims contained allowable subject matter. Ex. 1004, at 62. In response, the applicant cancelled the claim subject to the 102(a) rejection and requested allowance of the claims that contained allowable subject matter. Ex. 1004, at 75.

VIII. OVERVIEW OF THE PRIOR ART

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

A. Zudrell-Koch (Ex. 1005)

U.S. Patent No. 9,173,273 (“Zudrell-Koch”) was filed on January 23, 2013 and published on February 27, 2014. Zudrell-Koch issued on October 27, 2015. Zudrell-Koch is prior art to the ‘713 Patent under 35 U.S.C. § 102(a). Zudrell-Koch teaches a driver circuit for controlling the dimming of SSL devices:

The driver circuit comprises a transistor operable in two modes, either alternating between on/off states or continuously controlling a current through the transistor. A power converter network provides a switched-mode power converter in conjunction with the transistor when operated in the first mode generating a drive voltage for the SSL. The control unit controls the transistor to selectively operate in one of the two modes; to control the transistor to determine that the input voltage exceeds an input voltage threshold; and to control a drive current through the SSL based on a measurement of a phase-cut angle thereby controlling an illumination level of the SSL device.

Ex. 1005, Abstract.

B. Zhdanau (Ex. 1006)

U.S. Patent Application Publication No. US2014/0103804 (“Zhdanau”). Zhdanau was filed on March 15, 2013, and claims priority to provisional patent

application no. 61/612,741, filed March 19, 2012. Zhdanau was published on April 17, 2014, and is prior art to the ‘713 Patent under 35 U.S.C. § 102(b). Zhdanau teaches:

an improved LED lighting system and method which limits current and employs a voltage significantly greater than line voltage in order to allow lighting circuits to be built with up to thousands of Watts fed from a single power/data source. The present system and method allows exceptionally long lengths of LED lighting of 200 meters or more for large scale LED lighting applications such as the architectural delineation of skyscrapers and bridges.

Ex. 1006, Abstract.

C. Veskovic (Ex. 1007)

U.S. Patent Application Publication No. US2013/0063047 (“Veskovic”). Veskovic was filed on March 9, 2012, and was published on March 14, 2013. Veskovic is prior art to the ‘713 Patent under 35 U.S.C. §§ 102(b). Veskovic teaches:

[a]n LED driver for controlling the intensity of an LED light source includes a power converter circuit for generating a DC bus voltage, an LED drive circuit for receiving the bus voltage and controlling a load current through, and thus the intensity of, the LED light source and a controller operatively coupled to the power converter circuit and the LED drive circuit. The LED drive circuit comprises a controllable-impedance circuit adapted to be coupled in series with the LED light source. The controller adjusts the magnitude of the bus voltage to a target bus voltage and generates a drive signal for controlling the

controllable-impedance circuit. To adjust the intensity of the LED light source, the controller controls both the magnitude of the load current and the magnitude of the regulator voltage. The controller controls the magnitude of the regulator voltage by simultaneously maintaining the magnitude of the drive signal constant and adjusting the target bus voltage.

Ex. 1007, Abstract.

IX. CLAIM CONSTRUCTION

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

X. GROUNDS FOR PETITION

A. Ground 1: Zudrell-Koch Anticipates Claims 1, 2, 5, 10 and 13

Independent claim 1 and dependent claims 2, 5, 10, and 13 of the ‘713 Patent are anticipated by Zudrell-Koch under 35 U.S.C. § 102.

1. Claim 1

a. 1[p] - Apparatus for controlling power to a solid state lighting (SSL) device load comprising:

To the extent that the Board finds that the preamble is limiting, claim 1 of Zudrell-Koch discloses “[a] control unit for a driver circuit which is configured to drive a solid state lightening, referred to as SSL device, subject to an input voltage derived from a mains voltage using a phase-cut dimmer, wherein the driver circuit comprises a transistor operable in a first mode and in a second mode; and a power converter network[.]” Ex. 1005, 18:25-30.

Additionally, when discussing Figure 5, Zudrell-Koch discloses:

[a] first step 500 depicts a provision of a control unit, a driver circuit comprising a single power Switch, and a SSL device, wherein the driver circuit is setting an illumination level of the SSL device in accordance to a setting of the phase-cut dimmer. The next step 501 shows measuring a phase-cut-angle set by the phase-cut dimmer by using the single power switch.

Ex. 1005, 17:50-56.

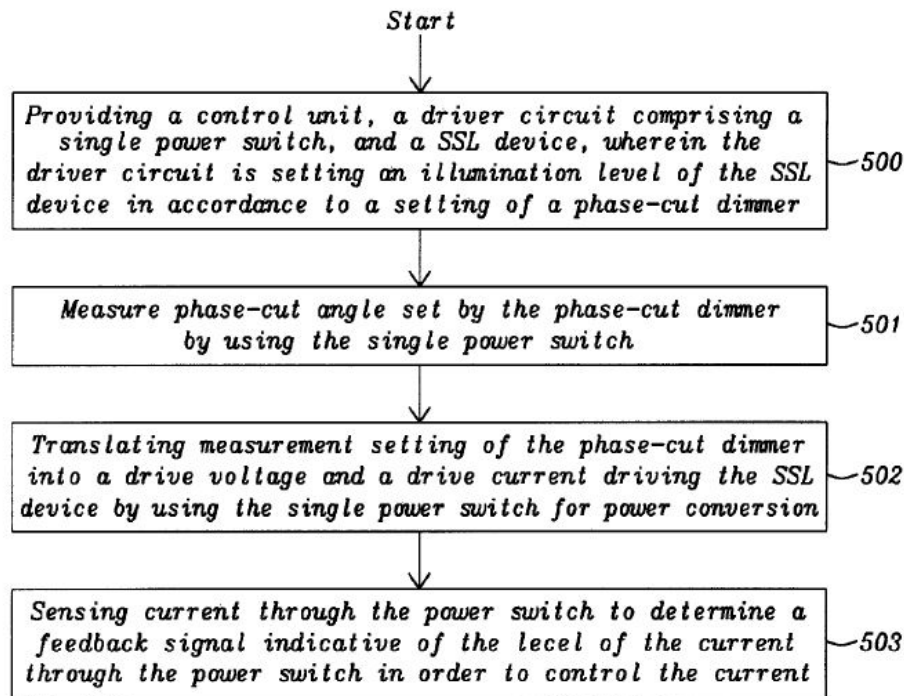


FIG. 5

Ex. 1005, fig. 5.

Zudrell-Koch discloses that the driver circuit containing a control unit can be used to drive SSL devices and set an illumination level of the SSL device. A POSITA would recognize that Zudrell-Koch disclosure of a driver circuit containing a control unit is equivalent to a configurable LED driver/dimmer. Ex. 1002, ¶ 57. A POSITA would also recognize that the solid state devices of Zudrell-Koch are light fixture loads. Ex. 1002, ¶¶ 53-54. As such, Zudrell-Koch discloses a configurable LED driver/dimmer for controlling a set of light fixture loads.

b. 1(a): a power circuit for receiving power from an external source

Zudrell-Koch discloses the power circuit of the ‘713 Patent. Zudrell-Koch discloses:

In order to control of dimming of solid state lighting devices (SSL) a driver circuit drives the SSL subject to an input voltage using a phase-cut dimmer. The driver circuit comprises a transistor operable in two modes, either alternating between on/off states or continuously controlling a current through the transistor. A power converter network provides a switched-mode power converter in conjunction with the transistor when operated in the first mode generating a drive voltage for the SSL.

Ex. 1005, Abstract.

Zudrell-Koch further discloses “[t]he driver circuit may comprise a current source and the control unit may be configured to control the current source to provide the appropriate drive current for the determined illumination level.” Ex. 1005, 5:26-28.

A power circuit, generally, is any circuit used to carry electricity that operates a load. Ex. 1002, ¶ 54. As demonstrated by the above excerpts, the driver circuit drives an input voltage to control dimming levels for SSL. As such, a POSITA would readily understand that the driver circuit of Zudrell-Koch discloses the power circuit of the ‘713 patent. *Id.* ¶¶ 54-55. Therefore, Zudrell-Koch discloses a power circuit.

c. 1(b): at least one power limit connected to the power circuit;

Zudrell-Koch discloses that at least one power limit is connected to the power circuit of the '713 Patent. For example, Zudrell-Koch discloses:

[t]he control unit may be configured to determine that the input Voltage exceeds a pre-determined input Voltage threshold (i.e. that the phase-cut dimmer goes into its on-state) by monitoring the input Voltage (or a Voltage derived from the input Voltage, or a Voltage derived from the mains Voltage). For this purpose, the control unit may comprise an input Voltage pin. The input Voltage pin may be linked to input Voltage measurement means of the driver circuit. The input Voltage measurement means may e.g. be a Voltage divider configured to provide a Voltage derived from the input Voltage to the input Voltage pin of the control unit. The input Voltage measurement means may be coupled to a rectifier unit of the driver circuit, on one side, and to the input Voltage pin of the control unit on the other side. As such, the control unit may be configured to receive a Voltage derived from the input Voltage. Furthermore, the control unit may be configured to determine that the input voltage exceeds a pre-determined input voltage threshold by determining that the received voltage exceeds a respective pre-determined threshold.

Ex. 1005, 4:60-5:11.

The '713 Patent makes a similar disclosure:

[t]he power limit 18 provides an apparatus to limit power to the external LED load 14 in the event of an operational fault condition such as, but not limited to, a single component failure within the LED power source

10. The single component failure may occur within the output current source, the current sense, or the current source controller. The power limit 18 may also limit power in the event of an external LED load fault or over load condition. The operational fault condition may further include a high impedance fault at the LED load. An over load condition may be a transient condition such as a cold start or power up of an LED load in ambient temperatures less than 0 degrees Celsius or an improper LED load connected to the LED power source.

Ex. 1001, 4:13-26.

A POSITA would readily understand that the input voltage pin as described in Zudrell-Koch is analogous to the power limit of the '713 Patent. Ex. 1002, ¶¶ 57-59. Additionally, a POSITA would recognize that the input voltage pin is disposed in the control unit, which is further disposed in the driver circuit means that the input voltage pin is connected to the driver circuit. Ex. 1002, ¶¶ 57-59. Therefore, Zudrell-Koch discloses a power limit connected to the power circuit.

- d. 1(c): at least one output current driver for supplying a load power to the SSL device load, the at least one output current driver connected to the at least one power limit; and**

Zudrell-Koch discloses the output current driver connected to the at least one power limit of the '713 Patent. As discussed above, Zudrell-Koch discloses a power limit. Ex. 1005, 4:60-5:11. Additionally, Zudrell-Koch discloses “[t]he driver circuit may comprise a current source and the control unit may be configured to control the current source to provide the appropriate drive current for the determined

illumination level.” Ex. 1005, 5:26-28. Zudrell-Koch further discloses “[b]y controlling the current through the Switch, the control unit may provide overstress protection of the components of the driver circuit and/or of the control unit (by limiting the current through the Switch to a value below a maximum current).” Ex. 1005, 4:47-50.

Finally, when discussing the driver circuit 100 of Figure 2a, Zudrell-Koch discloses that “[t]he estimated angle 113 indicates a desired dim level and is passed to an LED control unit 103 which controls the LED power supply 101 via a control signal 114 to provide an output power 115 to the LED 104 (referred to as light source 6 in FIG. 1) which drives the LED 104 to provide light 116 at the desired dim level.”

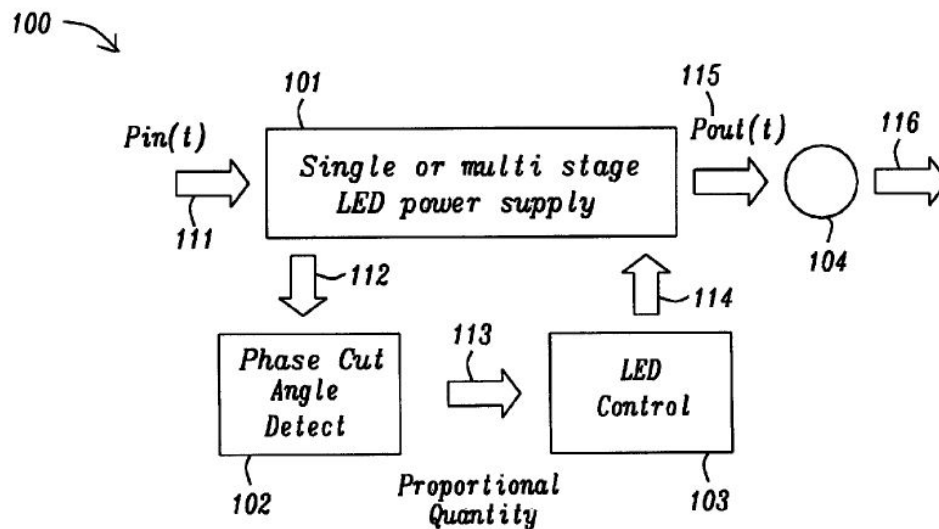


FIG. 2a

Ex. 1005, 9:58-63, fig. 2a.

A POSITA would recognize that Zudrell-Koch's disclosure that the driver circuit provides an output power 115 to the LED 104 is equivalent to the output current driver of the claim 1 of the '713 Patent. Ex. 1002, ¶ 57. Additionally, a POSITA would recognize that Zudrell-Koch's disclosure that the driver circuit contains a control unit, which, as discussed above, contains an input Voltage pin is equivalent to the required power limit. Ex. 1002, ¶ 58; *supra* Section X.A.1.c. Thus, Zudrell-Koch discloses the output current driver connected to the at least one power limit.

e. 1(d): a power limit controller;

Zudrell-Koch discloses the power limit controller of the '713 Patent:

The example power supply arrangement 100 comprises a phase-cut angle detection unit 102 which senses the input voltage 112 and which estimates the angle at which the original sinusoidal mains voltage has been cut by the dimmer. The estimated angle 113 indicates a desired dim level and is passed to an LED control unit 103 which controls the LED power supply 101 via a control signal 114 to provide an output power 115 to the LED 104 (referred to as light source 6 in FIG. 1) which drives the LED 104 to provide light 116 at the desired dim level.

Ex. 1005, 9:53-63.

Zudrell-Koch further discloses:

The control unit may be configured to determine that the input Voltage exceeds a pre-determined input Voltage threshold (i.e. that the phase-

cut dimmer goes into its on-state) by monitoring the input Voltage (or a Voltage derived from the input Voltage, or a Voltage derived from the mains Voltage). For this purpose, the control unit may comprise an input Voltage pin. The input Voltage pin may be linked to input Voltage measurement means of the driver circuit. The input Voltage measurement means may e.g. be a Voltage divider configured to provide a Voltage derived from the input Voltage to the input Voltage pin of the control unit. The input Voltage measurement means may be coupled to a rectifier unit of the driver circuit, on one side, and to the input Voltage pin of the control unit on the other side. As such, the control unit may be configured to receive a Voltage derived from the input Voltage. Furthermore, the control unit may be configured to determine that the input voltage exceeds a pre-determined input voltage threshold by determining that the received voltage exceeds a respective pre-determined threshold.

Ex. 1005, 4:60-5:11.

A POSITA would understand Zudrell-Koch's disclosure that the control unit, using the input voltage pin, may be configured to determine that the input voltage exceeds a pre-determined input voltage threshold is equivalent to the power limit controller. Ex. 1002, ¶¶ 57, 58, 59. As such, Zudrell-Koch discloses the power limit controller as required by claim 1 of the '713 Patent.

- f. 1(e): wherein the power circuit transmits the power to the at least one power limit which, in turn, transmits a current to the at least one output current driver;**

Zudrell-Koch discloses the power circuit transmits power to the at least one power limit which transmits current to the output current driver. For example, Zudrell-Koch discloses “[t]he driver circuit may comprise a current source and the control unit may be configured to control the current source to provide the appropriate drive current for the determined illumination level.” Ex. 1005, 5:25-28.

Zudrell-Koch further discloses:

[t]he control unit may be configured to determine that the input Voltage exceeds a determined input Voltage threshold (i.e. that the phase-cut dimmer goes into its on-state) by monitoring the input Voltage (or a Voltage derived from the input Voltage, or a Voltage derived from the mains Voltage). For this purpose, the control unit may comprise an input Voltage pin. The input Voltage pin may be linked to input Voltage measurement means of the driver circuit. The input Voltage measurement means may e.g. be a Voltage divider configured to provide a Voltage derived from the input Voltage to the input Voltage pin of the control unit. The input Voltage measurement means may be coupled to a rectifier unit of the driver circuit, on one side, and to the input Voltage pin of the control unit on the other side. As such, the control unit may be configured to receive a Voltage derived from the input Voltage. Furthermore, the control unit may be configured to determine that the input voltage exceeds a pre-determined input voltage

threshold by determining that the received voltage exceeds a respective pre-determined threshold.

Ex. 1005, 4:60-5:11.

As discussed above, a POSITA would understand that the input voltage pin is the power limiter that receives power from the power circuit. Ex. 1002, ¶¶ 57-59. A POSITA would also understand that the “appropriate drive current” is then transmitted to the output current driver. *Id.* As such, Zudrell-Koch discloses that the power circuit transmits power to the at least one power limit which transmits current to the output current driver as required by claim 1 of the ‘713 patent.

- g. 1(f): wherein the power limit controller directly or indirectly monitors a level of the load power and controls the at least one power limit to reduce the level of the load power for a predetermined period of time when the load power exceeds a predetermined power limit;**

Zudrell-Koch discloses that the power limit controller directly or indirectly monitors a level of the load power and controls the at least one power limit to reduce the level of the load power for a predetermined period of time when the load power exceeds a predetermined power limit. For example, Zudrell-Koch discloses that “[t]he control unit may be configured to determine that the input voltage exceeds a pre-determined input voltage threshold (i.e. that the phase-cut dimmer goes into its on-state) by monitoring the input voltage (or a voltage derived from the input

voltage, or a voltage derived from the mains voltage).” Ex. 1005, 4:60-64. Zudrell-Koch further discloses:

[t]he input voltage measurement means may e.g. be a voltage divider configured to provide a voltage derived from the input voltage to the input voltage pin of the control unit. The input voltage measurement means may be coupled to a rectifier unit of the driver circuit, on one side, and to the input voltage pin of the control unit on the other side. As such, the control unit may be configured to receive a voltage derived from the input voltage.

Ex. 1005, 5:1-7.

Still further, Zudrell-Koch discloses:

[t]he control unit may be configured to determine an indicator of a phase-cut angle set by the dimmer based on the time interval between the first and second time instants. In particular, the control unit may be configured to determine the illumination level corresponding to the phase-cut angle (or corresponding to the time interval).

Ex. 1005, 5:12-17

As discussed above, the input voltage pin is the power limit, which, in turn, is controlled by a control unit. *Supra* Section X.A.1.c. The control unit determines whether the voltage exceeds a voltage threshold. Ex. 1005, Abstract. As such, Zudrell-Koch discloses the power limit controller directly or indirectly monitors a level of the load power and controls the at least one power limit to reduce the level

of the load power for a predetermined period of time when the load power exceeds a predetermined power limit as required by claim 1 of the '713 Patent.

- h. 1(g): wherein if the load power exceeds the predetermined power limit, the power limit controller internally generates and transmits a signal to the current source controller to control the load power to the load;**

Zudrell-Koch discloses the required wherein clause of wherein if the load power exceeds the predetermined power limit, the power limit controller internally generates and transmits a signal to the current source controller to control the load power to the load of the '713 Patent. Specifically, Zudrell-Koch discloses “[t]he driver circuit may further comprise current sensing means configured to determine a feedback signal indicative of the level of the current through the switch.” Ex. 1005, 4:35-37. Zudrell-Koch further discloses:

[t]he feedback signal may correspond to the voltage drop across the sensing resistor, wherein the voltage drop across the sensing resistor is typically proportional to the current through the switch. The control unit may comprise a pin for receiving the feedback signal. Furthermore, the control unit may be configured to control the level of the current through the switch, when in the second mode, based on the feedback signal.

Ex. 1005, 4:39-44. Finally, Zudrell-Koch discloses:

[t]he control unit may be configured to determine that the input voltage exceeds a pre-determined input voltage threshold (i.e. that the phase-cut dimmer goes into its on-state) by monitoring the input voltage (or a

voltage derived from the input voltage, or a voltage derived from the mains voltage). For this purpose, the control unit may comprise an input voltage pin.

Ex. 1005, 4:60-66.

A POSITA would understand that current sensing means configured to determine a feedback signal which indicates the level of the current. Ex. 1002, ¶¶ 57, 58, 59. Further, the control unit uses a input voltage pin to monitor the voltage level which controls the load power to the load. Ex. 1002, ¶¶ 57, 58, 59. As such, Zudrell-Koch discloses wherein if the load power exceeds the predetermined power limit, the power limit controller internally generates and transmits a signal to the current source controller to control the load power to the load as required by claim 1 of the '713 Patent.

i. 1(h) wherein the signal is based on internal controls.

Zudrell-Koch discloses a signal based on internal controls. For example, Zudrell-Koch discloses “[t]he feedback signal may correspond to the voltage drop across the sensing resistor, wherein the voltage drop across the sensing resistor is typically proportional to the current through the switch.” Ex. 1005, 4:39-43. Zudrell-Koch further discloses:

[t]he control unit may comprise a pin for receiving the feedback signal. Furthermore, the control unit may be configured to control the level of the current through the switch, when in the second mode, based on the

feedback signal. By controlling the current through the switch, the control unit may provide overstress protection of the components of the driver circuit and/or of the control unit (by limiting the current through the switch to a value below a maximum current). Furthermore, the control unit may ensure that the components of the driver circuit are discharged within a pre-determined discharging time interval (by ensuring that the current through the switch exceeds a minimum current). In particular, it may be ensured that the components of the driver circuit are discharged prior to the second time instant (when the phase-cut dimmer goes into its on-state). As a result, the re-increase of the input voltage (due to the dimmer going into its on-state) can be reliably detected by the control unit.

Ex. 1005, 4:35-59.

A POSITA would recognize that the feedback signal is based on information received from the control unit is analogous to the signal based on internal controls.

Ex. 1002, ¶¶ 57, 58, 59. As such, Zudrell-Koch discloses the signal is based on internal controls.

2. Claim 2

Claim 2 depends from independent claim 1. Zudrell-Koch anticipates claim 1 for the reasons discussed above and incorporated herein. *Supra* Section X.A.1. Claim 2 discloses that the at least one power limit is integrated within one of the output current drivers. The additional limitation of claim 2 is disclosed by Zudrell-Koch.

Zudrell-Koch discloses that at least one power limit is connected to the power circuit of the '713 Patent. For example, Zudrell-Koch discloses:

[t]he control unit may be configured to determine that the input Voltage exceeds a pre-determined input Voltage threshold (i.e. that the phase-cut dimmer goes into its on-state) by monitoring the input Voltage (or a Voltage derived from the input Voltage, or a Voltage derived from the mains Voltage). For this purpose, the control unit may comprise an input Voltage pin.

Ex. 1005, 4:60-66.

A POSITA would recognize that Zudrell-Koch's disclosure that the driver circuit contains a control unit which as discussed above contains an input Voltage pin is equivalent to an output current driver with an integrated power limit. Ex. 1002, ¶ 58. Therefore, Zudrell-Koch discloses that the at least one power limit is integrated within one of the output current drivers. As such, claim 2 is anticipated by Zudrell-Koch.

3. Claim 5

Claim 5 depends from independent claim 1. Zudrell-Koch anticipates claim 1 for the reasons discussed above and incorporated herein. *Supra* Section X.A.1. Claim 5 of the '713 Patent requires that the output current driver includes an output current source, a current sense, and a current source controller. The additional limitation of claim 5 is disclosed by Zudrell-Koch.

First, Zudrell-Koch discloses “[t]he driver circuit may comprise a current source and the control unit may be configured to control the current source to provide the appropriate drive current for the determined illumination level.” Ex. 1005, 5:25-28. A POSITA would understand Zudrell-Koch’s disclosure of the driver circuit containing a current source and control unit is equivalent to the output current driver including an output current source found in claim 5 of the ‘713 Patent. Ex. 1002, ¶¶ 60-61.

Next, Zudrell-Koch discloses:

[t]he driver circuit may further comprise current sensing means configured to determine a feedback signal indicative of the level of the current through the switch. By way of example, the current sensing means may comprise a sensing resistor which is arranged in series with the switch. The feedback signal may correspond to the voltage drop across the sensing resistor, wherein the voltage drop across the sensing resistor is typically proportional to the current through the switch.

Ex. 1005, 4:35-39.

A POSITA would understand that Zudrell-Koch’s disclosure of a current sensing means that may comprise a sensing resistor is equivalent to the current sense found in claim 5 of the ‘713 Patent. Ex. 1002, ¶¶ 60-61.

Finally, Zudrell-Koch discloses “[t]he control unit may comprise a pin for receiving the feedback signal. Furthermore, the control unit may be configured to

control the level of the current through the switch, when in the second mode, based on the feedback signal.” Ex. 1005, 4:43-46. A POSITA would understand Zudrell-Koch’s disclosure that the control unit is configured to control the level of current is equivalent to the current source controller found in claim 5 of the ‘713 Patent. Ex. 1002, ¶¶ 60-61.

Therefore, Zudrell-Koch discloses the output current driver includes an output current source, a current sense, and a current source controller. As such, claim 5 of the ‘713 Patent is anticipated by Zudrell-Koch.

4. Claim 10

Claim 10 depends from independent claim 1. Zudrell-Koch anticipates claim 1 for the reasons discussed above and incorporated herein. *Supra* Section X.A.1. Claim 10 discloses the output current driver reduces the load power by a pulsing technique. The additional limitation of claim 10 is disclosed by Zudrell-Koch.

Zudrell-Koch discloses:

FIG. 3c illustrates block diagrams of example control units 320, 380 for a driver circuit 300. The control unit 320 of FIG. 3c corresponds to the control unit 320 shown in FIG. 3b. Furthermore, the control unit 320 of FIG. 3c comprises a switch 372 configured to provide the pulse width modulated control signal to the switch 304, for operating the switch 304 in an on/off mode.

Ex. 1005, 16:1-7.

Therefore, Zudrell-Koch discloses the output current driver reduces the load power by a pulsing technique. As such, claim 10 is anticipated by Zudrell-Koch.

5. Claim 13

Claim 13 depends from independent claim 1. Zudrell-Koch anticipates claim 1 for the reasons discussed above and incorporated herein. *Supra* Section X.A.1. Claim 13 of the '713 Patent requires the SSL device load is one of an organic light emitting diode (OLED) load, a LED load or a LED array load. The additional limitation of claim 13 is disclosed by Zudrell-Koch.

Zudrell-Koch discloses “[a] further object of the disclosure is to achieve a control unit for a driver circuit which is configured to drive a SSL device, e.g. an LED or an OLED.” Ex. 1005, 1:50-52. Here Zudrell-Koch’s disclosure of a control unit configured to drive a an LED or an OLED is analogous to claim 13’s requirement that the light fixture load be one of an OLED load or an LED load. A POSITA would understand that the LED driver disclosed in Zudrell-Koch can drive LEDs. Ex. 1002, ¶ 53. Therefore, Zudrell-Koch discloses the SSL device load is one of an OLED load, a LED load or a LED array load. As such, claim 13 is anticipated by Zudrell-Koch.

B. Ground 2: Zudrell-Koch In View of Zhdanau or Veskoic Renders Claims 12 and 13 obvious

Claims 12 and 13 of the ‘713 Patent are rendered obvious under 35 U.S.C. § 103 by Zudrell-Koch in view of Zhdanau or Veskoic. Zudrell-Koch anticipates independent claim 1 for the reasons discussed above and incorporated here. *Supra* Section X.A.1.

1. Claim 12

Claim 12 depends from independent claim 1. Zudrell-Koch anticipates independent claim 1 for the reasons discussed above and incorporated here. *Supra* Section X.A.1. The additional limitations of claim 12 are disclosed by Zhdanau and Veskovic. Claim 12 of the ‘713 Patent further requires that the at least one output current driver reduces load power by a constant current reduction technique.

For example, Zhdanau discloses:

The gauge or cross-section area of the conducting wires used to connect LED luminaires 260A . . . 260N may be selected much les [sic] than for conventional AC LED lighting system 100 (FIG. 1) due to the limited current, and output voltage from PFC 230 being significantly higher than AC line voltage used in conventional AC LED lighting system 100. Ex. 1006, 2[0032].

Zhdanau further discloses the “LED module controls 230A . . . 230N may be used to control the current and brightness of individual LEDs 240A . . . 240N.” Ex. 1006, 2[0030].

Similarly, Veskovic discloses:

The controller 140 is operable to control the LED drive circuit 130, so as to control the amount of power delivered to the LED light source 102 using the two different modes of operation (i.e., the current load control mode and the voltage load control mode). During the current load control mode, the LED drive circuit 130 regulates the peak magnitude IPK of the load current $ILOAD$ through the LED light source 102 to control the average magnitude $IAVE$ to a target load current $ITRGT$ in response to the load current feedback signal $VILOAD$ (i.e., using closed loop control). The target load current $ITRGT$ may be stored in the memory 170 and may be programmed to be any specific magnitude depending upon the LED light source 102.

Ex. 1007, 4[0043].

A POSITA would understand that using the LED module to control the current and brightness of individual LEDs as disclosed in Zhdanau, and using the controller to control the LED drive circuit to control the power delivered to the LED light source disclosed in Veskovic is analogous to reducing load power by a constant current reduction technique in the '713 Patent. Ex. 1002, ¶ 63. The Zudrell-Koch-Zhdanau and Zudrell-Koch-Veskovic combinations disclose “the at least one output current driver reduces load power by a constant current reduction technique” and renders claim 12 obvious.

2. Claim 13

Claim 13 depends from independent claim 1. Zudrell-Koch anticipates claim 1 for the reasons discussed above and incorporated herein. *Supra* Section X.A.1. The additional limitations of claim 13 are disclosed by Zhdanau and Veskovic. Claim 13 of the '713 Patent states that "the SSL device load is one of an organic light emitting diode (OLED) load, a light emitting diode (LED) load or a LED array load." Ex. 1001, 13:21-23.

Zhdanau discloses:

[t]here is disclosed an improved LED lighting system and method which limits current and employs a voltage significantly greater than line voltage in order to allow lighting circuits to be built with up to thousands of Watts fed from a sing power/data source. The present system and method allows exceptionally long lengths of LED lighting of 200 meters or more for large scale LED lighting applications such as the architectural delineation of skyscrapers and bridges.

Ex. 1006, Abstract.

Similarly, Veskoic discloses:

[a]n LED driver for controlling the intensity of an LED light source includes a power converter circuit for generating a DC bus voltage, an LED drive circuit for receiving the bus voltage and controlling a load current through, and thus the intensity of, the LED light source, and a controller operatively coupled to the power converter circuit and the LED drive circuit.

Ex. 1007, Abstract.

A POSITA would understand that the LED light source disclosed in Zhdanau and the LED-based light source of Veskovic are equivalent to the OLED load, a LED load, or a LED array load of claim 13. Ex. 1002, ¶¶ 52-53. The Zudrell-Koch-Zhdanau and Zudrell-Koch-Veskovic combinations disclose “the SSL device load is one of an OLED load, a LD load or a LED array load” and render claim 13 obvious.

C. Motivation to Combine Zudrell-Koch and Zhdanau or Veskovic

A POSITA would have been motivated to combine Zudrell-Koch and Zhdanau or Veskovic for several reasons. *See* Ex. 1002, ¶¶ 64-68.

First, Zudrell-Koch and Zhdanau or Veskovic are analogous art to the ‘713 Patent because they are in the same field of endeavor—namely, LED drivers. *In re Bigio*, 381 F.3d 1320, 1325 (Fed. Cir. 2004). The ‘713 Patent defines its “Technical Field” as a “novel LED Driver/dimmer for solid state lighting applications.” Ex. 1001, 1:39-40. Like the ‘713 Patent, Zudrell-Koch, Zhdanau, and Veskovic are directed to powering and controlling SSL applications. Ex. 1005, 1:18; Ex. 1006, Abstract; Ex. 1001 Abstract; *Supra* Section X.A-B.

Moreover, for the reasons provided in Section X.A-B., Zudrell-Koch and Zhdanau or Veskovic are analogous to the ‘713 Patent because they are reasonably

pertinent to the technical problem allegedly addressed by the claimed invention. *In re Bigio*, 381 F.3d at 1325.

Finally, a POSITA would have had a reasonable expectation of success in making this modification. The LED Driver components described in Zudrell-Koch and Zhdanau or Veskovic were well-known at the time. *See, e.g., supra* Section X.A-B.; Ex. 1005, 1:25 (“A wide variety of off-line LED drivers are known”). As such, it would also have been straightforward for a POSITA to modify the LED driver of Zudrell-Koch and Zhdanau or Veskovic to include constant current reduction technique and LED loads and that such a system would work. *See* Ex. 1002, ¶ 67.

D. The Board Should Not Discretionarily Deny Institution

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

Apple Inc. v. Fintiv, Inc., No. IPR2020-00019, Paper 11 (P.T.A.B. Mar. 20, 2020), articulated an additional standard, under which the PTAB may decline to institute IPR based on a number of factors (“*Fintiv* factors”) related to the existence

of a parallel district court proceeding on the same challenged patents. The PTAB considers the following non-exclusive *Fintiv* factors:

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

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

1. Factor 1: Whether the Court Granted a Stay

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

2. Factor 2: Proximity of Trial Date

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

Memorandum 8 (explaining that when other factors weigh against denial or are neutral, proximity to trial should not alone control). The U.S. District Court for the Southern District of California issued a scheduling order on March 22, 2023, setting a final pretrial conference on August 22, 2024. Ex. 1008. Based on the most recent statistics showing a median time from filing to trial in a civil proceeding to be 46 months, disposition of this case can occur as late as April 2026, which will be 17 months after the Final Written Decision. Ex. 1009.

3. Factor 3: Investment in Parallel Proceedings

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

4. Factor 4: Overlap of Issues

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

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

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

6. Factor 6: Other Circumstances

Factor 6 favors institution and is dispositive under the Discretionary Denial Memorandum because the unpatentability challenges here are compelling and rely on references that were not before the Office. Additionally, Advanced Lighting Concepts's IPRs are the only challenges to the Asserted Patents that have been before the Board, which favors institution. And, there is a strong public interest against "leaving bad patents enforceable," which also favors institution. *Thryv, Inc. v. Click-To-Call Techs., LP*, 140 S. Ct. 1367, 1374 (2020).

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

XI. CONCLUSION

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

Dated: August 3, 2023

Respectfully submitted,

By: / Winston O. Huff /

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**ATTORNEYS FOR PETITIONER
ADVANCED LIGHTING CONCEPTS
LLC**

U.S. PATENT NO. 9,591,713 – LISTING OF CHALLENGED CLAIMS

<u>CLAIM NO.</u>	<u>CLAIM ELEMENTS</u>
1[p]	1. Apparatus for controlling power to a solid state lighting (SSL) device load comprising:
1[a]	a power circuit for receiving power from an external source;
1[b]	at least one power limit connected to the power circuit;
1[c]	at least one output current driver for supplying a load power to the SSL device load, the at least one output current driver connected to the at least one power limit; and
1[d]	a power limit controller;
1[e]	wherein the power circuit transmits the power to the at least one power limit which, in turn, transmits a current to the at least one output current driver;
1[f]	wherein the power limit controller directly or indirectly monitors a level of the load power and controls the at least one power limit to reduce the level of the load power for a predetermined period of time when the load power exceeds a predetermined power limit;
1[g]	wherein if the load power exceeds the predetermined power limit, the power limit controller internally generates and transmits a signal to the current source controller to control the load power to the load;
1[h]	wherein the signal is based on internal controls.
2	The apparatus of claim 1 wherein the at least one power limit is integrated within one of the at least one output current drivers.
5	The apparatus of claim 1 wherein the at least one output current driver comprises: an output current source; a current sense; and a current source controller.

<u>CLAIM NO.</u>	<u>CLAIM ELEMENTS</u>
10	The apparatus of claim 1 wherein the at least one output current driver reduces the load power by a pulsing technique.
12	The apparatus of claim 1 wherein the at least one output current driver reduces load power by a constant current reduction technique.
13	The apparatus of claim 1 wherein the SSL device load is one of an organic light emitting diode (OLED) load, a light emitting diode (LED) load or a LED array load.

CERTIFICATION OF COMPLIANCE WITH TYPE-VOLUME LIMITS

This Petition includes 7,630 words, as counted by Microsoft Word, and is therefore in compliance with the 14,000-word limit established by 37 C.F.R. 42.24(a)(1)(i). Accordingly, pursuant to 37 C.F.R. 42.24(d), lead counsel for the Petitioner hereby certifies that this Petition complies with the type-volume limits established for a petition requesting PGR.

Dated: August 3, 2023

Respectfully Submitted,

/ Winston O. Huff /

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

CERTIFICATE OF SERVICE

Pursuant to 37 C.F.R. 42.6(4) and 42.105, lead counsel for Petitioners hereby certifies that on August 15, 2022, copies of this Petition, Power of Attorney, and all supporting exhibits were sent via Federal Express to the correspondence address of record for the '713 patent:

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

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