ARNOLD & RICHTER CINE TECHNIK GMBH & CO. BETRIEBS KG,
Petitioner

v.

ROTOLIGHT LIMITED,
Patent Owner (“PO” or “Rotolight”)

IPR2021-01496 (U.S. Patent No. 10,197,257 B2)
IPR2021-01497 (U.S. Patent No. 10,197,258 B2)
IPR2021-01498 (U.S. Patent No. 10,203,101 B2)

Patent Owner’s Demonstrative Exhibit For
Oral Hearing On December 13, 2022

ROTOLIGHT 2015
Arnold & Richter v Rotolight
IPR2021-01496

Summary Of Grounds Challenging ’257, ’258, And ’101 Patents

U.S. Patent No. 10,197,257 (’257 Patent) (EX1001)
IPR2021-01496

Ground	Challenged Claims	Basis	Art Relied Upon
1	1-21	102/103	Astera (EX1004)
2	1-21	102/103	Pohlert (EX1003)

U.S. Patent No. 10,203,101 (’101 Patent) (EX1001)
IPR2021-01498

Ground	Challenged Claims	Basis	Art Relied Upon
1	1-21	102/103	Edwards (EX1004)
2a	1-2, 5-10, 11-16, 17, 21	102/103	Astera (EX1003)
2b	3-4, 18-20	103	Astera (EX1003) Edwards (EX1004)

U.S. Patent No. 10,197,258 (’258 Patent) (EX1001)
IPR2021-01497

Ground	Challenged Claims	Basis	Art Relied Upon
1a	1-6, 8-14, 16-22	102/103	Showline (EX1004)
1b	7	103	Showline (EX1004) Choong (EX1005)
1c	15	103	Showline (EX1004) Reinoso (EX1006)
2	1-22	102/103	Pohlert (EX1003)

Rotolight Patents Overview

The ’257, ’258, and ’101 Patents have substantially the same disclosure

Patent Overview

The Rotolight Patents disclose an improved lighting system for, e.g., broadcasting or filming.

(57) **ABSTRACT**

A method for controlling a lighting device to produce a range of user customizable realistic lighting effects for videography, broadcasting, cinematography, studio filming and/or location filming is disclosed. The method comprises: calculating a time varying lighting value based on at least one simulation parameter; wherein said at least one simulation parameter for characterizing a lighting effect is at least one of: a random brightness; a random duration; and a random interval; said simulation parameter depending on the lighting effect being simulated and outputting said time varying lighting value thereby to simulate a lighting effect.

IPR2021-01496, EX1001, Abstract

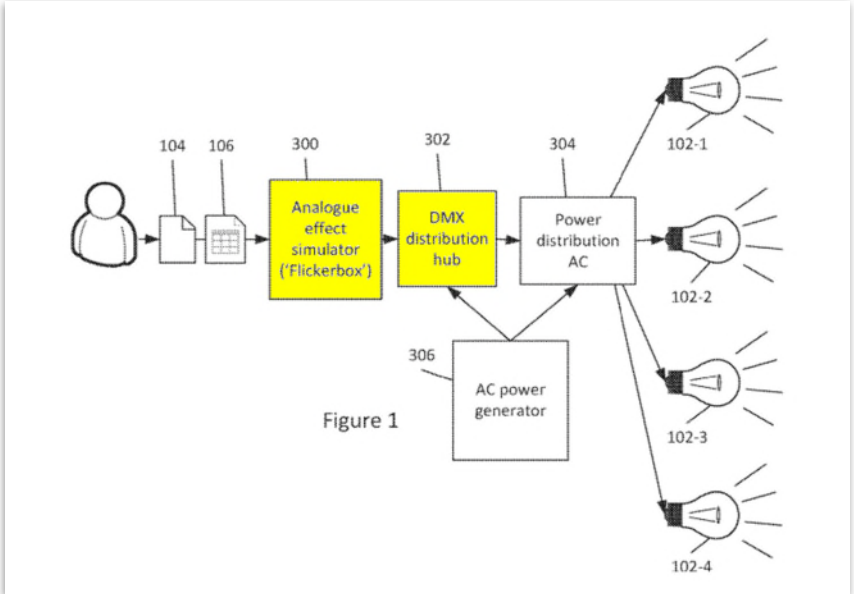
**Where proceedings make similar arguments, citations are to IPR2021-01496

IPR2021-01496, POR, 5-8

Prior Art System – Flicker Box With DMX Distribution Hub

FIG. **1** shows a schematic diagram of a 'flickerbox' lighting control system. The system comprises an analogue effect simulator, **300**, a DMX distribution hub **302**, an AC power generator **306**, an AC power distribution module **302** and a plurality of incandescent lights **102**. The analogue effect simulator **300** simulates a lighting effect such as fire, or electrical sparking based on various parameters **104**. The analogue effect simulator **300** produces data **106** such as brightness parameters that vary over time for producing the desired lighting effect. The data **106** is used to modulate the light **102** such that the desired lighting effect is produced. The user has very limited ability to alter many of the parameters to adapt the lighting effect as desired.

IPR2021-01496, EX1001, 5:45-57



IPR2021-01496, EX1001, FIG. 1

IPR2021-01496, PO Sur-Reply, 7
IPR2021-01496, POR, 5-8

Improvement Over The Prior Art

Calculation of a “time-varying lighting value” to actively simulate effect

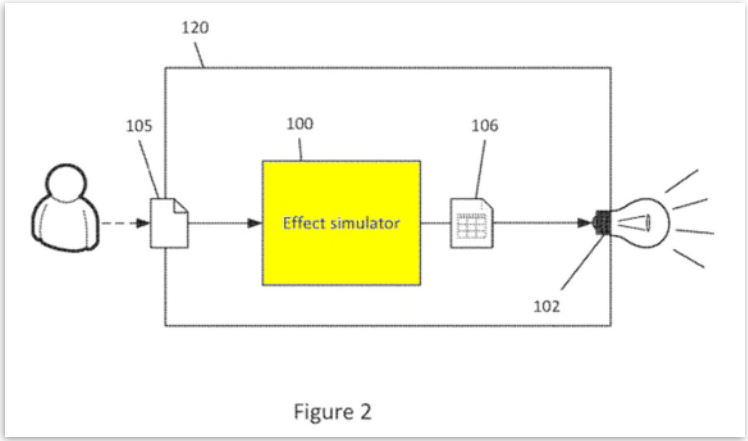


Figure 2

IPR2021-01496, EX1001, FIG. 2

FIG. **2** schematically shows an example where a lighting effect simulator **100** and the light **102** are integrated in a single studio lamp device **120**. In one example, the light **102** is an array of LEDs, preferably of differing colours. This arrangement does not require the DMX distribution hub **302**, power elements **304**, **306** as described above, and is more flexible in producing effects as will be described in more detail below. A microcontroller or other computing unit is integrated in the lamp device **120** for performing calculations.

IPR2021-01496, EX1001, 5:58-67

IPR2021-01496, POR, 5-8

The “Calculating” Limitation

Each independent claim of each challenged patent claims a variation of the “calculating” limitation

Calculating In Claims

What is claimed is:

1. A method for controlling a lighting device to produce a user customisable lighting effect, the method comprising:

calculating, using an effect simulator, a time varying lighting value based on at least one simulation parameter; wherein said at least one simulation parameter characterises a user customisable lighting effect selected from a range of different user customisable lighting effects for at least one of: videography, broadcasting, cinematography, studio filming, and location filming; wherein said at least one simulation parameter is at least one of: a random brightness; a random duration; and a random interval; said simulation parameter depending on the user customisable lighting effect being simulated; and

outputting, from said effect simulator, said time varying lighting value thereby to simulate the user customisable lighting effect.

IPR2021-01496, EX1001, cl. 1

What is claimed is:

1. A lighting system comprising:

a lighting device; and

a controller adapted to control the lighting device to produce a user customisable cinematic lighting special effect selected from a range of different user customisable cinematic lighting special effects, the controller comprising:

an input interface for receiving user input to enable a user to select user customisable cinematic lighting special effect from said range of different user customisable cinematic lighting special effects; and

an effect simulator adapted to calculate a time varying lighting value based on at least one simulation parameter, said at least one simulation parameter depending on the selected user customisable cinematic lighting special effect being simulated, and adapted to output said time varying lighting value to said lighting device so as to simulate the selected user customisable cinematic lighting special effect;

wherein said lighting device and said controller are integrated in a combined unit.

IPR2021-01497, EX1001, cl. 1

What is claimed is:

1. A method for controlling a lighting device to produce user customisable lighting effects while compensating for rolling shutter artefacts produced by a camera, the method comprising:

calculating, using an effect simulator, a time varying lighting value

compensating for the rolling shutter artefacts produced by the camera, the time varying lighting value being calculated based on at least one user input simulation parameter input by a user, said at least one user input simulation parameter comprising a user selectable parameter indicative of a member of a group consisting of:

a camera recording frequency of the camera,

a camera shutter speed of the camera, and

a camera frame rate of the camera; and

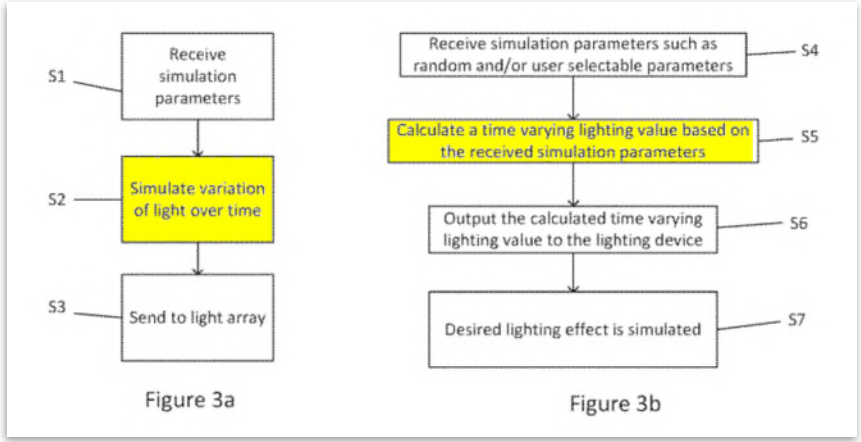
outputting, from said effect simulator, said calculated time varying lighting value to said lighting device thereby to simulate a lighting effect compensated for the rolling shutter artefacts.

IPR2021-01498, EX1001, cl. 1

Calculating In The Rotolight Patents

FIG. **3***a* illustrates a simple example of a method for simulating a lighting effect. FIG. **3***b* illustrates in more detail the method for simulating a lighting effect In a first step **S1** simulation parameters are received, such as random parameters and/or user-selectable parameters as shown in step **S4**. Where a random parameter is algorithmically generated it is only pseudo-random, but for the purposes of the simulation a pseudo-random parameter is sufficiently random for realistic simulation and is hence considered to be equivalent to a truly random parameter. In a second step **S2** a simulation is performed based on a simulation model and the received parameters. The nature of the simulation model can vary greatly, depending on the lighting effect that is desired and the sophistication of the desired simulation. As shown in **S5**, the simulation calculates how the lighting changes over time in order to produce the desired lighting effect. Following simulation in a third step **S3** the lighting information determined by the simulation is output, for example to a lighting device, as shown in step **S6**, in order to produce the desired lighting effect as shown in step **S7**.

IPR2021-01496, EX1001, 7:25-44
IPR2021-01498, EX1001, 7:34-53



IPR2021-01496, EX1001, FIGS. 3a, 3b
IPR2021-01498, EX1001, FIGS. 3a, 3b

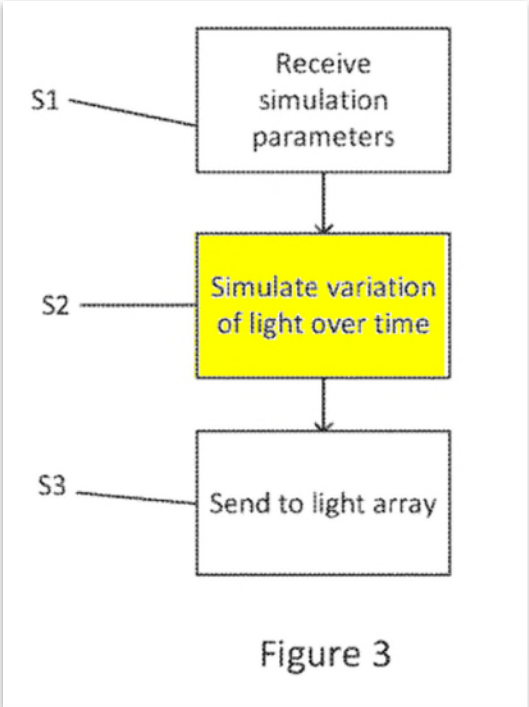
IPR2021-01496, POR, 9-12; PO Sur-Reply, 3-9
IPR 2021-01498, POR, 8-12, PO Sur-Reply, 2-8

Calculating In Rotolight Patents

FIG. 3 illustrates a simple example of a method for simulating a lighting effect. In a first step S1 simulation parameters are received, such as random parameters and/or user-selectable parameters. Where a random parameter is algorithmically generated it is only pseudo-random, but for the purposes of the simulation a pseudo-random parameter is sufficiently random for realistic simulation and is hence considered to be equivalent to a truly random parameter. In a second step S2 a simulation is performed based on a simulation model and the received parameters. The nature of the simulation model can vary greatly, depending on the lighting effect that is desired and the sophistication of the desired simulation.

The simulation calculates how the lighting changes over time in order to produce the desired lighting effect. Following simulation in a third step S3 the lighting information determined by the simulation is output, for example to a lighting device, in order to produce the desired lighting effect.

IPR2021-01497, EX1001, 7:29-46



IPR2021-01497, EX1001, FIG. 3

IPR2021-01497, POR, 8-14; PO Sur-Reply 2-8

Rotolight Patents Include Calculating Examples

8-12.) The problem for Rotolight: nowhere does the '257 claim or disclose an algorithm. Claim 1 of the '257 recites "***calculating***, using an ***effect simulator***, a

IPR2021-01496, Pet. Reply, 2

An example sequence of instructions for the simulation is as follows:
At the end of a spark up and down period:
Reset duration for next spark to between 2.5 s to 5 s
Generate new brightness targets for the next spark between 12.5% and 100% of current maximum brightness setting.
Offset the random brightness targets by the requested brightness floor value
Set the new peak brightness target for the new spark
Ensure the new targets are greater than the existing faded brightness value to prevent downward jumps
Set the fade direction to UP
Start new animation frame:
Calculate brightness fade step sizes:
Fade up fast, progressively larger fade step sizes
Change fade direction at peak
Fade down slow, progressively smaller fade step sizes
Set the frame rate for the new spark to a random value
prevent the curtailment of a long fade by a new short pulse: if the faded brightness is still >25% of max then don't allow new FramePeriod to be less than old.

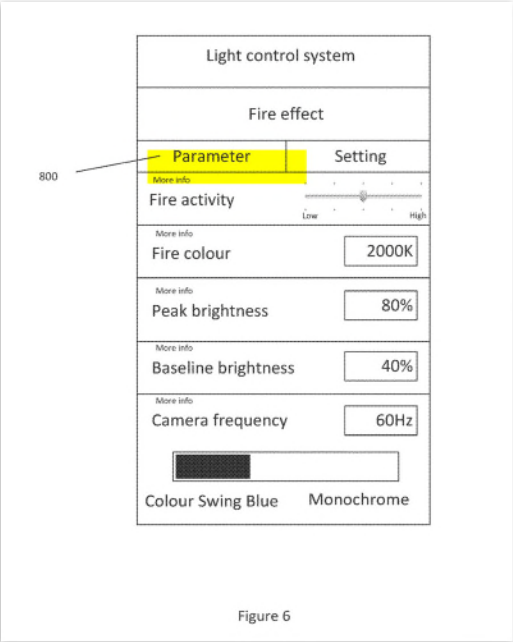
IPR2021-01496, EX1001, 10:16-39

The Rotolight Patents disclose several examples of algorithms that accomplish the "calculating" step. (*See, e.g.,* IPR2021-01496, EX1001, 10:19-39, 11:3-18; *see also* IPR2021-01496, PO Sur-Reply, 3-4)

IPR2021-01496, POR, 9-12; IPR2021-01497, POR, 8-14, IPR2021-01498, POR, 8-12
IPR2021-01496, PO Sur-Reply, 3-9; IPR2021-01497, PO Sur-Reply, 2-8; IPR2021-01498, 2-8

Calculating Algorithm For Fire Effect

Rotolight Patents disclose an algorithm that relies on user input and/or random simulation parameters



IPR2021-01496, EX1001, FIG. 6

FIG. **3***a* illustrates a simple example of a method for simulating a lighting effect. FIG. **3***b* illustrates in more detail the method for simulating a lighting effect In a first step **S1** simulation parameters are received, such as random parameters and/or user-selectable parameters as shown in step **S4**.

IPR2021-01496, EX1001, 7:25-29

IPR2021-01496, POR, 9-12; IPR2021-01497, POR, 8-14, IPR2021-01498, POR, 8-12
IPR2021-01496, PO Sur-Reply, 3-9; IPR2021-01497, PO Sur-Reply, 2-8; IPR2021-01498, PO Sur-Reply, 2-8

Calculating Algorithm For Fire Effect

Fire is simulated as a series of 'sparks'. Each spark has the following random parameters:

Interval: New sparks are generated at an interval which varies randomly between a defined maximum and minimum interval.

Peak: The peak luminance of each spark varies randomly between a defined minimum and maximum.

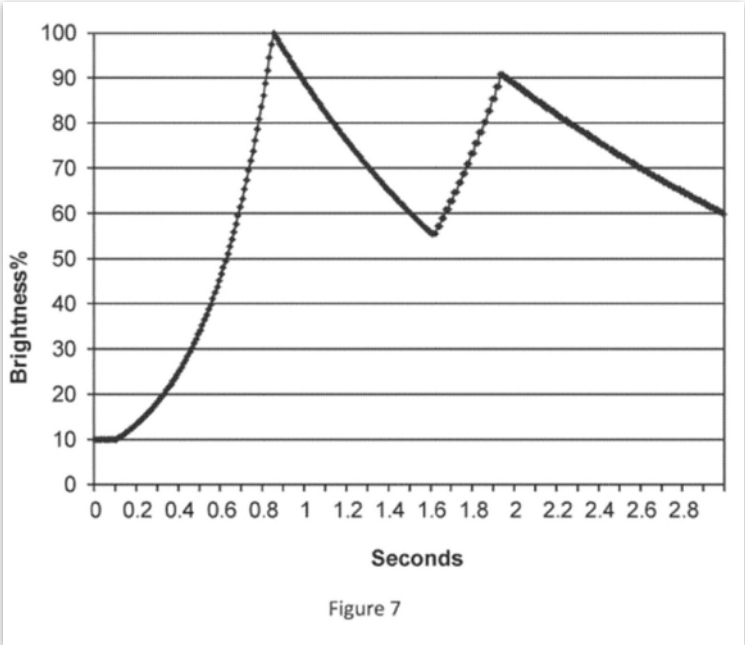
Ramp-up time: The luminance of each spark ramps up to the peak at a randomly generated rate.

Fade-down time: The fade from the peak is linked to the ramp-up time but is much slower—simulating the gradual decline in luminance of a burning ember.

If the interval is short with respect to the ramp-up and fade-down time, then sparks can overlap in time—in which case the brightest spark determines the lamp luminance.

The lighting effect simulator **100** typically cycles round a loop calculating new lamp brightness and colour values.

IPR2021-01496, EX1001, 9:51-67



IPR2021-01496, EX1001, FIG. 7

IPR2021-01496, POR, 9-12; IPR2021-01497, POR, 8-14, IPR2021-01498, POR, 8-12
IPR2021-01496, PO Sur-Reply, 3-9; IPR2021-01497, PO Sur-Reply, 2-8; IPR2021-01498, PO Sur-Reply, 2-8

Calculating Algorithm For Fire Effect

An example sequence of instructions for the simulation is as follows:

At the end of a spark up and down period:

Reset duration for next spark to between 2.5 s to 5 s

Generate new brightness targets for the next spark between 12.5% and 100% of current maximum brightness setting.

Offset the random brightness targets by the requested brightness floor value

Set the new peak brightness target for the new spark

Ensure the new targets are greater than the existing faded brightness value to prevent downward jumps

Set the fade direction to UP

Start new animation frame:

Calculate brightness fade step sizes:

Fade up fast, progressively larger fade step sizes

Change fade direction at peak

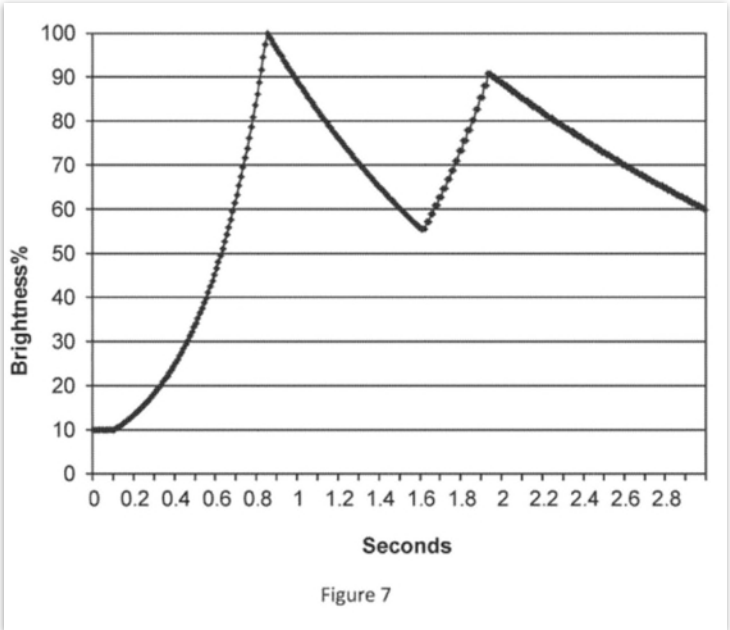
Fade down slow, progressively smaller fade step sizes

Set the frame rate for the new spark to a random value

prevent the curtailment of a long fade by a new short pulse: if the faded brightness is still >25% of max then don't allow new FramePeriod to be less than old.

FIG. **7** shows an example of the brightness varying over time produced according to a simulation as described above.

IPR2021-01496, EX1001, 10:17-41



IPR2021-01496, EX1001, FIG. 7

IPR2021-01496, POR, 9-12; IPR2021-01497, POR, 8-14, IPR2021-01498, POR, 8-12

IPR2021-01496, PO Sur-Reply, 3-9; IPR2021-01497, PO Sur-Reply, 2-8; IPR2021-01498, PO Sur-Reply, 2-8

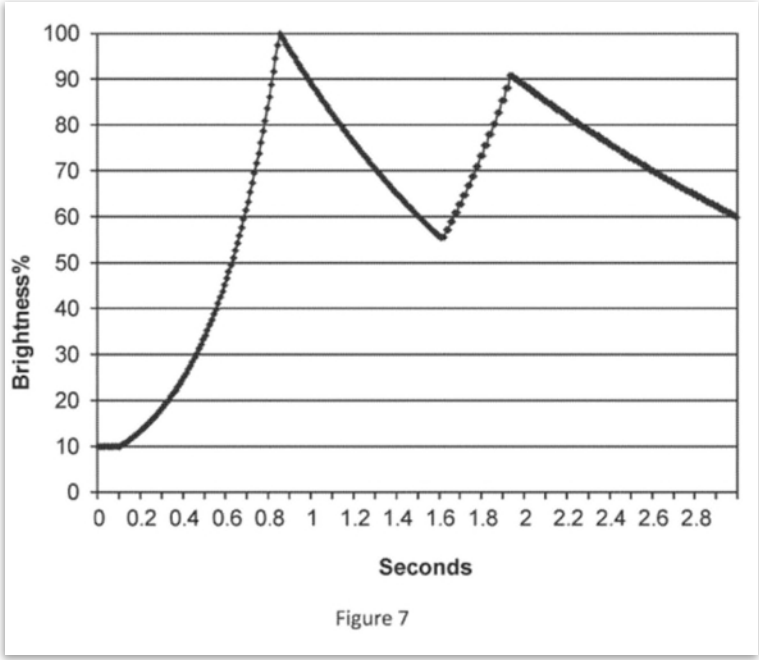
Calculating Algorithm For Fire Effect

Alternatively the calculation can be triggered by an interrupt generated by a timer. The calculation is typically performed every 250μs.

The duration of each spark can be controlled by choosing whether or not to perform a new brightness calculation based on the value of a counter which is decremented every time an interrupt occurs. When the counter reaches zero it is either reset to its previous start value or, for a new spark, a new count start value is randomly generated. In this way each spark has a different speed, duration and peak—simulating the look of a real flame.

Generating the light output with the simulation provides a greater level of user adjustment and control than that produced by simply sampling the intensity of a real flame and replaying it at different speeds.

IPR2021-01496, EX1001, 9:66-10:16



IPR2021-01496, EX1001, FIG. 7

IPR2021-01496, POR, 9-12; IPR2021-01497, POR, 8-14, IPR2021-01498, POR, 8-12
IPR2021-01496, PO Sur-Reply, 3-9; IPR2021-01497, PO Sur-Reply, 2-8; IPR2021-01498, PO Sur-Reply, 2-8

Calculating Algorithm For Lightning Effect

An example sequence of instructions for the simulation of lightning, with a series of bursts of flashes, is as follows:

At the end of a burst of flashes recalculate the parameters for the next burst:

Reset the number of flashes in a burst to a random number between 2 and 10

Reset the period to next burst to a random number between 2.5 and 5 s. Calculate parameters for each flash in a burst of flashes:

Randomly modulate brightness of each flash slightly

Reset the time to next flash to a random number between 8 ms and 220 ms

Reset the 'on' flash duration to a random number between 8 ms and 120 ms

ensure a minimum off-period is maintained between flashes

For the final flash set the duration to a random number between 10 ms and 113 ms.

IPR2021-01496, EX1001, 11:1-18

IPR2021-01496, POR, 9-12; IPR2021-01497, POR, 8-14, IPR2021-01498, POR, 8-12
IPR2021-01496, PO Sur-Reply, 3-9; IPR2021-01497, PO Sur-Reply, 2-8; IPR2021-01498, PO Sur-Reply, 2-8

Calculating In Rotolight Patents Is Distinct From:

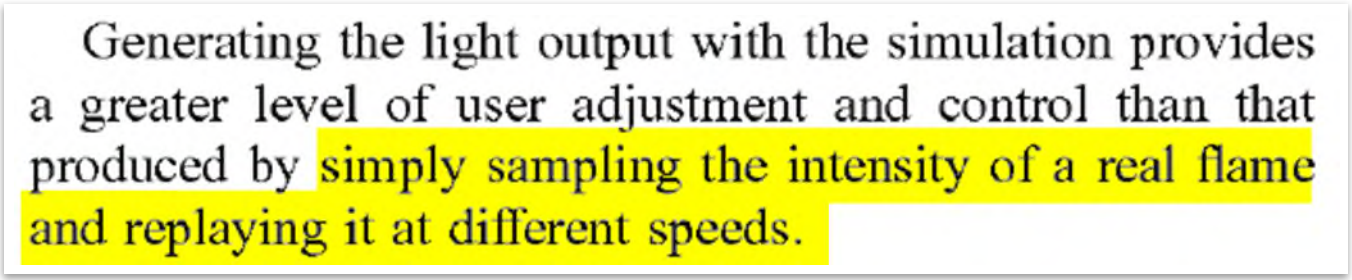
1. Adjusting parameters of a pre-recorded lighting effect

2. Converting inputs to light signals to control light (*e.g.*, via DMX)

IPR2021-01496, POR, 9-12; IPR2021-01497, POR, 8-14, IPR2021-01498, POR, 8-12
IPR2021-01496, PO Sur-Reply, 3-9; IPR2021-01497, PO Sur-Reply, 2-8; IPR2021-01498, PO Sur-Reply, 2-8

Pre-recorded Effects

The ’257 Patent distinguishes between replaying pre-recorded effects at different speeds and “calculating … a time varying lighting value”


Generating the light output with the simulation provides a greater level of user adjustment and control than that produced by simply sampling the intensity of a real flame and replaying it at different speeds.

IPR2021-01496, EX1001, 10:13-16

IPR2021-01496, POR, 9-12; IPR2021-01497, POR, 8-14, IPR2021-01498, POR, 8-12
IPR2021-01496, PO Sur-Reply, 3-9; IPR2021-01497, PO Sur-Reply, 2-8; IPR2021-01498, PO Sur-Reply, 2-8

Calculating Generates New Time-varying Values For Lighting Effects

Fire is simulated as a series of 'sparks'. Each spark has the following random parameters:

Interval: New sparks are generated at an interval which varies randomly between a defined maximum and minimum interval.

IPR2021-01496, EX1001, 9:51-55

unit. The lighting effect simulator **100** creates data **106** characterising a lighting effect and controls the master light **102** as described above. The data **106** is transmitted to the

IPR2021-01496, EX1001, 7:48-50

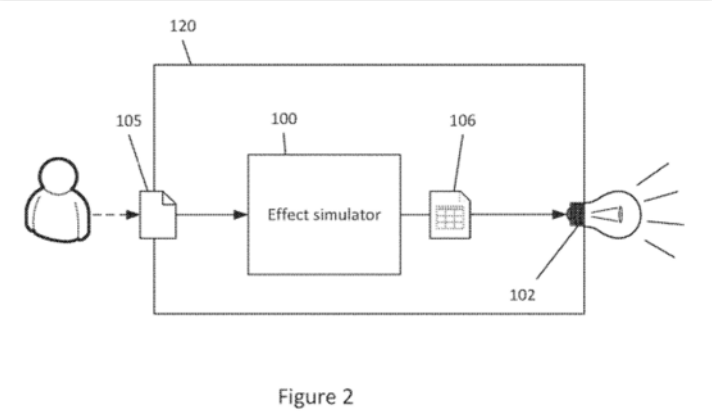
The lighting effect simulator **100** typically cycles round a loop calculating new lamp brightness and colour values.

IPR2021-01496, EX1001, 9:66-67

IPR2021-01496, POR, 9-12; IPR2021-01497, POR, 8-14, IPR2021-01498, POR, 8-12
IPR2021-01496, PO Sur-Reply, 3-9; IPR2021-01497, PO Sur-Reply, 2-8; IPR2021-01498, PO Sur-Reply, 2-8

Converting Is Not Calculating By The Effect Simulator

Effect simulator calculations are distinct from converting a user input into a signal:



IPR2021-01496, EX1001, FIG. 2

The lighting effect simulator **100** typically provides data **106** in the form of brightness and/or colour values that vary over time. In order to cause the light **102** to produce the desired effect a lighting data converter may convert the data **106** from the lighting effect simulator **100** into a suitable signal for a particular light **102**. For example for a light emitting diode (LED) array lighting the data conversion occurs at an LED lamp control logic that produces and supplies a separate pulse-width-modulation output for each LED colour to an LED drive circuit. A lighting data converter may be provided separately from the lighting effect simulator **100** and the light **102** or it may be integrated with one or the other or both.

IPR2021-01496, EX1001, 8:36-48

IPR2021-01496, POR, 9-12; IPR2021-01497, POR, 8-14, IPR2021-01498, POR, 8-12
IPR2021-01496, PO Sur-Reply, 3-9; IPR2021-01497, PO Sur-Reply, 2-8; IPR2021-01498, PO Sur-Reply, 2-8

The Claims Include A Separate Converter Element

What is claimed is:

1. A lighting system comprising:

a lighting device; and

a controller adapted to control the lighting device to produce a user customisable cinematic lighting special effect selected from a range of different user customisable cinematic lighting special effects, the controller comprising:

an input interface for receiving user input to enable a user to select user customisable cinematic lighting special effect from said range of different user customisable cinematic lighting special effects; and

an effect simulator adapted to calculate a time varying lighting value based on at least one simulation parameter, said at least one simulation parameter depending on the selected user customisable cinematic lighting special effect being simulated, and adapted to output said time varying lighting value to said lighting device so as to simulate the selected user customisable cinematic lighting special effect;

wherein said lighting device and said controller are integrated in a combined unit.

IPR2021-01497, EX1001, cl. 1

19. The lighting system according to claim **1**, further comprising a converter adapted to convert at least one of brightness and colour data from the simulator into lighting signals for output by the output.

IPR2021-01497, EX1001, cl. 19

The lighting effect simulator **100** typically provides data **106** in the form of brightness and/or colour values that vary over time. In order to cause the light **102** to produce the desired effect a lighting data converter may convert the data **106** from the lighting effect simulator **100** into a suitable signal for a particular light **102**. For example for a light emitting diode (LED) array lighting the data conversion occurs at an LED lamp control logic that produces and supplies a separate pulse-width-modulation output for each LED colour to an LED drive circuit. A lighting data converter may be provided separately from the lighting effect simulator **100** and the light **102** or it may be integrated with one or the other or both.

IPR2021-01496, EX1001, 8:36-48

IPR2021-01496, POR, 9-12; IPR2021-01497, POR, 8-14, IPR2021-01498, POR, 8-12

IPR2021-01496, PO Sur-Reply, 3-9; IPR2021-01497, PO Sur-Reply, 2-8; IPR2021-01498, PO Sur-Reply, 2-8

DMX Hub Parameter Adjustment And Conversion

The specification of the RotoLight Patents describes prior art DMX based systems.

FIG. **1** shows a schematic diagram of a 'flickerbox' lighting control system. The system comprises an analogue effect simulator, **300**, a DMX distribution hub **302**, an AC power generator **306**, an AC power distribution module **302** and a plurality of incandescent lights **102**. The analogue effect simulator **300** simulates a lighting effect such as fire, or electrical sparking based on various parameters **104**. The analogue effect simulator **300** produces data **106** such as brightness parameters that vary over time for producing the desired lighting effect. The data **106** is used to modulate the light **102** such that the desired lighting effect is produced. The user has very limited ability to alter many of the parameters to adapt the lighting effect as desired.

IPR2021-01496, EX1001, 5:45-57

FIG. **2** schematically shows an example where a lighting effect simulator **100** and the light **102** are integrated in a single studio lamp device **120**. In one example, the light **102** is an array of LEDs, preferably of differing colours. This arrangement does not require the DMX distribution hub **302**, power elements **304**, **306** as described above, and is more flexible in producing effects as will be described in more detail below. A microcontroller or other computing unit is integrated in the lamp device **120** for performing calculations.

IPR2021-01496, EX1001, 5:58-67

IPR2021-01496, POR, 9-12; IPR2021-01497, POR, 8-14, IPR2021-01498, POR, 8-12
IPR2021-01496, PO Sur-Reply, 3-9; IPR2021-01497, PO Sur-Reply, 2-8; IPR2021-01498, PO Sur-Reply, 2-8

Prior Art System – DMX Distribution Hub

34. One common method of remote control, still in widespread use today, is an industry standard digital communications protocol called DMX512[3]. This

[3] DMX-512 is the common name for the communications protocol defined in ANSI E1.11 'USITT DMX512-A Asynchronous Serial Digital Data Transmission Standard for Controlling Lighting Equipment and Accessories'. It is a standard for digital data transmission between controllers and controlled lighting equipment and accessories, including dimmers and related equipment. DMX-512 is a long-standing standard, first defined in 1986, and has become the ubiquitous norm for such communication. Just about every luminaire and controller manufactured for use within the entertainment lighting industry world wide will offer DMX-512 as a means for control. (*See, e.g.*, Ex. 1005 (ANSI E1.11 'USITT DMX512-A Asynchronous Serial Digital Data Transmission Standard for Controlling Lighting Equipment and Accessories'.)

IPR2021-01496, EX1006, fn. 3

IPR2021-01496, POR, 9-12; IPR2021-01497, POR, 8-14, IPR2021-01498, POR, 8-12
IPR2021-01496, PO Sur-Reply, 3-9; IPR2021-01497, PO Sur-Reply, 2-8; IPR2021-01498, PO Sur-Reply, 2-8

The ’257 Patent

IPR2021-01496

Overview Of
The Astera Manual

The Astera Manual

6.2 Ways to Control

The light can be controlled in several ways:

IR

Use Astera's ARC1 infrared remote control, point it at individual lights and press the desired effect. Note that the IR sensor is on the AX10's rear side.

App

The AsteraApp™ is an efficient way to quickly create a customized light show. It can group several lights together, address individual lights or groups of lights, and send complex effects with a user defined color palette to all lights in range. For additional information refer to chapter 7.
Alternatively, the Astera ARC2 remote control can be used.

DMX

LumenRadio

The light can also be controlled by CRMX wireless DMX, the built in receiver is compatible with all LumenRadio CRMX transmitters as well as W-DMX™ G2, G3, G4 and G4S transmitters (G4 and G4S in 2.4 GHz mode only).
You can also use an Astera ART3 Wireless DMX Transmitter to send DMX in the UHF frequency band, although CRMX is the recommended method.

Power the light on/off, set a static color or change its settings.

IPR2021-01496, EX1004, 9

IPR2021-01496, EX1004, cover

IPR2021-01496, EX1004, 1

IPR2021-01496, POR, 16-19

The Astera Manual Discloses Pre-Defined Effects

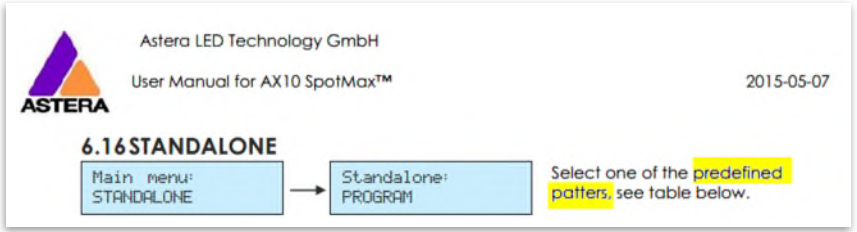
6.16.1 Predefined Programs

The predefined programs may use more than one pixel. To display these effects properly with your light, it is first necessary to group them into Flow-Sets and control them by the AsteraApp™ (see chapter 7.4).

If several lights are grouped into a Flow-Set, they form a virtual big light with several pixels.

Name	Pattern
ONE COLOR STATIC	A static color is displayed on the whole virtual light.
TWO COLOR STATIC	The virtual light is split into two halfs and two colors are displayed.
THREE COLOR STATIC	The virtual light is split into three parts and three colors are displayed.
FOUR COLOR STATIC	The virtual light is split into four parts and four colors are displayed.
ONE COLOR FADE	For all FADE programs, the whole color palette of four colors is used. Those colors are faded in and out one by one. Here, the whole virtual light shows the same color.
TWO COLOR FADE	The virtual light is split and shows two colors at a time.
THREE COLOR FADE	The virtual light is split and shows three colors at a time.
FOUR COLOR FADE	The virtual light is split and shows four colors at a time.
SIMPLE RUNNING	A running light; the background and the running pixels color can be set.
DOUBLE RUNNING	Two pixels are running in opposite direction.
TWO COL RUNNING	The two pixels are of different color even.
FLAG RUNNING	A three color flag is running over the background color.
DOUBLE FLAG RUNNING	Two flags are running over background in opposite direction.
SPIRAL 4 COLORS	The color is changed pixel by pixel. All four colors are used one after the other.
SPIRAL 2 COLORS	The color changes between color 1 and 2 from the outside to the inside, pixel by pixel.
RAINBOW	A rainbow effect is displayed.
FIRE	The fire effect is a random flicker between two colors, background and flickering color.

IPR2021-01496, EX1004, 21



IPR2021-01496, EX1004, 20

IPR2021-01496, POR, 16-19

AsteraApp™ Functionality

7 USING THE LIGHT WITH THE ASTERAAPP™

The buttons of the AX10 only allow a basic operation of the light. To gain full control over all features, the AsteraApp™ should be used.

IPR2021-01496, EX1004, 23

Astera LED Technology GmbH

User Manual for AX10 SpotMax™ 2015-05-07

7.7 LIST OF EFFECTS

The effects' patterns are pre-defined and cannot be modified by the user. They are pre-programmed inside of each light. Still they can be parameterized. These effects are:

IPR2021-01496, EX1004, 27

AN EFFECT CAN BE HIGHLY CUSTOMIZED:

The speed tells how long it will take for the effect to complete one cycle.

IPR2021-01496, EX1004, 27

IPR2021-01496, POR, 16-19

The Astera Manual Does Not Anticipate The Independent Claims Of The ’257 Patent

Astera Does Not Anticipate Independent Claims Because Lacks:

1. Effect simulator that calculates time varying lighting values

2. “Random” Input to Calculation

Astera Does Not Anticipate Independent Claims Because Lacks:

1. **Effect simulator that calculates time varying lighting values**

2. “Random” Input to Calculation

The Astera Manual Does Not Disclose “Calculating”

Relevant Portion Of The Claim Language:

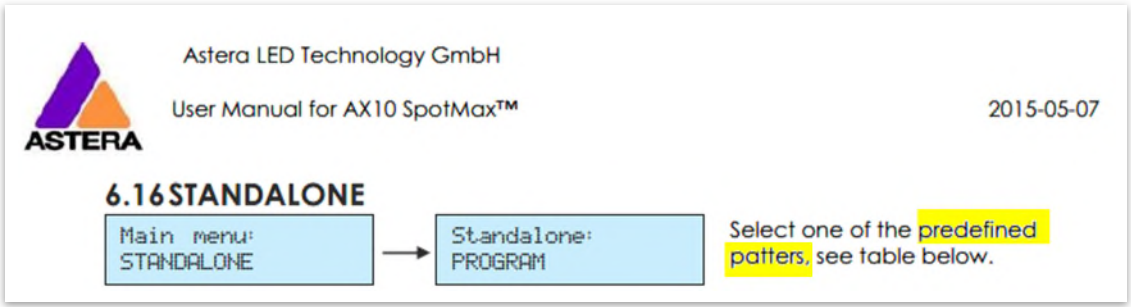
“Calculating, using an effect simulator, a time varying lighting value based on at least one simulation parameter.”

7.2 Powerful Light Control

Your light has a built in standalone engine. It can display static colors or replay a number of predefined effect patterns with a customizable color palette.

With the AsteraApp™ these effects can be created and be sent to the light by the built in UHF receiver. The effects are just triggered and then each light replays them autonomously until a new effect is sent.

IPR2021-01496, EX1004, 24



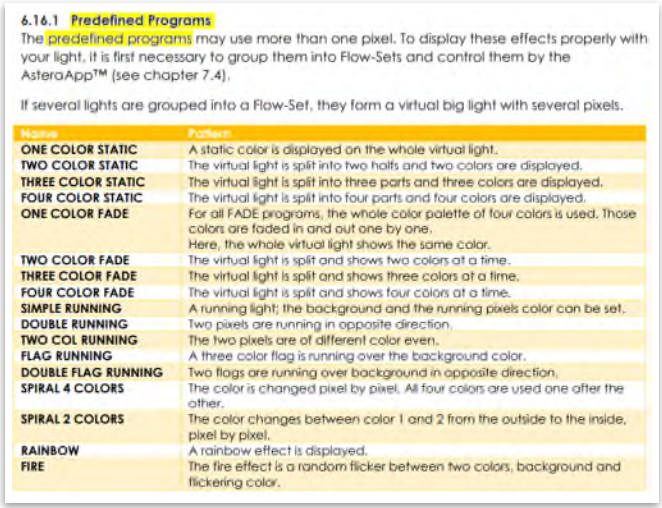
IPR2021-01496, EX1004, 20

IPR2021-01496, POR, 26-34
IPR2021-01496, PO Sur-Reply, 11-14

The Astera Manual Does Not Disclose “Calculating”

Relevant Portion Of The Claim Language:

“Calculating, using an effect simulator, a time varying lighting value based on at least one simulation parameter.”



6.16.1 Predefined Programs

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THREE COLOR FADE	The virtual light is split and shows three colors at a time.
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DOUBLE RUNNING	Two pixels are running in opposite direction.
TWO COL RUNNING	The two pixels are of different color even.
FLAG RUNNING	A three color flag is running over the background color.
DOUBLE FLAG RUNNING	Two flags are running over background in opposite direction.
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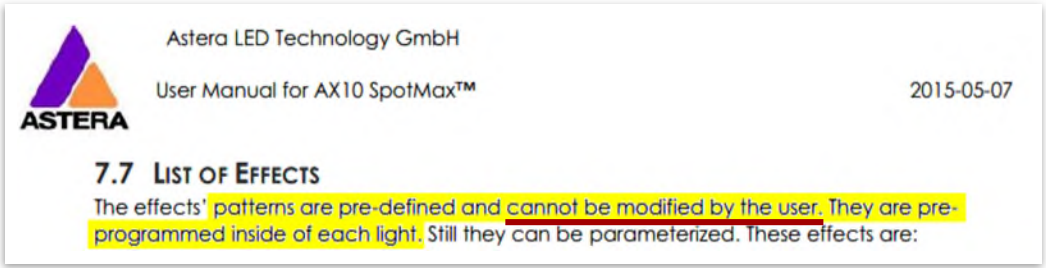
SPIRAL 2 COLORS	The color changes between color 1 and 2 from the outside to the inside, pixel by pixel.
RAINBOW	A rainbow effect is displayed.
FIRE	The fire effect is a random flicker between two colors, background and flickering color.

IPR2021-01496, EX1004, 21



Astera LED Technology GmbH

User Manual for AX10 SpotMax™ 2015-05-07

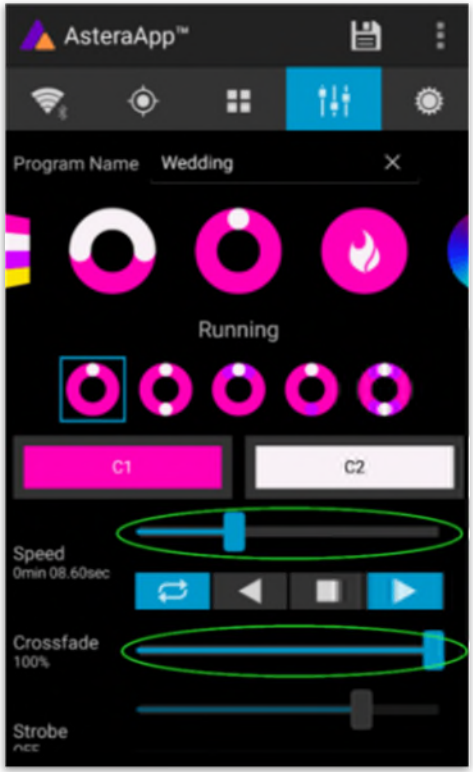
7.7 List of Effects

The effects' patterns are pre-defined and cannot be modified by the user. They are pre-programmed inside of each light. Still they can be parameterized. These effects are:

IPR2021-01496, EX1004, 27

IPR2021-01496, POR, 26-34
IPR2021-01496, PO Sur-Reply, 11-14

The Astera Manual Does Not Disclose “Calculating”



IPR2021-01496, EX1004, 27

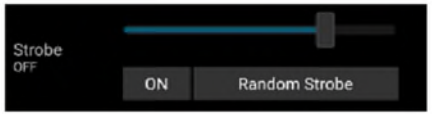
IPR2021-01496, POR, 26-34
IPR2021-01496, PO Sur-Reply, 11-14

The Astera Manual Does Not Disclose “Calculating”

AN EFFECT CAN BE HIGHLY CUSTOMIZED:

The speed tells how long it will take for the effect to complete one cycle.

The crossfade tells if the light will fade from step to step. If it is set to 0% an immediate change is visible. If set to 100% the changes will be soft.



Stroboscope effect can be enabled and seamlessly adjusted in speed. Additionally, three random stroboscope options are available: slow, medium and fast.

Each effect can be adjusted in brightness as well.

IPR2021-01496, EX1004, 27

IPR2021-01496, POR, 26-34
IPR2021-01496, PO Sur-Reply, 11-14

Petition Fails To Establish Anticipation

Petition failed to sufficiently explain explicit or inherent disclosure of "calculating"

Claim 1a: ***calculating, using an effect simulator, a time varying lighting value based on at least one simulation parameter;***

Astera discloses Claim 1a. (Wood Decl., ¶¶ 58-62.) The Control Panel and AsteraApp controllers calculate time varying lighting values for generating special effects based on user-input simulation parameters. (Astera, 9-11, 13, 17, 21.)

The Control Panel allows users to "select" from predefined effects, and then adjust parameters including intensity (to set a dimmer level), speed (to change the time to complete one cycle), fade time, and color. (*Id.*, 20.) Based on these selections, the Control Panel creates data characterizing the adjusted lighting effect, in the form of values and settings for the LEDs to "display these effects properly with [the] light." (*Id.*, 17, 20-21; *see also* Wood Decl., ¶¶ 58-59.)

IPR2021-01496, Petition, 20-21

AsteraApp calculates time varying lighting values, including brightness and color information, for the user-customized effects. (*Id.*, 23-29; *see also* Wood

IPR2021-01496, Petition, 22

IPR2021-01496, POR, 26-34
IPR2021-01496, PO Sur-Reply, 11-14

PO Expert Demonstrated Astera's Special Effects Do Not Require Calculating

Dr. Eric Bretschneider

150. Accordingly, in my opinion, customization of pre-recorded values, as disclosed in Astera, does not anticipate "calculating, using an effect simulator, a time varying lighting value." EX1001, 11;56-58. While a user may adjust the playback speed, color, or overall intensity of a pattern in Astera, the underlying pattern is not actually changed – thus, further demonstrating no calculation is performed. Returning to the mp3 player Jazz analogy, adjusting the volume, or playback speed, of a recorded song does not change the pattern of notes that the mp3 player is repeating. The output is changed, but time varying musical notes are not "calculated."

IPR2021-01496, EX2002, ¶150

IPR2021-01496, POR, 26-34
IPR2021-01496, PO Sur-Reply, 11-14

PO Expert Demonstrated Astera's Special Effects Do Not Require Calculating

THE WITNESS: I'm saying Astera could work with a series of lookup tables.

IPR2021-01496, EX1010, 506:8-9

THE WITNESS: Each effect could consist of a lookup table. Here's the information that describes the effect, the intensity over time.

Another lookup table could say how much current through each LED color channel to create the color temperature so the

IPR2021-01496, EX1010, 506:16-22

Q And so in that situation, all those different values would have to be brought together into one signal eventually, correct?

A Those values would affect a series of switches that would modify the output of the fixture.

IPR2021-01496, EX1010, 507:5-10

IPR2021-01496, POR, 26-34
IPR2021-01496, PO Sur-Reply, 11-14

Astera Does Not Anticipate Independent Claims Because Lacks:

1. Effect simulator that calculates time varying lighting values

2. **“Random” Input to Calculation**

The ’257 Patent’s “Random” Parameter Requirement

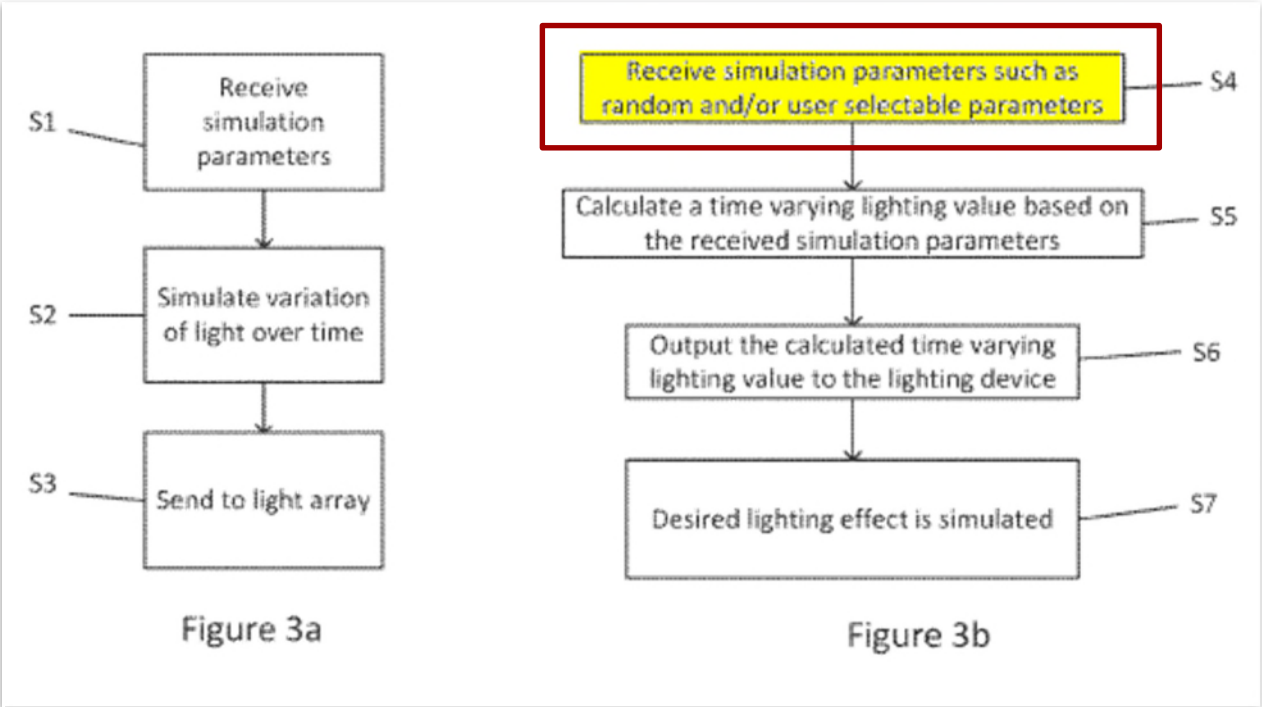
1. A method for controlling a lighting device to produce a user customisable lighting effect, the method comprising:

calculating, using an effect simulator, a time varying lighting value based on at least one simulation parameter; wherein said at least one simulation parameter characterises a user customisable lighting effect selected from a range of different user customisable lighting effects for at least one of: videography, broadcasting, cinematography, studio filming, and location filming; wherein said at least one simulation parameter is at least one of: a random brightness; a random duration; and a random interval; said simulation parameter depending on the user customisable lighting effect being simulated; and

IPR2021-01496, EX1001, cl. 1

IPR2021-01496, POR, 35-40
IPR2021-01496, PO Sur-Reply, 14-16

The ’257 Patent’s “Random” Parameter Requirement



IPR2021-01496, EX1001, FIGS. 3a and 3b

IPR2021-01496, POR, 35-40
IPR2021-01496, PO Sur-Reply, 14-16

Petitioner's Expert Agreed

17 Q The calculating of the time-varying
18 lighting value must, in your words, use the at
19 least one simulation parameter when it is using
20 the calculation. True?
21 A Yes.

IPR2021-01496, EX2004, 72:17-21

22 Q And so the simulation parameter is an
1 input, whether manual or automatic, into the
2 calculation of a time-varying lighting value.
3 True?
4 A True.

IPR2021-01496, EX2004, 72:22-73:4

IPR2021-01496, POR, 35-40
IPR2021-01496, PO Sur-Reply, 14-16

The Astera Manual Does Not Disclose "Random" Input Parameters

With respect to **random brightness**, Astera, like the '257, discloses a "fire effect" comprising a "random flicker between two colors, background and flickering color." (Astera, 17; *see also id.*, 28.) As the fire is described as having a "flicker" characteristic, it includes random brightness levels between the background and flickering colors—rather than consistent brightness levels, which would create a strobe rather than flicker effect. (*Id.*)

IPR2021-01496, Petition, 25

Astera also discloses a "chaser effect," where "colors are randomly chosen." (*Id.*, 28.) Different colors have different brightness (*e.g.*, a yellow created by illuminating both the red and green LED emitters to full is brighter than a red light consisting of the red LED emitter alone), and thus the random color parameter has random brightness. (Wood Decl., ¶ 70.)

IPR2021-01496, Petition, 25

In addition, the "stroboscope" effect includes "random" settings options. (Astera, 17, 21, 27.) For a "stroboscope" to be random, the duration and interval of flashes must be random. (Wood Decl., ¶¶ 72, 90.) Absent such random duration and interval, strobing would be consistent and uniform, rather than "random." (*Id.*) Further, "slow" random strobe would have a different duration and interval than "fast," with "fast" including more random flashes per interval. (Wood Decl., ¶ 72.)

IPR2021-01496, Petition, 26

IPR2021-01496, POR, 35-40
IPR2021-01496, PO Sur-Reply, 14-16

Petitioner's Example 1: Fire Effect

With respect to **random brightness**, Astera, like the '257, discloses a "fire effect" comprising a "random flicker between two colors, background and flickering color." (Astera, 17; *see also id.*, 28.) As the fire is described as having a "flicker" characteristic, it includes random brightness levels between the background and flickering colors—rather than consistent brightness levels, which would create a strobe rather than flicker effect. (*Id.*)

IPR2021-01496, Petition, 25

The Fire effect shows a random flickering effect. The background color and the color of the flickering effect can be adjusted.

IPR2021-01496, EX1004, 28

FIRE	The fire effect is a random flicker between two colors, background and flickering color.

IPR2021-01496, EX1004, 21

IPR2021-01496, POR, 35-40
IPR2021-01496, PO Sur-Reply, 14-16

Petitioner's Example 2: Chaser Effect

Astera also discloses a "chaser effect," where "colors are randomly chosen." (*Id.*, 28.) Different colors have different brightness (*e.g.*, a yellow created by illuminating both the red and green LED emitters to full is brighter than a red light consisting of the red LED emitter alone), and thus the random color parameter has random brightness. (Wood Decl., ¶ 70.)

IPR2021-01496, Petition, 25

Chaser effects provide an efficient means to create dancefloor lighting. The static chaser exchanges the color of the lights according to the tapped-in beat. The colors are randomly chosen. The effect can be adjusted to show up to 4 different colors at a time.

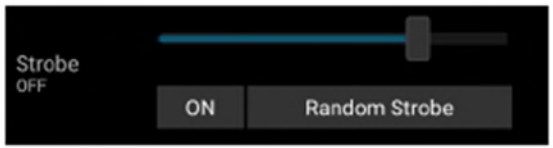
IPR2021-01496, EX1004, 28

IPR2021-01496, POR, 35-40
IPR2021-01496, PO Sur-Reply, 14-16

Petitioner's Example 3: Strobe Effect

In addition, the "stroboscope" effect includes "random" settings options. (Astera, 17, 21, 27.) For a "stroboscope" to be random, the duration and interval of flashes must be random. (Wood Decl., ¶¶ 72, 90.) Absent such random duration and interval, strobing would be consistent and uniform, rather than "random." (*Id.*) Further, "slow" random strobe would have a different duration and interval than "fast," with "fast" including more random flashes per interval. (Wood Decl., ¶ 72.)

IPR2021-01496, Petition, 26



Stroboscope effect can be enabled and seamlessly adjusted in speed. Additionally, three random stroboscope options are available: slow, medium and fast.

IPR2021-01496, EX1004, 27

IPR2021-01496, POR, 35-40
IPR2021-01496, PO Sur-Reply, 14-16

Dependent Claims 10 and 19

Claim 10: The Astera Manual Does Not Disclose "Repeated Cycles Of Calculating"

Dependent claim 10 requires "repeated cycles of calculating … and simulating"

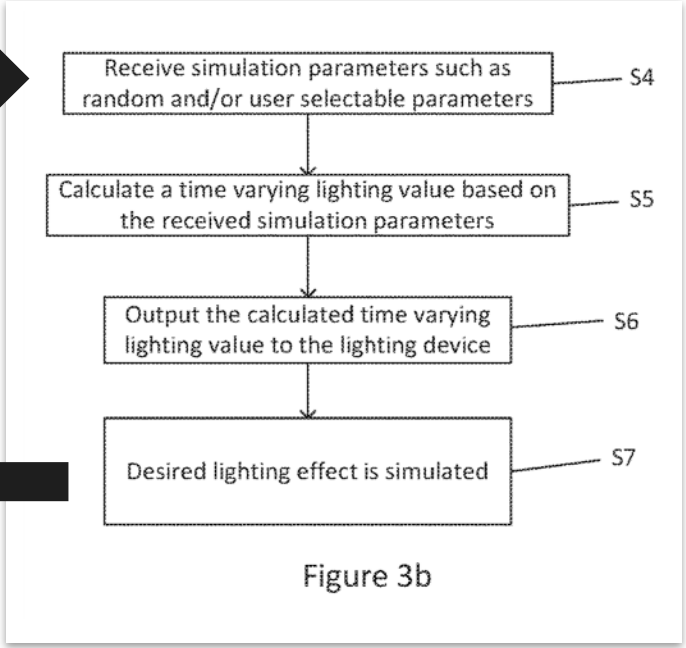


Figure 3b

IPR2021-01496, EX1001, FIG. 3b

10. The method according to claim **1** wherein the simulation iterates through repeated cycles of calculating a time varying lighting value based on at least one random simulation parameter and simulating the user customisable lighting effect.

IPR2021-01496, EX1001, cl. 10

IPR2021-01496, POR, 9, 35, 40-41
IPR2021-01496, PO Sur-Reply, 16-17

The Astera Manual Does Not Disclose “Repeated Cycles”

7.2 Powerful Light Control

Your light has a built in standalone engine. It can display static colors or replay a number of predefined effect patterns with a customizable color palette.

With the AsteraApp™ these effects can be created and be sent to the light by the built in UHF receiver. The effects are just triggered and then each light replays them autonomously until a new effect is sent.

IPR2021-01496, EX1004, 24

AN EFFECT CAN BE HIGHLY CUSTOMIZED:

The speed tells how long it will take for the effect to complete one cycle.

IPR2021-01496, EX1004, 27

IPR2021-01496, POR, 40-41
IPR2021-01496, PO Sur-Reply, 16-17

Claim 19: The Astera Manual Does Not Disclose The “integrated” Limitation

19. The lighting system according to claim **18** wherein said controller and said lighting device are integrated in a combined unit.

IPR2021-01496, EX1001, cl. 19

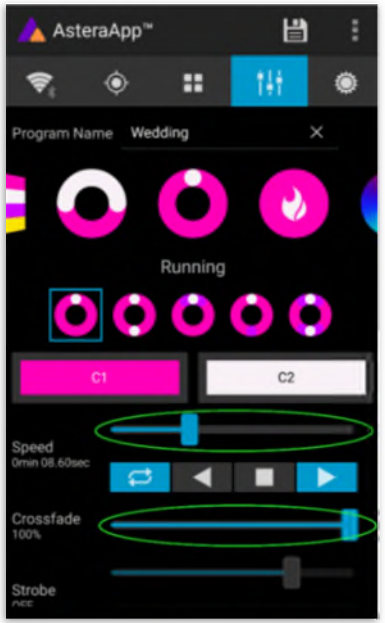
IPR2021-01496, POR, 42-44
IPR2021-01496, PO Sur-Reply, 17

Claim 19: Petitioner Has Not Shown That The Astera Manual's Disclosed "Standalone" Mode Anticipates Independent Claim 15

6.6 CONTROL PANEL

LEGEND			
MENU / COLOR	- / SPEED	+ / BRIGHT	ENTER / PROG
BACK TO PREVIOUS MENU	SCROLL DOWN	SCROLL UP	CHOOSE/ CONFIRM
FROM THE STATUS SCREEN, PRESS THE ABOVE BUTTONS TO:			
ENTER THE MAIN MENU	FACTORY RESET	ENTER THE MAIN MENU	ENTER THE DMX MENU
HOLD THE ABOVE BUTTON FOR 2SECS TO:			
STANDALONE MENU	ADJUST SPEED	ADJUST BRIGHTNESS	CHANGE PROGRAM

IPR2021-01496, EX1004, 11



IPR2021-01496, EX1004, 27

IPR2021-01496, POR, 42-44
IPR2021-01496, PO Sur-Reply, 17

Overview Of Pohlert

U.S. Patent Publication No. US 2012/0044374

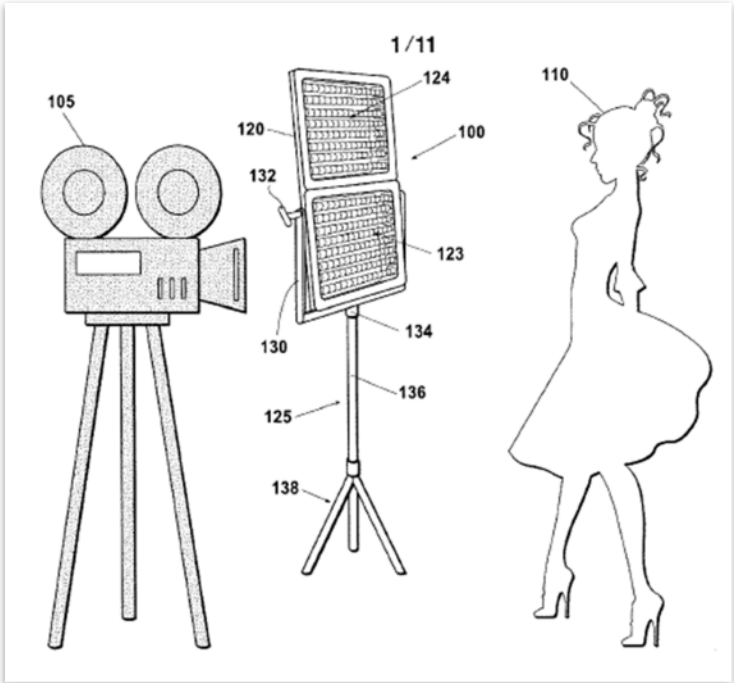
Pohlert Discloses Pre-Defined Effects

(57) **ABSTRACT**

A lighting apparatus comprises a light panel having a panel frame, and a plurality of LEDs or other light elements secured to the panel frame. The panel frame may be a portable frame.

[0052] FIG. **1** illustrates the general environment in which one preferred embodiment of the instant invention might be used. In some instances, a video camera **105** might be directed toward a subject **110** that is being illuminated by inventive light **100**. The camera **105** of FIG. **1**, while illustrated as a motion picture-type camera, could be any type of image capture or optical viewing device, whether analog or digital in nature. For example, the camera **105** might use film, video tape, or solid-state image capture circuitry (e.g., CCDs) and may be a still photography camera, a motion picture camera, or some combination of the two.

IPR2021-01496, EX1003, Abstract, ¶16



IPR2021-01496, EX1003, FIG. 1

IPR2021-01496, POR, 45-49

Pohlert Does Not Anticipate The Independent Claims Of The ’257 Patent

Pohlert Does Not Anticipate Independent Claims Because Lacks:

1. Effect simulator that calculates time varying lighting values

2. “Random” Input to Calculation

Pohlert Does Not Anticipate Independent Claims Because Lacks:

1. **Effect simulator that calculates time varying lighting values**

2. “Random” Input to Calculation

Petitioner Relies On Pohlert's "Dimming," "Strobing," "Pattern Generation," And "Control Circuits"

[0059], [0061]-[0062], [0065]-[0067]; *see also* Wood Decl., ¶ 139.) These power control signals provide time-varying signals for "controlling the intensities" of the LEDs to generate the desired light output patterns and effects. (*Id.*, *see also id.*, [0050]-[0051].) Moreover, these power controls signals are based on user-selected parameters for desired lighting effects, including brightness (or dimming), duration, frequency, whether a sequence will be pseudo-random, and color. (*Id.*,

IPR2021-01496, Petition, 60

Users may select a strobing effect, for example, implemented by the controller generating an oscillating signal (which is a time varying signal) and applying it as a control signal to control intensities of the LEDs. (Wood Decl., ¶¶ 139-140; *see also* Pohlert, [0062].) Users can adjust the oscillator frequency parameter of the strobing effect "via a manual knob, switch, or other selection means as part of the effects selector 533" in the user interface. (*Id.*, [0062].)

IPR2021-01496, Petition, 60

Pohlert also discloses generating light effect patterns where light segments are strobed, flashed, or dimmed in sequences, requiring the controller to calculate signals that are time varying, as some lights are on and some off at different times to generate patterns. (Wood Decl., ¶ 141; *see also* Pohlert, [0063], [0067].) The

IPR2021-01496, Petition, 61

[0092].) The "intensity control" and "ratio control" adjustments are received by "intensity control circuits" and "ratio control circuits" in the controller, which then calculates and generates signals to modify the power supply to the LEDs to generate desired colors and color temperature. (*Id.*, [0089]; *see also id.* [0090]-

IPR2021-01496, Petition, 61

IPR2021-01496, POR, 49-57
IPR2021-01496, PO Sur-Reply, 18-23

Manual Adjustment Is Not Calculating Of Time Varying Lighting Values

[0061] An effects generator **543** (FIG. **5**A) may optionally be included in the power controller **512**, along with an effects selector **533** which forms part of the manual interface **530**. The effects generator **543** may provide the ability to create various lighting effects, such as, e.g., dimming, strobing, pulsation, or pattern generation. The effects selector **543** may affect all of the switches **522** simultaneously, or else may affect individual switches or groups of switches **522**, depending upon the desired complexity of the lighting effects. Dimming may be accomplished, for example, through a manual control knob or multi-position switch on the effects selector **533**. The dimming control may be electronically implemented, for example, in an analog fashion through a variable resistive element, or in a digital fashion by detecting the selected manual setting and converting it to selecting power setting through, e.g., selected resistive elements in a resistive ladder circuit or through a variable duty cycle delivered to the lights. Where the switches **522** are implemented, for example, as controllable variable amplifiers, the selectable resistance may be used to control the output of each amplifier and thereby the light output by the amplifier's respective light segment **325-360** (or group of light segments FIG. **3**B). In other embodiments, the dimming control may optionally be applied to the output of switches **522**. Where dimming control is applied collectively, it may be implemented by applying the selected dimming control level to the incoming signal from the power converter **520**, which is supplied to all of the switches **522** collectively. Other variations for implementing dimming control are also possible and will be apparent to those skilled in the art of electrical engineering.

IPR2021-01496, EX1003, ¶61

The lighting effect simulator **100** typically provides data **106** in the form of brightness and/or colour values that vary over time. In order to cause the light **102** to produce the desired effect a lighting data converter may convert the data **106** from the lighting effect simulator **100** into a suitable signal for a particular light **102**. For example for a light emitting diode (LED) array lighting the data conversion occurs at an LED lamp control logic that produces and supplies a separate pulse-width-modulation output for each LED colour to an LED drive circuit. A lighting data converter may be provided separately from the lighting effect simulator **100** and the light **102** or it may be integrated with one or the other or both.

IPR2021-01496, EX1001, 8:36-48

IPR2021-01496, POR, 49-57
IPR2021-01496, PO Sur-Reply, 18-23

Strobing Is Not “Calculating” Of Time Varying Lighting Values

Dr. Eric Bretschneider

192. While there are lots of types and forms of sinusoidal signal generators (sometimes called a signal generator, an oscillator, a waveform generator, etc.), the electrical components used to create an oscillating signal are very well-known and have been around for many years (and thus, Pohlert likely did not include more details in ¶[0062] because someone in the lighting industry would have understood how the oscillating signal is generated). These signal generators use common electrical parts such as amplifiers, capacitors, resistors, and transistors in an integrated circuit to produce an oscillating (*e.g.*, sine wave type) output signal. Pohlert discloses these types of integrated circuits to control LEDs. EX1003, ¶¶[0068]-[0071], [0119]-[0125], FIGS. 6, 19A, 19B. The integrated circuit simply receives a voltage and generates an oscillating signal using the integrated circuit – there is no “calculating” relied upon to generate the signal. Further, to the extent

IPR2021-01496, EX2003, ¶192

IPR2021-01496, POR, 49-57
IPR2021-01496, PO Sur-Reply, 2-8, 18-23

Pohlert's Pattern Generation Is Not Calculating Of Time Varying Lighting Values

Pattern generation is achieved through selection of "predefined patterns"

[0063] Pattern generation may be accomplished by, e.g., manual selection from a number of predefined patterns, or else through an interface allowing different pattern sequencing. Patterns may include, for example, strobing or flashing different groups of light segments **325**, **330**, **335**, **340**, **345**, **350**, **355**, and **360** (given the example of FIG. 3B) in a predefined sequence (which may be a pseudo-random sequence, if desired), strobing or flashing different light elements **320** of the light segments **325-360** in a predefined (or pseudo-random) sequence, gradually dimming or brightening light segments **325-360** (individually, in groups, or collectively), or various combinations of these effects.

IPR2021-01496, EX1003, ¶ [0063]

[0067] In operation, the processor **574** reads instructions from the memory **575** and executes them in a conventional manner. The instructions will generally cause the processor **574** to control the switch selector by, e.g., setting various digital values in registers whose outputs control the switches **562**. The programming instructions may also provide for various lighting effects, such as dimming, strobing, pulsation, or pattern generation, for example. To accomplish dimming, the processor **574** may be programmed select binary-encoded values to load into registers of the switch selector **572**, which in turn select a variable resistance value which controls the output from each individual or group of switches **562**. To accomplish strobing, the processor **574** may be programmed to turn the switches **562** on and off according to a predesignated pattern dictated by the programming instructions. The processor **574** may make use of one or more electronic timers to provide timing between on and off events. The programming instructions may provide that the switches **562** are turned on and off according to designated sequences, thus allowing the capability of pattern generation via the processor

IPR2021-01496, EX1003, ¶ [0067]

IPR2021-01496, POR, 49-57
IPR2021-01496, PO Sur-Reply, 18-23

A Sequence Is Not A “Lighting Value”

Relevant Portion Of The Claim Language:

“Calculating, using an effect simulator, a time varying lighting value based on at least one simulation parameter.”

574. As mentioned before, patterns may include, for example, strobing or flashing all or different groups of light segments **325-360** (given the example of FIG. **3**) in a predefined (or pseudo-random) sequence, strobing or flashing different low

IPR2021-01496, EX1003, ¶ [0067]

IPR2021-01496, POR, 49-57
IPR2021-01496, PO Sur-Reply, 18-23

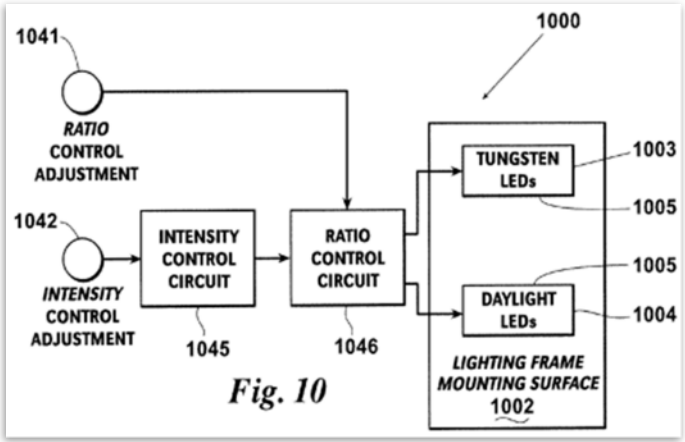
Intensity Control Circuits Do Not Calculate Time Varying Lighting Values

Relevant Portion Of The Claim Language:

"Calculating, using an effect simulator, a time varying lighting value based on at least one simulation parameter."

like" on a user interface. (*Id.*, [0088]; *see also id.*, [0089]-[0092].) The "intensity control" and "ratio control" adjustments are received by "intensity control circuits" and "ratio control circuits" in the controller, which then calculates and generates signals to modify the power supply to the different LEDs to generate the desired color and color temperature. (*Id.*, [0089]; *see also id.* [0090]-[0091]; Wood Decl., ¶

IPR2021-01497, Petition, 64-65



IPR2021-01497, EX1003, FIG. 10

IPR2021-01496, POR, 49-57
IPR2021-01496, PO Sur-Reply, 18-23

No Rationale To Combine Embodiments In Petition

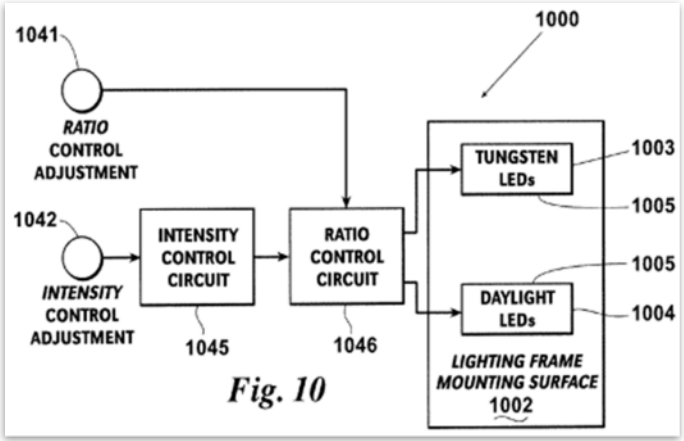


Fig. 10

IPR2021-01497, EX1003, FIG. 10

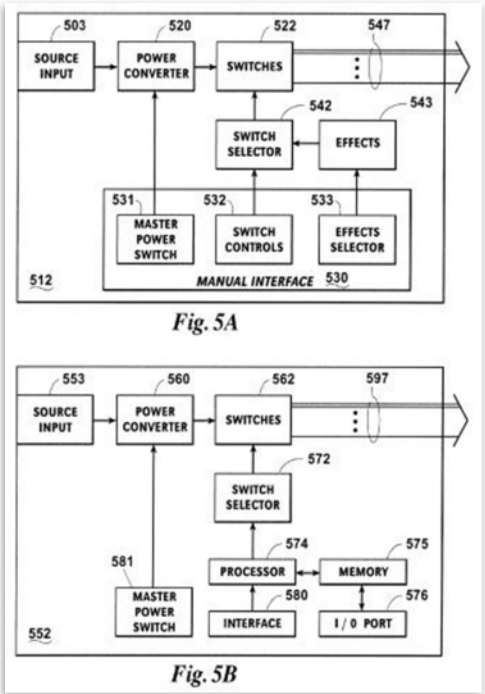


Fig. 5A

Fig. 5B

IPR2021-01497, EX1003, FIGS. 5a and 5b

IPR2021-01496, POR, 49-57
IPR2021-01496, PO Sur-Reply, 18-23

FIG. 10 Is A Distinct Embodiment

Petitioner's expert admits distinct embodiments

colors, tungsten and daylight. They're here two separate drawings and two separate systems, but they're not mutually exclusive.

Q Okay. But they are disclosed in Pohlert as two separate embodiments. True?

MR. RAFFETTO: Objection. Asked and answered.

A They're two separate embodiments of different things. But they could be combined in a single unit.

IPR2021-01496, EX2004, 236:1-10

IPR2021-01496, POR, 49-57
IPR2021-01496, PO Sur-Reply, 18-23

Pohlert Does Not Anticipate Independent Claims Because Lacks:

1. Effect simulator that calculates time varying lighting values

2. **“Random” Input to Calculation**

The ’257 Patent’s “Random Input” Requirement

1. A method for controlling a lighting device to produce a user customisable lighting effect, the method comprising:

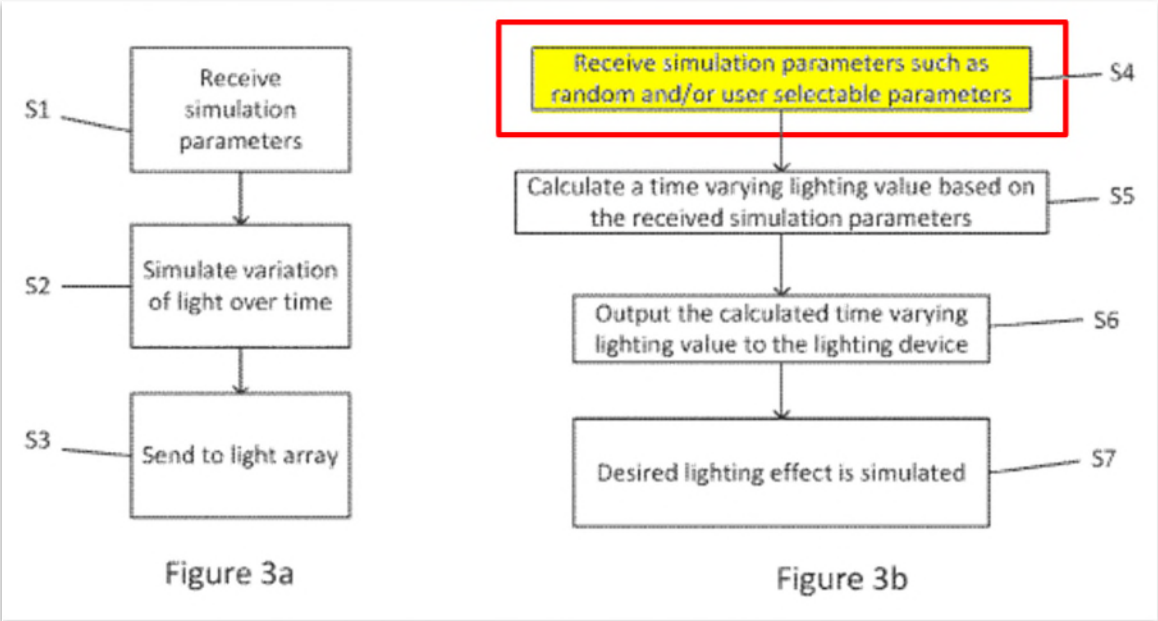
calculating, using an effect simulator, a time varying lighting value based on at least one simulation parameter; wherein said at least one simulation parameter characterises a user customisable lighting effect selected from a range of different user customisable lighting effects for at least one of: videography, broadcasting, cinematography, studio filming, and location filming; wherein said at least one simulation parameter is at least one of: a random brightness; a random duration; and a random interval; said simulation parameter depending on the user customisable lighting effect being simulated; and

IPR2021-01496, EX1001, cl. 1

IPR2021-01496, POR, 57-58
IPR2021-01496, PO Sur-Reply, 23-24

The ’257 Patent’s “Random Input” Requirement

This requirement can further be seen in FIG. 3b, which shows a “random” parameter being input into the calculation



IPR2021-01496, EX1001, FIGS. 3a and 3b

IPR2021-01496, POR, 57-58
IPR2021-01496, PO Sur-Reply, 23-24

Petitioner's Expert Agrees

Petitioner's expert admitted that the simulation parameters, including the random simulation parameter, are inputs into the calculation. (IPR2021-01496, PO Response, 36-37)

17 Q The calculating of the time-varying
18 lighting value must, in your words, use the at
19 least one simulation parameter when it is using
20 the calculation. True?
21 A Yes.

IPR2021-01496, EX2004, 72:17-21

22 Q And so the simulation parameter is an
1 input, whether manual or automatic, into the
2 calculation of a time-varying lighting value.
3 True?
4 A True.

IPR2021-01496, EX2004, 72:22-73:4

IPR2021-01496, POR, 57-58
IPR2021-01496, PO Sur-Reply, 23-24

Pohlert Does Not Disclose "Random" Input Parameters

574. As mentioned before, patterns may include, for example, strobing or flashing all or different groups of light segments **325-360** (given the example of FIG. **3**) in a predefined (or pseudo-random) sequence, strobing or flashing different low power lamps **320** of the light segments **325-360** in a predefined (or pseudo-random) sequence, gradually dimming or brightening the light segments **325-360** (individually, in groups, or collectively), or various combinations of these effects is contemplated. Predefined (or pseudo-random) sequence, gradually dimming or brightening the lamps **320** (individually, in groups, or collectively), or various combinations of these effects is contemplated.

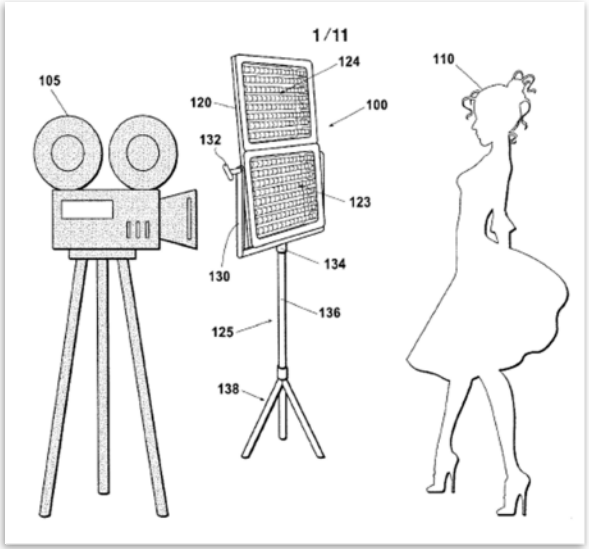
IPR2021-01496, EX1003, ¶ [0067]

IPR2021-01496, POR, 57-58
IPR2021-01496, PO Sur-Reply, 23-24

Pohlert Does Not Disclose “Random” Input Parameters

[0063] Pattern generation may be accomplished by, e.g., manual selection from a number of predefined patterns, or else through an interface allowing different pattern sequencing. Patterns may include, for example, strobing or flashing different groups of light segments **325**, **330**, **335**, **340**, **345**, **350**, **355**, and **360** (given the example of FIG. **3**B) in a predefined sequence (which may be a pseudo-random sequence, if desired), strobing or flashing different light elements **320** of the light segments **325-360** in a predefined (or pseudo-random) sequence, gradually dimming or brightening light segments **325-360** (individually, in groups, or collectively), or various combinations of these effects.

IPR2021-01496, EX1003, ¶ [0063]



IPR2021-01496, EX1003, FIG. 1

IPR2021-01496, POR, 57-58
IPR2021-01496, PO Sur-Reply, 23-24

Pohlert Does Not Anticipate Dependent Claim 19 Of The ’257 Patent

Claim 19: Pohlert Does Not Disclose The “Integrated” Limitation

Dependent claim 19 requires that the lighting device and the controller are integrated in a combined unit

19. The lighting system according to claim **18** wherein said controller and said lighting device are integrated in a combined unit.

IPR2021-01496, EX1001, cl. 19

IPR2021-01496, POR, 58-61
IPR2021-01496, PO Sur-Reply, 24-25

Petitioner Relies On A Cable Connection

FIG. 2, on which Petitioner relies, shows cable 213 connecting the power controller to the lighting frame

[0058] Block diagrams of two different types of power controllers **212** as may be used in various embodiments as described herein are illustrated in FIGS. **5**A and **5**B, respectively. With reference to FIG. **5**A, a first type of power controller **512** has an input for receiving an AC power source **503**, and outputs a plurality of power wires **547** preferably through a cable (e.g., cable **213** shown in FIG. **2**) for connection to the lighting frame **202**. The power controller **512** may further comprise a power converter **520**, the nature of which depends upon the type of power source **210**. If the power source is an AC source, the power converter **520** may comprise an AC-to-DC converter and appropriate step-down power conversion circuitry (e.g., a step-down transformer). On the other hand, if the power source is a DC source (e.g., a battery), the power converter **520** may comprise a DC-to-DC converter, if necessary. The design and construction of power converters is well known in the field of electrical engineering, and therefore is not be described herein in detail.

IPR2021-01496, EX1003, ¶ [0058]

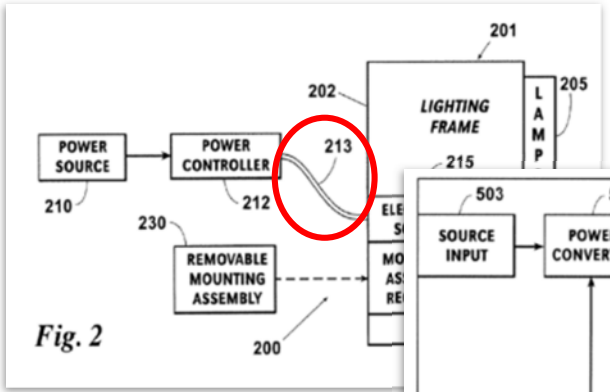


Fig. 2

IPR2021-01496, EX1003, FIG. 2

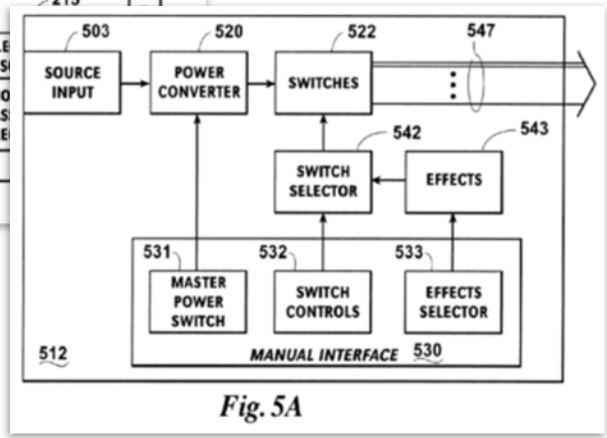


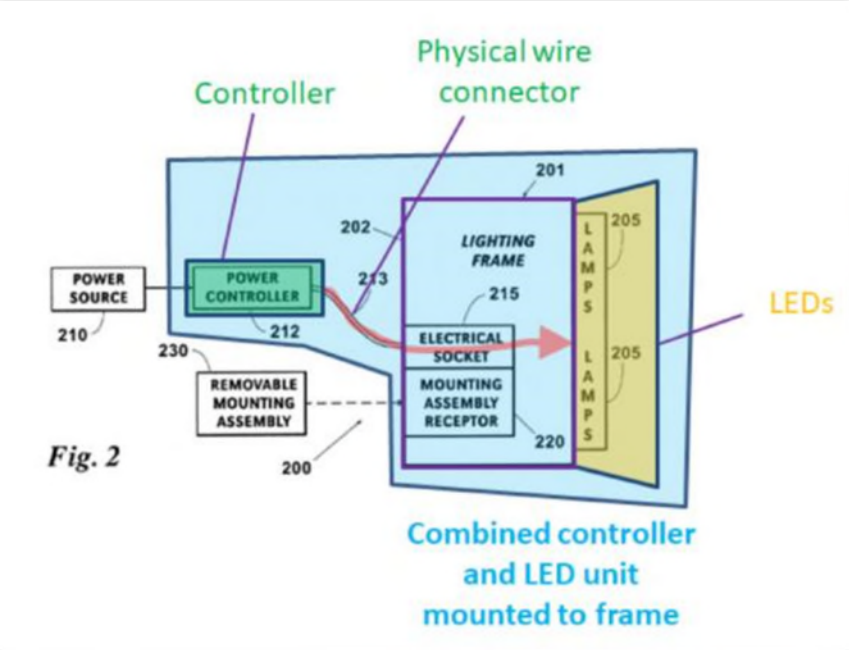
Fig. 5A

IPR2021-01496, EX1003, FIG. 5A

IPR2021-01496, POR, 58-61

IPR2021-01496, PO Sur-Reply, 24-25

Petitioner Relies On An Annotated Figure



IPR2021-01496, EX1006, ¶213

IPR2021-01496, POR, 58-61
IPR2021-01496, PO Sur-Reply, 24-25

A Cabled Connection Is Not "Integrated In A Combined Unit …"

Petitioner

and "connectable" to the light via a cable. ('257, 11:39-42.) A POSITA would thus understand a controller may be separate from the light and connected to it via a cable to form the combined, integrated lighting unit. (Wood Suppl., ¶50.)

IPR2021-01496, Pet. Reply, 27

'257 Patent

that the effect simulator **100** or the computing device **130** may be separate from any light **102**, and connectable to lights **102**, by either a wired or wireless connection.

IPR2021-01496, EX1001, 11:39-42

IPR2021-01496, POR, 58-61
IPR2021-01496, PO Sur-Reply, 24-25

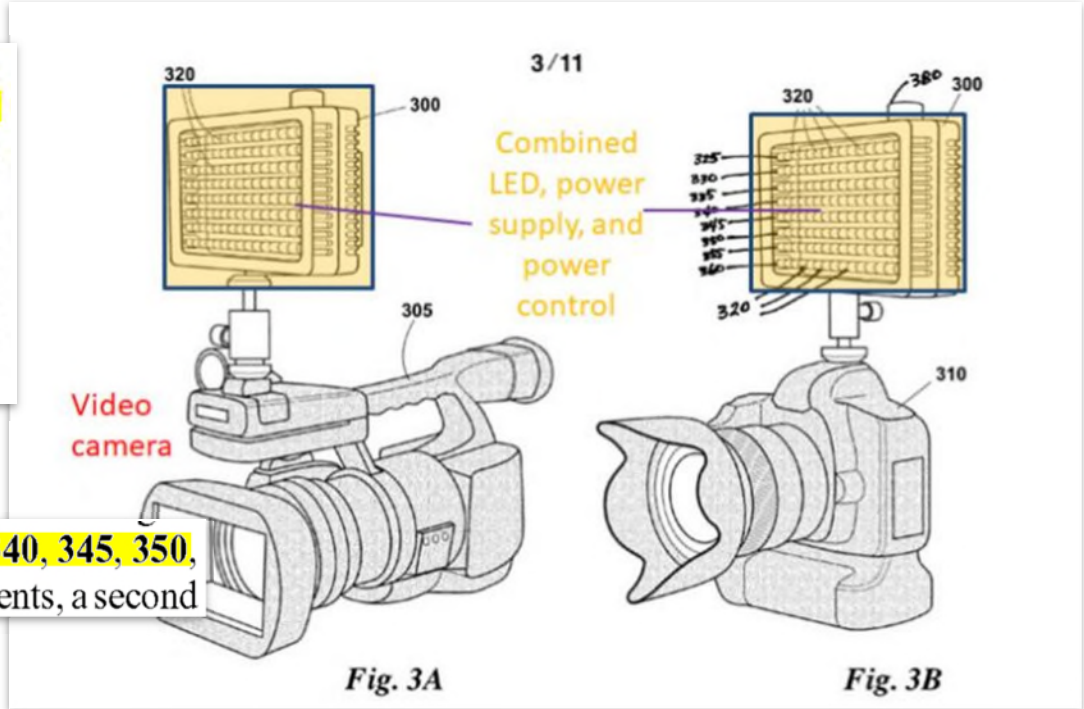
Labeled Drawing In Petition Not Disclosed In Pohlert

[0055] FIGS. **3**A and **3**B illustrate another preferred aspect of the instant invention. In some arrangements, the lighting device might be directly mounted on a camera as opposed to being stand-mounted. In FIG. **3**A, a preferred embodiment of the instant invention is shown mounted on a conventional video camera and in FIG. **3**B a similar example of the instant invention is shown mounted on a conventional SLR camera. As should be clear from these figures, embodiment **300** is designed to be mounted on a video camera **305** or digital still camera **310** and operate in conjunction therewith.

IPR2021-01496, EX1003, ¶55

select all of the light segments **325**, **330**, **335**, **340**, **345**, **350**, **355**, **360** thereby illuminating all **320** light elements, a second

IPR2021-01496, EX1003, ¶59



IPR2021-01496, Petition, 99

IPR2021-01496, POR, 58-61
IPR2021-01496, PO Sur-Reply, 24-25

The ’258 Patent

IPR2021-01497

Overview Of
The Showline Manual

The Showline Manual Overview

INSTALLATION & USER'S MANUAL

SL PAR 155 ZOOM
RGBW LED Luminaire

IPR2021-01497, EX1004, Cover

SL PAR 155 ZOOM RGBW LED Luminaire Main Menu Options

Presets

Presets are stored values of the luminaire's LED settings that can be recalled via the menu system or DMX. You can customize up to 31 presets via the menu system.

IPR2021-01497, EX1004, 15

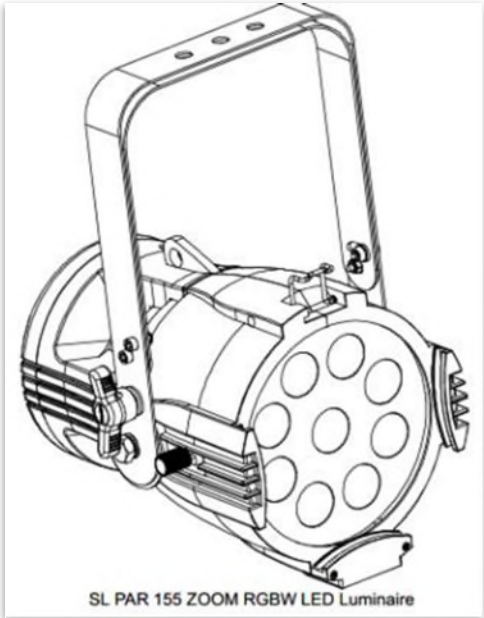
IPR2021-01497, POR, 18-19

The Showline Manual Does Not Anticipate Independent Claim 1 Of The ’258 Patent

Petitioner Relies On Customization Of “Chases” For Calculating Limitation

on user-selected and adjusted parameters. (Showline, 14-17.) For example, Showline discloses there are “[e]ight User Chases” that “can be further ***customized to create*** different effects on the fixture.” (*Id.*, 16-17.) This customization can include adding new steps to a Chase, as well editing of existing steps to change parameters like color, intensity, speed, and fade. (*Id.*; *see also* 15-16 (discussing similar customization of Presets).) When parameters for a selected effect are changed, “calculation” (*i.e.*, creation of data) is required to create new values to send to the lights, so as to generate a lighting effect reflecting the adjusted parameters. (Wood Suppl., ¶¶18-20.)

IPR2021-01497, Pet. Reply, 11



IPR2021-01497, EX1004, 2

IPR2021-01497, POR, 23-34
IPR2021-01497, PO Sur-Reply, 9-15

Chases Are Factory Defined Or Input Directly By User

Relevant Portion Of The Claim Language:

“an effect simulator adapted to calculate a time varying lighting value based on at least one simulation parameter”

Effects

Effects are chases stored values of the luminaire's LED settings that can be recalled via the menu system or DMX. There are 10 factory defined chases and eight user adjustable chases. You can adjust the master intensity, speed, and fade values for any of the 18 chases.

IPR2021-01497, EX1004, 16

To edit and save a Step:

Step 1. Select Edit Step or New Step from the Edit User Chase menu.

Step 2. The top left field indicates the preset or color filter to be used for the step. When set to OFF no preset or color filter is to be used. Use the left and right buttons to scroll through all presets and color filters.

Step 3. Use the Up and Down keys to scroll through the output parameters. Once a parameter is selected, use the left and right arrow buttons to make adjustments.

IPR2021-01497, EX1004, 17

IPR2021-01497, POR, 23-34
IPR2021-01497, PO Sur-Reply, 9-15

Presets Are Stored Lighting Values

Presets

Presets are stored values of the luminaire's LED settings that can be recalled via the menu system or DMX. You can customize up to 31 presets via the menu system.

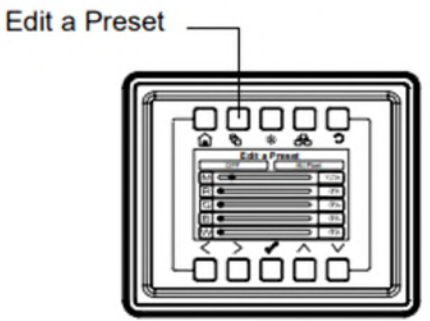
Recalling or Editing Presets

To recall or edit a preset:

Step 1. Select Preset from the main menu or from the Preset shortcut key.

Step 2. The top left field indicates the current preset or Off, when this field is selected (highlighted in blue), use the left and right buttons to scroll through all presets

Step 3. If you wish to edit the preset, use the Up and Down keys to scroll through the parameters. Once a parameter is selected, use the left and right arrow buttons to make adjustments.



IPR2021-01497, EX1004, 15

IPR2021-01497, POR, 23-34
IPR2021-01497, PO Sur-Reply, 9-15

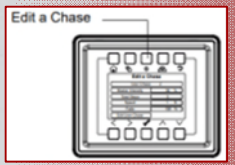
User Adjustable Chases

The user-defined chases allow the user to set master intensity, speed, and fade values

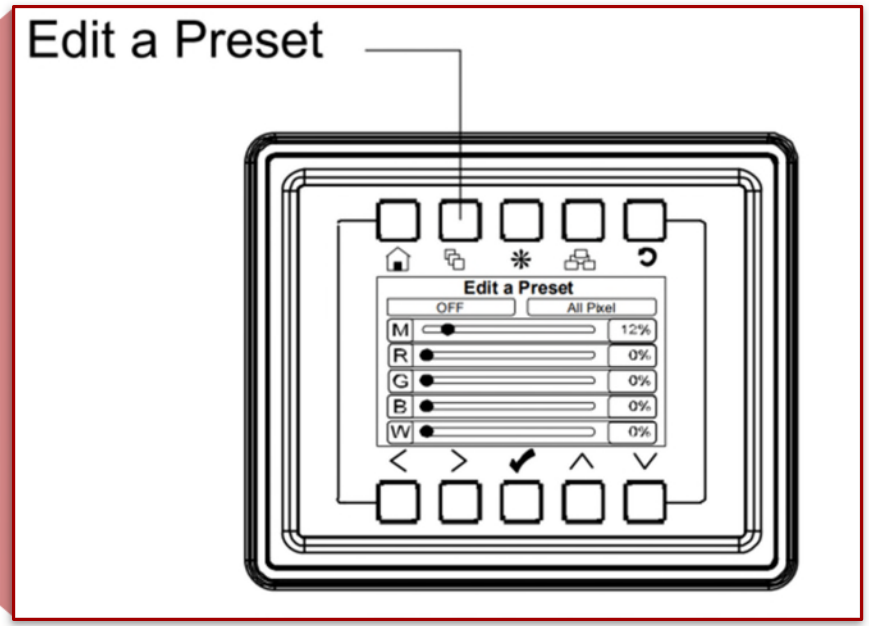
Editing User Chases

Eight User chases can be further customized to create different effects on the fixture. To edit a User Chase, first use the up and down arrows to scroll to the Edit User Chase field and then press the Check Mark button. The Edit User Chase window will be displayed:

Use the Up and Down buttons to select parameters and the Left and Right buttons to assign the different general fixture settings. When finished, press the Check button to exit the menu level.



IPR2021-01497, EX1004, 17



IPR2021-01497, POR, 23-34
IPR2021-01497, PO Sur-Reply, 9-15

Inputting Parameters Does Not Require Calculating

Relevant Portion Of The Claim Language:

"an effect simulator adapted to calculate a time varying lighting value based on at least one simulation parameter"

Table 3: Effects Parameters

Parameter	Description
User Chase / Built-in Chase	Select from the 18 different chases.
Master Intensity	Adjust the master intensity for ALL chases.
Total Steps	Displays the total steps used by the chase. This field is not editable.
Speed	The total time each step of the chase will be recalled.
Fade	The percentage of the time assigned by the speed that is crossfaded between steps.

IPR2021-01497, EX1004, 16

IPR2021-01497, POR, 23-34
IPR2021-01497, PO Sur-Reply, 9-15

Adjusting Parameters Does Not Require Calculating

Relevant Portion Of The Claim Language:

"an effect simulator adapted to calculate a time varying lighting value based on at least one simulation parameter"

Table 4: Strobe / Timing Parameters

Parameter	Description
Master Intensity	Overall fixture output intensity level.
Strobe: X	Strobe mode and rate value settings following DMX map (see SL PAR 155 ZOOM RGBW LED Luminaire DMX Mapping for details).
Duration	The time each strobe flash remains ON.
Intensity Timing	The time used to change intensity values when running a chase.
Color Timing	The time used to change color values when running a chase.

IPR2021-01497, EX1004, 17

IPR2021-01497, POR, 23-34
IPR2021-01497, PO Sur-Reply, 9-15

The Showline Manual Does Not Disclose A "Controller Comprising … An Effect Simulator"

The Showline Manual discloses only a "LCD Display and Menu System"

1. A lighting system comprising:
a lighting device; and
a controller adapted to control the lighting device to produce a user customisable cinematic lighting special effect selected from a range of different user customisable cinematic lighting special effects, the controller comprising:

IPR2021-01497, EX1001, cl. 1

Q And the Showline manual, though, doesn't provide any details about how the device receives this input and then changes the output.
Is that fair?
A The user doesn't need to know that. So, no, it doesn't provide details of how that happens.

IPR2021-01497, EX2014, 329:15-21

IPR2021-01497, POR, 22-23
IPR2021-01497, PO Sur-Reply, 15-16

The Showline Manual Does Not Anticipate Dependent Claim 17 Of The ’258 Patent

Claim 17: The Showline Manual Does Not Disclose A Controller That Is Both “Separable” And “Integrated”

Claim 17 depends from claim 1, and requires that the controller be “separable”

17. The lighting system according to claim **1**, wherein the controller is separable from the lighting device.

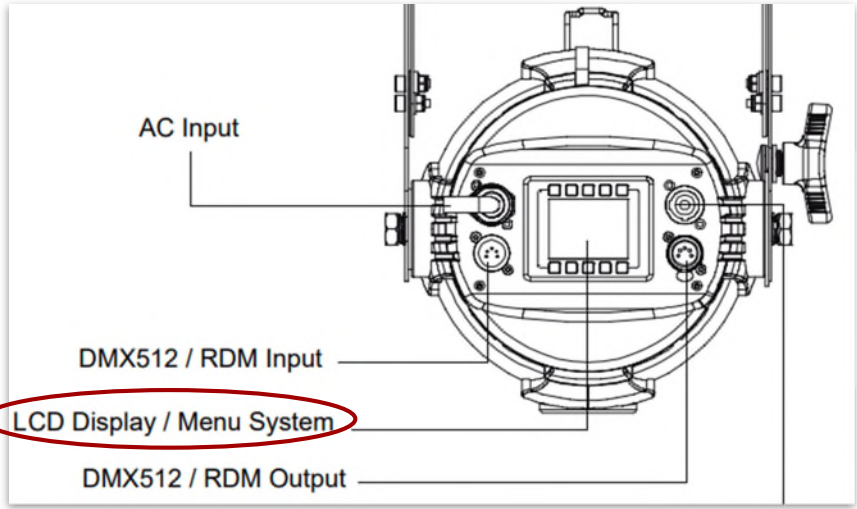
IPR2021-01497, EX1001, cl. 17

wherein said lighting device and said controller are integrated in a combined unit.

IPR2021-01497, EX1001, cl. 1

IPR2021-01497, POR, 34-36
IPR2021-01497, PO Sur-Reply, 16-17

Claim 17: The Showline Manual Does Not Disclose A Controller That Is Both “Separable” And “Integrated”



IPR2021-01497, EX1004, 6

DMX CONTROL

This section contains information for operating the luminaire using DMX control in 16-bit, 8-Bit, or HSIC (Hue, Saturation, Intensity and Color Correction) modes. For Menu options and detailed information, see "LCD Display and Menu System" on page 14.

Note: These tables assume a DMX start address of 1. When a different starting address is used, this address becomes channel 1 function and other functions follow in sequence.

IPR2021-01497, EX1004, 24

IPR2021-01497, POR, 34-36
IPR2021-01497, PO Sur-Reply, 16-17

A Cable Connection Is Insufficient

Petitioner's Expert

103. As mentioned, a DMX "cable" connector can be used to connect such a DMX controller to the SL PAR unit. (*Id.*, 10.) This creates a combined, connected unit of the SL PAR and its physically connected DMX controller. This DMX connector can, of course, also be disconnected from the SL PAR unit and its LED array, and is therefore "separable" from the LED lighting devices.

IPR2021-01497, EX1008, ¶103

'258 Patent

that the effect simulator **100** or the computing device **130** may be separate from any light **102**, and connectable to lights **102**, by either a wired or wireless connection.

IPR2021-01497, EX1001, 11:45-47

IPR2021-01497, POR, 34-36
IPR2021-01497, PO Sur-Reply, 16-17

Pohlert Does Not Anticipate Independent Claim 1 Of The ’258 Patent

Petitioner Fails To Establish Anticipation

Pohlert **does not** disclose:

"an effect simulator adapted to calculate a time varying lighting value based on at least one simulation parameter."

See PO Demonstrative Exhibit at slides 58-68.

Pohlert **does not** disclose:

"wherein said lighting device and said controller are integrated in a combined unit."

See PO Demonstrative Exhibit at slides 76-80.

IPR2021-01497, POR, 38-61
IPR2021-01497, PO Sur-Reply, 17-25

Petitioner's Expert's Overbroad View Of Calculating

Q Do you believe that when the user manually input to increase the brightness on a local panel in the 1960s and '70s, that the television was performing a calculation to actually output a different brightness?

A Yeah, absolutely. For the same reasons

IPR2021-01497, EX2004, 158:9-14

Q Okay. I apologize. So when someone adjusted the frequency of a square wave in the 1980s, in your view that would require performing a calculation. True?

A Yes, it would require a calculation. It would have been an analog calculation. The early

IPR2021-01497, EX2014, 369:13-18

Q Understand. I understand about this, it is an integrated electronic circuit inside of the unit that we're seeing here. Correct?

A I think it was discrete electronics, transistors, capacitors, resistors, that kind of thing. So this is --

Q And do those discrete electronics, in your view, calculate a valuable?

A Yeah, absolutely. It's a -- effectively

IPR2021-01497, EX2004, 99:1-9

IPR2021-01497, POR, 32

Strobing Is Not Calculating Of Time Varying Lighting Values

[0062] Strobing may be accomplished by generating an oscillating signal and applying it as a control signal either upstream or downstream from the switch selector **542**. The frequency of oscillation may be selectable via a manual knob, switch or other selection means as part of the effects selector **533**.

IPR2021-01497, EX1003, ¶ [0062]

IPR2021-01497, EX1008, ¶28

7 Q And do those discrete electronics, in
8 your view, calculate a valuable?
9 **A Yeah, absolutely. It's a -- effectively**
10 **an analog calculation. It's common to do**
11 **calculations with analog equipment. There were**
12 **analog computers that used voltage levels to**
13 **represent calculations. And this is a very simple**
14 **version of much the same thing.**
15 Q And can you explain what the calculation
16 actually is in the Super Strobe?
17 **A The calculation is the circuit is**
18 **essentially timing how long a capacitor takes to**
19 **charge through the resistor. And then when it**
20 **reaches a certain level that matches some internal**
21 **preset level, then the strobe will fire, it will**
22 **discharge the capacitor, and the cycle will start**

100

1 **again.**

IPR2021-01497, EX2004, 99:7-100:1

IPR2021-01497, POR, 32, 48-49

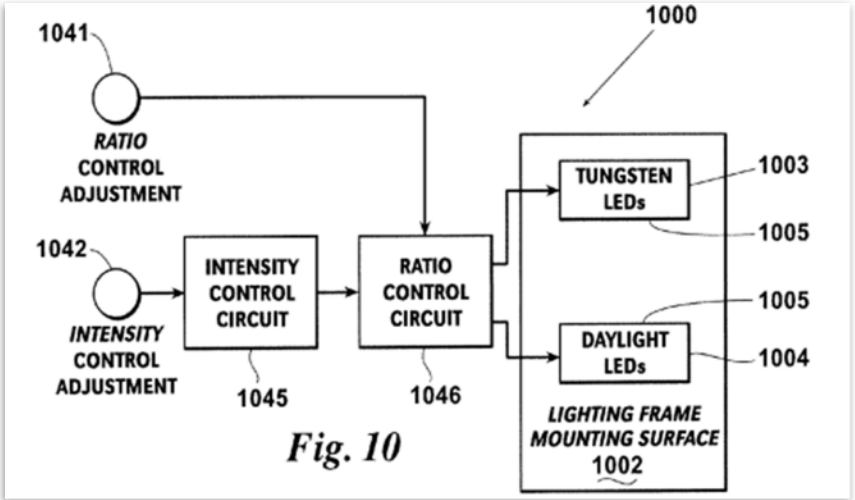
Pohlert Does Not Anticipate Dependent Claim 6 Of The ’258 Patent

Claim 6: Pohlert Does Not Disclose The "Colour Or Colour Temperature" Limitation

Petitioner relies entirely on the embodiment of Pohlert shown in FIG. 10 to disclose the limitation in claim 6

6. The lighting system according to claim 3, wherein the controller is adapted to control the colour or colour temperature of said LEDs in dependence on a user input received via the input interface.

IPR2021-01497, EX1001, cl. 6



IPR2021-01497, EX1003, FIG. 10

IPR2021-01497, POR, 61-63
IPR2021-01497, PO Sur-Reply, 24-25

Petition Fails To Explain Rationale To Combine Embodiments Of Pohlert

colors, tungsten and daylight. They're here two separate drawings and two separate systems, but they're not mutually exclusive.

Q Okay. But they are disclosed in Pohlert as two separate embodiments. True?

MR. RAFFETTO: Objection. Asked and answered.

A They're two separate embodiments of different things. But they could be combined in a single unit.

IPR2021-01497, EX2004, 236:1-10

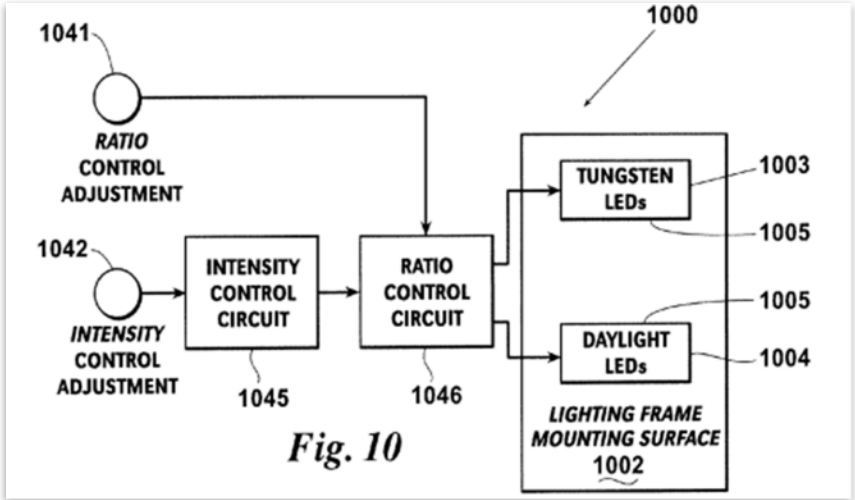


Fig. 10

IPR2021-01497, EX1003, FIG. 10

IPR2021-01497, POR, 61-63
IPR2021-01497, PO Sur-Reply, 24-25

The ’101 Patent

IPR2021-01498

Overview Of Edwards

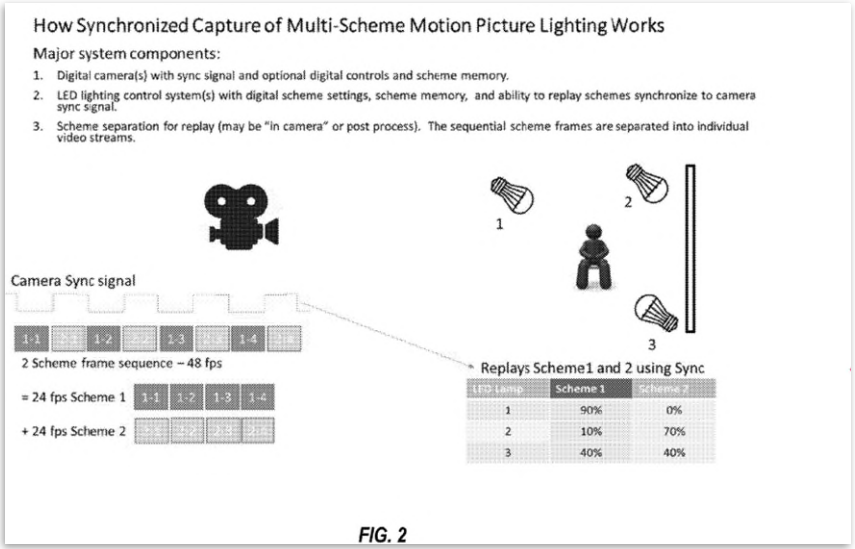
U.S. Patent No. 9,743,010

Summary Of Edwards

(57) **ABSTRACT**

A method and system for synchronizing LED lighting to the shutters of fast digital cameras. The system enables capture of multiple lighting schemes to be filmed in a single video take on sequential frames. Since 24 frames per second is the industry standard used broadly in film and television, a 96 FPS camera can capture up to 4 lighting tracks of 24 FPS each in a single take. Each lighting fixture can be changed

IPR2021-01498, EX1004, Abstract



IPR2021-01498, EX1004, FIG. 2

IPR2021-01498, POR, 16-18

Edwards Does Not Anticipate The Independent Claims Of The ’101 Patent

Edwards Does Not Anticipate Independent Claims Because It Lacks:

1. Effect simulator that calculates a time varying lighting value

2. “User input” camera parameters

Edwards Does Not Anticipate Independent Claims Because It Lacks:

1. **Effect simulator that calculates a time varying lighting value**

2. “User input” camera parameters

Petitioner relies on Edwards' disclosure of "lighting schemes"

The lighting commands include "lighting schemes," designed by users, having settings for each light necessary to implement desired light levels and lighting effects for filming scenes on a set. (*Id.*, 7:20-36 ("The SETUP command is used to setup the schemes. Using either the control panel on each light or using DMX commands, the cinematographer adjusts each light until he/she has the desired settings on all lights for the 'lighting scheme'."), 11:33-12:1; *see also id.*,

IPR2021-01498, Petition, 12-13

Once all lights on the network are setup at the correct settings the STORE command is issued. Multiple schemes can be stored, preferably digitally, each featuring different light levels, color controls and other settings per active LED light. This will save the settings of all lights to the same scheme location number. As an example, 0-255 scheme locations could be easily supported by DMX. Each light would have memory storage for all digital settings corresponding to each scheme. It is possible a large library of schemes can be stored and used over the entire production of a movie or other video production. In this way the same scheme settings can be shared over multiple takes, with multiple scheme options possible per take of the each video.

IPR2021-01498, POR, 18-28
IPR2021-01498, PO Sur-Reply, 17-23

IPR2021-01498, EX1003, 7:32-44

Edwards' Schemes Recall and Replay Stored Values

In one embodiment of this invention, when the RECORD command is issued a list of schemes would also be selected by the cinematographer (1, 3, 5 for example). In that example, all lights would prepare to replay scheme 1, then 3 then 5 in sequence throughout the filming. All lights would wait for the rising edge of the sync signal to trigger turning on each scheme frame. At the falling edge the lights would all turn off. At the next rising edge all lights would turn on the next sequential scheme. Each active light in the network or system system will therefore recall the stored values for each of these schemes and replay them in order, sequentially in sync with the sync signal. When filming starts the sync

IPR2021-01498, EX1003, 7:54-65

IPR2021-01498, POR, 18-28
IPR2021-01498, PO Sur-Reply, 17-23

Edwards' "Dynamic" Effects are Pre-programmed and Replayed

In film and broadcast lighting there are frequently times when dynamic lighting is used as a special effect, editing element or to simulate an environment in the film. Some effects require high speed adjustments to the light. Here are some examples:

Simple fade to black—at the end of a scene the lights dim.

Lightning, camera flash or Gun Shot—This can be a single frame strobe or a strobe lasting for multiple frames. A sequence of pulses may be desired. In the case of lightning it can be a preprogrammed sequence at different brightness levels.

Night—car driving by, flashing sign in window, street light flicker—All common effects used in film that can be simulated in a studio by projected light thru a window. By controlling one or more lights the effect of light moving or changing intensity or distance can be portrayed.

Fire, candle and lantern light—to simulate this type of light source a subtle, randomly changing level of light is needed. This sequence can also be programmed thru DMX.

IPR2021-01498, EX1003, 11:33-53

VALT lighting systems have the benefit of being synchronized to the start of the frame. Therefore a DMX command typically will not be implemented mid frame. This avoids the undesirable effect of half bright/half dark frames. With progressive scan video this can result in the top of the frame having a different exposure than the bottom which can create a hardline in the middle of the frame. Even if only one track is being filmed there is benefit to using VALT so all lighting commands coming over DMX are synchronized and changed during the closed shutter angle time slot. All frames have constant lighting with all changings occurring during the off shutter time. This also enables higher speed effects such as single frame gun shot or paparazzi flash, which cannot be reliably done without synchronizing lighting to the shutter. VALT further enables the ability to try multiple lighting effects simultaneously—each version on a different track. For example, one fire effect may be very harsh with high and low extremes in contrast. Another track may use less severe contrast.

IPR2021-01498, EX1003, 11:54-12:5

IPR2021-01498, POR, 18-28
IPR2021-01498, PO Sur-Reply, 17-23

User Defined Effects Are Not Calculated

in multiple ways. (Wood Suppl., ¶¶35-38.) One way is creating lighting values corresponding to "lighting schemes." Edwards' "lighting schemes" comprise user inputs such as light levels, color temperature, and dimming (*i.e.*, simulation parameters). (*Id.*, ¶¶35-36.) Critically, schemes ***do not exist*** until users provide their desired inputs. (*Id.*, ¶37.) Therefore, they are not and cannot be "pre-stored," like a media player preloaded with multiple MP3 songs. (*Id.*; *cf.* POR, 18-20.) Instead, the various parameters associated with each scheme, when received after a user inputs them, are used by the controller to create ("calculate") lighting values that are transmitted to lighting devices when a lighting scheme is run. (Wood Suppl., ¶¶36-37, 40.)

IPR2021-01498, Pet. Reply, 26-27

IPR2021-01498, POR, 18-28
IPR2021-01498, PO Sur-Reply, 17-23

Synchronization Does Not Require Calculation

on each scheme frame. At the falling edge the lights would all turn off. At the next rising edge all lights would turn on the next sequential scheme. Each active light in the network or system system will therefore recall the stored values for each of these schemes and replay them in order, sequentially in sync with the sync signal. When filming starts the sync signal will initialize the record sequence and all lighting will continue to sequentially replay each scheme until the sync

IPR2021-01498, EX1004, 7:60-67

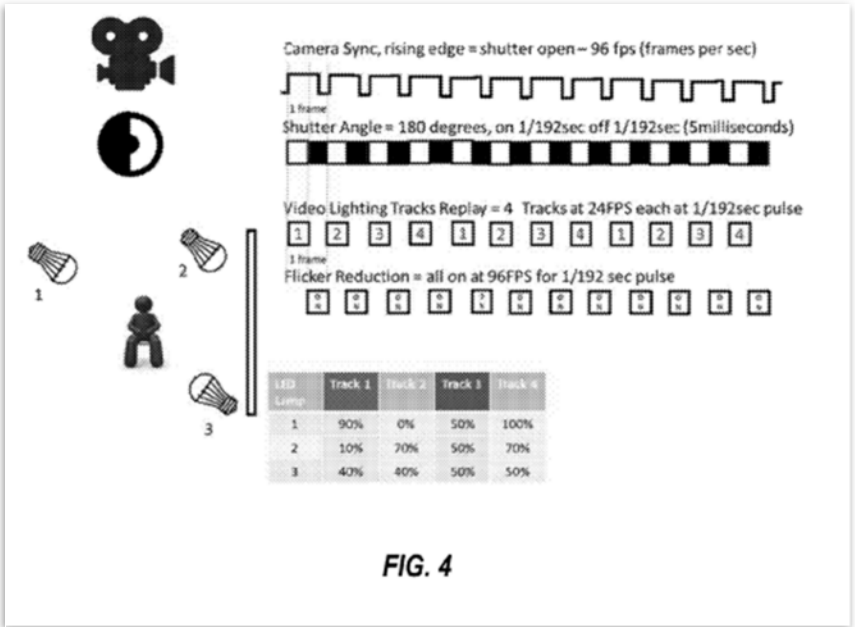


FIG. 4

IPR2021-01498, EX1004, FIG. 4

IPR2021-01498, POR, 18-28
IPR2021-01498, PO Sur-Reply, 17-23

Synchronization Does Not Require Calculation

- The controller in Edwards simply holds each next command of the pre-defined sequence until a signal from the synch signal is received

the lights (this can be thru standard DMX). Instead of changing the lights asynchronously, the controller preferably holds the commands until the next vertical frame sync pulse. The lighting transitions for each frame are preferably timed to occur during the closed shutter period prior to the frame being captured by the camera. In this way lighting is stable

IPR2021-01498, EX1004, 5:24-29

IPR2021-01498, POR, 18-28
IPR2021-01498, PO Sur-Reply, 17-23

Synchronization Does Not Require Calculation

Petitioner:

Because Edwards only makes scheme transitions when the camera shutter is closed, and the sync signal is received, none of these calculations can be carried out in advance. (*Id.*) Instead, the Edwards system must wait until the next sync

IPR2021-01498, Pet. Reply, 29

Edwards:

the lights (this can be thru standard DMX). Instead of changing the lights asynchronously, the controller preferably holds the commands until the next vertical frame sync pulse. The lighting transitions for each frame are preferably timed to occur during the closed shutter period prior to the frame being captured by the camera. In this way lighting is stable

IPR2021-01498, EX1004, 5:24-29

IPR2021-01498, POR, 18-28
IPR2021-01498, PO Sur-Reply, 17-23

Edwards Does Not Anticipate Independent Claims Because It Lacks:

1. Effect simulator that calculates a time varying lighting value

2. **“User input” camera parameters**

Independent Claims Require “User Input” Simulation Parameter

11. A controller adapted to control a lighting device to produce user customisable lighting effects while compensating for rolling shutter artefacts produced by a camera, the controller comprising:

an effect simulator adapted to calculate a time varying lighting value compensating for the rolling shutter artefacts produced by the camera based on at least one user input simulation parameter input by a user, said at least one user input simulation parameter comprising a user selectable parameter indicative of a member of a group consisting of:

a camera recording frequency of the camera;

a camera shutter speed of the camera; and

a camera frame rate of the camera; and

wherein the effect simulator is adapted to output said calculated time varying lighting value to the lighting device thereby to simulate a lighting effect compensated for rolling shutter artefacts.

IPR2021-01498, EX1001, cl. 11

IPR2021-01498, POR, 28-31
IPR2021-01498, PO Sur-Reply, 23-24

Petitioner Reads More Into Edwards Than Is Disclosed

Petition:

Edwards discloses Claim 1b. (Wood Decl., ¶¶ 52-57.) Edwards discloses compensating for rolling shutter artefacts by allowing a user to input parameters indicative of at least camera shutter speed and frame rate, in the form a camera synchronization signal. (Edwards, Abstract, 1:44-49, 3:18-28, 11:19-12:1.) The lighting controller, based on a user choosing to feed the camera sync signal to the controller, "preferably holds the commands until the next vertical ***frame sync pulse***," so that the "lighting transitions for each frame are preferably timed to occur during the ***closed shutter period*** prior to the frame being captured by the ***camera***. In this way ***lighting is stable throughout the frame*** and there are preferably no asynchronous lighting events that can impact the image capture." (Edwards, 5:18-31 (emphasis added).) By providing an input to synchronize lighting changes to the

IPR2021-01498, Petition, 13-14

Edwards:

The DMX communication standard for lighting does not include support for sync signals. In embodiments of the present invention an industry standard sync signal (Black Burst, Tri-Level, SD . . .) is preferably fed into the lighting controller that synchronizes lighting commands. The lighting controller preferably receives the commands that control the lights (this can be thru standard DMX). Instead of changing the lights asynchronously, the controller preferably holds the commands until the next vertical frame sync pulse. The lighting transitions for each frame are preferably timed to occur during the closed shutter period prior to the frame being captured by the camera. In this way lighting is stable throughout the frame and there are preferably no asynchronous lighting events that can impact the image capture. For

IPR2021-01498, EX1004, 5:18-31

IPR2021-01498, POR, 28-31
IPR2021-01498, PO Sur-Reply, 23-24

Edwards' Anti-Flicker Is Automatic

Edwards explicitly states that its anti-flicker compensation is automatic and requires no intervention by a user

This anti-flicker compensation is completely automatic and requires no manual intervention or adjustment. The table in

IPR2021-01498, EX1004, 14:52-53

for an "anti-flicker pulse". It is calculated by the VALT system and requires no intervention by the user. These two

IPR2021-01498, EX1004, 14:1-2

IPR2021-01498, POR, 28-31
IPR2021-01498, PO Sur-Reply, 23-24

The Astera Manual Does Not Anticipate The Independent Claims Of The ’101 Patent

The Astera Manual Does Not Disclose “Calculating”

Astera **does not** disclose:

“an effect simulator adapted to calculate a time varying lighting value compensating for rolling shutter artefacts produced by the camera based on at least one user input simulation parameter input by a user … .”

See PO Demonstrative Exhibit at slides 33-44.

IPR2021-01498, POR, 33-36, 43-53
IPR2021-01498, PO Sur-Reply, 10-15

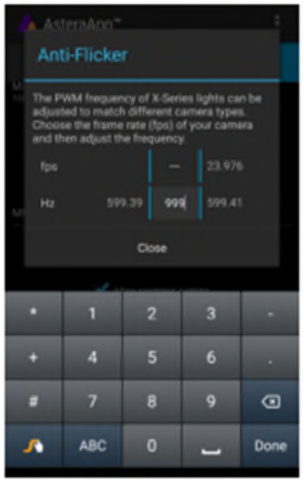
Astera's Anti-Flicker Does Not Require Calculating

7.12 ANTI-FLICKER

The PWM refresh rate of this light is 599.4 Hz by default. This frequency can be freely adjusted between 200 Hz and 1205 Hz to fit different camera's frame rates.

Make sure you have targeted the lights you wish to adjust (chapter 7.5). Then press the "Anti-Flicker".

Slide the "fps" to adjust to default values for a framerate.
Slide the "Hz" to fine-adjust.



Press the highlighted frequency to enter a custom value between 200 and 1205 Hz.

IPR2021-01498, EX1003, 32

IPR2021-01498, POR, 51-53
IPR2021-01498, PO Sur-Reply, 10-15

The Astera Manual Does Not Anticipate Or Render Obvious Dependent Claim 16 Of The ’101 Patent

Claim 16: Petitioner Has Not Shown That The Astera Manual's Disclosed "Standalone" Mode Anticipates Independent Claim 11

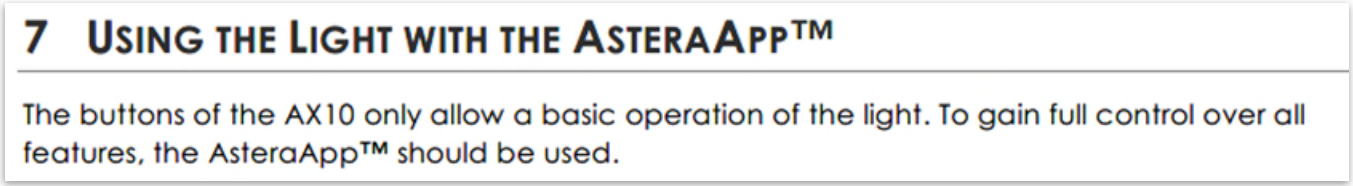
16. The lighting system according to claim **15** wherein said controller and said lighting device are integrated in a combined unit.

IPR2021-01498, EX1001, cl. 16

IPR2021-01498, POR, 53-56
IPR2021-01498, PO Sur-Reply, 15-16

Claim 16: Petitioner Has Not Shown That The Astera Manual's Disclosed "Standalone" Mode Anticipates Independent Claim 11

- Standalone Mode has limited functionality compared to the AsteraApp



7 USING THE LIGHT WITH THE ASTERAAPP™

The buttons of the AX10 only allow a basic operation of the light. To gain full control over all features, the AsteraApp™ should be used.

IPR2021-01498, EX1003, 23

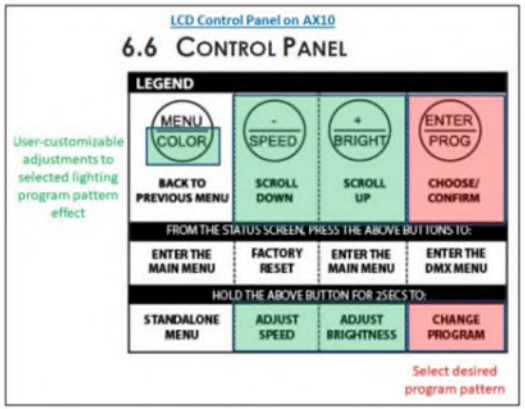
IPR2021-01498, POR, 53-56
IPR2021-01498, PO Sur-Reply, 15-16

Claim 16: Petitioner Has Not Shown That The Astera Manual's Disclosed "Standalone" Mode Anticipates Independent Claim 11

"Anti-Flicker" functionality is not available in standalone mode, and "Anti-Flicker" is relied upon by Petitioner to anticipate independent claim 11

C. Astera Anticipates and Renders Obvious Claim 16

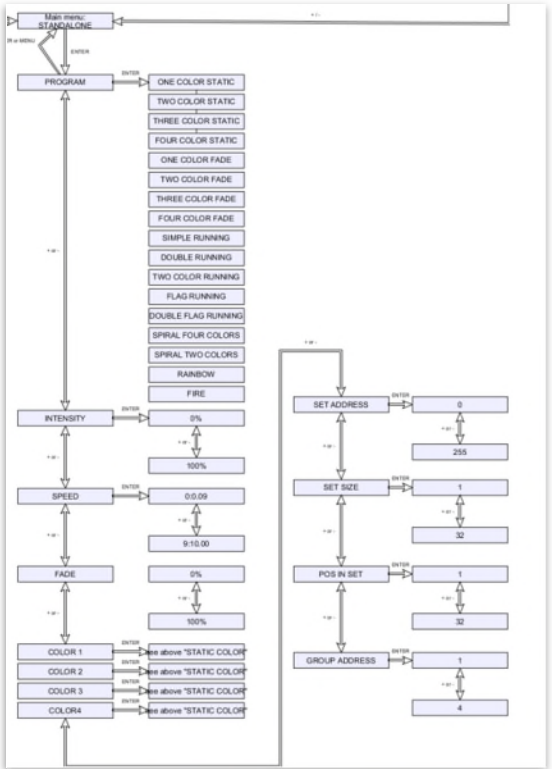
As explained in the Petition and above, Astera discloses every feature recited in claim 11, from which claim 16 depends. (*See* Petition, 39-58.) Rotolight does not dispute the AX10, as described in Astera, comprises a controller and LEDs "integrated in a combined unit," as recited in claim 16 of the '101. To be sure, Astera discloses that the AX10 itself "has a built in standalone engine" (*e.g.*, a controller). (Astera, 10.) Astera also discloses there is a Control Panel on the AX10 through which a user may control the standalone engine:



IPR2021-01498, Pet. Reply, 22

IPR2021-01498, POR, 53-56
IPR2021-01498, PO Sur-Reply, 15-16

Claim 16: Petitioner Has Not Shown That The Astera Manual's Disclosed "Standalone" Mode Anticipates Independent Claim 11



IPR2021-01498, EX1003, 36

IPR2021-01498, POR, 53-56
IPR2021-01498, PO Sur-Reply, 15-16

Claim 16: It Would Not Be Obvious To Combine The Functionality Of The AsteraApp™ With The Integrated Controller

7 USING THE LIGHT WITH THE ASTERAAPP™

The buttons of the AX10 only allow a basic operation of the light. To gain full control over all features, the AsteraApp™ should be used.

IPR2021-01498, EX1003, 23

effects sent to it from the AsteraApp™. A POSITA would have understood that providing advanced functionality in an app (*i.e.*, an application on a smartphone or tablet) provides several specific benefits. For example, the user is likely already familiar with the user interface on their own device, and so allowing the user to control the lighting device from, *e.g.*, their smartphone provides desirable, convenient operability. Additionally, providing the functionality on the AsteraApp™—and not the local control panel—provides numerous benefits that a POSITA would have appreciated, such as freeing up memory and processing load for the local system and avoiding having to introduce a significantly more complicated user interface locally on the lighting device.

IPR2021-01498, EX2002, ¶193

IPR2021-01498, POR, 53-56
IPR2021-01498, PO Sur-Reply, 15-16

Petitioner Did Not Present Any Obviousness Arguments

Petitioner Has Not Presented An Obviousness Analysis

Aside from asserting obviousness in the section headings and the grounds table, Petitioner did not present any substantive obviousness position other than anticipation.

IPR2021-01496, Petition, i

Ground	References	Claims[3]	Basis
1	Astera	**1**-14, **15**-19,	102 / 103

IPR2021-01496, Petition, 3

2	Pohlert	**1**-14, **15**-19, **20**, 21	102 / 103

IPR2021-01496, Petition, 4

IPR2021-01496, POR, 36-37, 63-64; PO Sur-Reply, 25
IPR2021-01497, POR, 44-45, 62-63; PO Sur-Reply, 24
IPR2021-01498, POR, 32, 56-57; PO Sur-Reply, 24

No Obviousness Analysis Beyond Anticipation

The Board has previously found insufficient obviousness arguments that fail to provide any analysis beyond anticipation

> Moreover, Petitioner's obviousness allegations fail because Petitioner does not perform an obviousness analysis with respect to claim 1. Petitioner alleges that Krieger '362 discloses all of the limitations of independent claim 1. Pet. 28–38. At no time does Petitioner allege that Krieger '362 does not disclose a limitation, but it would have been obvious to modify Krieger '362 to arrive at the claimed invention having that limitation, or provide other analysis that bears the hallmarks of an obviousness analysis. *See id.*

Lindsay Corp. v. Valmond Indus., Inc., IPR2016-01387, Paper 7 (PTAB Jan. 9, 2017) (Denying Institution)

IPR2021-01496, POR, 36-37, 63-64; PO Sur-Reply, 25
IPR2021-01497, POR, 44-45, 62-63; PO Sur-Reply, 24
IPR2021-01498, POR, 32, 56-57; PO Sur-Reply, 24

Petitioner's Case Law

***Real Time Data* is inapposite:**

[2] Here, HP's primary argument to the Board was that all of the elements of claims 1–4, 8, and 28 were disclosed in O'Brien, a single reference. HP relied on Nelson simply to demonstrate that a person of ordinary skill in the art would have understood that the string compression disclosed in O'Brien was, in fact, a type of dictionary encoder, the terminology used in the '812 patent. As both the Board and

Real Time Data, LLC v. Iancu, 912 F.3d 1368, 1372-73 (Fed. Cir. 2019)

a type of dictionary encoder. In addition, Realtime conceded the point HP sought to use Nelson to prove: that O'Brien disclosed a dictionary encoder. *See Hewlett-*

Real Time Data, 912 F.3d at 1373

[3] Under these circumstances, the Board was free to come to the very conclusion it reached: that O'Brien alone disclosed every element of claims 1–4, 8, and 28. And because the Board did not rely on Nelson for the disclosure of a particular element or teaching, the Board had no obligation to find a motivation to combine O'Brien and Nelson. While Realtime ar-

Real Time Data, 912 F.3d at 1373

IPR2021-01496, POR, 36-37, 63-64; PO Sur-Reply, 25
IPR2021-01497, POR, 44-45, 62-63; PO Sur-Reply, 24
IPR2021-01498, POR, 32, 56-57; PO Sur-Reply, 24

Real Time Data Holding

The Court held that the Board may find claims unpatentable based on obviousness where the requirements of anticipation are also met, because “anticipation is the epitome of obviousness”

VI. IF PRIOR ART REFERENCES DO NOT ANTICIPATE, THEY AT LEAST RENDER OBVIOUS CLAIMS 1-21

IPR2021-01496, Pet. Reply, 28
(Petitioner relies on obviousness only if the requirements of anticipation are not met)

IPR2021-01496, POR, 36-37, 63-64; PO Sur-Reply, 25
IPR2021-01497, POR, 44-45, 62-63; PO Sur-Reply, 24
IPR2021-01498, POR, 32, 56-57; PO Sur-Reply, 24

Polygroup Ltd MCO v. Willis Elec. Co.

***Polygroup* is likewise non-analogous:**

- "Polygroup's petitions **explicitly** argued that Miller alone teaches every element of the challenged claims of the '186 and '187 patents in its **limitation-by-limitation analysis**" (*Polygroup Ltd MCO v. Willis Elec. Co.*, 759 F. App'x 934, 942 (Fed. Cir. 2019)

IPR2021-01496, POR, 36-37, 63-64; PO Sur-Reply, 25
IPR2021-01497, POR, 44-45, 62-63; PO Sur-Reply, 24
IPR2021-01498, POR, 32, 56-57; PO Sur-Reply, 24

The Astera Manual Is Not Prior Art

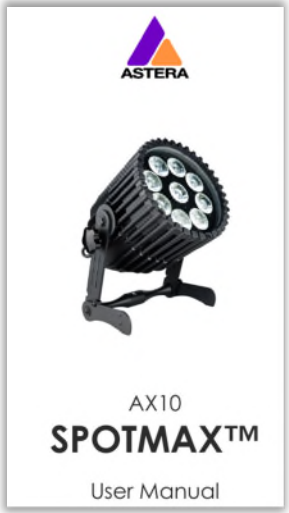
Petitioner Fails To Show That The Astera Manual Was Publicly Available To A POSITA Before April 8, 2016

First: Petitioner failed to establish a publication date prior to April 8, 2016. (IPR2021-01496, PO Response, 19-21; IPR2021-01496, PO Sur-Reply, 10)

Second: Petitioner failed to establish accessibility by a POSITA. (IPR2021-01496, PO Response, 22-23; IPR2021-01496, PO Sur-Reply, 9)

IPR2021-01496, POR, 19-25; PO Sur-Reply, 9-10
IPR2021-01498, POR, 36-43; PO Sur-Reply, 9-10

Petitioner Failed To Establish A Publication Date Prior To April 8, 2016



IPR2021-01496, EX1004, 1

UNITED STATES PATENT AND TRADEMARK OFFICE

BEFORE THE PATENT TRIAL AND APPEAL BOARD

ARRI AG,

Petitioner,

v.

ROTOLIGHT LIMITED,

Patent Owner.

DECLARATION OF SIMON CANINS REGARDING AX10 SPOTMAX™ MANUAL

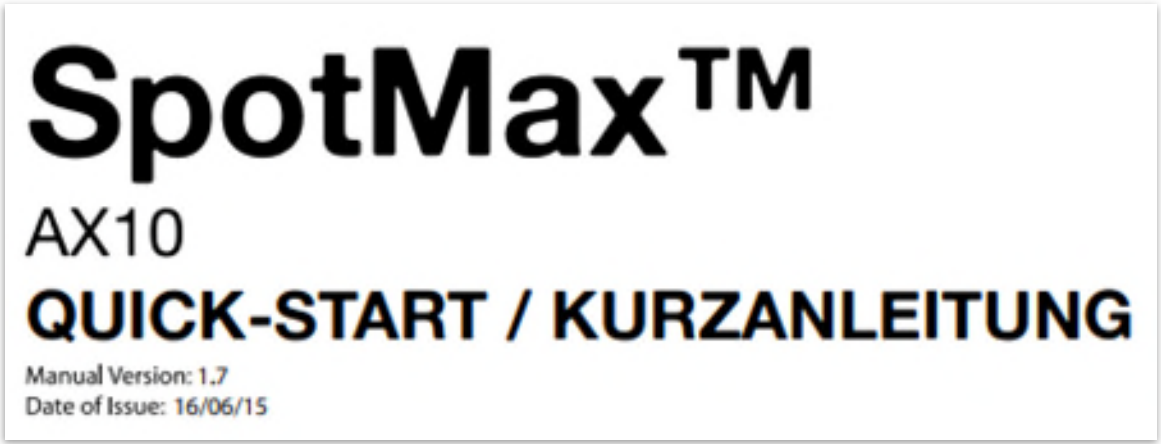
IPR2021-01496, EX1008, 1

4. Astera includes a "Quick Start Guide" in the box of the products it sells. These Quick Start Guides contain safety instructions and basic usage and specifications. They also includes a link and a QR code that leads to an Astera webpage, where the full "User Manual" for the product, like the AX10 Manual, can be viewed, printed, and downloaded. Information required for the full operation of the AX10 Product is only provided in the full User Manual (not the Quick Start Guide). For environmental reasons, however, Astera does not print and include a physical copy of the full User Manual in the box of each product.

IPR2021-01496, EX1008, ¶4

IPR2021-01496, POR, 19-25; PO Sur-Reply, 9-10
IPR2021-01498, POR, 36-43; PO Sur-Reply, 9-10

Petitioner Failed To Establish A Publication Date Prior To April 8, 2016



IPR2021-01496, EX1008, Exhibit B at 1

IPR2021-01496, POR, 19-25; PO Sur-Reply, 9-10
IPR2021-01498, POR, 36-43; PO Sur-Reply, 9-10

Mr. Canins' And Astera's Preferred Date Format

Mr. Canins uses a "Year/Month/Date" format, and stated that "Year/Month/Date" is the **most common** format used by Astera

nothing, just informative. Also there was a Quick Start Guide which traditionally always was handled by this marketing part.

I also put my fingers into that after I had finished the manual, because I knew that it's important that people open the box and even get a link to the manual so it's easier for them to find it. So we leave the Quick Start Guide as well under my direction, which was also then added to the item. That's as far as I went, and obviously I took care that this also got executed in terms of marketing it.

IPR2021-01496, EX2007, 21:18-22:7

Q. Year, month, date. Is that the typical format for Astera users?

A. No. We are German and we have lots of people in China. And sometimes we even try to use their dates. So that is the most common one we use in the company unless we try to please someone else.

IPR2021-01496, EX2007, 40:7-13

Q. Got it. Which date format is the most common?

A. Most common for what?

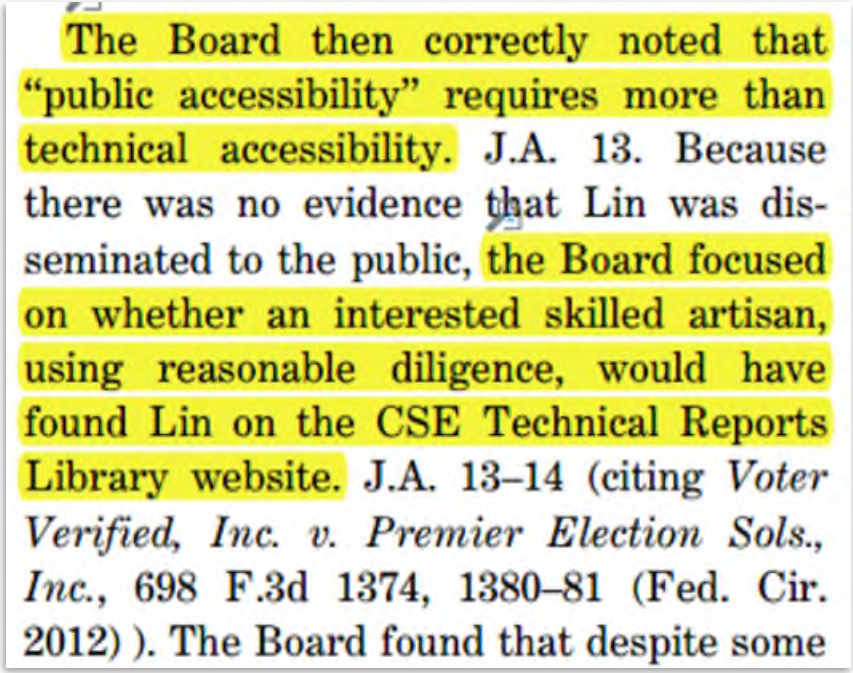
Q. The document.

A. I'm using this mostly if you ask me.

IPR2021-01496 EX2007, 40:18-22

IPR2021-01496, POR, 19-25; PO Sur-Reply, 9-10
IPR2021-01498, POR, 36-43; PO Sur-Reply, 9-10

Petitioner Failed To Establish Accessibility By A POSITA



The Board then correctly noted that "public accessibility" requires more than technical accessibility. J.A. 13. Because there was no evidence that Lin was disseminated to the public, the Board focused on whether an interested skilled artisan, using reasonable diligence, would have found Lin on the CSE Technical Reports Library website. J.A. 13–14 (citing *Voter Verified, Inc. v. Premier Election Sols., Inc.*, 698 F.3d 1374, 1380–81 (Fed. Cir. 2012)). The Board found that despite some

Acceleration Bay, LLC v. Activision Blizzard Inc., 908 F.3d 765, 773 (Fed. Cir. 2018)

IPR2021-01496, POR, 19-25; PO Sur-Reply, 9-10
IPR2021-01498, POR, 36-43; PO Sur-Reply, 9-10

Petitioner Failed To Establish Accessibility By A POSITA

A person of ordinary skill in the art ("**POSITA**") in the field of the '257 would have had a good working knowledge of electrical engineering and entertainment lighting systems, controls, and effects. (Wood Decl., ¶ 39.) She would have gained this through an undergraduate Bachelor's degree in electrical engineering, or a comparable field as well as some experience in the field (*e.g.*, in entertainment lighting systems). (*Id.*) The more education one has, the less

IPR2021-01496, Petition, 8

A. Well, it's an interesting topic. So we have different kinds of customers I would say. But the most important ones are what we call rental companies. So there's companies out there, they basically do -- you couldn't even say financial investment, so they see what products they could buy for their rental stock and how much payback we would get over time.

IPR2021-01496, EX2007, 35:9-16

as many more. And on the other hand, we have people that decide to buy these lights for their own use, basically they also do events and they use their own stuff there basically. And they don't rent it to other people.

IPR2021-01496, EX2007, 35:9-16

IPR2021-01496, POR, 19-25; PO Sur-Reply, 9-10
IPR2021-01498, POR, 36-43; PO Sur-Reply, 9-10

The Astera Manual Discloses Features That Petitioner Has Not Shown To Have Been Available Prior To April 8, 2016

7.12 ANTI-FLICKER

The PWM refresh rate of this light is 599.4 Hz by default. This frequency can be freely adjusted between 200 Hz and 1205 Hz to fit different camera's frame rates.

IPR2021-01496, EX1004, 32

7.13 THEFT ALARM

Your light is equipped with a theft alarm. A motion sensor in the light detects when it is moved/taken away and a small siren will sound to deter potential thieves.

IPR2021-01496, EX1004, 33

IPR2021-01496, POR, 19-25; PO Sur-Reply, 9-10
IPR2021-01498, POR, 36-43; PO Sur-Reply, 9-10

AsteraApp™ V.8.43 And V.9.11

AsteraApp™ V.8.43 was released on April 3, 2016

Updated	Size	Installs
April 3, 2016	9.3M	1,000 - 5,000
Current Version	**Requires Android**	**Content Rating**
8.43	4.0.3 and up	Everyone Learn more

IPR2021-01496, EX2011, 1-2

AsteraApp™ V.9.111 was released on July 17, 2019

Version :	9.111	Developer :	Astera LED Technology GmbH
Category :	Tools	Requires Android :	Android 4.0.3+
Update :	July 17, 2019	Content Rating :	Everyone
Installs :	25,407	Get it on :	Google Play

IPR2021-01496, EX2010, 1

IPR2021-01496, POR, 19-25; PO Sur-Reply, 9-10
IPR2021-01498, POR, 36-43; PO Sur-Reply, 9-10

The Features Listed Under The V9 Announcement Appear To Be Newly Added

Android application AsteraApp™ developed by Astera LED Technology GmbH is listed under category Tools. The current version is 9.111 released on 2019-07-17. According to Google Play AsteraApp™ achieved more than 25 thousand installs. AsteraApp™ currently has 118 ratings with average rating value of 4.5

---------- AsteraApp™ v9 with Talkback+ is now online! ----------

IPR2021-01496, EX2010, 2

- Talkback+
Detect all available lights, set them up, check their status, configure DMX addresses and DMX presets.

- Theft Alarm
With built-in sensors the lights give visual and audio alarm and send notification to the AsteraApp™ if they are being moved during an event.

- Anti-flicker
Avoid flickering in recorded videos by adjusting the PWM frequency of the lights.

IPR2021-01496, EX2010, 2

IPR2021-01496, POR, 19-25; PO Sur-Reply, 9-10
IPR2021-01498, POR, 36-43; PO Sur-Reply, 9-10

The European Patent Office Held That The Astera Manual Was Not Prior Art

Even if NPL2 appears to be relevant for the assessment of novelty/inventive step (see in particular chapter 7.12 and the argumentation in the previous official communication at p.3-4), the examining division cannot proof the date of disclosure to be before the priority date (08.04.2016) of the present application. Therefore, the disclosure of NPL2 is disregarded because it cannot be proven by the examining division that NPL2 was made available to the public before 08.04.2016.

IPR2021-01496, EX2008, 87

IPR2021-01496, POR, 19-25; PO Sur-Reply, 9-10
IPR2021-01498, POR, 36-43; PO Sur-Reply, 9-10

The Showline Manual Is Not Prior Art

Petitioner failed to meet its burden of showing the Showline Manual was publicly available

Petitioner Failed To Establish Accessibility By A POSITA

A person of ordinary skill in the art ("**POSITA**") in the field of the '258 would have had a good working knowledge of electrical engineering and entertainment lighting systems, controls, and effects. (Wood Decl., ¶ 36.) She would have gained this through an undergraduate Bachelor's degree in electrical engineering, or a comparable field, as well as some experience in the field (*e.g.*, in entertainment lighting systems). (*Id.*) The more education one has, the less

IPR2021-01497, Petition, 7

already on the market as a direct replacement product. The first sales of the SL PAR 155 were in December 2013 to dealers, and these dealers started shipping to end user customers in January 2014, with more than 1,800 SL PAR 155 units being sold within the United States from its launch around October of 2013 through the end of 2014. Around an additional 900 SL PAR 155 units were sold globally in

IPR2021-01497, EX1010, 4

IPR2021-01497, POR, 20-21
IPR2021-01497, PO Sur-Reply, 8-9

All Independent Claims

IPR2021-01496, -01497, -01498

’257 Patent Claims

Independent Claim 1 of the ’257 Patent (EX1001, 11:54-12:3):

[1pre] A method for controlling a lighting device to produce a user customisable lighting effect, the method comprising:

[1a] calculating, using an effect simulator, a time varying lighting value based on at least one simulation parameter;

[1b] wherein said at least one simulation parameter characterises a user customisable lighting effect selected from a range of different user customisable lighting effects for at least one of: videography, broadcasting, cinematography, studio filming, and location filming;

[1c] wherein said at least one simulation parameter is at least one of: a random brightness; a random duration; and a random interval;

[1d] said simulation parameter depending on the user customisable lighting effect being simulated; and

[1e] outputting, from said effect simulator, said time varying lighting value thereby to simulate the user customisable lighting effect.

’257 Patent Claims

Independent Claim 15 of the ’257 Patent (EX1001, 12:57-13:8) recites a similar limitation, in system form:

[15pre] A controller adapted to control at least one lighting device to produce a user customisable lighting effect, the controller comprising:

[15a] an effect simulator adapted to calculate a time varying lighting value based on at least one simulation parameter;

[15b] wherein said at least one simulation parameter characterises a user customisable lighting effect selected from a range of different user customisable lighting effects for at least one of: videography, broadcasting, cinematography, studio filming, and location filming;

[15c] wherein the at least one simulation parameter is at least one of: a random brightness; a random duration; and a random interval;

[15d] said simulation parameter depending on the user customisable lighting effect being simulated; and

[15e] wherein an output of the effect simulator is adapted to control a lighting device according to the calculated variation of lighting over time.

’257 Patent Claims

Independent Claim 20 of the ’257 Patent (EX1001, 14:1-18) recites an identical limitation:

[20pre] A computer program comprising software code for controlling a lighting device to produce a user customisable lighting effect, the computer program adapted to perform, when executed, the steps of:

[20a] calculating, using an effect simulator a time varying lighting value based on at least one simulation parameter;

[20b] wherein said at least one simulation parameter for [*sic*] characterises a user customisable lighting effect selected from a range of different user customisable lighting effects for at least one of: videography, broadcasting, cinematography, studio filming, and location filming;

[20c] wherein the at least one simulation parameter is at least one of: a random brightness; a random duration; and a random interval;

[20d] said simulation parameter depending on the user customisable lighting effect being simulated; and

[20e] outputting, from said effect simulator, said time varying lighting value thereby to simulate the user customisable lighting effect.

’258 Patent Claims

Independent Claim 1 of the ’258 Patent (EX1001,11:59-12:12):

[1pre] A lighting system comprising:

[1a] a lighting device; and

[1b] a controller adapted to control the lighting device to produce a user customisable cinematic lighting special effect selected from a range of different user customisable cinematic lighting special effects, the controller comprising:

[1c] an input interface for receiving user input to enable a user to select user customisable cinematic lighting special effect from said range of different user customisable cinematic lighting special effects; and

[1d] an effect simulator adapted to calculate a time varying lighting value based on at least one simulation parameter, said at least one simulation parameter depending on the selected user customisable cinematic lighting special effect being simulated, and adapted to output said time varying lighting value to said lighting device so as to simulate the selected user customisable cinematic lighting special effect;

[1e] wherein said lighting device and said controller are integrated in a combined unit.

’101 Patent Claims

Independent Claim 1 of the ’101 Patent (EX1001, 11:59-12:11):

[1pre] A method for controlling a lighting device to produce user customisable lighting effects while compensating for rolling shutter artefacts produced by a camera, the method comprising:

[1a] calculating, using an effect simulator, a time varying lighting value[;]

[1b] compensating for the rolling shutter artefacts produced by the camera, the time varying lighting value being calculated based on at least one user input simulation parameter input by a user,

[1c] said at least one user input simulation parameter comprising a user selectable parameter indicative of a member of a group consisting of: a camera recording frequency of the camera, a camera shutter speed of the camera, a camera frame rate of the camera; and

[1d] outputting, from said effect simulator, said calculated time varying lighting value to said lighting device thereby to simulate a lighting effect compensated for the rolling shutter artefacts.

’101 Patent Claims

Independent Claim 11 of the ’101 Patent (EX1001, 12:47-64) recites a similar limitation, in system form:

[11pre] A controller adapted to control a lighting device to produce user customisable lighting effects while compensating for rolling shutter artefacts produced by a camera, the controller comprising:

[11a] an effect simulator adapted to calculate a time varying lighting value compensating for the rolling shutter artefacts produced by the camera based on at least one user input simulation parameter input by a user,

[11b] said at least one user input simulation parameter comprising a user selectable parameter indicative of a member of a group consisting of: a camera recording frequency of the camera; a camera shutter speed of the camera; and a camera frame rate of the camera; and

[11c] wherein the effect simulator is adapted to output said calculated time varying lighting value to the lighting device thereby to simulate a lighting effect compensated for rolling shutter artefacts.

’101 Patent Claims

Independent Claim 17 of the ’101 Patent (EX1001, 13:15-14:9) recites an identical limitation:

[17pre] A computer program comprising software code for controlling a lighting device to produce user customisable lighting effects while compensating for rolling shutter artefacts produced by a camera, the computer program adapted to perform, when executed, the steps of:

[17a] calculating, using an effect simulator, a time varying lighting value compensating for the rolling shutter artefacts based on at least one user input simulation parameter input by a user,

[17b] said at least one user input simulation parameter comprising a user selectable parameter indicative of a member of a group consisting of: a camera recording frequency of the camera, a camera shutter speed of the camera, and a camera frame rate of the camera; and

[17c] wherein the effect simulator is adapted to output, from said effect simulator, said calculated time varying lighting value to said lighting device thereby to simulate a lighting effect compensated for rolling shutter artefacts.