

UNITED STATES PATENT AND TRADEMARK OFFICE

BEFORE THE PATENT TRIAL AND APPEAL BOARD

VIDENDUM PRODUCTION SOLUTIONS, INC.,
Petitioner,

v.

ROTOLIGHT LIMITED,
Patent Owner.

Case (to be assigned)
Patent 10,197,257

**DECLARATION OF WOODY SMITH
IN SUPPORT OF VIDENDUM PRODUCTION
SOLUTIONS, INC.'S PETITION
FOR *INTER PARTES* REVIEW OF U.S. PATENT NO. 10,197,257**

I, Woody Smith, declare:

I. INTRODUCTION

1. I have been retained by Videndum Production Solutions, Inc. (“Videndum”) to offer technical analysis and opinions relating to U.S. Patent No. 10,197,257 (Ex. 1001) (the “’257 Patent”) (Ex. 1001) and certain prior art references relating to its subject matter.

2. As far as I am aware, I have no financial interest in the Petitioner, Patent Owner, the ’257 Patent, or in the outcome of this proceeding. I am being compensated for my work as an expert on an hourly basis at my standard consulting rate. My compensation is not dependent on the outcome of these proceedings or the content of my opinions.

3. I have been informed that the ’257 Patent was challenged by Arnold & Richter Cine Technik GmbH & Co. Betriebs KG (“ARRI”) in 2021-2022. I have reviewed the September 3, 2021 and September 9, 2022 declarations submitted by Michael Wood in which he opined that the claims of the ’257 Patent are invalid based on Astera and Pohlert. I agree with Mr. Wood’s conclusions regarding whether these claims are anticipated and/or obvious.

4. I present this Declaration in order to present my opinions on ’257 Patent and its relation to the prior art.

II. BACKGROUND AND QUALIFICATIONS

5. After receiving my B.S. in Electrical Engineering in 1975, I became involved in the lighting industry starting with regional (Texas) touring sound and lighting support. PAR cans with gels were commonplace at the time. Automated entertainment lighting was just beginning to impact touring but showed how much more was possible. That led me to design and develop a small, DMX controlled color mixing RGB light fixture. High End Systems, then the largest manufacturer of automated entertainment lighting at the time, must have like it and hired me as Director of R&D and so began 30+ years working in the areas of lighting fixture design and development, LED lighting, controls, electronics and manufacture. My work has included the design and manufacture of automated entertainment lighting fixtures including: High End Systems Studio Color & Technobeam, Hubbell Lighting Entertainment Helix range of entertainment lighting, Affineon Lighting DL, PAL, IG, and other LED lighting fixtures featuring DMX controlled dimming and color mixing, Evolucia Lighting Street Lighting fixtures, and most recently VERTAAG Lighting automated lighting, digital controls, sensors and software for Controlled Environment Agriculture. In addition to the design and development of lighting fixtures I've also provided technical support for automated lighting world-wide for major entertainment events including Singapore National Day (Singapore), Vina del Mar (Chile), China National Television, as well as numerous concert tours

including Van Halen and Britney Spears. While at High End Systems I also assisted in the drafting of patent applications from the technical side and worked with High End's patent attorney. This included the drafting of the High End Systems patent on the Studio Color design where I am listed as the primary inventor.

6. I am familiar with the lighting control systems and controls described and claimed in the '257 Patent. I have been designing lighting fixtures which utilize AMX-192 and DMX-512 ever since the inception of these standards by USITT and ANSI. Starting with my first RGB lighting fixture design I have incorporated microprocessor control of lighting functions with AMX or DMX to control lighting fixture functionality. This includes controlling numerous aspects of the lighting fixtures function from dimming (electronic as well as mechanical), strobe, color selection, color mixing, pattern selection, beam shaping, pattern rotation, beam positioning and more. These functions are typically addressed and implemented through the use of microprocessors within the fixture which translate the digital data (DMX) into a value which is then compared against a predetermined function within the lighting fixture.

7. It is also commonplace that the lighting control device (lighting console) is outfitted with extensive micro processing power and memory. While many special functions can be imbedded within the fixture software a wide range of effects are implemented by the control console including dimming, color changing,

pattern changing, strobe, positioning, flicker effects, chase, ballyhoo, waves, etc. This is only limited by the lighting designer's creativity, knowledge and expertise.

8. My CV is attached to this Declaration as Appendix B.

III. INFORMATION CONSIDERED

9. In forming my opinions as expressed in this Declaration, have reviewed the '257 Patent and its prosecution history, as well as the other materials referenced in Appendix A. I have also reviewed all of the Exhibits submitted with the Petition.

10. Counsel has informed me that I should consider these materials through the lens of one of ordinary skill in the art related to the '257 Patent at the time of the earliest purported priority date of the '257 Patent, which I understand to be April 8, 2016 (the "Priority Date"). I have done so during my review of these materials.

11. As noted above, I have reviewed the declarations submitted by Michael Wood in IPR2021-01496 and agree with the ultimate conclusion regarding anticipation and obviousness.

12. My analyses are based on my education and practical experience, as well as my inspection and study of relevant materials. In my analyses, I have considered the materials identified in this Declaration and those listed in Appendix A. I may rely on these materials, additional materials, and this Declaration as a whole in order to respond to arguments raised by the Patent Owner. I may also

consider other documents and information in further analyses, including materials that may not yet have been provided to me.

13. My review and assessment of the materials provided in this proceeding are ongoing, and I will continue to consider new materials as they are provided to me. I reserve the right to review, supplement, and amend my analyses to address any new information obtained in the course of this proceeding, on my continuing review of the materials already provided, or based on any new positions taken by Patent Owner.

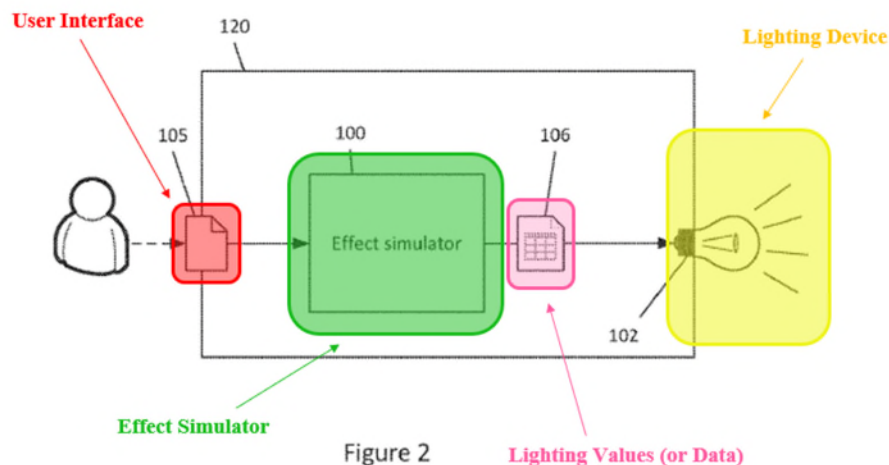
IV. BACKGROUND OF THE '257 PATENT

A. The '257 Patent

14. Independent Claims 1, 15, and 20 of the '257 Patent recite a method, controller, and computer program, respectively, for producing a user customizable lighting effect that has at least one of a random “brightness,” “duration,” or “interval.” Ex. 1001 at 1:17-20, 2:1-35, 11:54-12:3, 12:57-13:8, 14:1-18.

15. The independent claims recite two basic elements: (1) calculate a “time varying lighting value” based on a simulation parameter that: (a) characterizes a user customizable lighting effect for use in videography, broadcasting, cinematography, studio filming, and location filming and (b) includes a parameter related to at least one of a random brightness, duration, or interval; and (2) output the “time varying lighting value” to a lighting device, so as to generate the user-selected lighting effect.

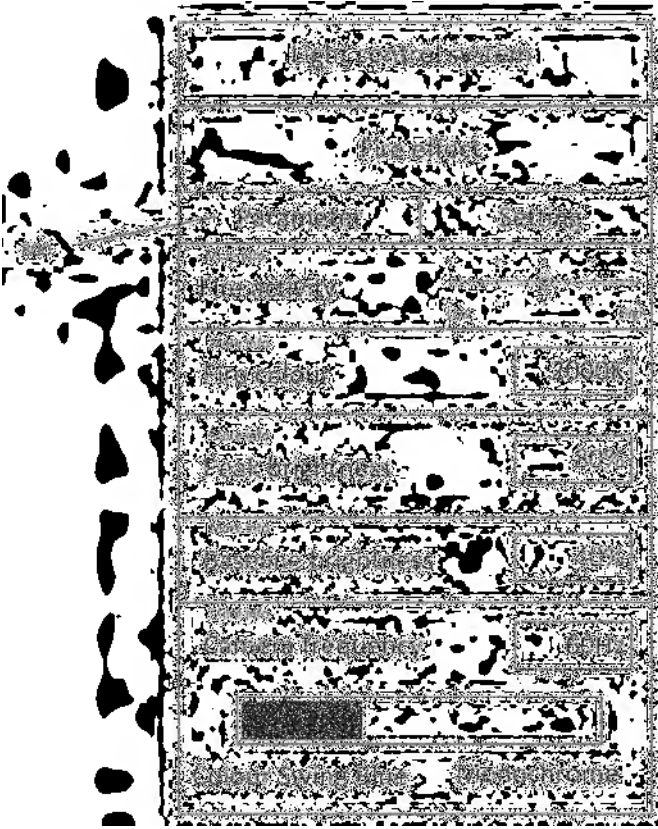
Ex. 1001 at 3:37-43, 11:54-57. This series of functions is “standard” operating means in most “intelligent” lighting fixtures. As detailed hereafter, it is standard for a lighting fixture to receive a command from an external (or internal) user interface device, such as a lighting controller, to modify a given parameter or operation of the lighting fixture. Change of color, movement of beam, rotation of effects, all are parameters of lighting fixtures which are controlled by the user. On receiving an input from said device the lighting fixture will compare the latest data set versus current data set and calculate any necessary actions to implement same. This could include a change of color by instructing a motor within the fixture to rotate the color wheel to a new location, dimming of the light by closing a shutter slowly, strobe effect by moving the shutter open to close quickly, etc. Strobe effects, for example, may be of variable speed depending upon the value received by the lighting fixture.



Id. at Fig. 2 (annotated).

16. The '257 Patent describes how users can make selections of desired lighting effects on the user interface. *Id.* at 6:1-8, 6:43-7:44, Fig. 2. Depending on the desired effect, a user can select “simulation parameters,” such as “brightness,” “duration,” “colour,” and “frequency,” to customize the effect. *Id.* at 3:47-62, 6:44-7:12, 8:8-21, Fig. 6. The “effect simulator” uses these simulation parameters, which may be random or user-selected, to calculate the data, or “time varying lighting value[s],” that characterize the lighting effect and are used to produce it on the LEDs. *Id.* at 3:50-51, 7:25-44, 8:14-48.

17. For example, the '257 Patent indicates that “fire” is a randomized effect that the user can produce and customize. *Id.* at 6:43-63, 8:14-25, 9:51-65. Parameters, such as color (“fire colour”) and maximum brightness (“peak brightness”), minimum brightness (“baseline brightness”), and “fire activity” can be used to customize the effect. *Id.* The effect will produce randomized sparks, or flicker, based on the modified parameters. *Id.*; *see also* Fig. 6.



Id. at Fig. 6.

18. I understand the '257 Patent was filed November 22, 2017 and issued February 5, 2019. Ex. 1001 at Cover Page. The '257 Patent is a continuation of U.S. Application No. 15/481,460, and claims priority to U.S. Provisional Application No. 62/319,809, which was filed April 8, 2016. Ex. 1001. I have assumed, for purposes of this Declaration, that the '257 Patent is entitled to this Priority Date of April 8, 2016.

19. During examination, the claims of the '257 Patent were rejected in a single office action. Ex. 1002 at 422-34. The examiner rejected the claims as anticipated by U.S. Patent Publication No. 2008/0129226, which was published June

5, 2008 (“Dewitt”). *Id.* In the rejection, the examiner indicated that Dewitt “discloses a method and a computer program product for controlling a lighting device to produce a range of user customizable realistic lighting effects for videography,” among other uses. *Id.* The examiner also indicated that Dewitt is adapted to (a) calculate the time-varying lighting value wherein the simulation parameter characterized a lighting effect that has at least one of random brightness, duration, or interval; and (b) output the time-varying lighting value to simulate a lighting effect. *Id.*

20. In response, the Applicant amended the independent claims, purportedly to clarify that “the simulation parameter(s) 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.” Ex. 1002 at 457. The Applicant argued that, while DeWitt teaches a simulated “tea light” candle, this does not necessarily imply that the lighting effect is selected from a range of lighting effects for videography, broadcasting, cinematography, studio filming, or location filming, as claimed. *Id.*

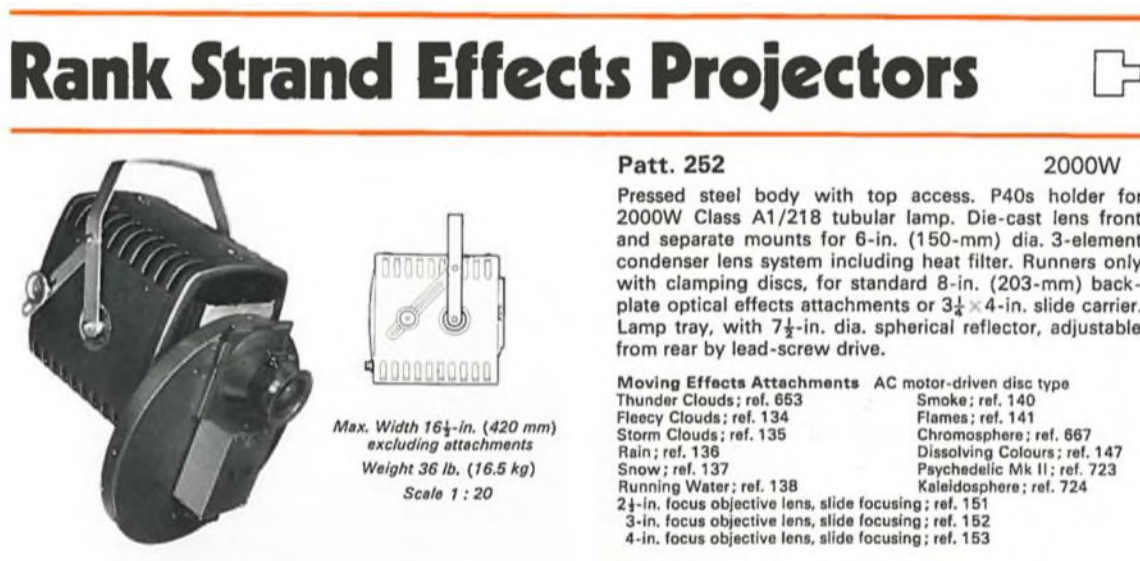
21. The claims of the ’257 Patent were thereafter allowed. Ex. 1002 at 601-08. In the Notice of Allowance, the Examiner indicated the claims should be allowed because “[t]he prior art fails to teach or fairly suggest combination of elements

recited in independent Claims 1, 15, and 20.” *Id.* at 606-07. The Examiner then restated the entirety of the language of Claim 15 following the preamble.

V. ENTERTAINMENT LIGHTING EFFECTS SYSTEMS

22. The '257 Patent discusses lighting effects, but this is nothing new. In fact, lighting effects for entertainment industries (e.g., film, broadcast and TV) have a long history. Directors have long desired realistic lighting arrangements to fully engage the audience into the plot of the movie or program. Effects help complete the illusion for the viewers. Examples include the use of warm, dynamic light to represent a fire, for example.

23. An early example of a self-contained lighting product designed to produce these types of effects is shown below.

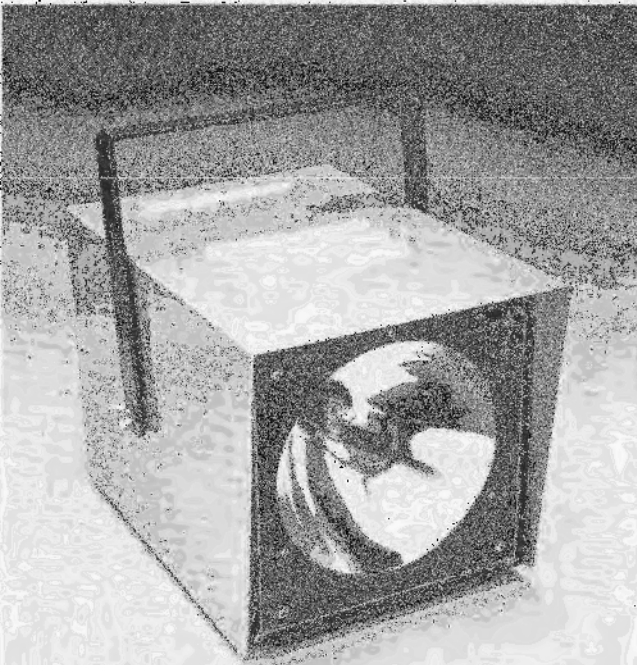


The above image is an excerpt from Strand Electric’s 1971 catalogue, showcasing the Patt 252 Effects Projector. The Patt 252 was an integrated effects projector for

use in theatre, film, and TV. This device operates by projecting effects from discs chosen from a long list of options. As listed in the catalogue under “Moving Effects Attachments,” these options included Flames, Rain, Snow, and Running Water. A user could add atmosphere to a scene by projecting the effects onto performers or backgrounds. The effects were dynamic and moving, controlled by the rotation speed of the disc. The disc speed could be manually varied and adjusted directly from the effects projector through the small box seen under the light output lens in the above figure. This type of effects projector was in standard use throughout the 1960s and is still occasionally seen today, though later models also included remote control options.

24. This kind of unit answered the need for continuous effects (e.g., fire and light reflected from water) but it did not provide the flashes required for other types of effect simulations (e.g., lightning). Further, incandescent filament lamps were not ideal for such lightning simulations because of the time required to heat up and cool down, which may not depict the instantaneous flash of real lightning.

25. Instead, many television and film makers shifted to the xenon strobe technology, which was originally developed for photographic flash and high-power emergency lights. For example, the pictures below show an Optikinetics Super Strobe from the 1980s:



Super Strobe Full Power Strobe Unit

The Super Strobe is a compact unit that offers an excellent quality of light with great flexibility in operation.

The unit is designed for rugged use and is built to withstand the most demanding conditions.

The Super Strobe is available in two models: a standard model and a high power model. Both models are designed to provide excellent results in a wide range of applications.

The Super Strobe is a versatile unit that can be used in a variety of applications, including photography, cinematography, and stage lighting.

The Super Strobe is a compact unit that offers an excellent quality of light with great flexibility in operation.

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The Super Strobe is available in two models: a standard model and a high power model. Both models are designed to provide excellent results in a wide range of applications.

The Super Strobe is a versatile unit that can be used in a variety of applications, including photography, cinematography, and stage lighting.



The Super Strobe could be locally operated and the flash rate was controlled by the user through a knob on the rear of the unit. *See above image.* The unit also had a “Remote Input” connection, allowing the strobe to be remotely operated or linked to other units. These larger banks of strobes could be synchronized to produce larger effects. I have personal experience with these types of products for entertainment applications.

26. Over time, the effects projectors and strobes improved and their functionality was integrated with the automated lighting units that were widely used from the 1990s onwards. Companies like Vari-Lite, High End Systems, Coemar, Clay-Paky and TAS, developed and manufactured sophisticated lighting instruments

capable of producing colored effects, strobing, movement, and pattern projection in a single unit. These devices were adopted throughout the entertainment industry, including applications in film and TV, for the kinds of effects described above and in the '257 Patent.

27. In the mid-1980s, automated lights were remotely controlled through digital communication protocols from a central control desk capable of controlling multiple lights at once. With the 1990s came the introduction of lighting units that added local control via on-board control panels and displays. This improvement allowed for units to be used independently, without a remote controller sending commands to the units. Starting in the early 2000s, the vast majority of automated light included this local control functionality as a standard feature. This allowed the user to locally control selections of effects and their parameters, such as the speed of strobes, duration of lightning flashes, and the speed of color changing effects. In addition, the ability to control effects with a random timing element was introduced. As discussed below, this resulted in more realistic effects, especially for lightning flashes or a candle flickering.

28. One common method of remote control, which is currently widely used, is an industry standard digital communications protocol called DMX512. This protocol allows a master controller to send individual data to several connected luminaires at once.

29. DMX-512 is a variant of industry standard RS-485 developed by the U.S. Institute for Theatre Technology (“USITT”). The DMX512 standard (512 channels of 8-bit data) was created in 1986, with subsequent revisions in 1990 leading to USITT DMX512/1990. This lighting protocol replaced AMX-192, which was developed by Strand Century in the late 1970s. AMX-192 was an analog-based protocol with severe limitations on data density, volume, and the distance to which the data could be transmitted. DMX-512 is duplex, meaning it allows a larger volume of data, and bi-directional transmission of same, to allow the transmission of data between devices. This allows data to be transmitted from a controller to any number of devices. Those devices to be addressed from 1 to 512 so (i) to know what data is relevant for that device and (ii) to communicate back to the data source or to other devices within the network.

30. These methods and effects systems remained as features within the luminaires while manufacturers began to transition from conventional light sources (e.g., incandescent or HID sources) to the more efficient and user-friendly LEDs. Although LEDs had been available prior, white LEDs for lighting were not yet possible. In 1994, Shuji Nakamura invented the ultra-bright blue LEDs that served as the foundation for today’s common commercial LEDs. Blue light can be used to “excite” light emission from phosphors that have been commercially used in fluorescent lighting for decades. In the case of fluorescents, far blue or ultra-violet

energy excites the phosphor compounds, which then release this higher energy in the form of lower-frequency light within the visible spectrum. The specific combination of phosphors controls the spectrum of emitted light at a lower frequency or wavelength, specifically selected to emit in the visible light spectrum. Similarly, blue-emitting LEDs could be used to excite phosphors that “down-convert” the high-frequency blue light to colors within the visible light spectrum.

31. In 1996, the first commercially viable white LEDs were developed and offered for sale from Nichia in Japan. While a variety of colors were possible with prior LEDs, the blue LED was particularly difficult to produce. In the early 2000s, LEDs became sufficiently bright enough to be used in film and TV. The availability of a higher power (brighter) LEDs led manufacturers to produce new luminaires that utilized LEDs and included the features of the prior models and new features made possible by LEDs.

32. There are drawbacks of using incandescent lamps as lightning or strobe simulators due to their relatively slow on and off times. However, this does not limit lighting fixtures produced since the 1980s from creating strobing effects, and a wide range of other special effects while using incandescent light sources or much more powerful discharge lamps. The use of mechanical shutters, mechanical dimming, etc., allowed a wide range of effects to be produced, albeit with major issues related to heating.

33. LEDs do not suffer from this issue, rather, they can be turned on and off almost instantaneously. As a result, LEDs were a clear choice for lighting effects like emergency vehicle strobes or lightning. Further, LEDs were available in multiple colors, eliminating the need for colored gels and filters. Because of these benefits, a single LED luminaire could perform many different tasks.

34. At the time of the '257 Patent, there were several available options for the generation of lighting effects in the entertainment industries. Luminaires could produce effects controlled either locally with a control panel on the luminaire, or remotely through a data connection (e.g., DMX-512 control protocol). Further, luminaires could be connected to produce coordinated or synchronized effects. Coordinated or synchronized effects can be used to produce several lightning bursts from different directions, or to mimic the movement of an emergency vehicle. As discussed above, these coordinated effects could be controlled locally from each luminaire individually, or in a master-slave relationship.¹ Multiple luminaires could also be controlled from a central lighting control system through a dedicated communication link. For each of the above control methods (local, master-slave, and remote), the ability to control the timing, speed, or rate of effects is a given.

¹ In the master-slave relationship, one luminaire is designated as the master and its local control panel controls other connected luminaires.

35. All of these systems and techniques were in common use at the time of the '257 Patent.

VI. CLAIM CONSTRUCTION AND DEFINITION OF THE POSITA

A. Claim Construction

36. It is my understanding that claims in an IPR are generally given their ordinary and customary meaning, which is the meaning that the term would have to a person of ordinary skill in the art in question at the time of the invention.

37. I have analyzed the patentability of Claims 1-21 in the '257 Patent based on their ordinary and customary meaning, unless otherwise stated below.

B. Definition of a Person of Ordinary Skill in the Art

38. A person of ordinary skill in the art ("POSITA") in the field of the '257 Patent would have had a good working knowledge of electrical engineering and entertainment lighting systems, controls, and effects. The POSITA would have obtained 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).

39. The more education one has, the less experience needed to attain an ordinary level of skill. Similarly, more experience in the field may serve as a substitute for formal education.

VII. THE ELEMENTS IN CLAIMS 1-21 OF THE '257 PATENT ARE DISCLOSED IN THE PRIOR ART

40. I have been asked to provide an analysis as to whether the elements of Claims 1-21 of the '257 Patent (the "Challenged Claims") are disclosed in two prior art references: (a) the Astera AX10 Spotmax User Manual (Ex. 1004) ("Astera Manual") and (b) U.S. Patent Application Publication No. 2012/0257374 (Ex. 1006) ("Pohlert").

VIII. GROUND I: THE ASTERA MANUAL ANTICIPATES CLAIMS 1-21

A. The Astera Manual

41. The Astera Manual (Ex. 1004) is a user manual for the AX10 Spotmax (the "AX10"), which is a controllable lighting device used in the entertainment industry. The AX10 is commonly used in cinematography, studio filming and photography, and entertainment lighting. I have analyzed the Astera Manual, dated May 7, 2015. Ex. 1004. I understand the Astera Manual to qualify as prior art.

42. Astera LED Technology GmbH, the manufacturer of the AX10, is a German company that has established a reputation in the entertainment lighting business as a manufacturer of LED lighting, specifically for use in film, TV, and outdoor entertainment. The company was founded in the mid-2000s and is known for its battery-powered products and wirelessly-controlled luminaires that do not require a main power source. For example, the Astera AX10 is waterproof and capable of being run from local battery power with wireless control. This allows for

greater freedom and flexibility in use, making the Astera AX10 particularly well-suited for location shooting for in film and TV. The Astera AX10 can be used at public events, festivals, concerts, and other venues where a completely self-contained lighting unit with no cabling requirement is used.

43. After reviewing the '257 Patent's file history, it is my opinion that the Astera Manual was not substantively considered during prosecution of the '257 Patent.

44. Astera attends industry trade shows such, showcasing products that are widely used throughout the industry. Based on my review of the declaration provided by Simon Canins (Ex. 1005), Astera showcased its AX10 Spotmax at the Prolight and Sound Tradeshow in Frankfurt Germany around March 2014. Ex. 1005 at ¶¶ 2, 5.

45. I understand that the Astera Manual was publicly available in 2015. Ex. 1005 at ¶¶ 4-8. I also understand that a "Quick Start Guide," which included a QR code and link for accessing the full Astera Manual, was included in the packaging of AX10 products sold in 2015. Ex. 1005 at ¶¶ 4-8. In addition, I understand that the Astera Manual was publicly available online, through Astera's website since before the Priority Date. Ex. 1005 at ¶¶ 4-8.

46. The Astera Manual includes information on the AX10 lighting system, including guidance on its operation and use. Ex. 1004. The AX10, pictured below,

is a controllable lighting fixture that includes an array of nine “RGBAW” (red, green, blue, amber, and white) LEDs with 135W power. Ex. 1004 at 7.



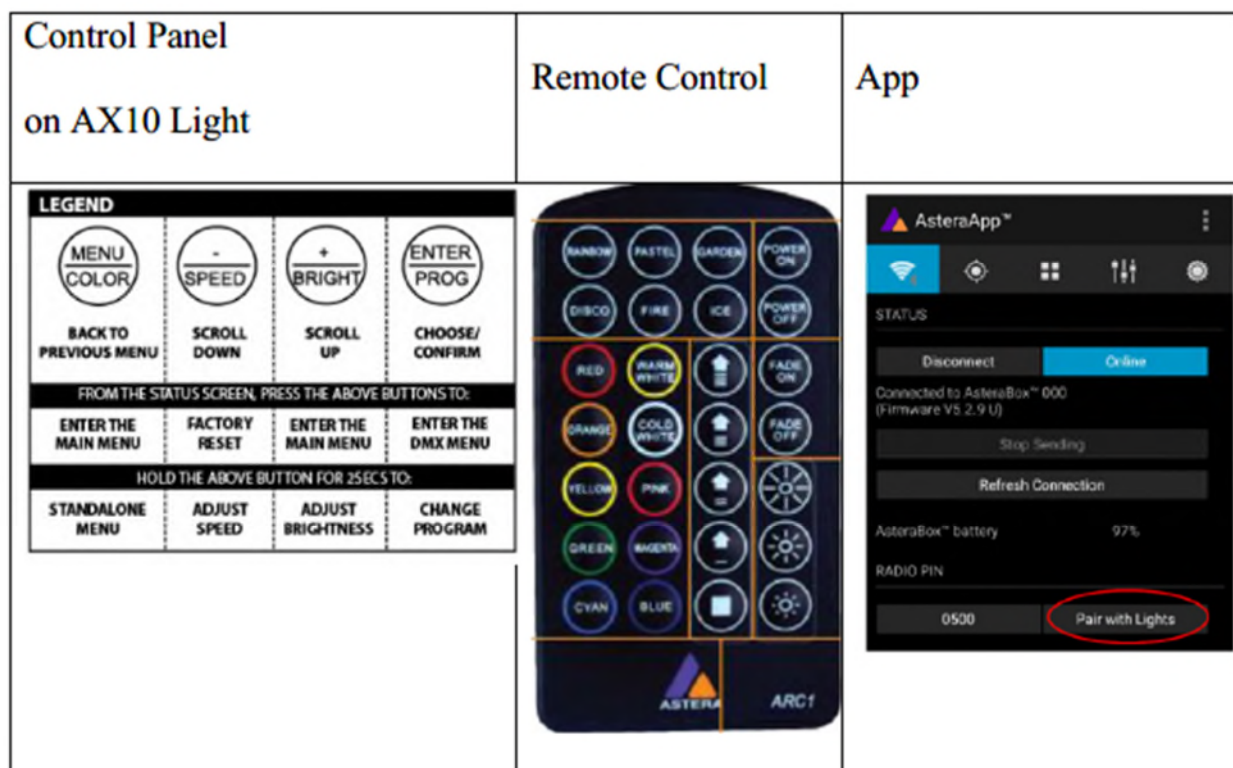
4 SPECIFICATION

LED power:	135W
Illuminants:	9 x 15W RGBAW Philips LEDs
Luminous Flux*:	3,350lm (at White 4000K)
Emittance*:	10,350lx (at 2m; White 4000K)
CRI*:	up to 92

Ex. 1004 at Cover, 7 (annotated).

47. The Astera Manual notes that the AX10’s LEDs can be controlled with different controllers. Ex. 1004 at 9-11. Specifically, the Astera Manual discloses that the AX10 “can be controlled in several ways,” including (i) an LCD Control Panel (working with a “standalone engine”) on the AX10 (referred to throughout this Declaration as the “Control Panel”), (ii) “Astera’s ARC1 infrared remote control,” (iii) the AsteraApp (an app for mobile devices), and (vi) CRMX wireless

DMX. *Id.* Exemplary images of the Control Panel, remote control, and AsteraApp are shown below:



Id. at 9, 11, 23.

48. As disclosed in the Astera Manual, the AX10 can produce customized lighting effects through the Control Panel, infrared remote, AsteraApp, or DMX control. *Id.* at 21, 23-24, 27-28, 32; *see also id.* at 17. Exemplary effects include fire with a “random” flickering; strobes of varying speeds; color chasers; color fades; spiral colors; and rainbows. *Id.* at 17, 21. Descriptions of these effects appear in the table below:

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 halves 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.

Id.

49. Further, users can customize these lighting effects with the Control Panel or AsteraApp by adjusting parameters such as speed, crossfade, stroboscope, and brightness. *Id.* at 9, 11, 27-31. In the AsteraApp, the user can adjust these parameters using a sliding scale:

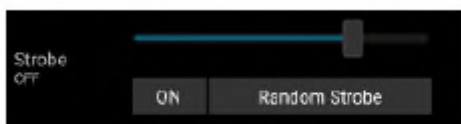
AN EFFECT CAN BE HIGHLY CUSTOMIZED:



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.

Id. at 27; *see also id.* at 20, 24-29.

B. The Astera Manual Discloses Claims 1-21

a) Independent Claim 1

50. As viewed by a Person of Ordinary Skill, the Astera Manual discloses or teaches Claim 1.

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

51. The Astera Manual discloses the preamble to Claim 1.

52. The Astera Manual discloses the features and functionality of the AX10, a controllable lighting fixture that includes an array of nine “RGBAW” LEDs at 135W power. Ex. 1004 at 7.



4 SPECIFICATION

LED power:	135W
Illuminants:	9 x 15W RGBAW Philips LEDs
Luminous Flux*:	3,350lm (at White 4000K)
Emittance*:	10,350lx (at 2m; White 4000K)
CRI*:	up to 92

Ex. 1004 at Cover (annotated), 7 (annotated).

53. The AX10 can be controlled by various different controllers. Ex. 1004 at 9 (noting the AX10 light “can be controlled in several ways”). Specifically, the AX10 light can be controlled with the Control Panel, an infrared remote control, the AsteraApp, and CRMX wireless DMX. *Id.* at 9.

54. Exemplary images of the Control Panel, remote control, and AsteraApp are shown below:

LCD Control Panel	Remote Control	AsteraApp
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Id. at 9, 11, 23.

55. As disclosed in the Astera Manual, the AX10 can produce customized lighting effects. *Id.* at 17, 21, 24-32. “Effect modes” offer “a comprehensive control of the built in standalone engine,” to implement “predefined programs” providing desired lighting effects. *Id.* at 21. Exemplary effects include fire, strobe, static colors, color fades, rainbow, spiral colors. Ex. 1004 at 17, 21. Descriptions of these effects appear in the table below:

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 halves 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.

Id. at 21.

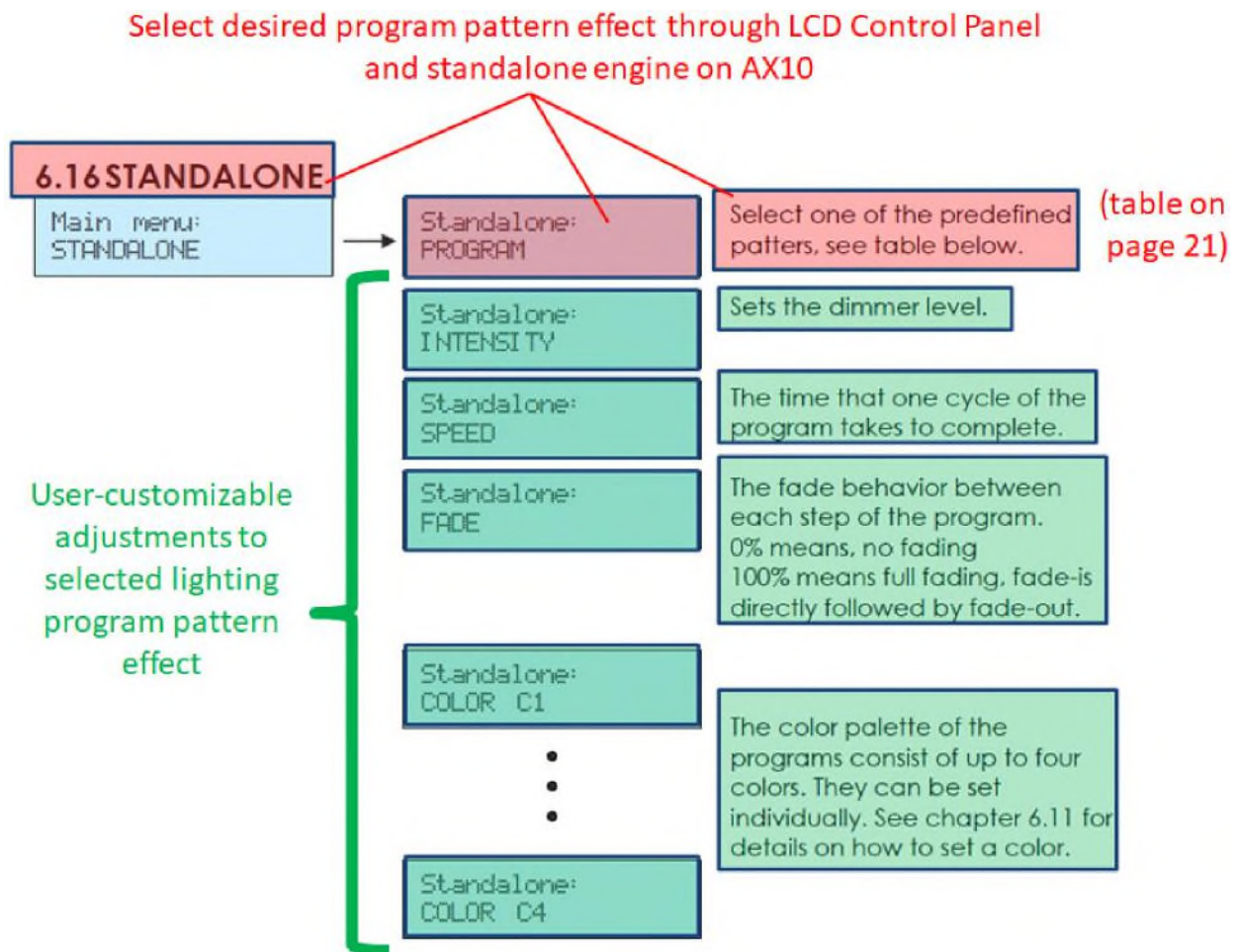
56. These lighting effects can be customized through the Control Panel or the AsteraApp. *Id.* at 8, 11, 13, 20, 24-29. The Control Panel allows a user to (i) “select” an effect; (ii) adjust the intensity, setting a dimmer level; (iii) adjust the speed, changing the time to complete one cycle of the program; (vi) adjust the fade time between the steps of the program; and (v) adjust color selections. *Id.* at 20.

6.6 CONTROL PANEL

User-customizable
adjustments to
selected lighting
program pattern
effect

LEGEND			
 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

Select desired
program pattern



Id. at 11, 20 (annotated).

57. Users can also select and customize effects through the AsteraApp. *Id.* at 23-32. As illustrated in the below image, the list of effects include “running lights,” “fire effect,” “rainbow effect,” “chaser effects” and “moving chasers.” *Id.* at 27-28.

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:

	Several variations of running lights are available.
	The Fire effect shows a random flickering effect. The background color and the color of the flickering effect can be adjusted.
	The rainbow effect shows a color change through all colors. Only its speed can be adjusted.
	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.
	The Moving Chasers overlay the static chaser by a second movement of the four displayed colors over the available positions of a Flow-Set. This gets mostly interesting if the Moving Strobe is chosen. Then, only some of the positions strobe and they are moving. So the strobe effect moves over the Flow-Set.

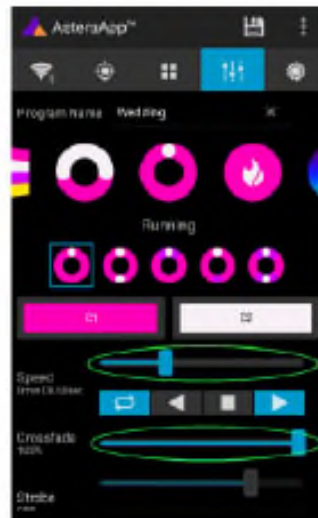
Id. at 28 (annotated).

58. Once selected, a user can “highly customize[.]” the effects by adjusting parameters. *Id.* at 27. These parameters include: (i) the “speed” “to complete one cycle,” (ii) the “crossfade” of the light between steps, (iii) the “speed” of a “stroboscope effect,” (iv) the “brightness” of the effect. *Id.* The user interface for parameter customization is illustrated below:

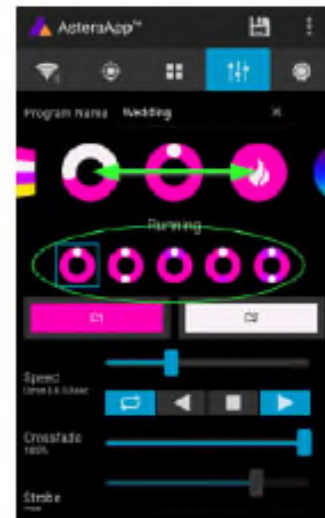
7.6 CHANGING THE EFFECT



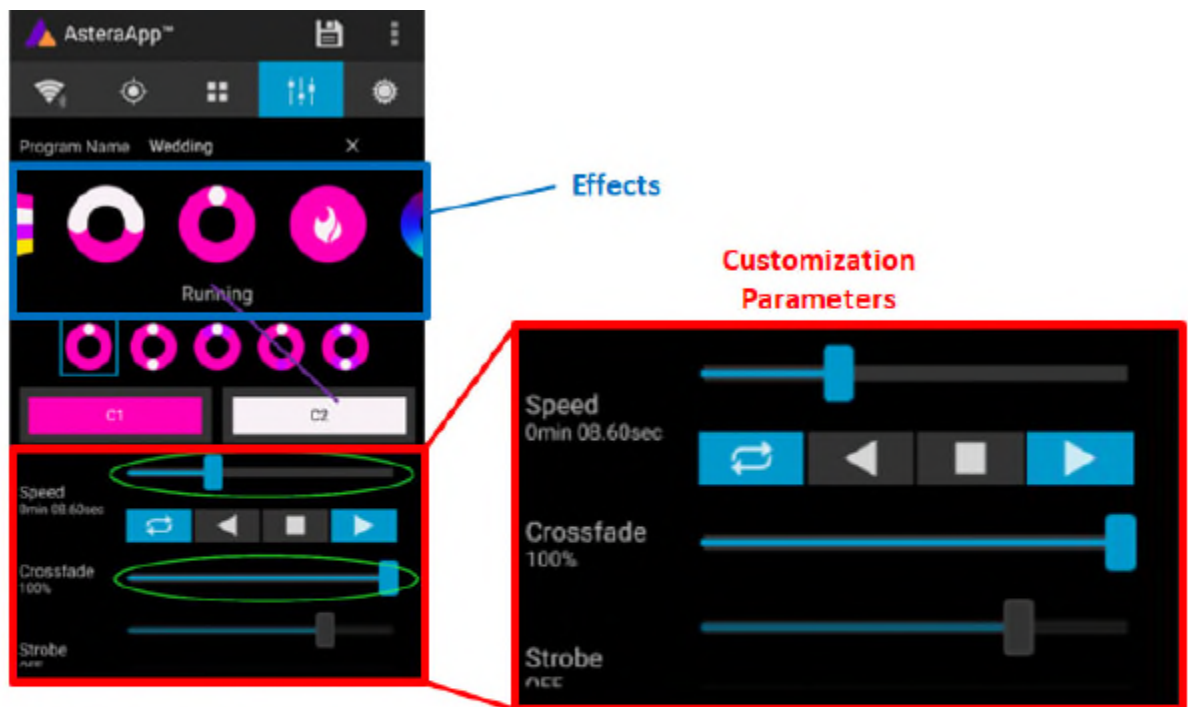
On the AsteraApp™ main screen, press "Wedding" (1), then enter the editor (2).



Set "Crossfade" to 0% and "Speed" to around 2 seconds. You should see a clean running light now. The White light will run over a pink background.



The effect can be changed by sliding the effect picker and choosing a sub-effect below it. Again the colors can be adjusted, too.



Set **'Crossfade'** to 0% and **'Speed'** to around 2 seconds. You should see a clean running light now. The White light will run over a pink background.

Id. at 27 (annotated).

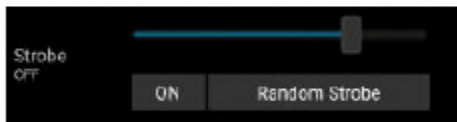
AN EFFECT CAN BE HIGHLY CUSTOMIZED:



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.

Id. at 27.

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

59. The Astera Manual discloses Claim 1[a].

60. The '257 Patent describes the “effect simulator” as a component that “creates data 106 characterising a lighting effect.” Ex. 1001 at 7:45-50; *see also id.* at 5:51-55. It also describes the “time varying lighting value” as data or signals that contain brightness or color values, which vary over time to produce desired effects. Ex. 1001 at 8:36-48, 8:55-57. Astera includes effects simulators to calculate time-varying lighting values to generate customized effects based on user-input simulation parameters using the Control Panel and AsteraApp. Ex. 1004 at 9-11, 13,

17, 21. Similar to the '257 Patent, the Astera Manual discloses how the Control Panel and AsteraApp are used to input parameters, and the AX10 calculates values that represent the desired effects based on the parameters. This can be done using a processor. The calculated values will change depending on which recalled effects and parameters (e.g., speed and brightness) the user chooses to be played. Data characterizing the customized effect is then created from the calculated values and sent to the LEDs in order to generate the effect.

61. Users can “select” from predefined effects in the Control Panel and adjust parameters, including intensity (to set a brightness level), speed (to change the time to complete one cycle), fade time, and color. *Id.* at 20. Using the Control Panel, the AX10 creates data that characterizes the customized effect based on the recalled effect settings. *Id.* at 23-32. This data exists in the form of values and settings for the LEDs to “display these effects properly with [the] light.” *Id.* at 17, 20-21. When parameters for a selected effect are changed, a “calculation” (the creation of data) is required to create new values to generate an effect reflecting the adjusted parameters

62. The “standalone engine” then causes the LEDs to “display static colors or replay a number of predefined effect patterns with a customizable color palette.” *Id.* at 24; *see also id.* at 10, 17. With respect to effect patterns, the values vary with time to change the output of the LEDs, which creates the effect. *Id.* The contents of

the effects, including the LEDs in use and their brightness, colors, and dynamic qualities (e.g., fade-in time and strobe rate), can be saved and recalled on the AsteraApp. *Id.* at 24-32. When a user recalls a saved effect to play, the values corresponding to the effect parameters are transmitted to the light, which replays them on its effects engine using the values and times from the AsteraApp. *Id.* The effects engine, or processor, offers controls for the brightness and color of each LED, from moment to moment in a time-varying manner, by using the values sent by the AsteraApp.

63. As discussed above, users can select from various effects in the AsteraApp. *Id.* at 24-27. These effects include “fire,” “chasers,” “rainbow” and “stroboscope.” *Id.* at 2324, 27-28; *see supra* ¶¶ 51-58 (Claim 1[pre]); Ex. 1004. The user can “highly customize[,]” their chosen effects by adjusting the parameters. *Id.* at 27. Available parameters include: (i) the “speed” to complete one cycle, (ii) the “crossfade” between steps, (iii) the random “stroboscope” speed, and (iv) the “brightness.” *Id.* at 27. Users can also use the “customizable color pallete,” to select and customize colors for effects. *Id.* at 29. Further, certain effects (e.g., “fire”) allow a user to change the colors that make up the effect. *Id.* at 24, 28. Within the AsteraApp, users are presented with interfaces showing the selected effect. *Id.* at 27, 30. The interface includes slider and button controls to adjust the speed, crossfade

(from 100% for a soft fade to 0% for immediate change), stroboscope speed, random stroboscope options, and brightness (from 0% to 100%). *Id.* at 27.

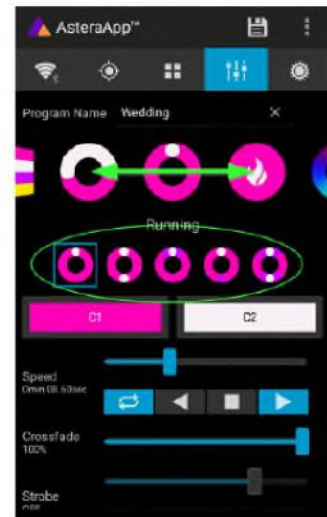
7.6 CHANGING THE EFFECT



On the AsteraApp™ main screen, press “Wedding” (1), then enter the editor (2).



Set “Crossfade” to 0% and “Speed” to around 2 seconds. You should see a clean running light now. The White light will run over a pink background.



The effect can be changed by sliding the effect picker and choosing a sub-effect below it. Again the colors can be adjusted, too.

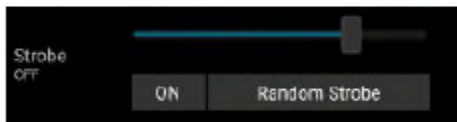
AN EFFECT CAN BE HIGHLY CUSTOMIZED:



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.

Id. at 27.

64. A user can save their selections and recalled the customized effect for later use. *Id.* at 25, 27, 34. The recalled parameters are used to calculate the time varying lighting value. Ex. 1004 at 10, 24, 30. Once a saved effect is recalled, the effects engine uses the values input in the AsteraApp, or the AsteraApp itself, calculates time-varying lighting values (e.g., brightness and color information) for these customized effects. *Id.* at 23-29. The AsteraApp is capable of “send[ing] complex effects” that can be “used to adjust the lights remotely” by sending controls. *Id.* at 23. The complex effects are composed of the values that represent the desired lighting and any adjustments the user made to the parameters, which are recalled

with the effect as described above. When the effects are part of a show, the sent values include the timing of when each effect should be played, as well as the timing for changes within the effect itself. These changes could include timing values for implementing a “random” slow strobe, or for completing a cycle of the effect from the “speed” selection. *Id.* at 23-24, 27-28. Therefore, based on recalled user-customized parameters, “effects can be created and [can] be sent to the light by the built in UHF receiver,” where the effects are “triggered” and replayed at each light. *Id.* at 23.

Claim 1[b]: 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;

65. The Astera Manual discloses Claim 1[b].

66. The Astera Manual teaches that a user can choose from various lighting effects (e.g. fire, chasers, and rainbow). *See supra* ¶¶ 59-64 (Claim 1[a]); Ex. 1004 at 17, 21, 24. The user can customize the effect by modifying the speed, crossfade, stroboscope, or brightness, resulting in lighting value data that represents the effect. Ex. 1004 at 24-29; *See, e.g., supra* ¶ 63. Similar to the ’257 Patent, these parameters characterize the selected effect such that the selected, modified effect depends on and reflects the parameters. Ex. 1004 at 17, 20-21, 24-28.

67. Further, a POSITA would understand that the AX10 could be used for “videography, broadcasting, cinematography, studio filming, and location filming.”

Ex. 1004 at 32. It was well known in the art that Astera manufactures luminaires for the entertainment industry, with applications in film, TV, and theatre. *See supra* ¶¶ 41-42; *see also* Ex. 1005 at ¶¶ 2, 5 (noting the AX10 is one of Astera’s “production lighting products,” and that it was shown at a “Prolight and Sound Exhibition”). It was also well known that the AX10 was designed and sold for such uses. *See supra* ¶¶ 41-42; *see also* Ex. 1005 at ¶¶ 2-5.

68. The Astera Manual specifically teaches the AX10 can produce effects captured by video cameras (used in videography, broadcasting, cinematography, and studio/location filming). Ex. 1004 at 32.

69. Further, the AX10 has an “Anti-Flicker” adjustment, meaning the light settings will “fit different camera’s frame rates.” Ex. 1004 at 32.

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.

Id. at 32 (annotated). As shown above, the Astera Manual shows a selected camera fps of “23.976” fps, which is very similar to the commonly used rate of 24 fps used in film and TV. *Id.* at 32.

70. Fitting the lights to a camera’s “frame rate” with the “Anti-Flicker” option indicates the lighting effects are intended to be captured on video. This avoids the “flicker”—an unwanted artefact that would otherwise appear on captured video. The term “frame rate” is used in the entertainment industry to refer to the number of images captured by a video camera each second, as opposed to cameras used for still image capture, where there is no frame rate.

71. The term “flicker” is commonly used to describe the interference between a camera’s shutter or capture rate and the pulsing rate of light sources. A still camera can also suffer from these kinds of problems; however, the issue manifests itself as black or grey bars across the image instead of a “flicker.” Thus, a POSITA would understand that the Astera Manual is discussing videography, broadcasting, cinematography, studio filming, and location filming, as opposed to still camera usage, in providing the “Anti-Flicker” option that fits the lighting settings to a camera’s frame rate.

72. A POSITA would also understand that the references to the DMX control protocol in the Astera Manual (*see, e.g.*, Ex. 1004 at 9-10) indicate the AX10 was intended for use in TV, cinematography, and studio filming. As discussed

above, DMX is a common communication standard created by and for the entertainment lighting industry.

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

73. The Astera Manual discloses Claim 1[c].

74. The Astera Manual discloses that effects can include simulation parameters of “at least one of” a random (i) brightness, (ii) duration, and (iii) interval. Ex. 1004 at 17, 20-21, 27-28.

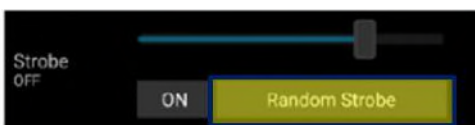
75. Similar to the '257 Patent, the Astera Manual discloses a “fire effect” comprising a “random flicker between two colors, background and flickering color.” Ex. 1004 at 21; *see also id.* at 28. The “fire” uses random brightness levels between the states as it changes between the background and flickering colors, as opposed to consistent brightness levels, to mimic the “flicker” characteristic. If the brightness levels were consistent, a POSITA would consider this effect to be that of a strobe with alternating colors instead of a flickering effect between a background and flickering color. *Id.* The randomness of the brightness contributes to the “flickering” characteristic.

76. The Astera Manual also discloses a “chaser effect,” where “colors are randomly chosen.” *Id.* at 28. Different colors possess different levels of brightness (*e.g.*, a yellow that is created by illuminating red and green LED emitters to full is brighter than a red light that is created by only illuminating the red LED emitter).

Therefore, a POSITA would understand that the random color parameter has random brightness.

77. With respect to random durations and intervals, the “random flicker” in the “fire” effect illustrates that the (total) duration of time that the background and flickering colors are activated is random. It also illustrates that the interval of time between activations is random. Without these random duration and intervals, the effect would not be a “random flicker.” Instead, it would simply be considered strobing between background and flickering colors. Ex. 1004 at 17, 21, 27 A “random flicker” indicates that the flicker (or the alternating between background colors and flickering colors) occurs at random intervals, with each color active for a random duration.

78. In addition, the “stroboscope” effect includes random duration and intervals. Ex. 1004 at 17, 21, 27. A stroboscope effect is a sequence of flashes. The “slow” random strobe would have different duration and interval than “fast,” with “fast” including more random flashes per interval.



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

Id. at 27 (annotated).

79. Thus, in order for a “stroboscope” effect to be considered random, the duration and intervals of the flashes must be random. Without these random duration and intervals, the strobing would be consistent and uniform. *Id.*

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

80. The Astera Manual discloses Claim 1[d].

81. The Astera Manual discloses that the simulation parameter is dependent upon the user-selected pre-programmed light effect (e.g., fire, chaser), as modified by the desired random strobing, speed, brightness, or color parameters. *See supra* ¶¶ 65-79 (Claims 1[b]-[c]). The speed, fade, color, stroboscope, and brightness menu options are based on the user-selected effect and are presented as parameters for customizing the desired effect(s). Ex. 1004 at 20-21, 24-28. If the “rainbow” effect is chosen, a “speed” parameter can be generated. *Id.* at 27, 28. If the “fire” effect is chosen, parameters to generate the “random flicker” and set the background color and flickering effect color can be generated. *Id.* at 28.

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

82. The Astera Manual discloses Claim 1[e].

83. The Astera Manual discloses that both the Control Panel and AsteraApp output time-varying lighting values for the AX10 light, “display[ing] these [selected] effects properly with [its] light.” *Id.* at 21.

84. Users can select “STANDALONE” mode on the Control Panel “Main Menu” status screen. *Id.* at 11, 12, 14, 20. The Control Panel “set[s the] parameters of the standalone engine” in the AX10 light. *Id.* at 12, 17. In “STANDALONE” operation mode, the Control Panel allows users to choose a program and change the parameters (e.g., intensity, speed, fade, and color) for that particular effect. *Id.* at 20-21; *see also supra* ¶¶ 59-64 (Claim 1[a]). As a result, using the Control Panel creates data characterizing the adjusted lighting effect. This appears in the form of values and settings for the LEDs (which will change over time) that set the “parameters of the standalone engine.” Ex. 1004 at 12, 17. When a user wants to play the effect, the “standalone engine” outputs the lighting values to the LEDs, causing the LEDs to “display static colors or replay a number of predefined effect patterns with a customizable color palette.” *Id.* at 24; *see also id.* at 10, 17. With respect to effect patterns, the values vary with time to change the output of the LEDs, which creates the effect.

85. The AsteraApp also allows users to choose from different lighting effects (e.g., fire effect, chaser effects, or rainbow). *Id.* at 24-28. The user can then customize the effect by adjusting the parameters. *See supra* ¶¶ 59-64 (Claim 1[a]). Based on these selected and/or customized effects, the time-varying lighting values are calculated (e.g., brightness and color information) for the desired effects). *Id.* at 23-29.

86. For example, the AsteraApp can create new values for the “fire” effect should the user chose to modify the colors for the background color and flickering color, or if the user adjusts the brightness of the effect. The Astera Manual teaches: “[w]ith the AsteraApp these effects can be created and be sent to the light by the built in UHF receiver,” where they are received by the standalone engine in the AX10. *Id.* at 24; *see also id.* at 10, 17. The AsteraApp outputs the lighting values for a customized adjusted effect to the AX10 light. *Id.* at 24-32. When the lighting values are received by the “standalone engine,” the AX10 “replays [the effect] autonomously until a new effect is sent.” Ex. 1004 at 24.

87. The Astera Manual teaches that the contents of the effects, including the LEDs in use (and their brightness, color, and dynamic qualities) can be set on the AsteraApp, and then later recalled and replayed. The recalled values are sent to the AX10 light, which uses the values and times sent from AsteraApp to replay the values on its effects engine. The effects engine in the light provides control signals representing the brightness and color of each LED in the light, from moment to moment in a time-varying manner using these parameters. The fire effect, for example, may be presented as outputs to the red and amber LEDs, varying in intensity over time. The end result is a realistic depiction of firelight changing in intensity, from moment to moment while the simulated flames appear to move,

grow, and shrink. The anti-flicker frequency adjustment is applied by the system to underlie this effect selection.

b) Independent Claims 15 and 20

88. A POSITA would not perceive any substantive differences of scope between independent Claim 1 and independent Claims 15 and 20. The foregoing reasoning regarding Claim 1 applies with equal force to Claims 15 and 20. A POSITA would understand the Astera Manual discloses Claims 15 and 20 for the same reasons it discloses Claim 1.

89. To illustrate the fact that Claims 1, 15, and 20 do not differ substantially in their scope, the claims are reproduced below with notable differences **bolded**²:

Claim 1	Claim 15	Claim 20
A method for controlling a lighting device to produce a user customisable lighting effect, the method comprising:	A controller adapted to control at least one lighting device to produce a user customisable lighting effect, the controller comprising:	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:

² The claim comparison charts throughout this Declaration apply to all grounds.

Claim 1	Claim 15	Claim 20
calculating, using an effect simulator, a time varying lighting value based on at least one simulation parameter;	an effect simulator adapted to calculate a time varying lighting value based on at least one simulation parameter;	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 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 for 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;	wherein the at least one simulation parameter is at least one of: a random brightness; a random duration; and a random interval;	wherein the 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	said simulation parameter depending on the user customisable lighting effect being simulated; and	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.	wherein an output of the effect simulator is adapted to control a lighting device according to the calculated variation of	outputting, from said effect simulator, said time varying lighting value thereby to simulate the user customisable lighting effect.

90. Claim 1 is directed to a “method” for controlling a lighting device, while Claim 15 is directed to a “controller” implementing *this same method* and Claim 20 is directed to a “computer program” performing *this same method*.

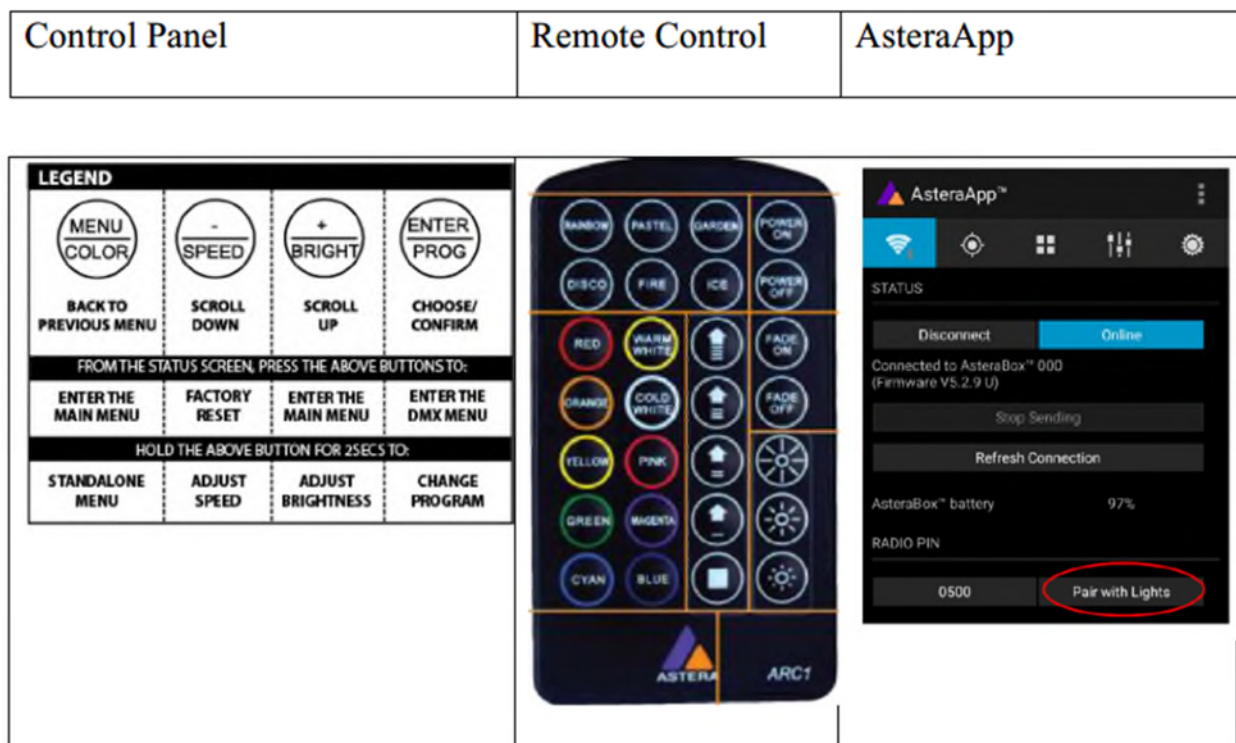
91. In addition, the limitation in Claim 1 regarding outputting the calculated time-varying lighting values to control a lighting device is the same as the limitation in Claim 15 regarding the effect simulator controlling a lighting device based on the calculated variation of lighting over time. Claim 1 is directed to a “method for controlling a lighting device,” and includes the following limitation: “outputting, from said effect simulator, said time varying lighting value thereby to simulate the user customisable lighting effect.” Ex. 1001 at Claim 1. While Claim 15 uses slightly different wording, the last limitation of Claim 15 is directed to the same result (the calculated time-varying lighting signals output from the effect simulator to control a lighting device and simulate the desired lighting effect). *Id.* at Claim 15.

92. The Astera Manual discloses each limitation in Claims 15 and 20 for the same reasons discussed above with respect to the corresponding limitation in Claim 1. Further, as discussed above, the Astera Manual specifically discloses that the claimed method can be performed on a “controller” or with a “software program.” Ex. 1004 at 2, 9, 22; Ex. 1001 at Claim 1.

93. The AX10 can be controlled by various different controllers. Ex. 1004 at 8, 9 (noting the AX10 light “can be controlled in several ways”), 11-13, 17, 20-

29. Specifically, the AX10 light can be controlled with the Control Panel, an infrared remote control, the AsteraApp, and CRMX wireless DMX. *Id.* at 9.

94. Exemplary images of the Control Panel, remote control, and AsteraApp are shown below:



Id. at 9.

95. The Astera Manual discloses Claim 20. the Astera Manual discloses that the claimed method can be performed by a “software program,” as recited in Claim 19. Ex. 1004 at 2, 11, 22. The software programs disclosed by the Astera Manual are the Control Panel and AsteraApp, which are computer programs that execute functions based on software code. *Id.* at 2, 11, 22, 24-32. The AsteraApp is a mobile app, taking the form of software code downloaded and run on a user’s

mobile device. *Id.* at 9. As was well-known, mobile apps are downloadable software programs executed by the processing device on a mobile device. The Control Panel is implemented through software-based programming within the AX10. The Astera Manual indicates that the lights include “firmware version 5.2.20,” and the information menu displays “the firmware version and hardware version of the light.” Ex. 1004 at 2, 12, 22. A POSITA would know that firmware is software programmed into a read-only memory, and would thus understand that this firmware implements the programming and control of the AX10.

c) Dependent Claim 2

Claim 2: The method according to claim 1 wherein the random brightness comprises a random peak brightness.

96. The Astera Manual discloses Claim 2.

97. Certain effects, such as “fire” and “chaser,” include a random brightness. *See supra* ¶¶ 73-79 (Claim 1[c]). These effects also include a random *peak* brightness.

98. The “random flicker” in a “fire” effect is achieved by alternating between the background and flickering colors at random levels of brightness. Ex. 1004 at 21, 28. Because the “fire” effect is described as having a “flicker,” it includes random levels of brightness, rather than consistent brightness levels, for the background and flickering colors. Consistent levels of brightness would create a strobe effect. *Id.* In order for the “fire” effect to appear to “flicker,” as disclosed in

the Astera Manual, the brightness of the background and flickering colors must vary randomly. If it did not, then the effect would amount to no more than an alternation between two colors. As part of the random brightness within the random flicker, there is a random “peak” brightness that can be achieved.

99. The Astera Manual indicates that a user can choose the peak for the random brightness levels by adjusting the customization controls. Ex. 1004 at 20-21, 27, 31. Modifying the overall brightness controls sets the peak brightness for each flicker in the effect. *Id.* at 20-21, 27-28, 31. The Astera Manual discloses that a user can set the “brightness” (or intensity) of the effect as a percentage of the maximum possible brightness, from 0% to 100%:



Each effect can be adjusted in brightness as well.

Ex. 1004 at 27; *see also id.* at 20. For example, if a user were to set this “brightness” at 80%, then the “fire” effect would have a random peak brightness maximum of 80% of the possible brightness output. If the user set the “brightness” at 40%, then the “fire” effect could still produce random flickering between the background and flickering colors, but the random peak brightness would be much lower.

100. The Astera Manual discloses that “colors are randomly chosen” for the “chaser” effects. *Id.* at 28. A POSITA would understand that different colors have

different levels of brightness. For example, a yellow light that is created by illuminating red and green LED emitters to full is brighter than a red light that is created by only illuminating the red LED emitter. The random peak brightness of the effect would change as the “chaser” effect randomly cycles between colors.

101. In addition, similar to the “fire” effect, a user can set the maximum level of brightness for the “chaser” effect, which controls the potential peak brightness as the effect randomly cycles through colors. *Id.* at 17, 20, 27-29, 31. Modifying the brightness percentage changes the random peak brightness of the colors.

d) Dependent Claim 3

Claim 3: The method according to claim 1 wherein the random interval comprises at least one of a random interval between flashes, a random interval between groups of flashes, and a random frequency.

102. The Astera Manual discloses Claim 3.

103. The “fire effect” and “stroboscope” parameters have a random interval between flashes as well as a random frequency. *See supra* ¶¶ 73-79 (Claim 1[c]).

104. In a “fire effect,” the random “flickering” between background colors and flickering colors illustrates that the effect includes a random interval between the flashes. Ex. 1004 at 21, 28; *see also supra* ¶¶ 73-79 (Claim 1[c]).) Without this random interval, the effect would be akin to a strobing between alternating colors, instead of a “random flicker.” *Id.* The AX10 offers this simple strobe option via the

“Two Color Static” effect, which is distinct from the “random” flickering in the fire effect described.

105. The “random flicker” refers to the random duration of the flashes of the flickering color and the interval of time in between flashes of the flickering color. Ex. 1004 at 21, 28. In implementing the random flicker, the AX10 outputs light at a “random frequency” as the interval between flashes randomly changes.

106. In order for the slow, medium, or fast “stroboscope” effect to be “random,” the strobe flash intervals must also be random. Ex. 1004 at 17, 27. Without this random interval, the strobing would be consistent and uniform—there would simply be a “slow” strobe, with flashes of a greater consistent duration or longer consistent interval between flashes, as compared to the “fast” strobe. *Id.* In that case, the flash would not be considered “random.” (contrast with the Astera Manual). Instead, there would be flashes with different consistent intervals and/or durations of flashes, in order to distinguish between the slow, medium, and fast options. The Astera Manual discloses that, where the stroboscope effect is “random,” a “slow” random strobe would have a longer random interval between flashes than a “fast” random strobe. Ex. 1004 at 15, 27, 29. On the other hand, a “fast” random strobe would have shorter random intervals between random flashes, producing more flashes within the same time period. Random intervals between strobe flashes also result in random frequency of the flashes.

AN EFFECT CAN BE HIGHLY CUSTOMIZED:



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

Id. at 27 (annotated).

e) Dependent Claim 4

Claim 4: *The method according to any claim 1 wherein the random duration comprises at least one of a random ramp-up time to peak brightness, a random fade-down time from peak brightness, and a random number of pulses.*

107. The Astera Manual discloses Claim 4.

108. The “fire effect” and “stroboscope” simulation parameters include a random number of pulses. *See supra* ¶¶ 73-79 (Claim 1[c]).

109. Randomly changing between background and flickering color in a “fire” effect involves a random number of pulses of each color (background and flickering), creating the “fire” effect. Ex. 1004 at 21, 28. A consistent number of pulses of background and flickering colors would cause the effect to appear as a consistent strobe instead of a flickering fire. *Id.* The Astera Manual discloses that this consistent change between two colors can be implemented through the “Two Color Static” effect. *Id.* at 17, 28. Thus, a POSITA would recognize that random flickering between the background and flickering colors (e.g., in the “fire” effect), will result in inconsistent duration and transition times between the background

color and flickering color. The presence of random intervals and duration of the background and flickering colors result in a random number of pulses of each during the fire effect. If the random fire effect were implemented for ten seconds, there could be ten pulses each of background color flickering color. However, if the same random fire effect were implemented a second time, again for a ten second time period, there may be 12 pulses each of background color and flickering color. The randomness in the number of pulses and the duration of those pulses causes the “random” flickering that mimics fire.

110. Selecting the random “slow, medium, [or] fast” stroboscope option includes with it a random number of pulses. *Id.* at 17, 27. Because the strobe is random, as opposed to consistent or uniform, the number of pulses output during the strobe effect changes randomly. A POSITA would understand that there would be a lower number of random pulses in the effect if a user chose the “slow” stroboscope option as compared to the “medium” or “fast” options. *Id.* at 17, 27.

f) Dependent Claim 5

Claim 5: The method according to claim 1 wherein said at least one simulation parameter is random within predefined boundaries and wherein the predefined boundaries comprise at least one of an upper and lower duration; a number of flashes in a burst; an interval between bursts; an amplitude; and a ramp-up or fade-down time.

111. The Astera Manual discloses Claim 5.

112. The Astera Manual discloses simulation parameters for the “fire,” “chaser,” and random “stroboscope” effects that are random within “predefined boundaries.” Ex. 1004 at 27-28.

113. The Astera Manual discloses that a user can set a simulation parameter for each of these effects, specifying the maximum level of brightness, and in turn setting the upper boundary for the maximum “amplitude” (or brightness). *Id.* at 20, 27; *see also supra* ¶¶ 73-79, 96-101 (Claims 1[c], 2).

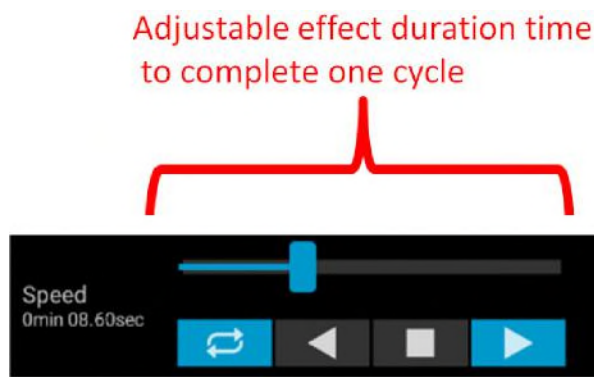


Each effect can be adjusted in brightness as well.

Ex. 1004 at 27 (annotated). In adjusting the percentage for the maximum brightness (ranging from 0% to 100%, adjustable using the slider in the above image), a user can set an upper boundary for the maximum amplitude (or brightness) of the light

output. For example, an effect that is run on the AX10 light with a brightness setting of 50% has an upper amplitude boundary that is only half of an effect having a brightness setting of 100%.

114. Similarly, by setting and modifying the “speed” of “how long it will take for the effect to complete one cycle,” users set boundaries for the duration. *Id.* at 27.

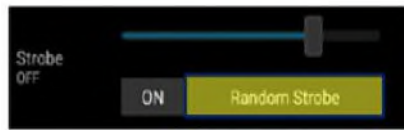


The speed tells how long it will take for the effect to complete one cycle. *Id.* (annotated). If an effect has five steps to complete one cycle, setting the speed effects the upper and lower duration of time that the effect has to complete said five steps. If, however, an effect has a single step, setting the speed will change the boundaries of how long the duration of that one step (e.g., a fade of a color) will take to complete.

115. With respect to the “stroboscope” effect, a user can also select “predefined boundaries” of an interval between bursts. Ex. 1004 at 17, 27. Specifically, a user can set boundaries indicating whether the duration and interval

between the bursts will be “slow, medium, [or] fast.” *Id.*; see also *supra* ¶¶ 73-79 (Claim 1[c]).

AN EFFECT CAN BE HIGHLY CUSTOMIZED:



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

Ex. 1004 at 27 (annotated). A user that chooses a “slow” random stroboscope will set different duration and interval boundaries for the strobing flashes of the effect, as compared to a user that modifies the same random stroboscope effect to be “fast.” In the “slow” setting, boundaries are set that result in a low number of flashes in a burst, or longer intervals between bursts. On the other hand, the “medium” and “fast” random strobe settings, include different boundaries for intervals and number of flashes, causing the strobes to appear faster.

g) Dependent Claim 6

Claim 6: The method according to claim 1 wherein the at least one of: a random brightness; a random duration; and a random interval is determined in dependence on one or more user-selectable simulation parameters.

116. The Astera Manual discloses Claim 6.

117. Certain effects (e.g., fire, chaser, and strobe) are based on parameters that include random brightness, duration, and interval. See *supra* ¶¶ 73-79 (Claim 1[c]). These random parameters are based on selections made through the user

interface. Ex. 1004 at 17, 20-21, 23-24, 28. User interfaces include the Control Panel and the AsteraApp. *Id.* at 9.

118. The “random brightness” is dependent upon on the user’s selection and customization of brightness percentage, made to adjust the allowable maximum brightness level. Ex. 1004 at 20, 27, 31; *see also supra* ¶¶ 73-79, 96-101 (Claims 1[c], 2). The “random brightness,” “random duration,” and “random interval” of the “fire” effect are also determined based on user-selected customizations. *See supra* ¶¶ 73-79 (Claim 1[c]). Adjusting the speed, colors, or the maximum percentage brightness of the “fire” effect through selections on the user interface (e.g., the Control Panel or the AsteraApp) determines the effect’s random duration, random interval, or random brightness. *Id.* at 17, 20, 27-28. The “random duration” and “random interval” for the “stroboscope” effect are also determined in dependence on user-selectable parameters, such as whether the random stroboscope will be “slow, medium, [or] fast.” Ex. 1004 at 17, 27; *see also supra* ¶¶ 73-79, 102-10 (Claims 1[c], 3, 4).

h) Dependent Claim 7

Claim 7: The method according to claim 1, wherein the simulation parameter is related to one or more of: a rate of increase of brightness; a rate of decrease of brightness; a rate of change of colour; a brightness; a local maximal brightness; a local minimal brightness; a brightness fluctuation period; and a colour fluctuation period.

119. The Astera Manual discloses Claim 7.

120. The Astera Manual teaches that users can use the Control Panel or the AsteraApp to choose from a variety of lighting effects. Ex. 1004 at 17, 20-21, 23-24, 27-28, 31. The Astera Manual also discloses that users can modify the level of brightness or intensity for each of the selected effects. *Id.* at 17, 20, 27, 31. The brightness of the effects is expressly disclosed as being adjustable; thus, the Astera Manual discloses simulation parameters for the effects that relate to, among other things, “a brightness.” Ex. 1004 at 11, 25, 27, 31.

121. Further, the Astera Manual teaches that the simulation parameters are related to a rate of increase or decrease in the brightness as well as the brightness fluctuation period. *Id.* at 20, 27. As discussed above, the time for an effect to complete a cycle is adjusted through the “speed” parameter. *Id.* at 20, 27. Completing the same effect in a shorter time cycle affects the speed at which the brightness or color fluctuates to complete the effect. *See supra* ¶¶ 96-101, 107-10 (Claims 2, 4).

122. The Astera Manual discloses that a user can choose an effect of a “one color fade.” *Id.* at 17. Changing the “speed” parameter for how long it will take for

the color to “fade in and out” is related to, at least, the brightness fluctuation period and color fluctuation. *Id.* at 17, 20, 27-28. By modifying the speed of the effect, the color will either fade in and out in a longer or shorter time, and thus with a longer or shorter duration.

123. The fading in and out illustrates the light’s increases and decreases in brightness. Thus, controlling the fade’s speed also relates to the fluctuation duration of the brightness as the light fades in and out. This is also true for a “two color fade,” “three color fade,” or “four color fade.” *Id.* at 17, 20, 27-28.

124. The “stroboscope” effect can also be adjusted in speed. *Id.* This changes the brightness fluctuation period of the flashes that make up the effect. *Id.* at 27. The perceived brightness fluctuation of the “slow” stroboscope effect has a longer duration than that of the “fast” stroboscope effect. In a “fast” stroboscope effect, the flashes appear to turn on and off more quickly. The parameters for rate of color change and color fluctuation period may also be modified in the “chaser effect” and “rainbow effect,” as the “speed” of both can be adjusted. *Id.* at 21, 27-29. Changing the speed affects the rate of color change and color fluctuation period.

i) Dependent Claim 8

Claim 8: *The method according to claim 1 further comprising receiving a user input of one or more user-selectable simulation parameters and adapting the simulation in dependence on the one or more user-selectable simulation parameters.*

125. The Astera Manual discloses Claim 8.

126. The Astera Manual discloses that the AX10 has multiple user interfaces to receive user inputs. Ex. 1004 at 9.



Id. at 9, 11, 23. Users can choose from different desired effects and their parameters through interfaces on the Control Panel or the AsteraApp. *Id.* at 8, 11, 13, 20, 24-29.

127. The Astera Manual teaches that the Control Panel includes an LCD menu interface, allowing users to “select” different lighting pattern effects (e.g., those listed on page 21 of the Astera Manual). *Id.* at 20-21.

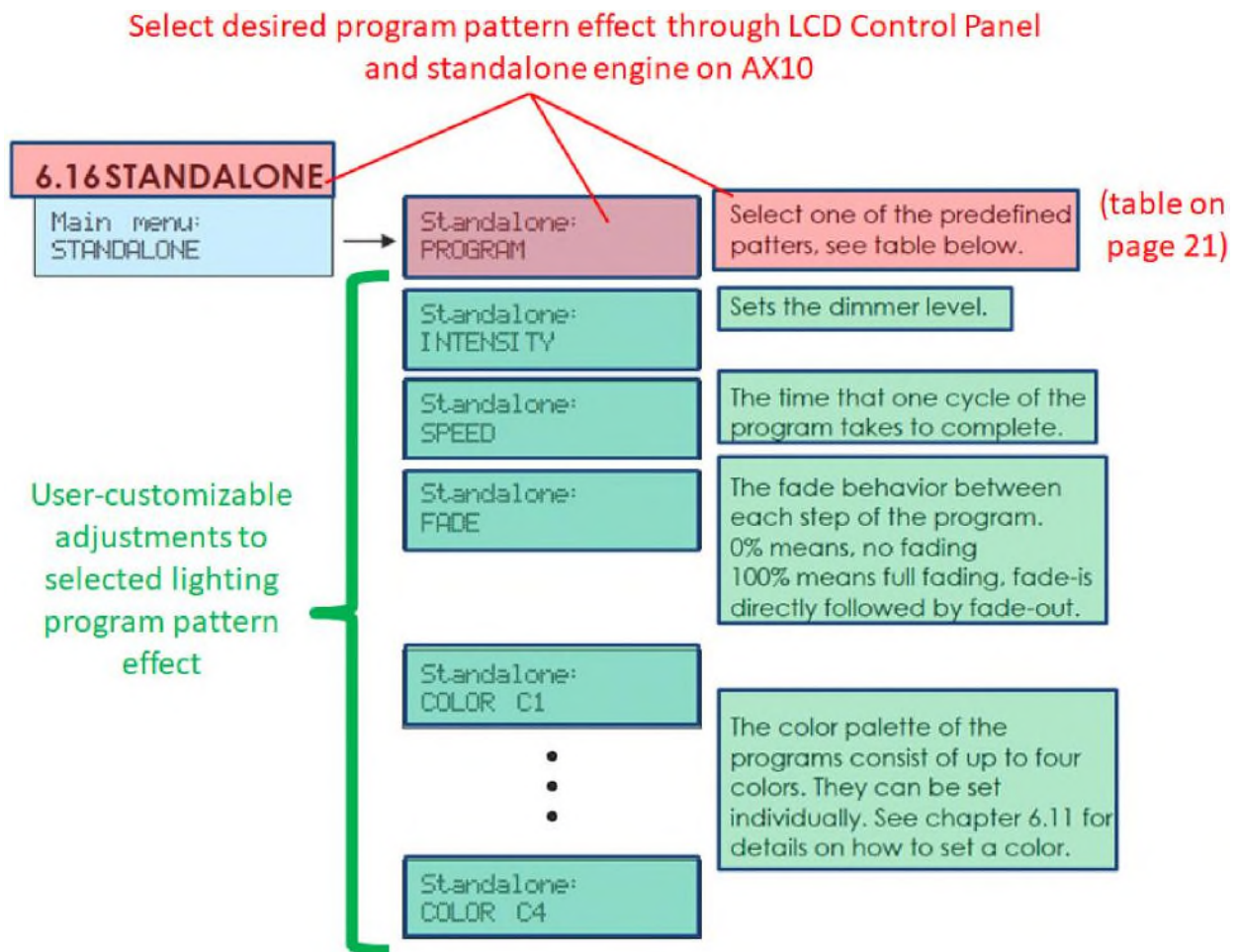
128. After a user selects an effect, the Control Panel allows the user to adjust:
(i) intensity, (ii) speed of a cycle of the program, (iii) fade time between steps of the program, and (iv) color selections. *Id.* at 20.

6.6 CONTROL PANEL

User-customizable
adjustments to
selected lighting
program pattern
effect

LEGEND			
 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

Select desired
program pattern



Id. at 11, 20 (annotated). Once a selection is made, the Control Panel adjusts the desired effect accordingly based on the parameters. *See supra* ¶¶ 82-87 (Claim 1[e]).

129. Lighting effects may be selected and “highly customized” through user interfaces in the AsteraApp. Ex. 1004 at 21, 27-28. In the AsteraApp, users can customize parameters such as: (i) the “speed” of “how long it will take for the effect to complete one cycle;” (ii) the “crossfade” of the light from step to step; (iii) the “speed” of a selected “stroboscope effect” or selecting for a “slow,” “medium,” or

“fast” stroboscope effect; and (iv) the “brightness” of each effect. *Id.* at 27. The AsteraApp creates new signals based on these user selections and sends the signals to the AX10 light in order to provide the desired output. *Id.* at 23-24, 27.

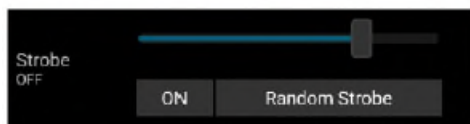
AN EFFECT CAN BE HIGHLY CUSTOMIZED:



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.

Id. at 27; see also *supra* ¶¶ 82-87 (Claim 1[e]).

j) Dependent Claim 9

Claim 9: The method according to claim 1 wherein the simulation parameter comprises at least one of: a maximum brightness; a minimum brightness; a colour; and a trigger.

130. The Astera Manual discloses Claim 9.

131. The Astera Manual discloses that, after a user selects a lighting effect in the AsteraApp, she can modify the lighting effect to adjust the brightness, change the color, or set a trigger. Ex. 1004 at 24, 27, 31-32.

132. The customization interface in the AsteraApp includes a slider sp that “[e]ach effect can be adjusted in brightness.” *Id.* at 27; *see also supra* ¶¶ 96-101 (Claim 2). Accordingly, the user-selected simulation parameter can be a maximum brightness, with the slider setting the maximum possible brightness for the effect as a percentage of the total possible brightness. Ex. 1004 at 27.

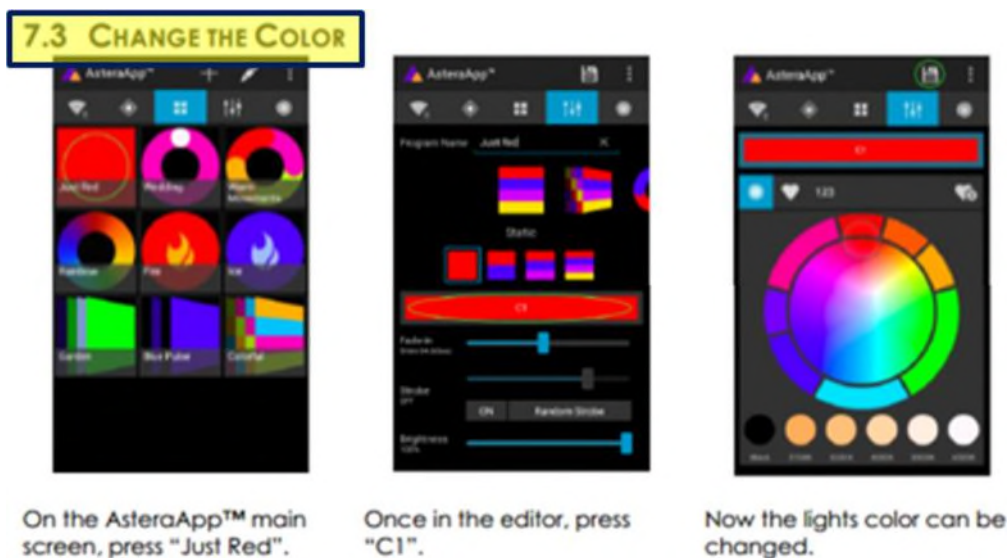


Each effect can be adjusted in brightness as well.

Id. at 27. Users can make similar changes to the brightness, or “intensity,” of an effect through the Control Panel. *Id.* at 17, 20, 36. An “intensity” option in the Control Panel allows users to set a “dimmer level” that would represent the brightness for the effect. *Id.* at 20. The Control Panel also includes a button to “adjust brightness.” *Id.* at 11. Also, because a “background” color can be set, there

is a “minimum” brightness equal to at least the brightness of the background color. *Id.* at 21, 27-28.

133. With respect to “color” limitation, the Astera Manual discloses additional options for user customization. For example, for the “fire” effect, “the background color and the color of the flickering effect can be adjusted.” *Id.* at 28. The background color and flickering color are parameters of the “fire” effect, and the flickering is caused by the random alternation between the two colors. A user can set the colors for many of the lighting effects. In addition, the effects can be customized to also include the random “stroboscope” effect. *Id.* at 24, 27-28.



Id. at 24 (annotated). Thus, a user can set a color for an effect and then add a stroboscope effect to randomly strobe the color. *Id.* at 24-27.

134. Users can manually select a time delay in a “standby” mode to start the customized lighting effect show at a later time. *Id.* at 10, 24, 34. This time delay is

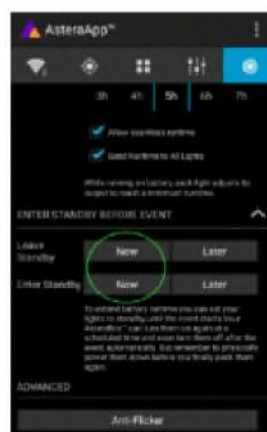
a “trigger” to start the effect, and the lights will not run the effect until the end of the time delay. *Id.* at 24, 33. The time delay sets a trigger for the lights to begin running a particular effect after a predetermined amount of time has elapsed. *Id.* The “standby is intended to be used between setup and event...[A]ll lights may be switched to standby mode and woken up later when the event starts.” *Id.* at 34; see also *infra* Claim 12.

7.14 ENTER AND LEAVE STANDBY

The standby is intended to be used between setup and event (see chapter 3.2.1 **Error! Reference source not found.**). After setup is completed, all lights may be switched to standby mode and woken up later when the event starts. This ensures that no battery runtime is wasted. This can be either done manually or automated.



Press the small arrow to open the standby menu.



By pressing the “Now” buttons, standby can be switched on or off for all currently targeted lights.



Any of the “Later” buttons will require a time to be set. The standby will be scheduled to the specified time.

Ex. 1004 at 34.

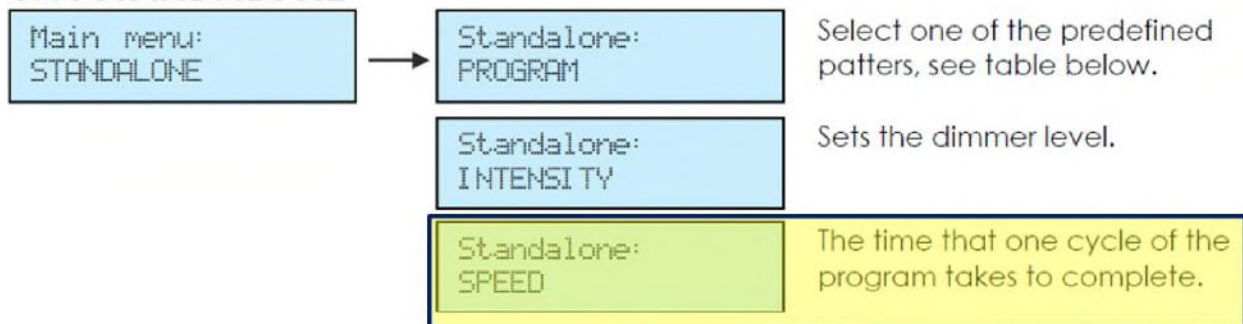
k) Dependent Claim 10

Claim 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.

135. The Astera Manual discloses Claim 10.

136. The Astera Manual discloses that, after a user chooses a lighting effect from the Control Panel or the AsteraApp, the user can adjust the length of time required to complete one cycle. Ex. 1004 at 20, 27.

6.16 STANDALONE



Id. at 20 (annotated).

AN EFFECT CAN BE HIGHLY CUSTOMIZED:



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

Id. at 17, 27 (annotated). The Control Panel and AsteraApp allow a user to modify a “speed” parameter, which represents how long each cycle of the effect will last. When a cycle ends, the LEDs need to receive the values to output over the course of the next cycle. In order to do this, the standalone engine in the AX10 would

calculate the lighting values for the desired effect at the start each of cycle, based on any user customizations. Whenever a desired effect includes a “random” color or speed parameter, the values must be continuously calculated each cycle to keep the effect “random.” Ex. 1004 at 17, 27.

137. The Astera Manual discloses that the light effects calculated by the AsteraApp, which are then sent to the light, are “just triggered and then each light replays them autonomously until a new effect is sent.” *Id.* at 24.

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.

Id. (annotated). This indicates that the AX10 light repeatedly calculates the lighting values for the effect and sends them to LEDs in order to continue autonomously playing the effect.

l) Dependent Claim 11

Claim 11: *The method according to claim 1 wherein the user customisable lighting effect is designed to mimic at least one of fire flickering; police light; television; lightning flashing; electrical sparking; fireworks; a neon flickering sign; a gunshot; welding; a scan; a propeller; a (nuclear) explosion; a wormhole; paparazzi flashes; flashes (strobe).*

138. The Astera Manual discloses Claim 11.

139. The Astera Manual discloses that the AX10 can produce several desired lighting effects. Ex. 1004 at 28. For example, the AX10 is capable of producing a “fire” effect, which mimics a fire “flickering.” Ex. 1004 at 21, 28.

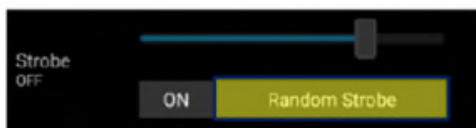


The Fire effect shows a random flickering effect. The background color and the color of the flickering effect can be adjusted.

Id. at 28; *see also id.* at 21.

140. The Astera Manual also teaches that a “stroboscope effect,” which produces a strobe of flashes, can be added to any of the selected lighting special effects:

AN EFFECT CAN BE HIGHLY CUSTOMIZED:



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

Id. at 27 (annotated); *see also id.* at 17.

141. A POSITA would understand, based on the Astera Manual, that the AX10 can also produce other claimed effects because of its ability to generate various colors, alternate between colors, and create strobing/flashing effects. *Id.* at 17, 24-28. This could be accomplished through the following editable effects: chaser, rainbow, spiral colors, fading colors, flow sets, and strobing. *Id.* For example, the AX10 can produce a lighting effect that mimics police car lights. In order to imitate the alternating red and blue lights of a police car, an effect can be easily set to run colors or a two-step color chase. Ex. 1004 at 17, 21, 27-28. The AX10 can also produce a customizable lighting effect that simulates lightning, paparazzi flashes, and welding or electrical sparking effects, which require irregular timing. *Id.* This can be accomplished with a random sequence flash or strobe, which can be implemented with the disclosed random “stroboscope” effect. In these effects, timing that is too regular appears artificial.

142. In addition, a color may be chosen to enhance the effect. Examples include a using a blue flash for an electrical spark or a yellow flash for a firework. Random flashes could also mimic a flickering neon sign, with the color of the randomly strobing light set to customized according to user preference. A fire effect can also be adjusted for brightness, permitting the user to create an effect that mimics candle light. The ability of the AX10 to illuminate sequences and patterns of LEDs on a Flow-Set provides an effect where the light source is moving. This allows for

effects that have a continually moving light source (e.g., fire flickering and scanning).

m) Dependent Claim 12

Claim 12: The method according to claim 1, further comprising selecting a definition of a trigger event, said trigger event initiating said output of the time varying lighting value thereby to simulate the user customisable lighting effect.

143. The Astera Manual discloses Claim 12.

144. The '257 Patent indicates that a “trigger” simply “start[s] the effect running,” and can be a manual trigger or a received remote signal. Ex. 1001 at 6:52-54, 9:43-45. The Astera Manual discloses several such triggers that initiate output of the light from the LEDs in order to simulate lighting effects.

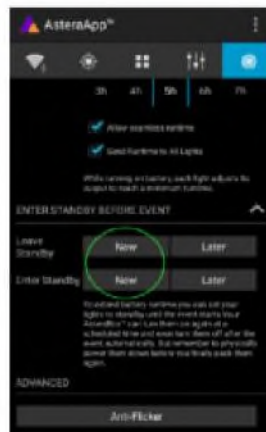
145. While in “standby” mode, users can select a time delay to start the customized lighting effect show at a later point in time. Ex. 1004 at 34. Once a user selects the standby mode and sets the time at which the lights will be “woken up,” outputs of control signals to vary the lighting values and simulate the desired effects run at that specified later time. *Id.* at 34. The Astera Manual teaches that “standby is intended to be used between setup and event... [A]ll lights may be switched to standby mode and woken up later when the event starts.” *Id.*

7.14 ENTER AND LEAVE STANDBY

The standby is intended to be used between setup and event (see chapter 3.2.1 **Error! Reference source not found.**). After setup is completed, all lights may be switched to standby mode and woken up later when the event starts. This ensures that no battery runtime is wasted. This can be either done manually or automated.



Press the small arrow to open the standby menu.



By pressing the “Now” buttons, standby can be switched on or off for all currently targeted lights.



Any of the “Later” buttons will require a time to be set. The standby will be scheduled to the specified time.

Id. at 34.

146. A users can enter the standby menu by choosing the arrow by to the “Enter Standby Before Event” option and selecting whether to leave/enter standby “Now” or “Later.” *Id.* If the user selects “Later,” a separate menu is presented that offers the option to select a specific time for the lights to leave standby, begin operating, and start outputting the pre-programmed light show. *Id.* If the user selects “Now,” it would immediately end standby and the lights would initiate the desired light show. *Id.*

147. Users can also choose options (from the Control Panel or AsteraApp) to start a programmed light effect for the LEDs to display. *Id.* at 9. Using the Control Panel, a user can “power the light on/off,” triggering the output of time-varying

lighting values to the LEDs so that they turn on with the correct characteristics. *Id.* at 9. A user can also use the Control Panel to “select” the predefined program patterns, which initiates a trigger to the LEDs to display that specific program. *Id.* at 20-21. In the AsteraApp, the “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 it autonomously until it receives a new effect.” *Id.* at 10; *see also id.* at 23-24.

n) Dependent Claims 13 and 21

Claim 13: The method according to claim 1, further comprising storing the at least one simulation parameter corresponding to said user customisable lighting effect.

Claim 21: The method according to claim 13, further comprising recalling said stored at least one simulation parameter from a memory.

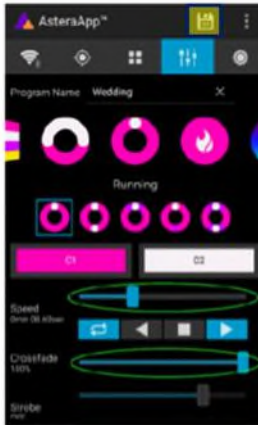
148. The Astera Manual discloses Claims 13 and 21.

149. The Astera Manual discloses that the user-selectable lighting effects, and modifications to those effects, can be “saved back to the main screen by pressing the save button.” Ex. 1004 at 27. A user may select an effect (e.g., “fire” or “wedding”) and modify it by altering simulation parameters that adjust the effect (e.g., “speed,” “crossfade,” “stroboscope,” and “brightness”). *Id.* Once the user is finished, he can choose to “save” the effect (and its customized parameters) by clicking the disk icon in the top right-hand corner of the AsteraApp. *Id.* at 27. Afterwards, the customized parameters related to the selected lighting effect are thereby saved. *Id.*

7.6 CHANGING THE EFFECT



On the AsteraApp™ main screen, press "Wedding" (1), then enter the editor (2).



Set "Crossfade" to 0% and "Speed" to around 2 seconds. You should see a clean running light now. The White light will run over a pink background.



The effect can be changed by sliding the effect picker and choosing a sub-effect below it. Again the colors can be adjusted, too.

After the effect is adjusted, it may be saved back to the main screen by pressing the save button.

Id. at 27 (annotated).

150. Once saved, these stored effects and their customized parameters, as well as custom light effects, can be recalled and played at a later time. *Id.* at 10, 24, 30. Because the customized effect has been “saved back to the main screen,” it is available for the user to recall the effect from the main screen and play the effect. *Id.* at 27.

151. A POSITA would understand that these effects and their adjusted parameters are stored to, and recalled from, a “memory.” The AsteraApp is a mobile app run on a mobile device. The programming for the app, as well as the stored

effects and adjustments, would be contained in memory as computer-readable instructions that can be recalled and implemented through the app.

o) Dependent Claim 14

Claim 14: *The method according to claim 1 comprising controlling a plurality of lights in dependence on the output.*

152. The Astera Manual discloses Claim 14.

153. The Astera Manual teaches that the AX10 light is comprised of nine “RGBAW” LEDs. Ex. 1004 at 7. The Control Panel and the AsteraApp control this plurality of LED “lighting devices” in the AX10. *See supra* ¶¶ 59-87 (Claims 1[a]-[e]).

154. The Astera Manual also discloses that the AX10’s LED lights controlled by the AsteraApp “can be grouped into sets,” so that a user-created effect “can stretch over up to 32 lights.” *Id.* at 10, 23.

6.4 CONTROL BY THE ASTERAAPP™

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 it autonomously until it receives a new effect.

Lights can be grouped into sets. This way they can be controlled separately and also effects can stretch over up to 32 lights.

Id. at 10 (annotated). All of the lights within such a set are controlled through the AsteraApp, permitting the user to control the plurality of lights in the set through the output commands sent from the AsteraApp and received at the UHF receivers

in the AX10s. *Id.* at 10, 23-24. For purposes of creating a customized light show, the Astera Manual teaches that the AsteraApp “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.” *Id.* at 23, 24.

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.

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.

Additionally, it can be used to adjust the lights settings remotely.

The AsteraBox™ is needed to interface your Android device with the lights. It communicates to the Android device by Bluetooth and controls the lights by UHF.

Id. at 23 (annotated).

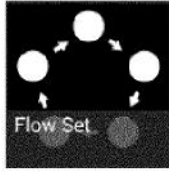
155. Lights can be grouped in a set such that all lights in the same “Sync-Set” will play the same effect simultaneously, based on control signals output from the AsteraApp:



Id. at 25.

156. Lights can also be grouped into a “Flow-Set,” in which each light can be assigned to “positions” within the Flow-Set. *Id.* at 21, 26-29. The lights within a Flow-Set will play the same lighting effect, but offset to each other, in order of their positions:

7.4.2 FLOW SET



By using a Flow-Set, lights can also be controlled together. But additionally, they are assigned to positions inside the Flow-Set and so form a virtual light with several pixels. All effects, like a running light, are stretched over this virtual light.

Id. at 26. “[C]ontrolling” these lights in the flow-set together is based on the control signals output from the AsteraApp that are received at each of the lights.

p) Dependent Claim 16

Claim 16: The controller according to claim 15, wherein the controller comprises a wired or wireless communication interface adapted for communication with one or more lighting devices.

157. The Astera Manual discloses Claim 16.

158. The Astera Manual discloses the claimed controller. *See supra* ¶¶ 50-94 (Claims 1, 15). The AX10 light can be controlled through various user interface systems. Examples include the LCD Control Panel (“Control Panel”) on the AX10 or the AsteraApp on a user device. *See supra* ¶¶ 50-94 (Claims 1, 15).

159. The Control Panel comprises a wired interface intended to communicate with the LED lights in the AX10 array. *Id.* at 8-9, 11. The Control Panel is included on the AX10; therefore, it necessarily communicates with the LED lights through wires, for example, to “power the light on/off, set a static color or change its settings.” *Id.*

160. The Control Panel and its embedded effects engine communicate directly with the LED driver circuitry with the AX10 in order to control the LEDs.

Low power control signals from the controller's computer circuitry (at least one for each color or independent LED) are typically used to control higher-powered switching and driver circuitry that are directly connected to the high-power LEDs.

161. The AsteraApp communicates wirelessly. It uses Bluetooth and controls the lights by UHF. *Id.* at 23.

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Additionally, it can be used to adjust the lights settings remotely.

The AsteraBox™ is needed to interface your Android device with the lights. It communicates to the Android device by Bluetooth and controls the lights by UHF.

Id. at 23; *see also id.* at 9-10, 22-24 (“With the AsteraApp™ these effects can be created and be sent to the light by the built in UHF receiver.”). AsteraApp “pairs” with the one or more AX10 lights through the wireless UHF interface, which creates a “connection” so the “lights are controllable.” *Id.* at 23.

q) Dependent Claim 17

Claim 17: *The controller according to claim 15, wherein the controller comprises an input interface adapted to receive a user input.*

162. The Astera Manual discloses Claim 17.

163. The Astera Manual discloses that the AX10 has a plurality of controller interface systems for users to provide inputs and control it. Ex. 1004 at 9-11. *See*

supra ¶¶ 125-29 (Claim 8). Examples include the Control Panel and the AsteraApp.
Id.

r) Dependent Claim 18

Claim 18: A lighting system comprising the controller according to claim 15 and at least one lighting device; said lighting device comprising at least one light emitting diode.

164. The Astera Manual discloses Claim 18.

165. The Astera Manual discloses the controller according to Claim 15. *See supra* (Claim 15). The Astera Manual discloses that the AX10 light includes one or more lighting devices that have “9 x 15 RGBAW Philips LEDs.” Ex. 1004 at 7. Thus, each AX10 light includes nine RGBAW LEDs.

4 SPECIFICATION

LED power:	135W
Illuminants:	9 x 15W RGBAW Philips LEDs
Luminous Flux*:	3,350lm (at White 4000K)
Emittance*:	10,350lx (at 2m; White 4000K)

Id. at 7 (annotated).

s) Dependent Claim 19

Claim 19: The lighting system according to claim 15 wherein said controller and said lighting device are integrated in a combined unit.

166. The Astera Manual discloses Claim 19.

167. The Astera Manual discloses that the AX10 is capable of being controlled through the Control Panel on the AX10 itself. Ex. 1004 at 9; *see, e.g., supra* at ¶¶ 47, 158-60. The AX10 has a built-in standalone engine that is controlled

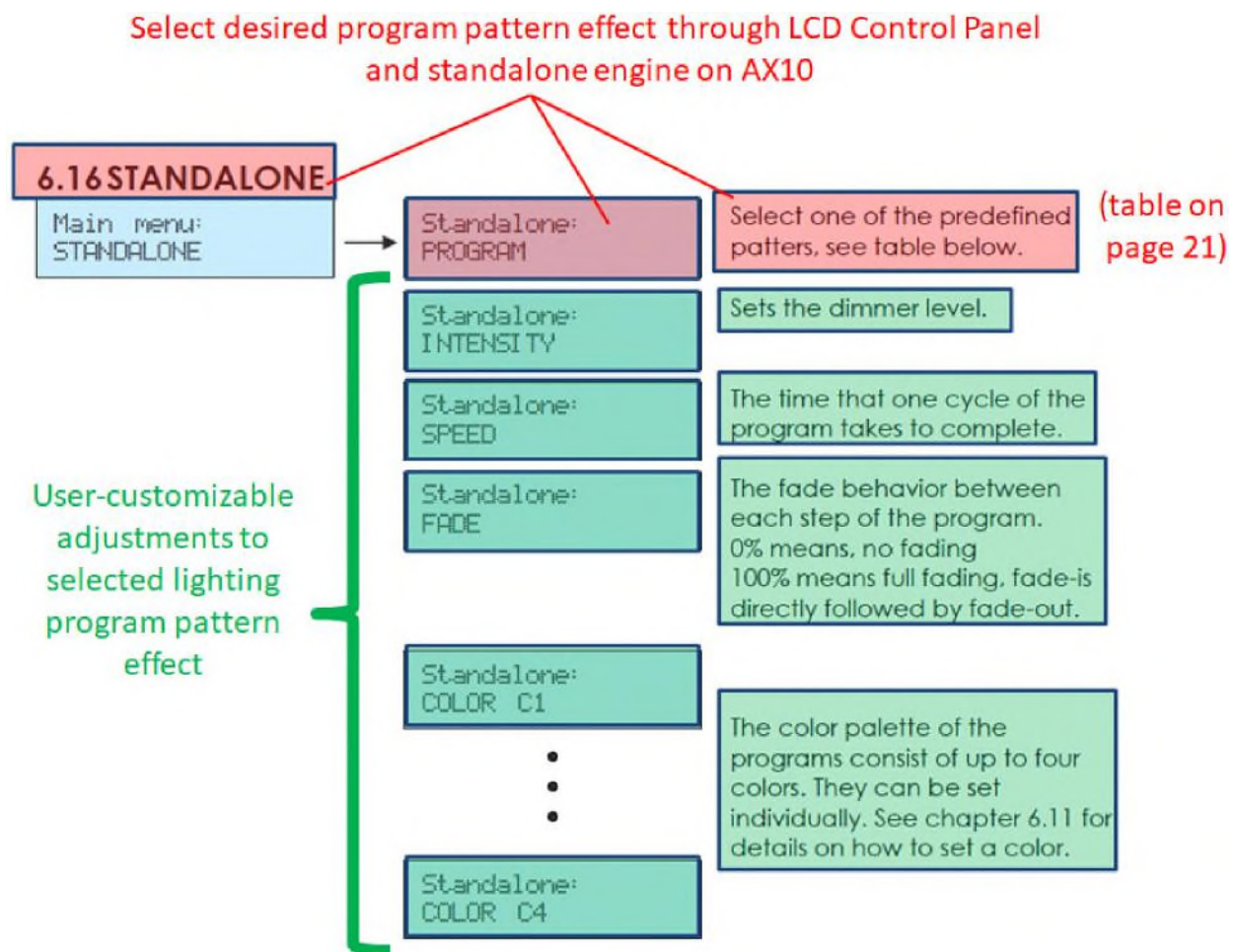
via the Control Panel menu. *Id.* at 9-10, 20-21; *see also id.* at 13 (allowing a user to select “standalone” mode.”). A user can utilize the Control Panel on the AX10 to select programs and adjust parameters such as speed, intensity, fade, and color of the program effect. *Id.* at 9-10, 20-21; *see also id.* at 13 (allowing users to select “standalone” mode”).

6.6 CONTROL PANEL

User-customizable
adjustments to
selected lighting
program pattern
effect

LEGEND			
 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

Select desired
program pattern



Id. at 11, 20 (annotated). The Control Panel and the lights are both part of the AX10 are thus considered to be integrated into a combined unit.

IX. GROUND II: CLAIMS 1-21 WOULD HAVE BEEN OBVIOUS TO A POSITA IN VIEW OF THE ASTERA MANUAL

168. I incorporate here by reference each of my opinions in the proceeding sections relating to Ground I, as the disclosures from the Astera Manual supporting my opinion that the Astera Manual anticipates Claims 1-21 apply equally to my opinion that Claims 1-21 would have been obvious to a POSITA in view of the Astera Manual.

169. The disclosures from Astera are nearly identical to, and in most instances more detailed than, the disclosures and claims in the '257 Patent. To the extent, however, that the Board finds that the independent claims are not disclosed by Astera, these claims, and by extension all of their dependent claims, would have been obvious to a POSITA.

170. For instance, the “calculate” limitation in Claim 1 would have been at least obvious to a POSITA. Claim 1[a] states as follows: “calculating, using an effect simulator, a time varying lighting value based on at least one simulation parameter.” Ex. 1001 at Claim 1. The '257 Patent does not provide any details regarding **how** the “calculation” is purportedly performed by the “effect simulator.” The '257 Patent does not disclose a specific algorithm that would be contemplated by the claims, or a specific way in which a “calculation” is being performed. A POSITA would understand that the “effect simulator” takes the user input parameters and generates or creates the lighting effect by calculating (*i.e.*, taking the sum of the parameter values and averaging them to generate a lighting effect matching those numeric parameters). I agree with Dr. Bretschneider when he testified that a POSITA who knows about color sciences and color mixing and different lighting effects would understand that to produce a lighting effect a POSITA would know a calculation occurs. Dr. Bretschneider Depo., 149:11-153:9, 153:19-154:18, 155:4-6, 165:9-11, 176:16-19; 150:14-21, 152:10-22, 185:7-188:13

(“[W]hen you set fire temperature or the fire color to 2000 Kelvin, there *has to be a calculation.*”) (emphasis added).

171. This is not new or unique, and a POSITA would have understood that the specific data (i.e., brightness and color values or timing) for an effect is created after the user selects the effect and customizes its parameters. A POSITA would have also understood that performing a calculation to determine how the LED lights will behave to generate a lighting effect is a standard functionality performed by a computer processor in any entertainment lighting device at the time of the invention. In this context, calculating refers to the function of the microprocessor within a lighting fixture.

172. For example, DMX-512 is a stream of 8-bit resolution of data values that are transmitted from a controlling device to a given lighting fixture and accessed by said fixture through addressing of the fixture. Addressing is accomplished by setting a start value, from 1 to 512. The lighting fixture is set to receive data starting at a specific address (set by the fixture through a user interface) and accepting as many packets of data as needed to control the various functions of the fixture. Simple on/off only needs one data packet and can be linked to any of the 1-512 data channels. A more complex lighting fixture might utilize 8 data packets to control multiple functions.

173. The values of these data packets are then used to “set” certain functional parameters within the lighting fixture. For example, data packet 1 may be dedicated to controlling lighting intensity. This could be used to control a mechanical dimming shutter via a stepper motor in the case of HID-based “intelligent” lighting fixtures or by utilizing Pulse Width Modulation (“PWM”) of an electronic dimming circuit for LEDs. An LED fixture such as the AX-10, which has multiple colors of LEDs, would utilize multiple data packets to control the intensity of the five colors.

174. One key element is the difference between DMX (a linear control) and the eye/photopic response to lighting (not linear). The sensitivity of the human eye allows for a wide range of sensitivity, 10 billion-fold, allowing us to see at extremely low light values (e.g., a single candle illuminating a room) to extremely high values (e.g., intense sunlight).

175. This response curve can be thought of as a logarithmic equivalent to 10X log, which requires that we utilize a non-linear curve controlling lighting intensity to better correspond to the sensitivity of human vision. This conversion from the linear values of DMX to logarithmic photopic response of human vision has to be translated.

176. Lighting fixture, like that disclosed in Astera, can use a microprocessor to take DMX values and calculate intensity of positional values (in the case of mechanical dimming) or PWM values (in the case of LED dimming) and output the

same to the associated electronics. This process has been in use for decades, and a POSITA would understand that such a calculation could (and would) be performed in Astera.

177. A lighting fixture can adapt to photopic response and generate effects. The DMX values would not need to be constantly changed to elicit a specific effect.

178. The Astera Manual discloses a “fire” effect having a “random flicker” characteristic. Ex. 1004 at 21, 28. A “random flicker” indicates that the flicker (or the alternating between background colors and flickering colors) occurs at random intervals, with each color active for a random duration. A POSITA would understand that this would result in the random generation of different visual effects for each cycle, based on a calculation that utilizes the input numerical values. If the same sequences were repeated, the light effect would not appear random. Further, the parameter adjustments would serve no purpose if no new values for an effect are created and sent to the LEDs based on said adjustments. A POSITA would not understand from Astera that the AX10 pre-stores in tables sequences of brightness and color values for every possible combination of effects and parameters.

179. A POSITA would understand that the Astera Manual discloses that the effects do not exist until a user creates and adds/customizes each new step/parameter for the effect. If the effect does not exist until the user creates it, it is not pre-recorded and a POSITA would understand that the effect is generated as disclosed in the '044

Patent. These lighting values would have to be created (*i.e.*, “calculated”) each time a user adjusts the parameters of an effect.

180. A POSITA would have understood that the specific data (*i.e.*, brightness and color values) for an effect (e.g., “fire,” “strobe,” and “chaser”) is created ***after*** the user selects the effect and customizes its parameters. A POSITA would have also known to provide any of the AsteraApp’s interfaces or functionality, including selecting effects programs, editing parameters, and saving and recalling effects to a main screen directly on the Control Panel. Thus, the Challenged Claims, including the “calculate” limitation, would have been obvious to a POSITA.

181. Astera discloses the “calculating” limitation of independent Claims 1, 15, and 20. At the very least, this would have been obvious to a POSITA.

182. To the extent Rotolight asserts that Astera does not disclose the limitation relating to “a random brightness, a random duration or a random interval,” this limitation would have, at a minimum, been obvious to a POSITA, to the extent these limitations are not expressly disclosed (which I believe they are). As an initial matter, and as explained in Section VIII, Astera discloses generating and outputting random lighting effects, such as a fire effect or an effect with random strobe requires certain input parameters that lead to or impact the randomness of the results. A POSITA would understand that the effect must have different values every time and

if the same strobe sequence is repeated every time, a user would not consider it random and it would appear artificial.

183. A POSITA would understand the '257 Patent's disclosures and claims are directed to "simulation parameters of a random brightness, duration, or interval" to be directed to *inputs* used to create the effect and impact the randomness of the effect. The user selected input parameters impact the randomness of the interval, duration, or color of a random effect like a random fire or strobe. For example, the '257 Patent teaches a lightning effect that "simulates lightning in a random manner" by allowing a user to "control the speed at which the lighting bursts re-occur" or to control the "duration of the lightning flashes." Ex. 1001 at 9:17-25. Or, the '257 Patent discloses "random" parameters in which a user inputs parameters setting the boundaries of a random effect, like strobe or lightning effects. *Id.* at 11:5-17.

184. A POSITA would understand that the Astera Manual discloses parameters—just like in the '257 Patent—that impact or affect the randomness of effects like fire, random strobe, or random chasers. For example, the Astera Manual discloses a random fire effect that may be selected by a user that is "a random flicker between two colors, background and flickering color." Ex. 1004, 20-21, 27-8. The Astera Manual further discloses that the intensity or brightness, speed, fade time, and the colors of the fire effect, and the others, can be adjusted by a user. A POSITA would understand that the fire effect is a "random flicker," changing between the

background color and flickering color and it discloses, or at a minimum would have been obvious, that this random flicker must occur at random intervals with each color lasting for random duration. *Id.* If the “random flicker” did not encompass random parameters, the effect would be a consistent strobing between background and flickering colors.

185. Further, a POSITA would understand that different colors have different brightness. A yellow light created by illuminating both the red and green LED emitters to full is brighter than a dark red light consisting of the red LED emitter alone. A user's ability to set the background and flickering colors for a "fire" effect will affect the randomness of, at least, the brightness, with a color such as yellow allowing for a random flicker that can be brighter than a color such as dark red. Ex. 1004 at 21, 28. Similarly, changing the speed of how long it will take the “fire” effect to complete one cycle affects the duration and interval of the flickering flames. *Id.* A “fire” effect with a high speed would have shorter intervals between flickers, so that all flickers can be completed within a shorter time period than if a lower speed were selected. It would have been obvious to a POSITA that these teachings in Astera disclose inputting a “simulation parameter” where the parameters are directed to “random brightness; a random duration; and a random interval.”

186. The Astera Manual also discloses generating chaser effects where “[t]he static chaser exchanges the color of the lights according to the tapped-in beat”

and the colors are *randomly chosen*. Ex. 1004 at 28. The input of random color by the user causes the random brightness of the chaser effects. For example, the user “taps” the key and the AX10 system uses the time between successive taps as the chaser time. The color for each step of the chaser is then chosen randomly and, as mentioned earlier, a random color has a random brightness. A lighting system with “simulation parameters” where the parameters are directed to “random brightness; a random duration; and a random interval” would have been expressly disclosed, or at a minimum obvious, to a POSITA based on these disclosures in Astera. A POSITA would have been motivated to utilize the “random” parameters and effects to ensure that the effect looks realistic and not artificial.

187. The Astera Manual also discloses a “random strobe” option for customizing lighting effects. Ex. 1004 at 15-17, 27. This effect has parameter selections for “slow,” “medium,” or “fast” random strobes that will impact the randomness of the duration and interval of the flashes that make up the strobe. A “fast” random strobe would have a shorter interval and duration of pulses than a “slow” random strobe. If the duration and interval of the flashes were consistent and uniform, then the strobe would not be “random.” I note that this input parameter in Astera of “slow,” “medium,” or “fast” for the strobe effect is the same as that disclosed in the ’257 Patent relating to “low,” “medium,” or “high” for fire activity,

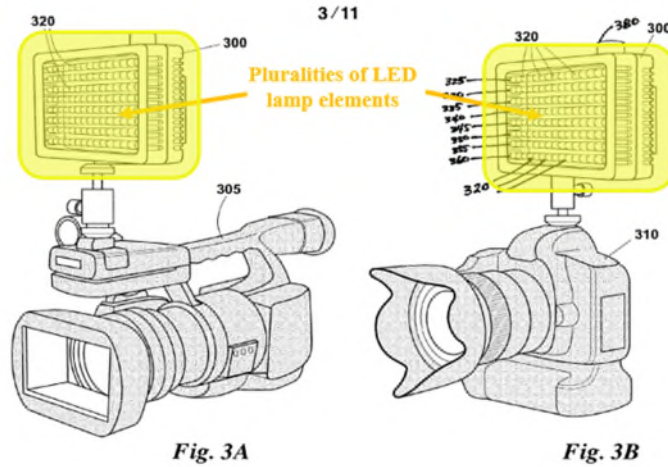
which also impacts the frequency of flashes (*e.g.*, fire flickers). Ex. 1001 at Fig. 6, 8:14-19.

X. GROUND III: POHLERT ANTICIPATES CLAIMS 1-21

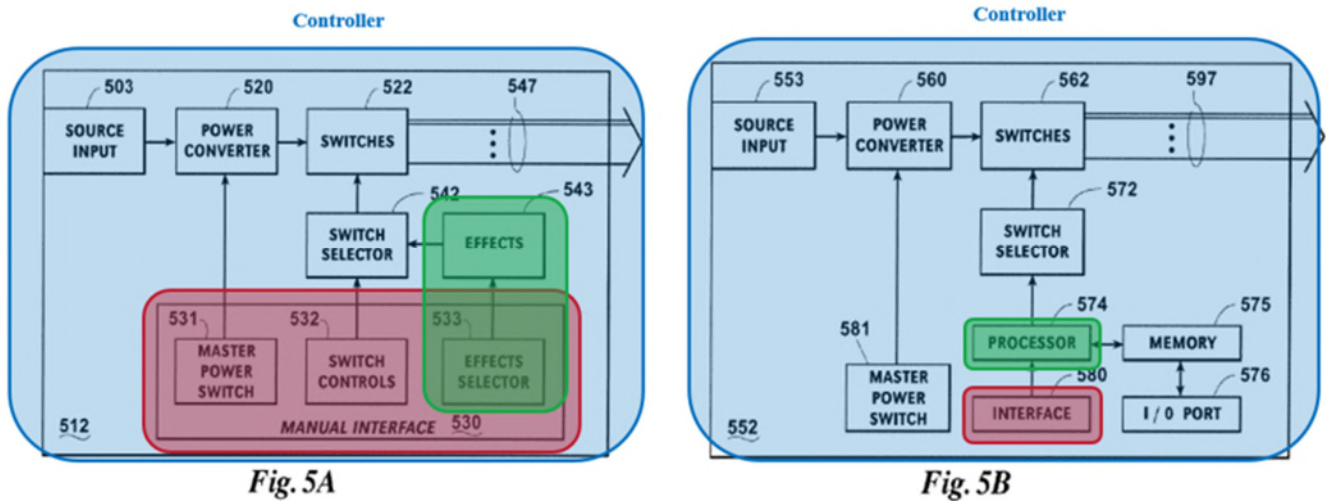
A. Pohlert

188. Pohlert (Exhibit 1006) is directed to a professional LED lighting and effects generation system. I understand Pohlert is prior art to the '257 Patent.

189. Pohlert discloses a “lighting and effects generation system” (Figs. 3A and 3B) that include LED lamps in a lighting frame. Exhibit 1008 at Abstract, [0051], [0057]. The lighting frame may be large, comprising multiple panels, or may be smaller and attached to a video or still camera. The LED lamps in the frame have a connected and dedicated “power controller.” *Id.* The power controller includes: (1) a user interface to select and customize lighting effects, (2) an “effects generator” that generates the selected effects, and (3) switches that convert the generated effects into power control signals output to the LEDs.



Id. at Figs. 3A-3B (annotated).



Id. at Figs. 5A-5B (annotated). The power controllers are used in the configurations shown in Figures 3A and 3B. *Id.* at [0059]-[0063].

B. Pohlert Discloses Claims 1-21

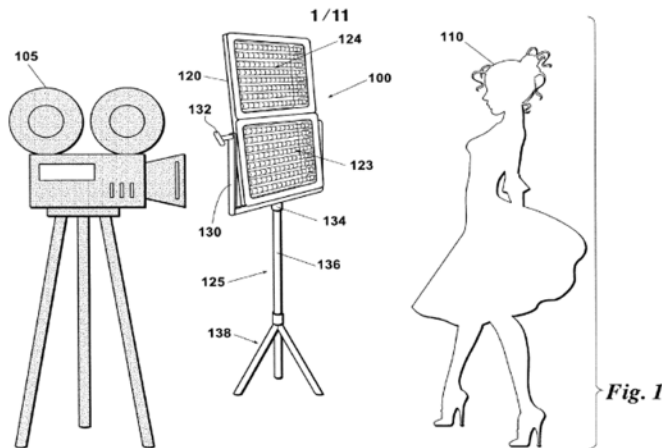
a) Independent Claim 1

190. As viewed by a POSITA, Pohlert discloses Claim 1.

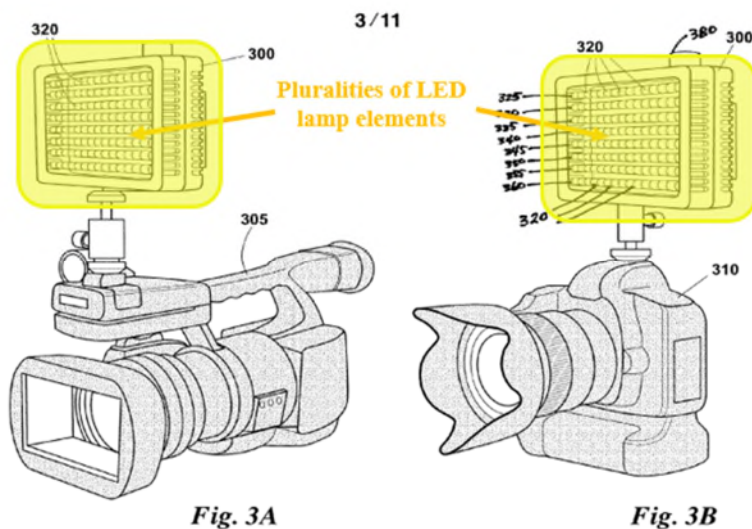
Claim 1[pre]: A method for controlling a lighting device to produce a user customisable lighting effect, the method comprising:

191. Pohlert discloses the preamble to Claim 1.

192. Pohlert discloses a method for controlling a lighting device including LEDs and controlled by a “power controller.” The power controller allows a user to interface with the LED lighting device and select and modify lighting special effects, such as patterns of strobing, flashing, and dimming and brightening the lights. Ex. 1006 at Abstract, [0020], [0050], [0063], [0067]. The lighting system and method “can provide a variety of lighting patterns, including programmable patterns by which individual or groups of lights can be controlled for different lighting effects.” *Id.* at [0103]. The system disclosed in Pohlert can be used to provide illumination for “a subject during video photography.” *Id.* at [0020].



Id. at Fig. 1.



Id. at Figs. 3A, 3B (annotated).

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

193. Pohlert discloses Claim 1[a].

194. The '257 Patent describes the “effect simulator” as a component that “creates data 106 characterising a lighting effect.” Ex. 1001 at 7:45-50; 5:51-55.

Further, the '257 Patent describes the “time varying lighting value” as data or signals that contain brightness or color values that vary over time to produce desired effect. Ex. 1001 at 8:36-48, 8:55-57. As previously explained, the “effect simulator” is described as nothing more than a black box that performs functions without any recitation as to *how* the functions are performed. Pohlert, however, discloses how its lighting system generates an effect using an “effects selector” and “effects generator” (Figure 5A) or “processor” (Figure 5B) in the “power controller” and how it calculates time varying lighting values in the form of data signals characterizing the desired lighting effect. Exhibit 1008 at [0059], [0061]-[0062], [0065]-[0067].

195. The outputs from the “effects selector” and “effects generator” (Figure 5A) or “processor” (Figure 5B) are data and signals characterizing the desired lighting effect, which are converted to power control signals supplied to the LEDs to generate the desired light output. *Id.* at [0059], [0061]-[0062], [0065]-[0067].

196. These power control signals provide time-varying signals (described in the '257 Patent as data or signals that contain brightness or color values that vary over time to produce desired colors of intensities Ex. 1001 at 8:36-48)) for “controlling the intensities” of the LEDs to generate the desired light output patterns and effects. Exhibit 1006, [0050]-[0051]. The power controls signals are based on user-selected parameters for the desired lighting effects, including brightness (or

dimming), duration, frequency, whether a sequence will be pseudo-random, and color. *Id.* at [0051], [0061]-[0063], [0066]-[0067], [0089]-0091].

197. Pohlert also discloses that a user can adjust the 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.* at [0062]. Adjusting the oscillation frequency causes the controller to calculate and create a new output time varying power control signal, changing the frequency of the strobe effect output by the LEDs. Importantly, this is an active adjustment to the light effect that is based on the user’s input parameters.

198. Pohlert 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 the patterns. *Id.* at [0063], [0067]. The brightness and frequency of these light effect patterns are customized by user-selected parameters, including the brightness and dimming of different groups of light elements during the pattern and whether the sequences will be pseudo-random. *Id.* at [0063], [0067]. Patterns like this requires the LEDs to be controlled by signals that are “time varying,” such that at different times in the sequence some LEDs will be on, some off.

199. Additionally, Pohlert teaches that adjusting the color or color temperature of the LEDs allows the user to input “intensity control” and “ratio

control” adjustments through “manual control knobs, dials, switches, or other such means, or alternatively may be embodied as a digital keypad, a set of digital buttons, or the like” on a user interface. *Id.* at [0088]-[0092]. The “intensity control” and “ratio control” adjustments are received by “intensity control circuits” and “ratio control circuits” in the controller, which calculates and generates signals to modify the power supply to the different LEDs to generate the desired color and color temperature. *Id.* at [0089]-[0091].

200. The generation and output of control signals, or time varying lighting values, representing the desired effect disclosed in Pohlert is the same as the effect simulator and output lighting values disclosed in the '257 Patent. See Exhibit 1001, Fig. 2 and Ex. 1008 at 5B.

201. The “effects selector” and “effects generator” (Figure 5A) or “processor” (Figure 5B) of Pohlert calculate data signals that are converted to power control signals supplied to the LEDs based on user input parameters such as brightness, duration, or sequence that allow the output from the LEDs to “simulate” the desired lighting effect or pattern. *Id.* at [0059], [0061], [0065]-[0067]. Controllers generate lighting values that are provided to appropriate switches to control power to the wires supplying power to light elements. *Id.* The pseudo-random sequences generated by the effect simulator (Ex. 1006 at [0063], [0067]) is

a sequence of preset values and calculations performed to generate values for the “pseudo-random” sequence.

202. Pohlert therefore discloses control signals affect the lighting output of the LEDs. The “effects selector” and “effects generator” generate power control signals as described above. These signals may then be routed through switches 522 where they are directed to specific LEDs or groups of LEDs. Which specific LEDs are powered, the level they are powered to, and when they are powered is controlled by the combination of the effects control signals and the switch routing.

Claim 1[b]: 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;

203. Pohlert discloses Claim 1[b].

204. Users can select from a range of effects through an interface on the controller, including patterns and pattern sequences, strobing, flashing, and dimming and brightening. Ex. 1006 at [0057]-[0059], [0061], [0063], [0067]; Figs. 2, 5A, 5B. Users can “customize” the lighting effects by selecting and adjusting different simulation parameters. *See supra* ¶¶ 193-202 (Claim 1[a]). These parameters input by the user create the and the effect that is generated depends on and reflects these parameters. Ex. 1006 at [0057]-[0059], [0061], [0063], [0067].

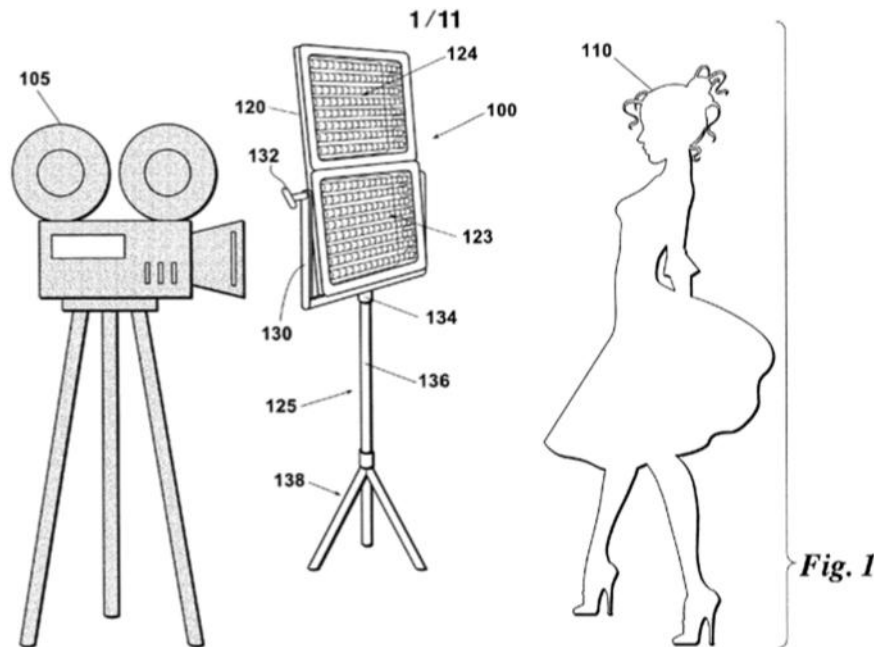
205. Pohlert also discloses that these parameters include selections for brightness (or dimming), duration, frequency, whether a sequence will be pseudo-

random, and color. *Id.* at [0051], [0061]-[0063], [0066]-[0067], [0089]-0091]. By choosing from, and adjusting, the combinations of parameters that make up the pattern, a user can create or modify a lighting effect. These parameter adjustments include strobing and flashing sequences, pseudo-random strobing and flashing sequences, and dimming and brightening of different light elements. *Id.* A POSITA would understand based on Pohlert that a user could use an interface and select to create a light pattern that included pseudo-random sequences, as well as dimming and brightening different groups of light segments. By selecting different combinations of the pseudo-random sequences of flashing different groups of lights, and choosing other effects to add as a combination of effects, a user can create a fully customized lighting pattern that is created live by the user.

206. The pattern generation, strobing, flashing, and dimming effects described in Pohlert are understood by a POSITA to be the types of effects used in videography, broadcast, cinematography, and studio and location filming. *Id.* at [0063], [0066].

207. The lighting system and effects are used to provide lighting in “photography, film, television, and other applications.” *Id.* at [0003]. Lighting systems are “an integral part of the film and photography industries,” providing essential proper illumination “when filming movies, television shows, or commercials, when shooting video clips, or when taking still photographs.” *Id.* at

[0005]. Figure 1 illustrates the use of the lighting and effects generation system of Pohlert in coordination with a video camera that may be “a motion picture-type camera.” *Id.* at [0052].



Id. at Fig. 1.

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

208. Pohlert discloses Claim 1[c].

209. Pohlert discloses that the user-selected lighting effects, including patterns and combinations of patterns and effects, can be modified by selecting from a number of patterns including “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.” *Id.* at [0063], [0067].

210. The ’257 Patent itself describes a “pseudorandom parameter” is “equivalent to a truly random parameter.” Ex. 1001 at 7:30-34. A POSITA would understand that a pseudo-random sequence—like that disclosed in Pohlert—generates *random* flashes and strobes of light using an algorithm generating outputs that determine the random sequence made up of different strobes and flashes of light at the different groups of LEDs.

211. For example, a user can select to strobe or flash different LEDs, or groups of LEDs, in a pseudo-random sequence using “random brightness” (the intensity of the overall strobe or flash), “random duration” (how long a strobe or flash lasts), and “random intervals” (time between strobes or flashes). Ex. 1006 at [0063]-[0067]. Pseudo-random sequences are a series of random strobes and flashes with the time random between strobes or flashes and the groups of lights used to output those strobes and flashes being random instead of using a consistent duration and interval. A POSITA would understand a pseudo-random sequence disclosed in Pohlert to include random brightness, duration, and intervals.

212. As another example, “random brightness” relates to the brightness of the sequence, and each step of the sequence, being random based on which LED

elements and groups of elements are randomly selected to be activated at any time. *Id.* If fewer elements are randomly activated, the output will not be as bright. Pohlert discloses that the total output of light (which would impact the brightness) depends on which groups of light segments are activated at any time. *Id.* at [0059] (“The switch controls 532 could have a first setting to select all of the light segments . . . thereby illuminating all 320 light elements, a second setting to select every other light segments 325, 335, 345 and 355, and a third setting to select every fourth of light segment 325, 340, 360, thus providing options of 100%, 50% and 25% total light output.”).

213. In the pseudo-random sequences, Pohlert expressly states that different groups of light element segments are flashed in pseudo-random sequences. *Id.* at [0063], [0064]. The brightness of the light output will necessarily be random in Pohlert as it depends on which of the groups are activated at any time. If the pseudo-random sequence randomly activates every fourth light segment, then all light segments, then every other light segment, then the brightness would randomly change from 25% total light output, to 100% light output, to 50% light output.

214. A pseudo-random sequence of flashes and strobes in Pohlert includes random durations and intervals for those flashes and strobes. If they were not random. *Id.* at [0063], [0067]. The sequences can be predetermined or pseudo-random, and a POSITA would understand that the difference between the two is that

the flashes in the pseudo-random sequence would have inconsistent, or random, duration and interval. This is so that the effect does not appear as a set and fixed repeating pattern of flashes, which will appear artificial to a viewer.

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

215. Pohlert discloses Claim 1[d].

216. The “simulation parameters” in Pohlert are based on the user-selected customizable lighting effects selected through the user interface on the power controller. *See supra* ¶¶ 203-14 (Claims 1[b]-[c]). Pohlert discloses “strobing” effects and light “pattern” effects used in “photography, film, television, and other applications.” Ex. 1006 at [0003], [0005], [0061].

217. Simulation parameters of dimming or brightening different groups of light elements, and selecting whether the sequences used to generate light patterns will be pseudo-random depend on user input, such as selecting to generate a pattern effect on the user interface. *Id.* at [0063], [0067].

218. The strobing effect output by Pohlert is based on the simulation parameter related to the “frequency” of an oscillation signal controlling the characteristics of the “flashes” or pulses of light input by a user. *Id.* at [0061]-[0063], [0066]-[0067]. A user adjusting the parameters relating to the “frequency” of strobing corresponds to a user selecting to produce a strobing effect.

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

219. Pohlert discloses Claim 1[e].

220. The power controller disclosed in Pohlert sends control signals causing the light elements to simulate the user's selected effect. A user may select a strobing, dimming, or pattern generation. *See supra* ¶¶ 193-218 (Claims 1[a]-[d]). The output from the "effects selector" and "effects generator" or "processor," and switches, is shown in Figures 5A-5B and the signals are provided to the LED lamps through a cable or wires. Ex. 1006 at [0058]-[0059] ("The power converter 520 is preferably connected to a plurality of switches 522 . . . each switch controlling power delivered by the power converter 520 to one of the wires 547 output by the power controller 512. . . . The switch selector 542 would then convert each knob setting to a set of control signals to the appropriate switches 522, which in turn would control power to the wires 547 supplying power to the light segments.").

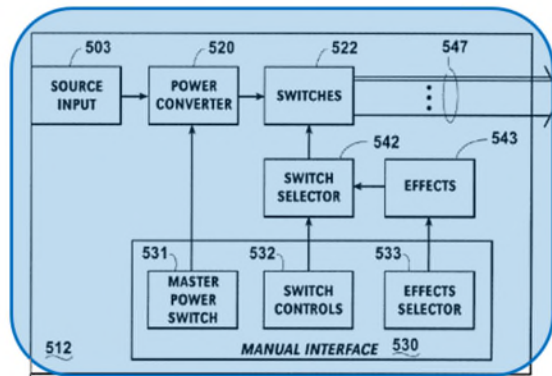


Fig. 5A

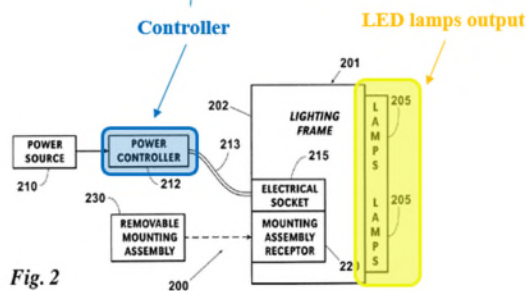


Fig. 2

Id. at Figs. 2 (annotated), 5A (annotated), *see also* Figure 5B. The LED lamps receive the power control signals and generate the desired effects.

b) Independent Claims 15 and 20

221. There are no substantive differences between independent Claim 1 and independent Claims 15 and 20. Claims 15 and 20 are essentially identical to independent Claim 1, and Pohlert discloses Claims 15 and 20 for the same reasons it discloses Claim 1, as discussed above.

222. A matching of each limitation in Claim 1, to the corresponding limitation in Claims 15 and 20, is as follows, with differences shown in **bold**:

Claim 1	Claim 15	Claim 20
A method for controlling a lighting device to produce a user customisable lighting effect, the method comprising:	A controller adapted to control at least one lighting device to produce a user customisable lighting effect, the controller comprising:	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
calculating, using an effect simulator, a time varying lighting value based on at least one simulation parameter;	an effect simulator adapted to calculate a time varying lighting value based on at least one simulation parameter;	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 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 for 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;	wherein the at least one simulation parameter is at least one of: a random brightness; a random duration; and a random interval;	wherein the 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	said simulation parameter depending on the user customisable lighting effect being simulated; and	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.	wherein an output of the effect simulator is adapted to control a lighting device according to the calculated variation of	outputting, from said effect simulator, said time varying lighting value thereby to simulate the user customisable lighting effect.

223. The only differences identified above are that while Claim 1 is directed to a “method” for controlling a lighting device, Claim 15 is directed to a “controller” implementing this same method, and Claim 20 is directed to a “computer program” performing the same method. Pohlert discloses each limitation in Claims 15 and 20 for the same reasons discussed above with respect to the corresponding limitation in Claim 1.

224. Pohlert discloses that the claimed method can be performed on a “controller” or using a “software program.” A controller (as shown in Figures 5A and 5B) performs the method for controlling the lighting elements. Ex. 1006 at Figs. 5A, 5B, [0057]-[0067]); *see also supra* ¶¶ 193-202 (Claim 1[a]).

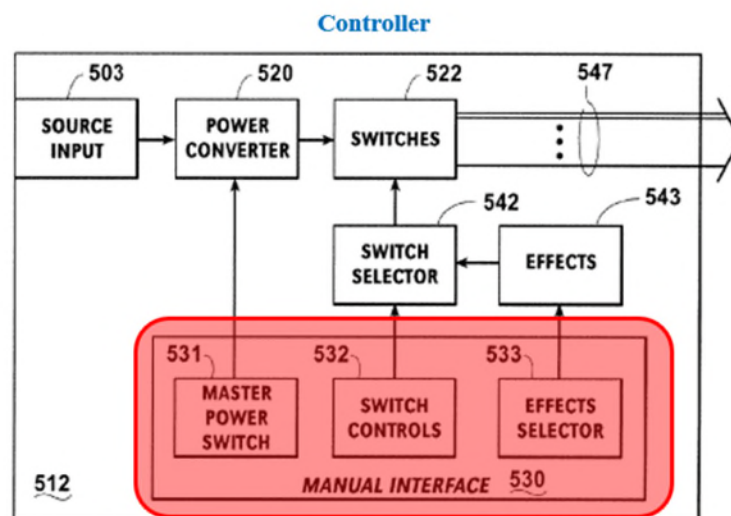


Fig. 5A

Id. at Fig. 5A (annotated).

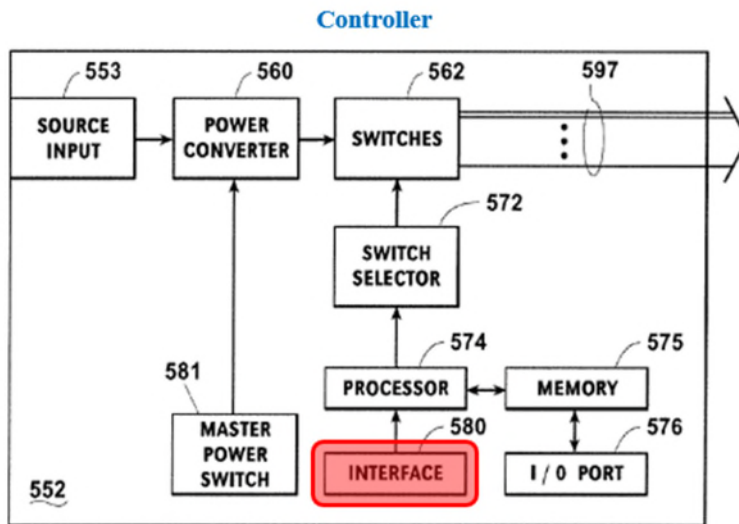


Fig. 5B

Id. at Fig. 5B (annotated). The controller in Figure 5B implements a software program, such as a “programming instructions,” that are read and implemented by the processor to customize and produce selected effects. *Id.* at [0066]-[0067]. The “programming instructions” are executed by the processor in the Figure 5B controller and “provide for various lighting effects, such as dimming, strobing, pulsation, or pattern generation, for example.” *Id.* at [0067]. The programming instructions, executed by the processor, perform the method steps recited in both Claims 1 and 20.

225. Pohlert discloses the claimed “controller” and “software program” for controlling “a lighting device to produce a user customisable lighting effect,” as recited in Claims 15 and 20.

c) Dependent Claim 2

Claim 2: *The method according to claim 1 wherein the random brightness comprises a random peak brightness.*

226. Pohlert discloses Claim 2.

227. Pohlert discloses strobing or flashing light elements in a pseudo-random sequence (as discussed in detail in Claim 1). The random sequence generates a random brightness for the strobe and flash effect as the lights go on and off during the random sequence. *See supra* ¶¶ 208-14 (Claim 1[c]).

228. The peak brightness generated during the random sequence changes as the different groups of light segments are randomly flashed or strobed. Pohlert discloses that a pseudorandom sequence includes strobing or flashing all, or different groups of, light elements. Ex. 1006 (at [0063], [0067]). As different groups of light elements may contain differing numbers of light elements turning randomly on and off, each activated light grouping has a different peak brightness. For example, if more light segments are activated, then the peak brightness will be greater.

229. When different combinations of groups of light elements are randomly selected, this indicates that the total light output would change depending on which groups are selected. *Id.* at [0059] (“[T]he switch controls 532 could have a first setting to select all of the light segments 325, 330, 335, 340, 345, 350, 355, 360 thereby illuminating all 320 light elements, a second setting to select every other light segments 325, 335, 345 and 355, and a third setting to select every fourth of

light segment 325, 340, 360, thus providing options of 100%, 50% and 25% total light output.”); *see also id.* at [0063], [0067].

230. When pseudo random sequences are selected or created and all light segments are randomly selected, there would be 100% total light output (brightness). This maximum light output would decrease to 50% if only every other light segment is randomly selected and to 25% if only every fourth light segment is randomly selected. *Id.* at [0059], [0063], [0067]. Depending on how many light segments are activated at any given time in the pseudo-random sequence, the peak brightness generated randomly changes.

d) Dependent Claim 3

Claim 3: The method according to claim 1 wherein the random interval comprises at least one of a random interval between flashes, a random interval between groups of flashes, and a random frequency.

231. Pohlert discloses Claim 3.

232. Pohlert discloses that the random interval can be a pseudo-random strobing or flashing sequence. *Id.* at [0063], [0067]; *see also supra* ¶¶ 208-14 (Claim 1[c]). A sequence of strobes or flashes is a series of strobes and flashes of lights that follow each other. When this sequence is pseudo-random, the interval, which is the time between strobes or flashes, changes in a random manner. This is instead of changing in a consistent, nonrandom sequence, because those intervals would appear as uniform and would not create the strobing effect that is desired.

233. Pohlert utilizes a pseudo-random sequence by controlling “all or different groups” of the light elements, causing random intervals between flashes and groups of flashes, as different groups of elements are randomly turned on and off. Ex. 1006 at [0063], [0067].

234. With a random interval between flashes or groups of flashes, the frequency of the flashes is also random because the frequency depends on the length of the interval between the different groups of light elements being activated. Pohlert discloses that the processor in the controller of Figure 5B may make use of one or more electronic timers to provide timing between on and off events (intervals between flashes or strobes) of the pseudo-random sequence. *Id.* at [0067].

235. Claim 3 requires a random interval between flashes or a random frequency. The interval between flashes plus the duration of the flash determine the flash frequency, and a change to either the interval between flashes or the flash duration necessarily alters the flash frequency. Such changes can be random in Pohlert.

e) Dependent Claim 4

Claim 4: The method according to any claim 1 wherein the random duration comprises at least one of a random ramp-up time to peak brightness, a random fade-down time from peak brightness, and a random number of pulses.

236. Pohlert discloses Claim 4.

237. Pohlert discloses that the random sequences can be pseudo-random strobing or flashing sequences. Ex. 1006 at [0063], [0067]; *see also supra* ¶¶ 208-14 (Claim 1[c]). The random sequences are generated by controlling “all or different groups” of the light elements, causing a random number of pulses, depending on lights are turned on and off. *Id.* at [0063], [0067]. This randomness is achieved by dividing the lights into groups and allowing a user to select parameters to determine how the strobes or flashes will be output. The number of pulses will randomly change depending on when the groups are randomly turned on and off with respect to each other, creating a random number of pulses. If during a certain period of time there are three of the four groups of lights activated, this will generate three pulses of light. If instead all four groups are activated twice each during the same time period, there would then be eight pulses of light. The randomness with which the groups of light segments are activated in a given time period means that the number of pulses of light output will also be random.

238. Pohlert also discloses that the patterns may be generated using “combinations” of effects, such as combinations of pseudo-random sequences of

flashing and strobing the LEDs and gradually dimming or brightening the same LEDs. *Id.* at [0063], [0067]. A POSITA would understand that Pohlert allows a user to create an effect of a pseudo-random sequence of flashing and strobing LEDs, combined with a user selection to gradually dim and brighten those flashes and strobes of light during the sequence. This would allow for user customization using randomness relating to ramp-up time and fade down time.

239. Gradually dimming and brightening the LEDs, as they are flashed or strobed in a pseudo-random sequence, would cause the time when the peak brightness of the random sequence is reached to shift. During this sequence, the brightness will randomly reach its highest and lowest levels, based on the gradual dimming and brightening of the LEDs. Based on this, the ramp up to the peak brightness, and ramp down from the peak brightness, would be random.

f) Dependent Claim 5

Claim 5: The method according to claim 1 wherein said at least one simulation parameter is random within predefined boundaries and wherein the predefined boundaries comprise at least one of an upper and lower duration; a number of flashes in a burst; an interval between bursts; an amplitude; and a ramp-up or fade-down time.

240. Pohlert discloses Claim 5.

241. In Pohlert, a user can adjust simulation parameters that include pseudo-random sequences of flashes or strobing. Ex. 1006 at [0063], [0067]. These pseudo-

random sequences are applied within “predefined boundaries” of the patterns, and within the “predefined boundaries” of the capabilities of the lighting elements.

242. For example, Pohlert discloses predefined boundaries for the amplitude of the light produced in the pseudo-random sequences. *Id.* at [0059], [0063], [0067]. The pseudo-random sequences can include flashing or strobing different combinations of groups of LEDs. *Id.* at [0063], [0067]. The “amplitude” of light in a pattern is based on the number of LEDs or groups of LEDs activated at any given time. *Id.* at [0059]. The “amplitude” output in the pseudo-random sequences is random within the boundaries of how many LEDs or groups of LEDs are activated at any given time.

243. Pohlert also discloses upper and lower “duration,” and the “interval” between flashes are linked and determined by the frequency of the oscillation used to generate the flashes or strobing. These boundaries represent predefined upper and lower boundaries for the frequency. The lower boundary for duration (or frequency) is zero time and an upper boundary is infinite time. While these are the upper and lower limits, a POSITA would understand that the true boundaries are determined by the limitations of the circuitry and LEDs in the lighting device. The lower boundary is how long the circuitry and LEDs can make a flash last, and an upper boundary is how short it can make a flash. The boundaries for the “interval” between flashes and bursts are determined by the capabilities of how quickly or slowly the

circuitry and LEDs can generate flashes and bursts. The LEDs in Pohlert have a predefined minimum output of zero, when the LED is off, and a predefined maximum output when the LED is on, which is limited by the capabilities of the specific LED, the power supply, the capacity of the LED cooling system, and other physical parameters.

g) Dependent Claim 6

Claim 6: The method according to claim 1 wherein the at least one of: a random brightness; a random duration; and a random interval is determined in dependence on one or more user-selectable simulation parameters.

244. Pohlert discloses Claim 6.

245. As explained above, simulation parameters can include random brightness, duration, and intervals in pseudo-random sequences of strobes and flashes. *See supra* ¶¶ 193-218 (Claims 1[a]-[d]). These random parameters are determined based on user parameter selections. Ex. 1006 at [0063], [0067]; *see also infra* Claim 8.

246. In Pohlert, the “[p]attern generation may be accomplished by, e.g., manual selection from a number of predefined patterns, or else through an interface allowing different pattern sequencing.” *Id.* at [0063]. User selections are used to implement a random sequence and generates a pattern by “strobing or flashing different groups of light segments” in “pseudo-random” sequences. *Id.*

247. Users can also select “combinations of effects” that include the “pseudo-random” sequences, and “gradually dimming or brightening light segments 325-360 (individually, in groups, or collectively).” *Id.* These combinations depend on a user selecting certain combinations.

h) Dependent Claim 7

Claim 7: The method according to claim 1, wherein the simulation parameter is related to one or more of: a rate of increase of brightness; a rate of decrease of brightness; a rate of change of colour; a brightness; a local maximal brightness; a local minimal brightness; a brightness fluctuation period; and a colour fluctuation period.

248. Pohlert discloses Claim 7.

249. Pohlert discloses at least one simulation parameter that is related “a brightness.” Pohlert discloses the parameter of using “pseudo-random” sequences of strobing and flashing light. Ex. 1006 at [0063], [0067]. Depending on the parameters chosen by the user will determine how many light elements are activated which directly determines the brightness levels. *Id.*

250. If all light elements are activated, the brightness will be higher. The simulation parameter of generating pseudo-random sequences of strobes and flashes will directly relate to brightness. Pohlert teaches that the simulation parameter is related to at least brightness. *See also supra* ¶¶ 208-14, 226-30, 236-39 (Claims 1[c], 2, 4).

251. Pohlert also discloses parameters that relate to gradually dimming or brightening the light elements, which relates a rate of increase/decrease in brightness, and brightness fluctuation period. *See supra* ¶¶ 236-39 (Claim 4). The effects can include pseudo-random sequences and “gradually dimming or brightening” the light elements. Ex. 1006 at [0063], [0067]. Gradually brightening or dimming the lights causes the lights to “ramp up,” or “increase” in brightness to a peak value, and then “decrease” in brightness to zero output or another minimal level of output. This timing between the gradual increase and decrease in brightness is a “brightness fluctuation period.”

252. Pohlert also discloses LEDs of differing colors, such as combinations of red, green, and blue (RGB) LEDs. These LEDs can “generate virtually any desired color.” Ex. 1006 at [0084]. A user may input simulation parameters related to color fluctuation periods, which relates to different colors in different steps in the sequences or patterns. *Id.* at [0063], [0067], [0086]. By generating patterns and sequences of the lights where the LEDs generate different colors includes different color fluctuation times as the lights are randomly activated.

i) Dependent Claim 8

Claim 8: The method according to claim 1 further comprising receiving a user input of one or more user-selectable simulation parameters and adapting the simulation in dependence on the one or more user-selectable simulation parameters.

253. Pohlert discloses Claim 8.

254. Pohlert includes a user interface that is adapted to receive user inputs of parameters to choose and adjust special effects. These effects include patterns, strobing, flashing, dimming and brightening. *Id.* at [0059], [0066]-[0067], Figs. 5A, 5B.

255. The controller shown in Figure 5A contains a “manual interface 530 is provided to allow operation of the switches 522 according to manual selection. The manual interface 530 may include a master power switch 531, switch controls 532, and, optionally, an effects selector 533. The switch controls 532 may include an individual manual switch, button or other selection means for each individual switch provided in the set of switches 522, or else may comprise a control mechanism (such as knob or reduced number of manual switches, buttons or other selection means) for selecting groups of switches 522 according to predesignated arrangements.” *Id.* at [0059].

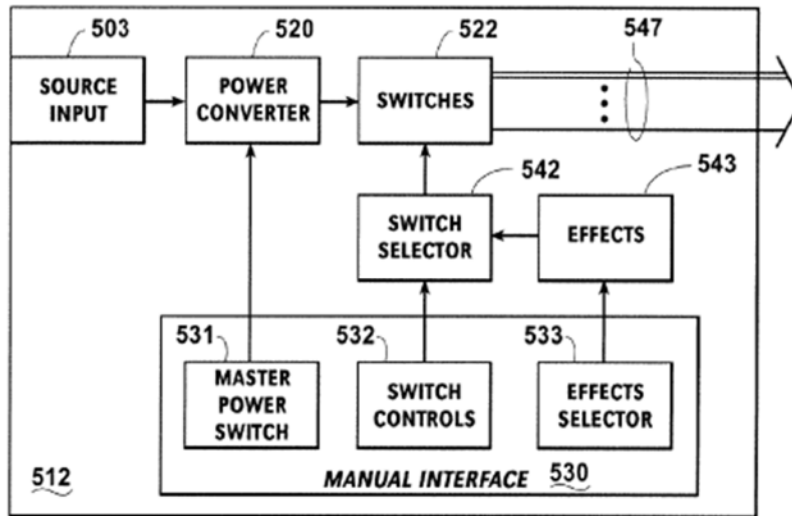


Fig. 5A

Id. at Fig. 5A.

256. Selections made by the user using the interface are sent to an “effects generator 543,” which provides “the ability to create various lighting effects, such as, e.g., dimming, strobing, pulsation, or pattern generation.” *Id.* at [0061]. The interface includes an effects selector for a user to adjust frequency of the “strobing” effect “through a knob, switch or other selection means.” *Id.* at [0062]. The controller includes the ability to use “manual selection from a number of predefined patterns, or else through an interface allowing different pattern sequencing.” *Id.* at [0063]. Example patterns to be selected by a user include “strobing or flashing different groups of light segments . . . 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.” *Id.*

257. The controller shown in Figure 5B also includes “[a]n interface 580 . . . for programming or otherwise interfacing with the processor 574, or manually selecting various lighting effects options through selectable knobs, switches or other selection means, as generally explained previously with respect to FIG. 5A.” *Id.* at [0066].

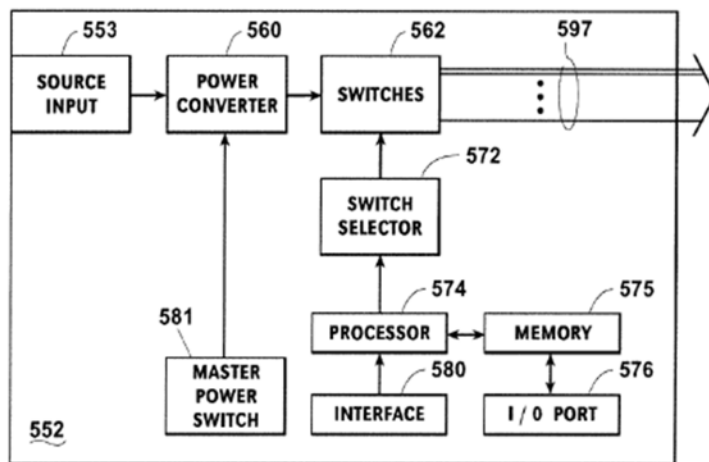


Fig. 5B

Id. at Fig. 5B.

258. Selections made by the user are converted to instructions for the processor, which “provide for various lighting effects, such as dimming, strobing, pulsation, or pattern generation, for example.” *Id.* at [0067]. 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 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.” *Id.* By inputting the simulation parameters, the user can select the desired effect patterns.

j) Dependent Claim 9

Claim 9: The method according to claim 1 wherein the simulation parameter comprises at least one of: a maximum brightness; a minimum brightness; a colour; and a trigger.

259. Pohlert discloses Claim 9.

260. Pohlert discloses that the effect parameters include maximum and minimum brightness, color, and a trigger. Ex. 1006 at [0061]-[0067], [0084]-[0091].

261. As for the parameters of “maximum brightness” and “minimum brightness,” these are disclosed by Pohlert which teaches that a user can selectively dim or brighten the lights. *Id.* at [0061], [0063]-[0065], [0067]. 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.” *Id.* at [0061].

262. Pohlert also discloses a “dimmer switch” that allows users to “control light output.” *Id.* at [0064]. If a user adjusts the dimmer switch, the user can select the maximum or minimum brightness. Dimming the lights would lower the maximum brightness, while brightening the lights increases the maximum brightness.

263. Pohlert also teaches that a user can “gradually dim[] or brighten[]” using the user interface. *Id.* at [0063], [0067]. Gradually dimming light elements adjusts the brightness level and can be gradually dimmed to the “minimum brightness.” Alternatively, a user can also increase to the “maximum brightness”.

264. Pohlert also teaches a simulation parameter relating to “a colour.” The LEDs in Pohlert can be adjusted to adjust the output color and color temperature. Ex. 1006 at [0086]. Color temperature describes the color appearance of light. A “cool” light may be a neutral white light, or have a slight blue tint to the white light. A “warm” white light, on the other hand, may have a more yellow-white appearance.

265. Users can adjust the color and color temperature of the LEDs by adjusting the “intensity control” and “ratio control” through “manual control knobs, dials, switches, or other such means, or alternatively may be embodied as a digital

keypad, a set of digital buttons, or the like” on a user interface. *Id.* at [0088]; [0089]-[0092]. The “intensity control” and “ratio control” adjustments are received by “intensity control circuits” and “ratio control circuits” in the controller, which then modifies the power supply to the different LEDs to generate the desired color and color temperature. *Id.* at [0089]; [0090]-[0091]. This can be seen in Figure 10 of Pohlert, which discloses how the light emitted from the tungsten LEDs (around 3200 K) and daylight LEDs (around 5600 K) may be adjusted to adjust the mixed color temperature. *Id.* at [0086]-[0091]. Pohlert discloses that “[b]ecause the two different colors of LEDs (e.g., daylight and tungsten) can be controlled separately (through common or separate circuitry), and because these particular LEDs, or other similar complementary colors, do not have significant color shifts when dimmed, it would be relatively straightforward to adjust (e.g., cross-fade, cross-dim) between the two colors and, for example, provide a variety of natural light illumination effects for various types of common film stock.” *Id.* at [0092]; *see also id.* at [0086]-[0091].

266. Pohlert also discloses “a trigger” parameter. *Id.* at [0059], [0065]-[0067]. A user can select “programming instructions” that dictate the start and stop times for the selected patterns, sequences, and effects that result in outputs of control signals to vary the lighting values and simulate the desired effects. *Id.* at [0066]-[0067]. The “power controller 552 includes a processor 574 which may be programmed to provide various lighting effects by manipulating the switch selector

572 (for example, by changing values in registers which control the on/off states of the switches 562).” *Id.*; see also Claim 12.

267. Pohlert also discloses a “trigger” relating to the “slave flashes” that can be used with the LED lighting system. Pohlert discloses that “slave flashes” can be triggered by RF, infrared (IR), or optical signals (such as the flashes generated by the LEDs directly connected to the controller). *Id.* at [0022]-[0023].

268. The controller in Figure 5B includes an “I/O port” that may be wireless (infrared) for obtaining digital information. *Id.* at [0066]. A POSITA would have understood that the Figure 5B power controller in Pohlert’s lighting system, having an IR “I/O port,” could generate the exact IR signals Pohlert teaches can be used to “trigger” the external slave flash units. The I/O port could both receive (input) and generate (output) IR signals. A POSITA would understand the wireless IR I/O port in the power controller to communicate with the slave flashes, so that a user could coordinate and control all lights being used from one controller.

k) Dependent Claim 10

Claim 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.

269. Pohlert discloses Claim 10.

270. Pohlert discloses that pattern generation may include “various combinations” of patterns and sequences that include pseudo-random sequences of

strobing and flashing. Ex. 1006 at [0063], [0067]; *see also supra* ¶¶ 203-18 (Claims 1[b]-[d]). “[P]rogramming 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 574.” Ex. 1006 at [0067]. Programming instructions control the switches according to designated sequences, cycle through calculations of the time varying lighting values needed for each different pattern and the different sequences within a pattern.

l) Dependent Claim 11

Claim 11: The method according to claim 1 wherein the user customisable lighting effect is designed to mimic at least one of fire flickering; police light; television; lightning flashing; electrical sparking; fireworks; a neon flickering sign; a gunshot; welding; a scan; a propeller; a (nuclear) explosion; a wormhole; paparazzi flashes; flashes (strobe).

271. Pohlert discloses Claim 11.

272. Pohlert discloses flashes (strobe) effects by teaching that “strobing or flashing different groups of light segments . . . 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.” *Id.* at [0063]; *see also id.* at [0062], [0067].

273. Pohlert also discloses an effect simulating lightning and welding or spark/short circuits, where the timing must be irregular or random. *Id.* at [0063]; *see also id.* at [0062], [0067], [0081]. These random strobe flashes of light would appear as random flashes of lightning. In generating an effect to look like lightning, welding, or sparking/short circuit, if the flashes or pulses are too regular the effect will look artificial. These randoms flashes of light in the pseudo-random sequences disclosed are well-suited to generate the effects claimed in Claim 11. *Id.* at [0063], [0067], [0081].

274. Pohlert also describes controlling different color LEDs. An alternating red and blue strobing light, for example, simulates a police car light. *Id.* at [0088], [0063], [0067], [0089]-[0092].

m) Dependent Claim 12

Claim 12: The method according to claim 1, further comprising selecting a definition of a trigger event, said trigger event initiating said output of the time varying lighting value thereby to simulate the user customisable lighting effect.

275. Pohlert discloses Claim 12.

276. In Figure 5B, Pohlert discloses a controller processor through which users may select programming instructions that indicate the start and stop times for the selected patterns, sequences, and effects. Ex. 1006 at [0066]-[0067]. Pohlert's "power controller 552 includes a processor 574 which may be programmed to provide various lighting effects by manipulating the switch selector 572 (for

example, by changing values in registers which control the on/off states of the switches 562).” *Id.*

277. 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 574.” *Id.* at [0067]. The control signals for turning the switches on are a trigger for the LEDs. *Id.* at [0059], [0061], [0065], [0067].

278. Figure 5A also discloses a controller that provides “trigger events.” *Id.* at [0059]. Users can turn a knob or press a switch on the user interface (*e.g.*, via the effects generator or effects selector) and can control illumination of the different groups of light elements. *Id.*

279. Pohlert also discloses as follows: “[t]o 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.” *Id.* at [0067]. “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.” *Id.* The instructions to select resistance values, or turn

on and off the switches, to accomplish dimming and strobing are triggers that initiate the generation of the effects.

280. Further, as discussed with respect to Claim 9, Pohlert describes “slave flashes” that can be controlled by radio frequency, infrared, and optical signals (including flashes from the LEDs controlled by the power controller). *Id.* at [0022]-[0023]. These may be “[o]ptical slave flashes” that are “triggered by light,” including light pulses from another device. *Id.* at [0023].

n) Dependent Claims 13 and 21

Claim 13: The method according to claim 1, further comprising storing the at least one simulation parameter corresponding to said user customisable lighting effect.

Claim 21: The method according to claim 13, further comprising recalling said stored at least one simulation parameter from a memory.

281. Pohlert discloses Claims 13 and 21.

282. Pohlert discloses a memory that stores programming instructions, which comprise “simulation parameters.” *Id.* at [0066]-[0067]. The processor in the “power controller” in Figure 5B interfaces with a memory, and “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.” *Id.* at [0067].

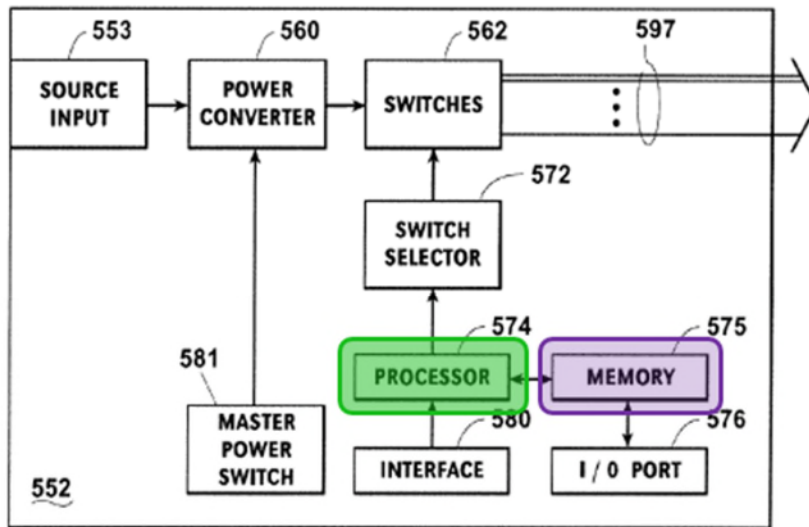


Fig. 5B

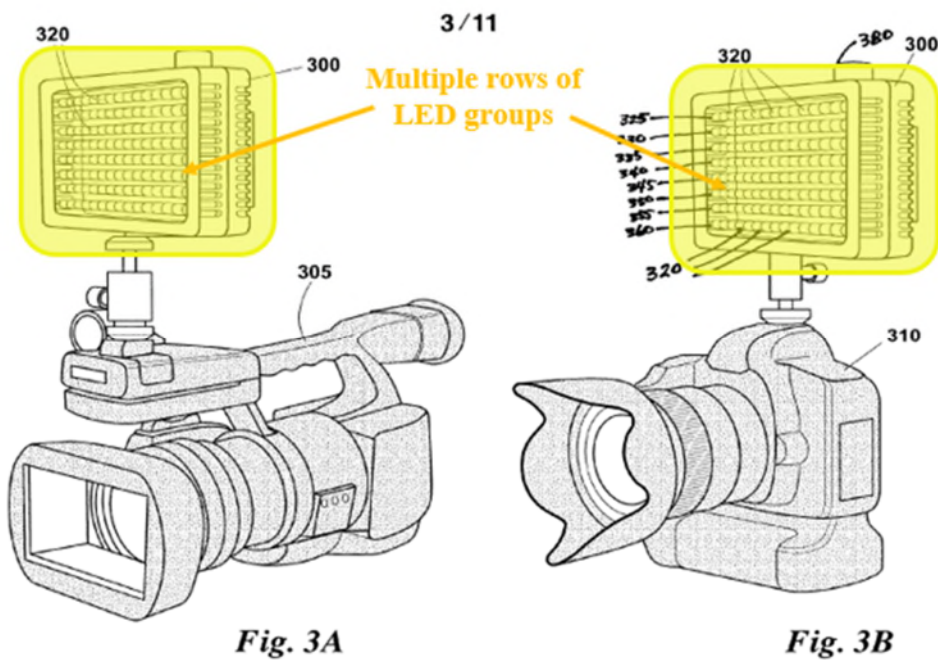
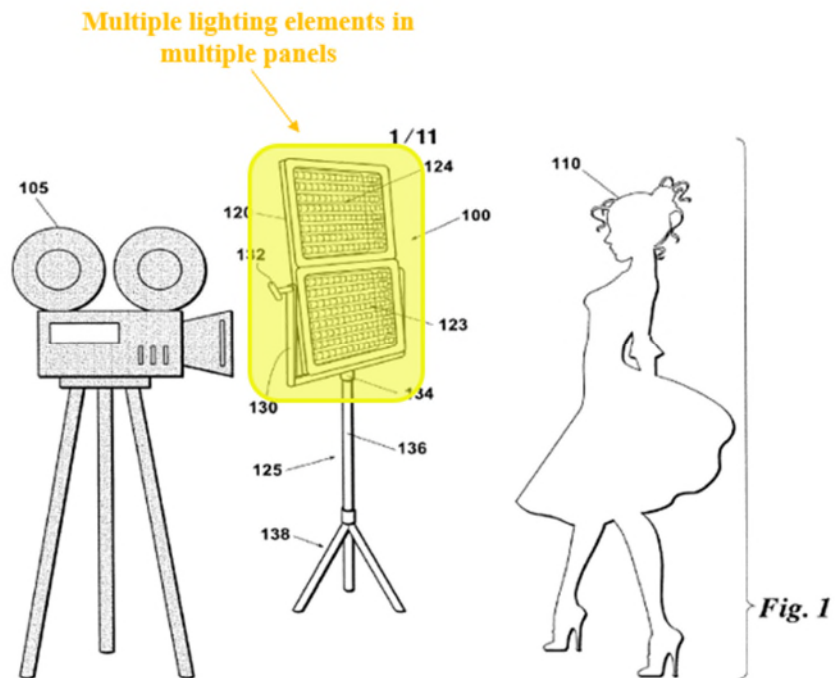
Id. at Fig. 5B (annotated).

o) Dependent Claim 14

Claim 14: *The method according to claim 1 comprising controlling a plurality of lights in dependence on the output.*

283. Pohlert discloses Claim 14.

284. A controller can be used to control a plurality of groups of LEDs disclosed in Pohlert. A plurality of LEDs may be included as lamp elements in an “arrangement” on a panel or frame, and the power controller “may be provided for controlling the intensities of the various lamp elements, either collectively, individually, or in designated groups, and, in some embodiments, through pre-programmed patterns.” *Id.* at [0050]; *see also id.* at [0053], [0059], [0067]. Each LED or group of LEDs controlled together is a “lighting device.”



Id. at Figs. 1, 3A, 3B (annotated).

285. The lighting system may include “multiple panel light sections 123, 124.” *Id.* at [0053]. The lighting arrangements are controlled by the controller to produce effects using multiple light segments. *Id.* at [0059]. The controller shown in Figure 5B “may be programmed to turn the switches 562 on and off according to a predesignated pattern dictated by the programming instructions. . . . 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 pseudorandom) sequence, gradually dimming or brightening the light segments 325-360 (individually, in groups, or collectively), or various combinations of these effects is contemplated.” *Id.* at [0067].

286. As previously discussed, Pohlert also discloses “slave flashes” that can be controlled by radio frequency, infrared, and optical signals (including flashes from the LEDs controlled by the controller). *Id.* at [0022]-[0023]. Pohlert discloses that these may be “optical slave flashes” that are “triggered by light,” including light pulses from another device. *Id.* at [0023]. When an optical slave flash is used with the Pohlert lighting system, the “power controller” in the lighting system would cause the LEDs to produce the light pulse that then triggers the optical slave flashes. Each of these slave flashes are also a “lighting device” triggered by the LEDs controlled by the controller to produce desired lighting effects.

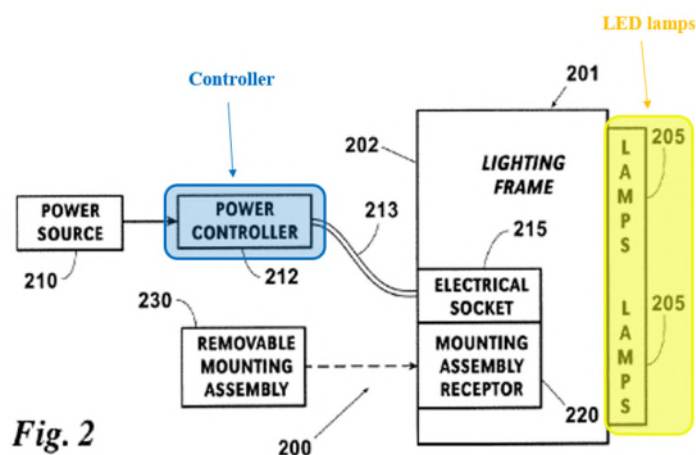
p) Dependent Claim 16

Claim 16: *The controller according to claim 15, wherein the controller comprises a wired or wireless communication interface adapted for communication with one or more lighting devices.*

287. Pohlert discloses Claim 16.

288. The controllers include a wired interface connecting to the lighting devices, wherein the wired connection communicates power control signals to the lighting devices. *Id.* at [0058]. In “the lighting assemblies shown in FIGS. 3A and 3B), the LEDs or other low power lamps 205 . . . may be powered by a power source 210 controlled by a power controller 212 such as is generally shown in FIG. 2.” Ex. 1006 at [0057].

289. Pohlert discloses that the power controller “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,” with the lighting frame including the light elements. *Id.*



Id. at Fig. 2 (annotated).

290. The controller in Figure 2 can be either the controller shown in Figure 5A or the controller shown in Figure 5B. *Id.* at [0058]. With respect to the controller shown in Figure 5A, the output from the controller “control[s] power to the wires 547 supplying power to the light segments.” *Id.* at [0059].

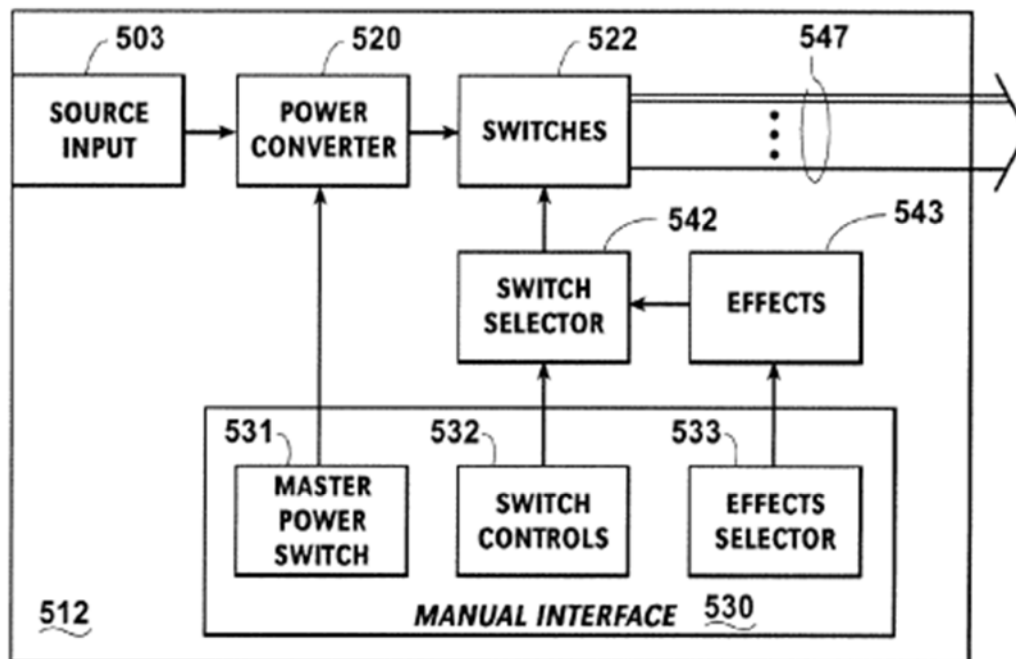


Fig. 5A

Id. at Fig. 5A.

291. Figure 5B includes an output for “providing power to individual wires 597 which are conveyed, preferably by cable, to the lighting frame assembly 201 of the lighting effects system 200.” *Id.* at [0065].

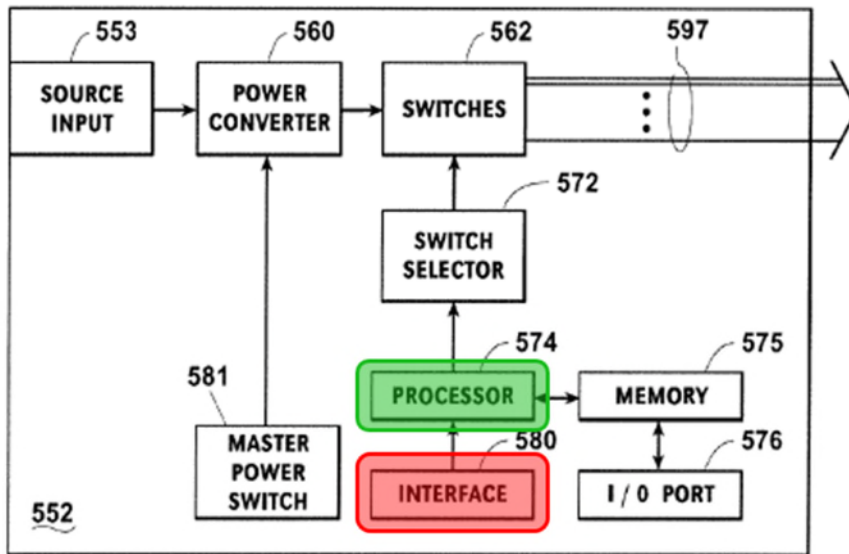


Fig. 5B

Id. at Fig. 5B (annotated).

292. Pohlert discloses a wireless communication interface. Figure 5B includes an “I/O port” that may be wireless (*e.g.*, infrared) for obtaining digital information. *Id.* at [0066]. Pohlert discloses that “slave flashes” can be controlled by RF, infrared (IR), or optical signals (such as the flashes generated by the LEDs directly connected to the controller). *Id.* at [0022]. Pohlert’s system is “particularly well suited for use with such optical, IR or RF slave flash systems.” *Id.* at [0023].

293. A POSITA would have understood that the Figure 5B power controller could generate the exact IR signals Pohlert mentions can be used to trigger the external slave flash units. A POSITA would have understood that the I/O port could both receive (input) and generate (output) IR signals. IR signals from the controller

could be received by any slave flash units near the controller. *See supra* at ¶¶ 267-68, 280, 286.

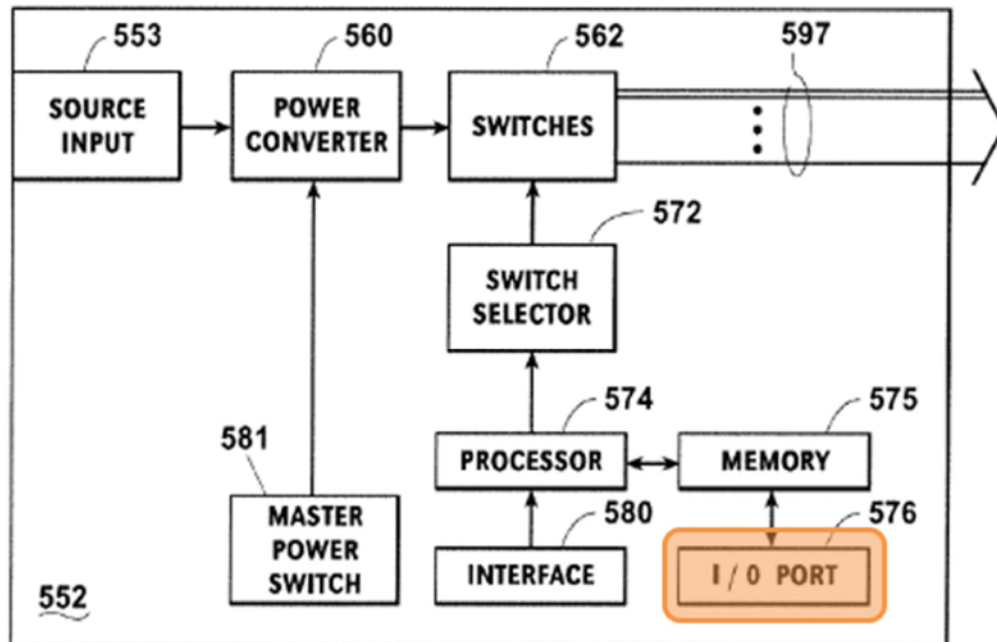


Fig. 5B

Ex. 1006 at Fig. 5B (annotated).

q) Dependent Claim 17

Claim 17: *The controller according to claim 15, wherein the controller comprises an input interface adapted to receive a user input.*

294. Pohlert discloses Claim 17.

295. Figures 5A and 5B include an input user interface to receive user inputs.

See supra ¶¶ 253-58 (Claim 8).

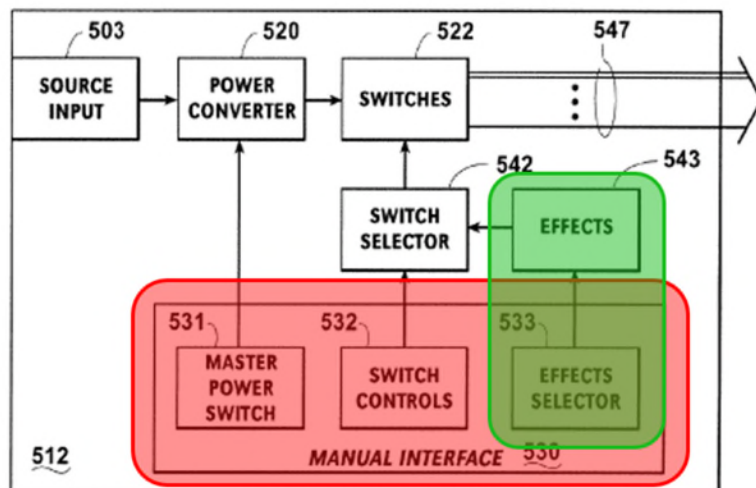


Fig. 5A

Id. at Fig. 5A (annotated).

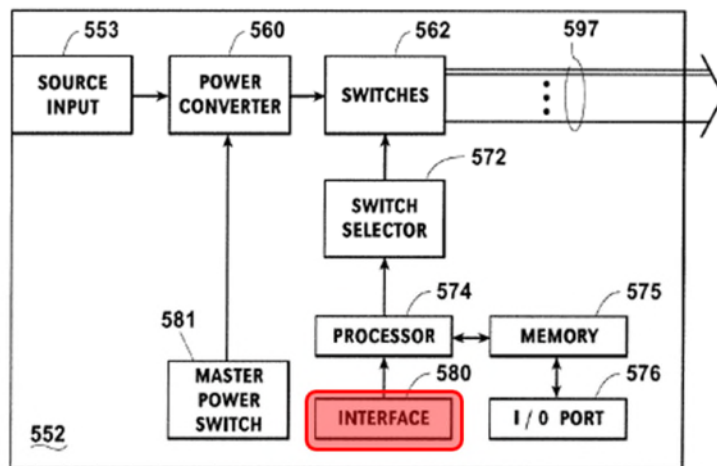


Fig. 5B

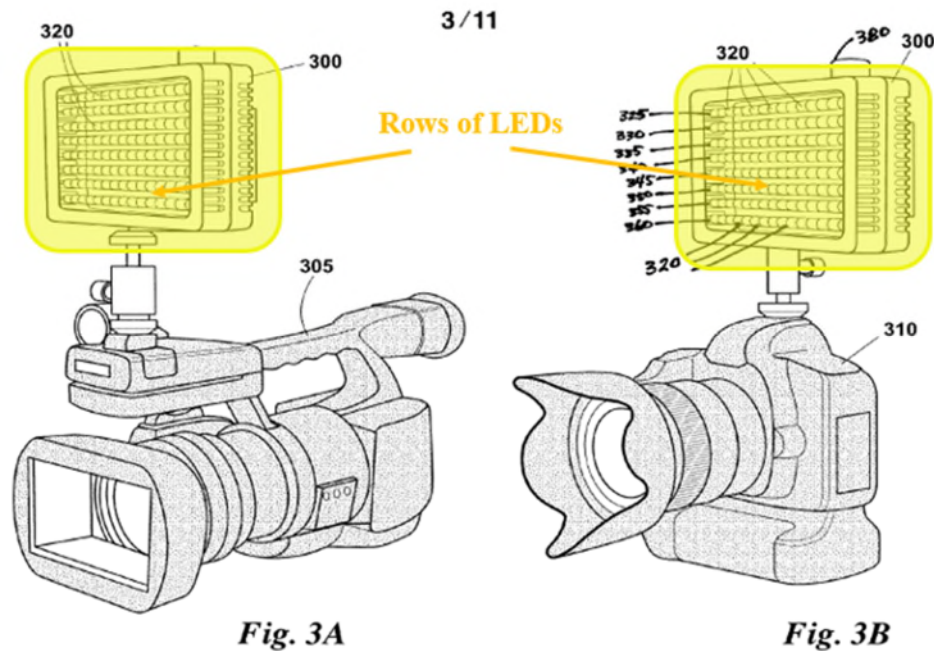
Id. at Fig. 5B (annotated).

r) Dependent Claim 18

Claim 18: *A lighting system comprising the controller according to claim 15 and at least one lighting device; said lighting device comprising at least one light emitting diode.*

296. Pohlert discloses Claim 18.

297. Pohlert discloses a lighting system comprising the controller according to Claim 15. *See Supra* Claim 15. The lamp elements in Pohlert’s lighting system include multiple LEDs, such as the plurality of lamp segments 320 shown in Figures 3A and 3B, and that these LEDs can be “red, green, and blue LEDs” (*i.e.*, RGB LEDs). *Id.* at [0081], [0084]. The lamp elements used in the lighting effects system may comprise “high output LEDs” that “are presently available in white as well as colors such as green, blue, red, amber, and cyan.” *Id.* at [0111].



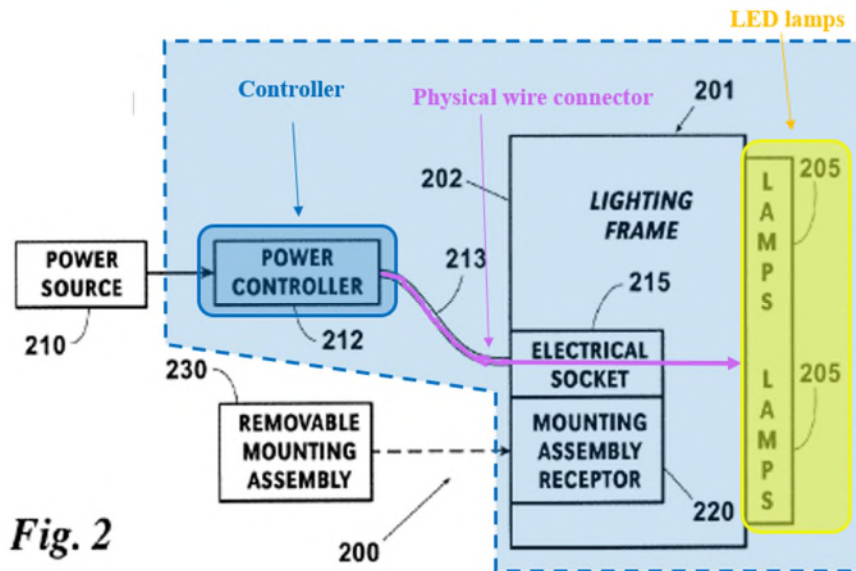
Id. at Figs. 3A, 3B (annotated).

s) Dependent Claim 19

Claim 19: *The lighting system according to claim 15 wherein said controller and said lighting device are integrated in a combined unit.*

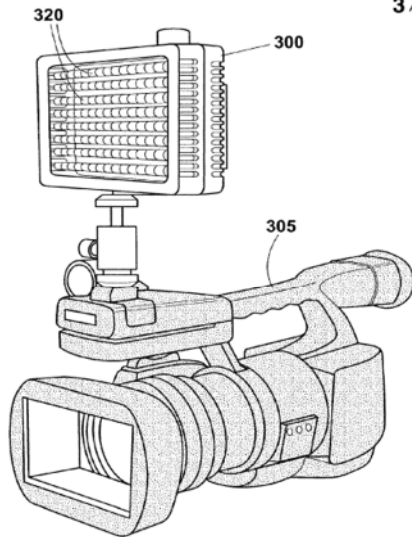
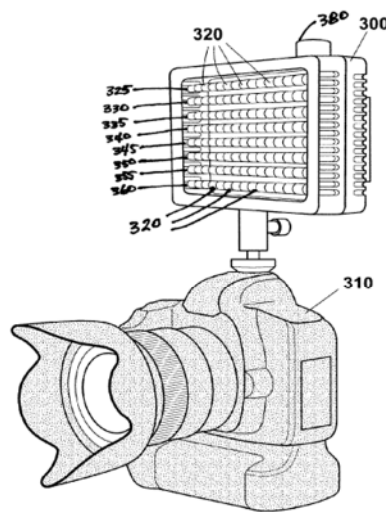
298. Pohlert discloses Claim 19.

299. Pohlert discloses that its lighting system includes both a power controller and LED lamps physically connected and combined into one device. *Id.* at [0020], [0050]-[0051]. As shown in Figure 2, a dedicated “power controller” can be physically connected by a cable to the lighting elements on the lighting frame, making them one combined unit:



Id. at Fig. 2 (annotated).

300. Pohlert further discloses that the “power source 210” in Figure 2 may be either “a standard electrical outlet” or “a battery having sufficient current to drive the LEDs.” *Id.* at [0057]. Where a battery is used to supply power, “the light panel and self-contained battery unit function as an integrated lighting apparatus.” *Id.* at [0018]. The lighting system may be a stand-alone unit mounted directly to a video or photography camera:

**Fig. 3A****Fig. 3B**

Id. at Figs. 3A, 3B. The LEDs and controller may be mounted to a camera or a frame, and may be “provided in the form of a kit, with one or more of a light panel, self-contained battery unit, compact stand, connecting cable(s), adapter(s), lenses or color gels, and so on, being provided in a single package to allow flexibility and versatility to users in the field.” *Id.* at [0024], [0050].

301. Pohlert also states that “[i]t is contemplated that the lighting and effects generator of the present disclosure could, due to its size and weight, be transported quickly and easily by a photographer to a location and rapidly setup to produce a lighting and effects system which provides continuous source of illumination for modeling and video capture as well as pulse, flash or strobe boost illumination for still photography. Such a system capable of being battery powered would not require cabling and thus could be used in crowded areas without a concern of someone

tripping over cables. A portable and therefor spontaneous battery powered, cordless, LED studio can be set up at any desired location.” *Id.* at [0094].

302. Pohlert therefore discloses “[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” (*id.* at Abstract), and goes on to say “[t]he lighting apparatus may include an effects generator. . . .” Pohlert discloses that the light panel and the effects generator is part of a single lighting apparatus, or, in other words, a combined unit.

XI. GROUND IV: CLAIMS 1-21 WOULD HAVE BEEN OBVIOUS TO A POSITA IN VIEW OF POHLERT

303. I incorporate here by reference each of my opinions in the proceeding sections relating to Ground III, as the disclosures from Pohlert supporting my opinion that Pohlert anticipates Claims 1-21 apply equally to my opinion that Claims 1-21 would have been obvious to a POSITA in view of Pohlert.

304. As I explained in detail in Section X, it is my opinion that Pohlert expressly discloses, and therefore anticipates, each of Claims 1-21. The disclosures from Pohlert are nearly identical to, and in most instances more detailed than, the disclosures and claims in the ’257 Patent. To the extent, however, that the Board finds that the independent claims are not disclosed by Pohlert, the independent claims, and all of their dependent claims, would have been obvious to a POSITA.

305. For instance, the “calculate” limitation in Claim 1 would have been at least obvious to a POSITA. Claim limitation 1[d] states as follows: “an effect simulator adapted to calculate a time varying lighting value based on at least one simulation parameter.” Ex. 1001 at Claim 1. The ’257 Patent does not provide any details regarding **how** the “calculation” is purportedly performed by the “effect simulator.” The ’257 Patent does not disclose a specific algorithm that would be contemplated by the claims, or a specific way in which a “calculation” is being performed. As I opine in detail in Section X.B.a (Claim 1[d]), a POSITA would understand that the “effect simulator” takes the user input parameters and generates or creates the lighting effect by calculating (*i.e.*, taking the sum of the parameter values and averaging them to generate a lighting effect matching those numeric parameters). I agree with Dr. Bretschneider when he testified that a POSITA who knows about color sciences and color mixing and different lighting effects would understand that to produce a lighting effect a POSITA would know a calculation occurs. Dr. Bretschneider Depo., 149:11-153:9, 153:19-154:18, 155:4-6, 165:9-11, 176:16-19; 150:14-21, 152:10-22, 185:7-188:13 (“[W]hen you set fire temperature or the fire color to 2000 Kelvin, there *has to be a calculation.*”) (emphasis added).

306. This is not new or unique, and a POSITA would have understood that the specific data (*i.e.*, brightness and color values or timing) for an effect is created after the user selects the effect and customizes its parameters. A POSITA would

have also understood that performing a calculation to determine how the LED lights will behave to generate a lighting effect is a standard functionality performed by a computer processor in any entertainment lighting device at the time of the invention. In this context, calculating refers to the function of the microprocessor within a lighting fixture.

307. For example, a lighting fixture like that disclosed in Pohlert utilizes a “microprocessor” to translate numerical value data relating to user input simulation parameters to output an effect. *See, e.g.*, Ex. 1006 at [0066] (“The processor 574 may interface with a memory 575 . . . To accomplish dimming, the processor 574 may be programmed select binary-encoded values to load into registers of the switch selector 572”), (“An interface 580 may also be provided for programming or otherwise interfacing with the processor 574, or manually selecting various lighting effects options through selectable knobs, switches or other selection means.”). Much like my discussion regarding the use of a DMX controller to control the lighting fixture, a processor (like that disclosed in Pohlert) will calculate and generate a randomized intensity function that simulates the natural flicker of a candle or fire. It would have been obvious to a POSITA that the microprocessor disclosed in Pohlert would have been used to calculate and output the lighting effect based on the input parameters.

308. A POSITA would understand that Pohlert discloses that the effects, such as a strobe effect, do not exist until a user creates and adds or edits each new step/parameter for the effect. A POSITA would understand that Pohlert's "effect generator 543" of Figure 5A or "processor 574" of Figure 5B must generate effects by doing "calculations" (or data creation). Just like the '257 Patent, inputs received through manual or digital interfaces in Pohlert are used by either the effects generator 534 or processor 574 to calculate time varying data signals representing the desired effect. Ex. 1008 at [0059]-[0067]. If the effect does not exist until the user creates it, it is not pre-recorded and a POSITA would understand that the effect is generated as disclosed in the '257 Patent (*i.e.*, the processor uses the numerical parameter data input by a user and calculates how the effect looks). These lighting values would have to be created (*i.e.*, "calculated") by a microprocessor or controller each time a user adjusts the parameters of an effect, which adds a new step.

309. For instance, a POSITA would understand that a "calculation" is needed for Pohlert's "strobing" effect. Users can adjust oscillator frequency for the strobing effect by, for example, adjusting a knob or switch. When these adjustments are made, the controllers calculate new oscillating signals changing the frequency of the strobing. Whether "conventional electronic components" or a "conventional" computer program implements changes to oscillation frequency does not negate that some calculation was performed to arrive at the adjusted oscillating frequency.

310. A POSITA would have understood that the specific data (*i.e.*, brightness and color values or timing) for an effect is created **after** the user selects the effect and customizes its parameters. Claim 1, including the “calculate” limitation, would have been obvious to a POSITA. Additionally, to the extent Claim 7 is found not to be expressly disclosed in Pohlert (a finding that I would disagree with), then the invention in Claim 7 would have at least been obvious to a POSITA.

311. Pohlert’s lighting system can use “tungsten” and “daylight” LEDs, which, respectively, have color temperature in the ranges of 2000-4200 degrees Kelvin and 4200-9500 degrees Kelvin, overlapping with the description of “warm” and “cool” white LEDs in the ’257 Patent. A POSITA would understand that the “tungsten” temperature range produces a “warm” white light, and the daylight temperature range produces a “cool” white light.

312. To the extent Rotolight argues that Pohlert does not disclose “random” simulation parameters, the random simulation parameters would have, at a minimum, been obvious to a POSITA. Pohlert’s disclosure of generating random light effects (as discussed in detail in Section X), a POSITA would have known that and it would have been obvious to have, “random” input parameters that cause the randomness.

313. For example, Pohlert discloses that a user is able to select “strobing or flashing “different groups of light segments” or “different light elements” in *pseudo-*

random sequences. Ex. 1006 at [0063], [0067]. This pseudo-random sequence will affect, at least, the brightness of the random effect because when more groups of lights or light elements are selected, the maximum brightness could be greater, and when less elements are selected, then the potential maximum brightness would be lower. Pohlert discloses that a user can select different combinations of pseudo-random sequences within an overall effect pattern, which will affect the overall duration and interval of flashes of light within that pattern. *Id.* at [0063], [0067].

314. It would have been obvious to a POSITA that selecting a pseudo-random sequence like that in Pohlert is a selection that requires random duration and intervals. A POSITA would understand that to output a “random” effect (such as a fire or strobe effect) a user must (and it is beneficial to) select random inputs or else the pattern would look like a consistent, steady strobe and not something “pseudo-random.”

315. It would have been obvious to a POSITA to select “random brightness,” “random duration,” and “random interval” based on the teachings of Pohlert because a user would desire to include different pseudo-random sequences in a desired effect pattern so that it would impact the overall randomness of the brightness, duration, and interval of the pattern. If these parameters are not random, the effect will look like a pattern and will appear artificial or unrealistic.

I declare that all statements made herein of my own knowledge are true and that all statements made on information and belief are believed to be true and, further, that these statements were made with the knowledge that willful false statements and the like are punishable by fine, imprisonment, or both, under Section 1001 of Title 18 of the U.S. Code.


Woody Smith
Dated: July 15, 2023

APPENDIX A

Materials Considered

Exhibit	Description
1001	U.S. Patent No. 10,197,257 to Gammons <i>et al</i>
1002	File History for U.S. Patent No. 10,197,257
1004	Astera AX10 Spotmax User Manual (“Astera”)
1005	Declaration of Simon Canins (“Canins Decl.”)
1006	U.S. Patent Application Publication No. 2012/0044374 to Pohlert (“Pohlert”)
1007	Institution Decision in IPR2021-01496 challenging the ’257 Patent
1008	Transcript of August 17/18, 2022 Deposition of Dr. Bretschneider
1009	Patent Owner’s First Amended Complaint Against Petitioner
1010	Gottuso January 14, 2023 Email to the Board
1011	Board’s Dismissal of IPR2021-01496

Appendix B

W O O D Y S M I T H
P R O F E S S I O N A L E X P E R I E N C E

Summary:

Twenty-five years' experience in automated system design for industrial, commercial and arena lighting, processing equipment and automation for vertical farming applications. Product development from concept, market research, design and development through production and release to market. Managed teams of 40+ engineers with budgets > \$2.5 million. CEO, COO, CTO, VP Engineering, Director R&D, Lean/Six-Sigma, International Sales and Technical Support, Hydroponics, Aeroponics, Automation, Vertical Farming, Renewable Energy

Digital Lighting, Engineering & Design, LLC

January 2015 – Present

Designed automated horticultural growing system (CEA: Controlled Environment Agriculture) for vertical farming applications including software, digital control, sensors, solar, wind and geothermal energy and advanced digitally controlled LED lighting technology. Specific emphasis on resource conservation, specific lighting spectrum to achieve highest photosynthetic efficiency, utilization of UV-LED to enhance Vitamin D levels in mushrooms and means and methods of determining nutritional value of produce. Developed significant technology implementing automation and AI in these applications.

Evolucia Lighting, Sarasota, FL

CTO, January 2012 – April 2014

Provided design, engineering, and manufacturing support for all Evolucia and Affineon LED products. Expanded LED streetlight offering while improving design for manufacturing. Engineering lead with Asian manufacturing partner.

Affineon Digital Lighting, Coral Springs, FL

CEO, August 2005 – January 2012

Founded Affineon in 2005 to integrate emerging LED technology into commercial, industrial, theatrical and house of worship applications. Designed over 20 products focusing on high power applications for LED. Worked with Disney, US Army, Sloan-Kettering, Osram, Siemens, etc. Acquired by Evolucia in 2012.

Coemar, Spa, Castel Goffredo, MN, Italy

DIRECTOR, INTERNATIONAL SALES, TECHNICAL SUPPORT *March 2003 to August, 2005*

Provided worldwide sales and technical support on concert lighting products utilized for theatrical, concert, TV/film and entertainment applications. Worked with Genesis, Van Halen, Singapore National Day, etc. Travel included Italy, Germany, US, Australia, China, Hong Kong, Korea, Singapore, and Japan.

Hubbell Entertainment Division, Hubbell Inc. Sunrise, Florida
V.P. ENGINEERING, DIRECTOR *August, 1999 to January, 2003*

Developed a new line of automated lighting fixtures for entertainment, commercial and architectural markets. These products utilized modular production techniques to produce 64 variants from 12 main component sub-assemblies. ISO-9000.

Martin Professional, Aarhus, Denmark

CHIEF OPERATING OFFICER *September, 1995 to August, 1998*

COO of US division of Martin Professional A/S of Denmark the world's leading manufacturer of automated lighting fixtures for entertainment applications with >\$100 million in annual sales. Handled Operations, QC, major account sales, and technical support.

High End Systems, Lightwave Research, Austin, TX

DIRECTOR, RESEARCH & DEVELOPMENT *March, 1992 to September, 1995*

Designed Studio Color and Technobeam automated lighting fixtures. Managed R&D team of 40+ engineers and support staff with oversight of budgets >\$2.5M. Product sales > \$30 million.

E D U C A T I O N / C E R T I F I C A T I O N

EDUCATION:

Trinity University, San Antonio, Texas, B.S., Electrical Engineering

CERTIFICATIONS:

Pro/Engineer Basic, Advanced, Detail, Sheet metal, and Surface Training
3D Systems SLA Rapid Prototype Basic and Advanced Training
LEAN and Six Sigma Master Black Belt
AGI Lighting Design

PATENTS:

US 5,515,254 Automated Color Mixing Wash Luminaire
US 5,580,164 Power Lens for an Automated Luminaire
US D 446,204 Portion of an Audio Amplifier
US D 489,145 Light Fixture
US D 492,436 Light Fixture
US D 496,744 Light Fixture

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