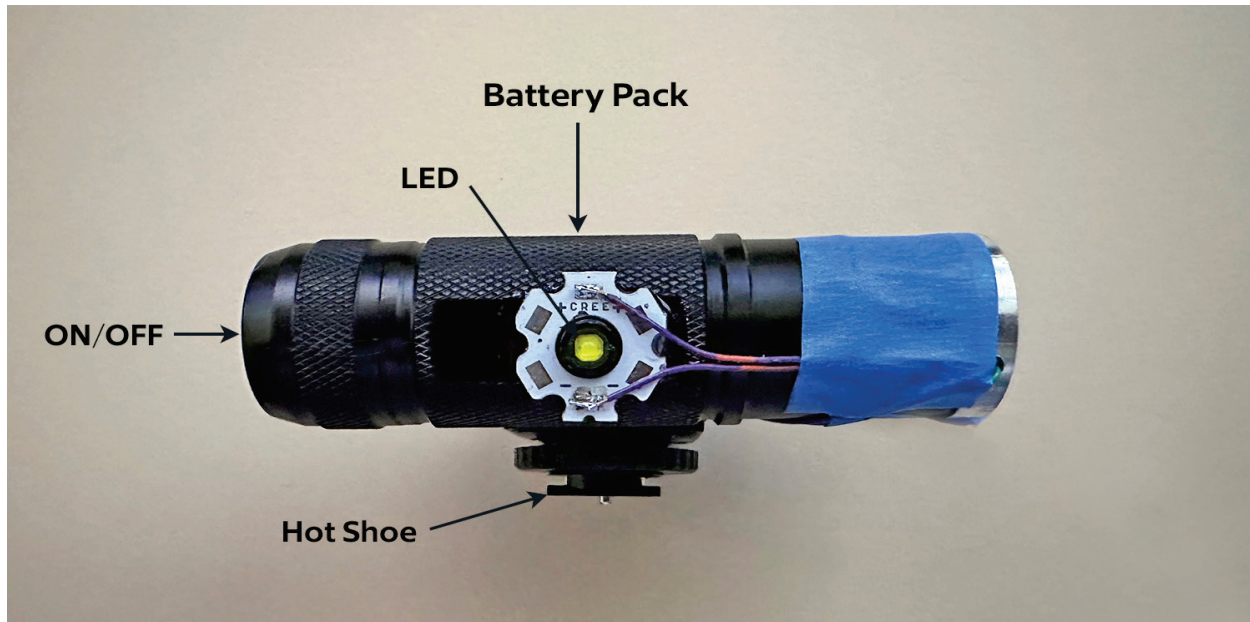


## HOT SHOE TRIGGERABLE FOCUSING AND MODELING LIGHT FOR PHOTOGRAPHY\*



**A prototype Macro focusing light—front view.**

**Hands-free, automatic lighting control for image capture**—A focusing light is triggerable by the shutter signal in a hot shoe. The light is ON while you focus and then automatically turns OFF when you push the shutter. Ready for the next shot: the light turns ON again after an image is captured. Hands-free operation let you concentrate on focusing and modeling.

**Originally designed for use in, but not limited to, Macro photography**—In macro photography the distance between a camera lens and a subject is often small, on the order of a few centimeters. At these distances, the depth of field of a suitable close-up lens is very small, on the order of a few millimeters. In order to record a particular area on a subject, focusing is often performed manually instead of using a camera's automatic focusing feature. Under these circumstances, a focusing light is useful for focusing and framing of an image but can interfere with optimal lighting of a subject. For example, a focusing light can introduce specular reflections, shadows and other unwanted lighting effects if it is ON during acquisition of an image. This new design eliminates these unwanted lighting effects by automatically turning the focus light OFF while the camera's shutter is open. The new design also reduces focusing errors caused by camera motion since the photographer only has to squeeze the shutter button.

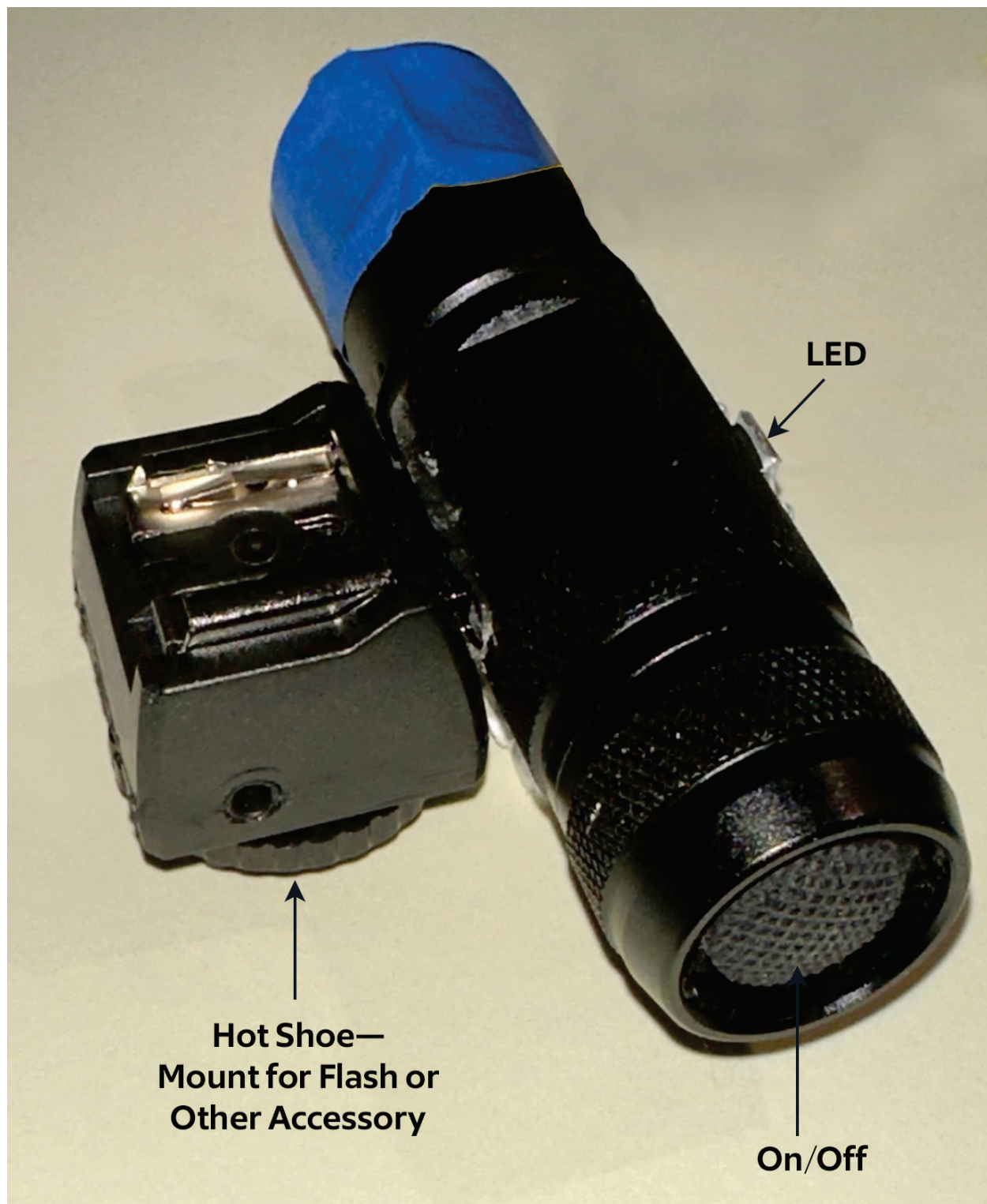
### **Photography at Specific Light Wavelengths: UV fluorescence, Infrared—**

Photographic illumination includes a range of wavelengths from ultraviolet (UV) through infrared. A popular aspect of photography uses ultraviolet light to excite fluorescence in subjects such as plants, insects, animals, and minerals. These images are often captured in dimly lit scenes, such as an insect at night. A focusing light is useful in focusing the camera before shooting but can obscure fluorescence emitted during a flash UV exposure.

The same is true in infrared photography. Subjects are often very poorly lit in the visible spectrum. A focusing light enables focusing and framing of otherwise visibly dark subjects, then turns OFF during image capture. Autofocus may not work with infrared illumination.

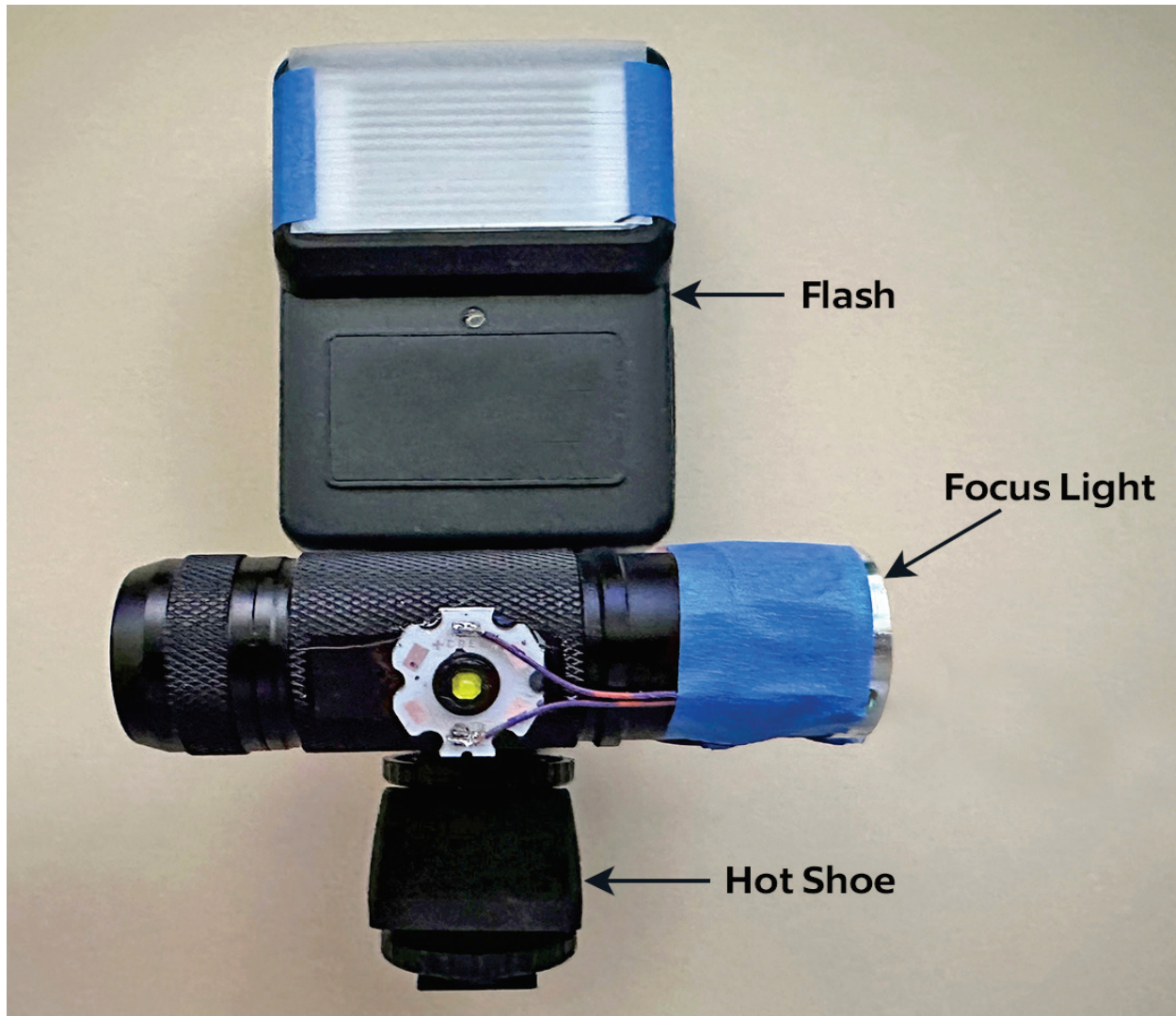
**Operation: Focus light power switch ON—**The focus light is triggered by a camera's shutter signal and automatically turns OFF while the shutter is open.

**Operation: Focus light power switch OFF—**A camera's shutter signal is passed through to an accessory such as a flash.



**A prototype focusing light—top view. A pass-through hot shoe connects a camera to an accessory such as a flash.**





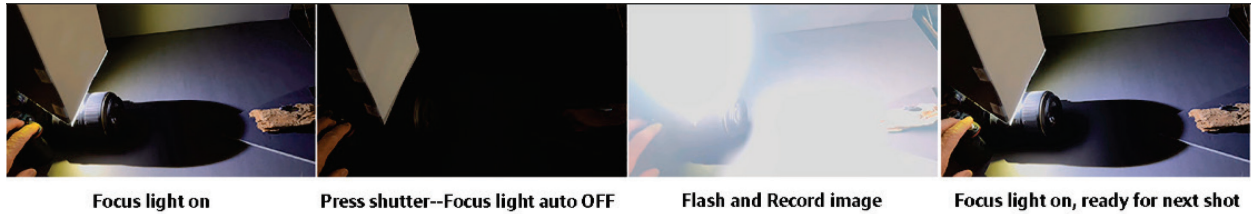
**A typical arrangement of a hot shoe, focus light, and a flash.**





**A hot shoe triggerable focusing light is ready for use.**

## Flash photography



## UV flash photography



**A subject is lit by the focus light while a camera is manually focused on the insect's eyes.**

See: [https://www.paedia.com/HotShoe/Image\\_Capture.mp4](https://www.paedia.com/HotShoe/Image_Capture.mp4) and

[https://www.paedia.com/HotShoe/Vis\\_focus\\_UV\\_capture.mp4](https://www.paedia.com/HotShoe/Vis_focus_UV_capture.mp4)



**The focus light is OFF, a UV flash lights the subject and a UV image is captured.**

Note that in visible light, the eyes are brown and in UV light, the eyes fluoresce and are blue.

See more photos below.





**Tosena splendida cicada, Thailand, in white light**



**Tosena splendida cicada, Thailand, in ultraviolet light from Hot Shoe Flash**



**Heterometrus laoticus scorpion in white light**



**Heterometrus laoticus scorpion in ultraviolet light from Hot Shoe Flash**

### **A very useful accessory**

The Macro focusing light (MFL) can remain in place between a camera and a flash unit whether or not it is in use. When the MFL is turned ON, its bright light illuminates a subject and enables focusing and framing of the subject. When the MFL is turned OFF, a camera's flash signal is still sent to a flash unit for seamless operation. There is no need to remove the MFL to switch between using a focus light and not using a focus light.





US011803102B1

(12) **United States Patent**  
**Clark**

(10) **Patent No.:** **US 11,803,102 B1**  
(45) **Date of Patent:** **Oct. 31, 2023**

(54) **HOT SHOE TRIGGERABLE FOCUSING  
LIGHT FOR PHOTOGRAPHY**

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(US)

(72) Inventor: **Lloyd D Clark**, San Francisco, CA  
(US)

(\*) Notice: Subject to any disclaimer, the term of this  
patent is extended or adjusted under 35  
U.S.C. 154(b) by 0 days.

(21) Appl. No.: **18/324,968**

(22) Filed: **May 27, 2023**

#### Related U.S. Application Data

(60) Provisional application No. 63/455,235, filed on Mar.  
28, 2023.

(51) **Int. Cl.**  
**G03B 15/04** (2021.01)

(52) **U.S. Cl.**  
CPC ..... **G03B 15/0421** (2013.01)

(58) **Field of Classification Search**  
CPC .... G03B 15/0421; G03B 15/02; G03B 15/03;  
G03B 15/0426  
See application file for complete search history.

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6,948,823 B2	8/2005	Pohlert et al.	
7,429,117 B2	8/2008	Pohlert et al.	
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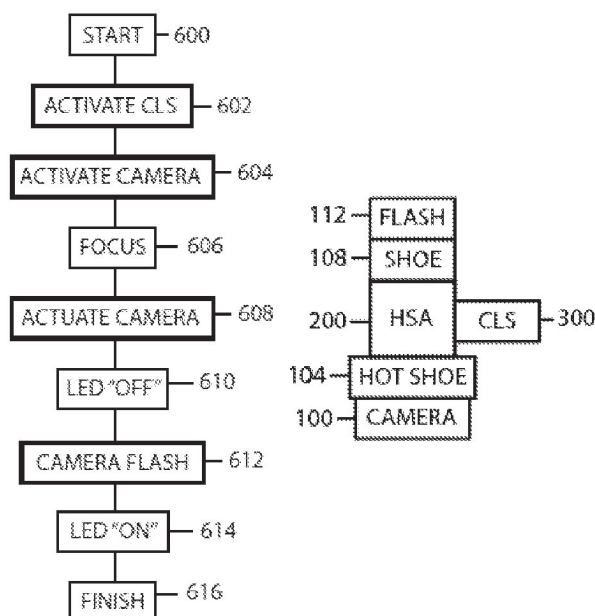
\* cited by examiner

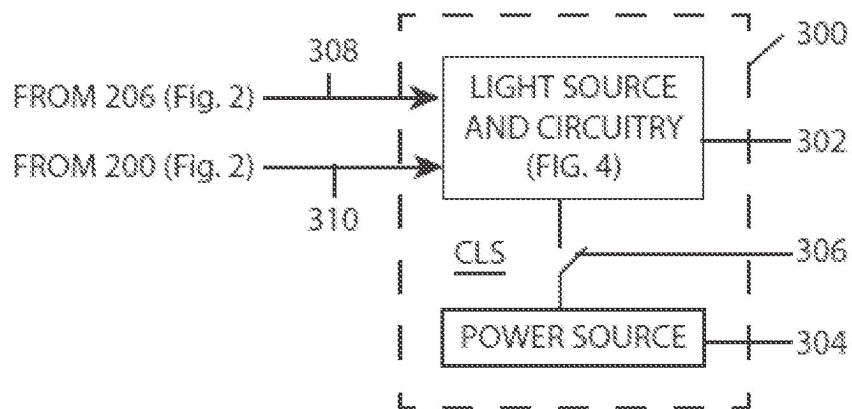
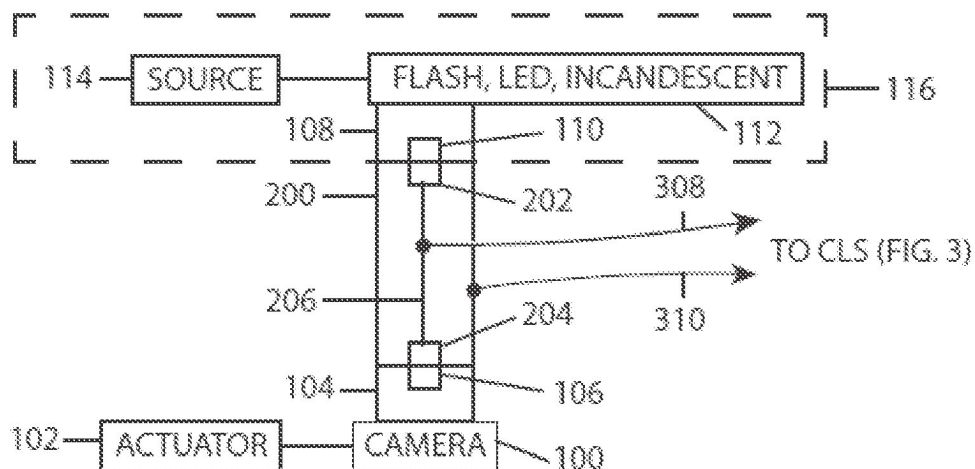
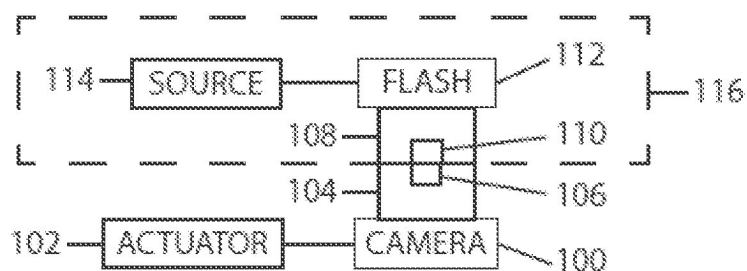
*Primary Examiner* — Christopher E Mahoney

#### (57) ABSTRACT

An illumination system for photography comprises at least a normally unlit pulsed light source (PLS) (112) with first and second electrical conduits (108, 110), a normally lit continuous light source (CLS) (300) with first and second electrical conduits (308, 310), and a hot shoe (104) with first and second electrical conduits, that is connected to a camera (100). The first conduits of all three components (112, 300, 100) are electrically connected together and the second conduits of all three components (112, 300, 100) are separately electrically connected together. When camera (100) is actuated, a switch closure from camera (100) actuates continuous light source (300), causing it to cease emitting light, and also actuates pulsed light source (112), causing it to briefly emit light, whereby both sources emit light at different times, thereby providing focus lighting while preventing light interference by CLS (300) during exposure of a subject by PLS (112).

**10 Claims, 3 Drawing Sheets**





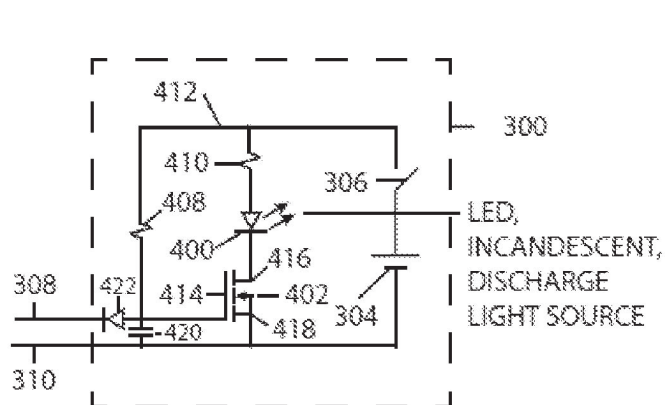


Fig. 4

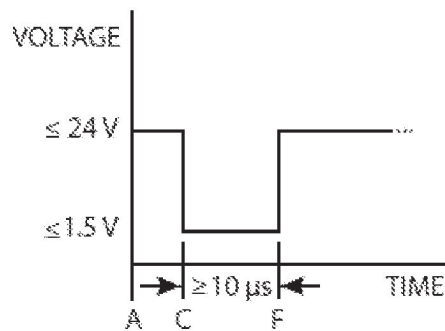


Fig. 5A--Prior Art

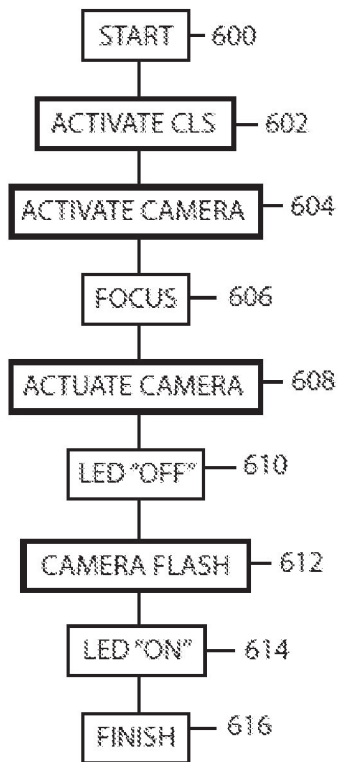


Fig. 6

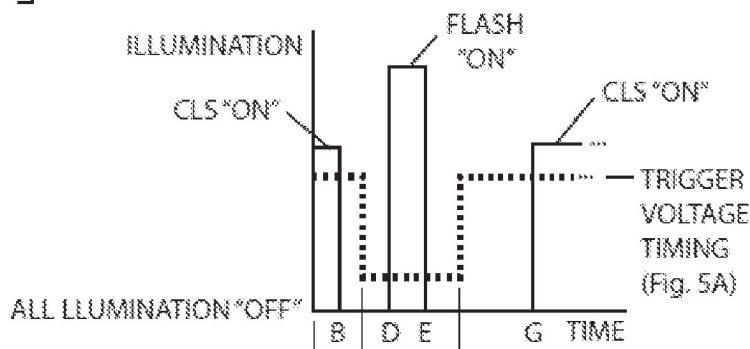


Fig. 5B

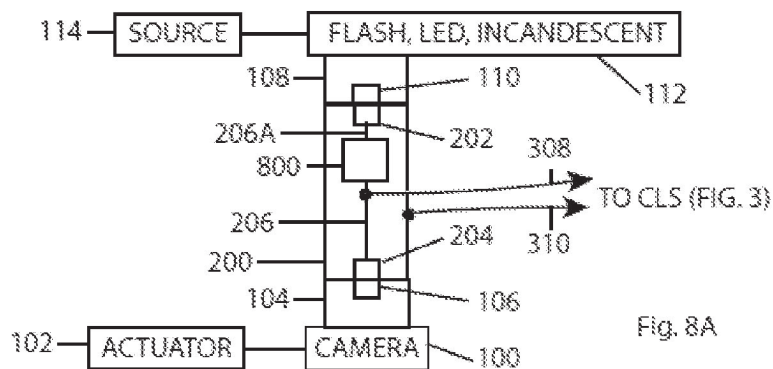


Fig. 8A

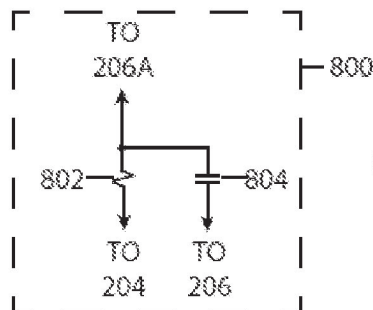


Fig. 8B



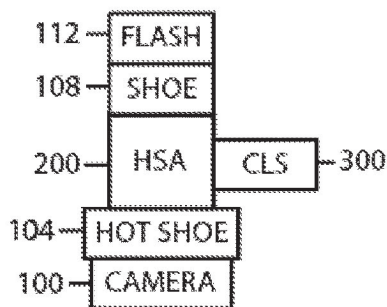


Fig. 7A

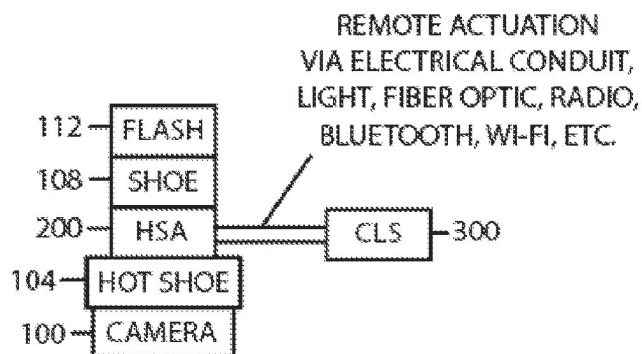


Fig. 7B

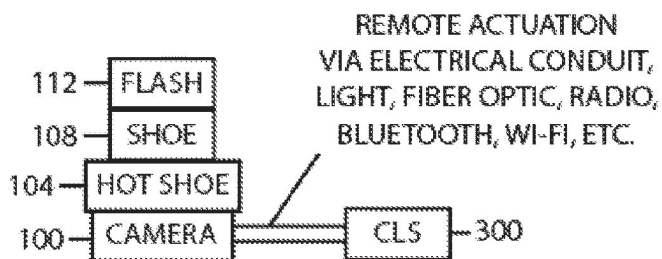


Fig. 7C

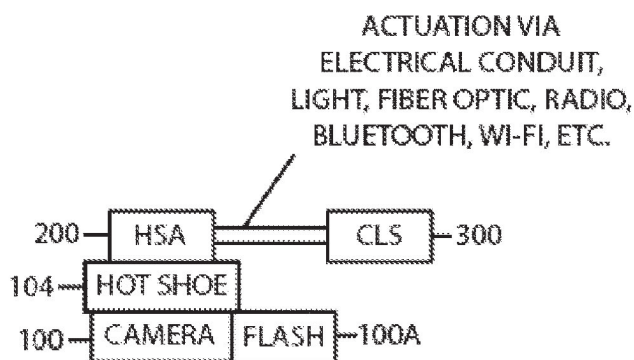


Fig. 7D

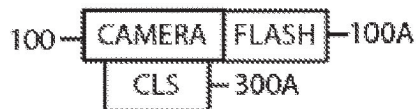


Fig. 7E

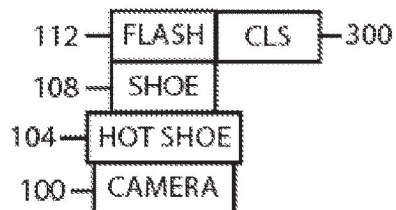


Fig. 7F

# HOT SHOE TRIGGERABLE FOCUSING LIGHT FOR PHOTOGRAPHY

## CROSS-REFERENCE TO RELATED APPLICATIONS

This application claims priority of my provisional patent application, Ser. No. 63/455,235, filed 28 Mar. 2023.

## BACKGROUND—Prior Art

Illumination of a photographic subject often comprises a plurality of lighting types.

A continuous light source (CLS) is used for focusing and modeling prior to recordation of an image and then a pulsed light source (PLS), such as a gaseous discharge flash or a light-emitting diode, is used for the actual acquisition and recordation of an image of a subject followed by subsequent storing of the image in photographic film or digital memory.

A CLS is distinct and not part of an automatic focusing feature of a camera. A CLS is used during framing of a subject within an image area, modeling (arranging) of a subject, and focusing of an image containing a subject. A photographer observes these actions through a lens, a translucent frosted screen or a digital display, all in well-known fashion. The intensity of a CLS is sufficient for these actions yet not blinding to the photographer.

Acquisition and recordation of an image of a subject commences when a photographer, or a proxy such as a timer or remote control, simultaneously actuates a camera and a PLS. The camera is prepared to receive and record an image of a subject, the PLS briefly illuminates the subject and the resulting image is recorded. A PLS is used for well-known reasons, including stopping motion of a subject and increasing the range of intensity in the recorded image.

In many cases, the CLS remains actuated, i.e., energized and emitting light, during recordation of an image because the intensity of the PLS is far greater than that of the CLS at the subject and therefore adds little appreciable light, or it is impractical or undesirable to deactivate, i.e., turn “OFF” the CLS during acquisition of an image. This can happen when a CLS emits light from an incandescent source since such a source takes a period of time on the order of seconds to cool and become dark.

## BACKGROUND—Prior Art—Macro Photography

In macro photography the distance between a camera lens and a subject is often small, on the order of a few centimeters. At these distances, the depth of field of a suitable close-up lens is very small, on the order of a few millimeters. In order to record a particular area on a subject, focusing is often performed manually instead of using a camera’s automatic focusing feature. Under these circumstances, a CLS is useful for focusing and framing of an image but can interfere with optimal lighting of a subject when a PLS is used. For example, a CLS can introduce specular reflections, shadows or other unwanted lighting effects if it is actuated during acquisition and recordation of an image.

## BACKGROUND—Prior-Art References

The following is a list of some possibly relevant prior art that shows materials and methods used in making photographic lighting equipment. Following this list I provide a discussion of these references.

Patent	Kind Code	Issue Date	Patentee
2,542,311	A	1951 Feb. 20	Carlson
5,142,299	A	1992 Aug. 25	Braun
6,948,823	B2	2005 Aug. 27	Pohlert et al.
7,429,117	B2	2008 Aug. 30	Pohlert et al.

In U.S. Pat. No. 2,542,311, Carlson teaches a photographic spotlight combining a flashtube and a continuous, incandescent modeling lamp. The continuous modeling lamp is used to arrange a subject and the flashtube is used during acquisition of an image of the subject. The modeling lamp and the flashtube present approximately equal light intensities at a subject. There is no mention of extinguishing the modeling lamp while the flashtube is used. Carlson’s combination of lamps would be unsuitable for photographing rapidly moving subjects because an incandescent modeling lamp having an intensity similar to that of a flashtube would take a period of time on the order of tenths of a second to fully extinguish.

In U.S. Pat. No. 5,142,299, Braun teaches a hand held system for close-range underwater photography composing and focusing. Two continuous light sources, flashlights (Braun, FIG. 1, 100, 200) emit beams of light that converge at an intersection 300 that coincides with a point of focus F of the camera lenses 25, 25A. The beam intersection enables focusing and framing without requiring an operator to look through a viewfinder 32. A flash unit 27 is attached to a camera system 23 by a bracket 29. When an operator actuates a shutter release 31, the flash unit 27 is actuated and briefly emits a pulse of light. Instead of triggering an external flash via a hot shoe, the Nikonos SB 102 bracket and strobe system described in the Braun patent is electrically connected to camera system 23 by a cable (not shown in the Braun patent), not a hot shoe. The sole mention of a shoe 99 in the Braun patent is for use as a mounting bracket for support member 95.

In column 7, lines 20-27, Braun states: “Note also that light sources 101 and 102 are sufficiently bright to allow focusing and composing, but are considerably dimmer than the light produced by the strobe-flash unit. Typically, the difference is at least a factor of ten. In this way, the light spots caused by the present invention are washed out by the strobe flash so that the photograph does not show a light spot where light beams 101 and 201 were present on the subject.” While the foregoing is true for underwater photography, it is not necessarily true for photography wherein a diffuser is used between a flash and a subject in order to spread light from a flash and provide even illumination of and around a subject. A diffuser decreases light intensity at each point on a subject, thereby reducing the difference in intensity between a continuous focusing light and a pulsed flash. There is no mention of extinguishing a continuous light source while recording an image using a pulsed light source.

In U.S. Pat. No. 6,948,823 B2, Pohlert et al. teach a lighting effects system comprising an arrangement of lamp elements on a panel or frame. A controller modulates the intensity, frequency, and duration of individual light sources on the panel. A term “thermal shoe” is used to identify a heat sink arrangement on the bottom surface of an LED, 3103 in FIG. 31. A “hot shoe” is not used in this patent. The term “focus” is used to describe the spread of light emanating from lamp elements, rather than adjusting the focus of a lens while using a focusing light source.

In U.S. 7,429,117 B2, Pohlert et al. teach a light panel and a plurality of light sources, such as LEDs, that are secured



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to the panel frame. A controller modulates the intensity, frequency, and duration of individual light sources on the panel. A term “thermal shoe” is used to identify a heat sink arrangement on the bottom surface of an LED, **3103** in FIG. **31**. A term “camera shoe” is used to identify a non-electrically-functional mounting member for securing a mounting pin, **5250** in FIG. **52B**, of lighting apparatus **4700**, FIG. **52A**. Neither of these terms refers to a “hot shoe” that is responsive to a shorting of conduits that occur with actuation of a camera, as used herein. Neither of the Pohlert patents teach using a continuous light source for focusing and a pulsed light source for recordation of an image.

## SUMMARY

Accordingly I have discovered apparatus and signal-responsive controls that comprise a CLS that is activated during focusing, modeling, and framing of an image and then automatically deactivated while a PLS is used during acquisition and recording of an image of a subject. My apparatus is suitable for use as an add-on accessory for a wide range of cameras with hot shoes. It is also suitable for inclusion in flash control systems. My apparatus overcomes drawbacks of prior-art systems at least by providing compatibility with existing flash adapters, enabling rapid image capture of subjects, and eliminating interference between a continuously operating modeling light and a pulsed flash unit.

## BRIEF DESCRIPTION OF DRAWINGS

FIG. **1** shows an assemblage comprising a camera and a flash unit using hot shoes, according to prior art.

FIG. **2** shows the addition of a hot shoe adapter according to one aspect of an embodiment.

FIG. **3** shows a continuous light source according to one aspect of an embodiment.

FIG. **4** shows a schematic electrical diagram of one aspect of the continuous light source of FIG. **3**.

FIG. **5A** shows a timing diagram of a prior art flash control signal.

FIG. **5B** shows a timing diagram of actuation of a continuous light source according to one aspect of an embodiment.

FIG. **6** is a block diagram showing the steps in the operation of an embodiment.

FIGS. **7A** through **7F** show various alternative arrangements of components according to aspects of the present disclosure.

FIG. **8A** shows an alternative aspect of an embodiment.

FIG. **8B** shows an alternative delay circuit.

## DRAWING FIGURE REFERENCE NUMERALS

**100** Camera  
**102** Actuator  
**104** Hot shoe, conduit  
**106** Contact  
**108** Shoe, conduit  
**110** Contact  
**112** Pulsed light source (flash, LED, other)  
**114** Source  
**200** Adapter  
**202** Contact  
**204** Contact  
**206** Conduit  
**206A** Conduit

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**300** Continuous light source

**302** Light source

**304** Source

**306** Switch

**308** Conduit

**310** Conduit

**400** LED or other continuous light source such as incandescent, electrical discharge, other

**402** Transistor

**408** Resistor

**410** Resistor

**412** Conduit

**414** Gate

**416** Drain

**418** Source

**420** Capacitor

**422** Diode

**800** Delay circuit

**802** Resistor

**804** Capacitor

## DETAILED DESCRIPTION

FIRST EMBODIMENT—Description FIGS. **1** Through **4**

In one embodiment, a CLS is self-powered by an electrical source and comprises in part a control circuit and at least one well-known “hot shoe” mount.

A hot shoe comprises a first electrical conduit having a well-known and widely-used male or female, slidably engageable and interlocking shape and a second electrical conduit that is electrically insulated from the first electrical conduit. When a female shoe is engaged with a male shoe, the first electrical conduit on the male shoe is in physical and electrical contact with the first electrical conduit of the female shoe and the second electrical conduits on each of the male and female shoes are in physical and electrical contact. Thus when a male shoe is engaged with a female shoe, the first and second conduits are capable of completing an electrical circuit.

FIG. **1** shows a prior-art assembly of components comprising a camera **100** having an internal power source such as a battery (not shown), an actuator **102**, an electrically conductive male shoe **104** with an isolated electrical contact **106** that is briefly electrically connected to shoe **104** when camera **100** is actuated, an accessory female shoe **108** with a contact **110** that is electrically connected to an accessory PLS **112** and electrically engaged with contact **106** in shoe **104**, and a power source **114** that is arranged to activate PLS **112**. Shoes **104** and **108** are in electrical and physical contact with one-another, as described above. PLS **112** is normally contained in a housing **116** that includes or is contiguous with at least hot shoe **108**, flash **112**, and source **114**.

When a subject (not shown) is to be photographed, source **114** activates flash **112** and camera **100** is activated in preparation for recordation of an image of a subject. When camera **100** is actuated by actuator **102**, camera **100** prepares for recordation and then briefly electrically connects electrode **104** and contact **106**. Since contact **110** is in contact with contact **106** and electrode **104** is in contact with electrode **108**, an electrical signal resulting from this contacting is communicated from camera **100** to PLS **112**, thereby actuating PLS **112** whereby a subject is illuminated for recordation by camera **100**.

FIG. **2** shows one aspect of an embodiment. In this aspect, a hot shoe adapter (HSA) **200** is slidably interposed and



secured between shoe **104** on camera **100** and shoe **108** on PLS **112**. At least a portion of HSA **200** is electrically conductive, thereby comprising an electrical terminal. Thus HSA **200** is joined in electrical contact with shoes **104** and **108**.

HSA **200** further includes a first contact **204** that is electrically insulated from the remainder of HSA **200** and is in electrical contact with terminal **106** of shoe **104**. A second contact **202**, electrically insulated from the remainder of HSA **200**, is in electrical communication with contact **110** of shoe **108**. Contacts **202** and **204** are also in electrical contact with one-another via a conduit **206**. Conduit **206** is also electrically insulated from the remainder of HSA **200**.

The addition of HSA **200** itself has no practical effect on the operation of camera **100** and PLS **112** since shoes **104** and **108** are in electrical contact with one-another and contacts **106** and **110** are also in electrical contact with one-another. Thus when HSA **200** is interposed between shoes **104** and **108**, camera **100** is able to operate PLS **112** as in the prior art.

FIG. **3** shows the addition of CLS **300** to the apparatus of FIG. **2**. CLS **300** comprises a light source **302** and associated circuitry (FIG. **4**), a power source **304**, and a switch **306** having first and second terminals. A first terminal of switch **306** is connected to light source **302** and a second terminal of switch **306** is connected to power source **304** so that when switch **306** is closed, light source **302** is electrically connected to and activated (energized) by power source **304**.

Light source **302** further includes electrical conduits **308** and **310**. Conduit **308** is connected to conduit **206** and conduit **310** is electrically connected to terminal **200** of HSA **200** (FIG. **2**).

FIG. **4** is a schematic electrical diagram of CLS **300** according to one aspect of the present embodiment. CLS **300** comprises a light-emitting diode (LED) **400** such as part number GW CSSRM3.PM-N5N8-XX57-1 from ams-Osram AG of Premstaetten, Austria, a transistor **402**, such as a well-known MOSFET type having part number SQA446CEJW-T1\_GE3 manufactured by Vishay Semiconductor of Malvern, PA, USA. CLS **300** also includes a power source **304**, such as a plurality of standard AA-size batteries or any of a number of suitable batteries such as a part number 2CR-5MPA photo battery made by Panasonic Company of Japan, a toggle switch **306** (also shown in FIG. **3**), a first resistor **408**, a second resistor **410**, a capacitor **420** and a diode **422**. Transistor **402** comprises a gate electrode **414**, a drain electrode **416**, and a source electrode **418**, as is well known to those skilled in the art of electronics. Resistors **408** and **410** are standard carbon or metal film resistors and switch **306** is a standard pushbutton or toggle switch of capacity about 1 ampere. In one aspect, capacitor **420** is a standard ceramic or film type with a capacitance of 0.1 microfarad and resistor **408** has a value of 1 megohm and a rating of one-quarter watt. Diode **422** is a standard switching type such as part number 1N4148.

In an alternative aspect of the present embodiment, LED **400** is replaced by a light source having an incandescent filament or an electrical discharge lamp.

FIRST EMBODIMENT—Operation FIGS. **4**, **5A**, **5B**, and **6**

Official Standard, Prior Art, FIG. **5A**—When camera **100** is actuated, hot shoe **104** sends an actuating electrical signal to PLS **112** via adapter **200** (time C-F). The ISO (International Organization for Standardization) Standard **10330** for hot shoes requires that the voltage difference supplied to

camera **100** by PLS **112** have a non-actuating direct current value between terminals **104** and **106** that is less than or equal to 24 volts (times A-C and after F) and more than 1.5 volts when shoe **104** is not actuated. When hot shoe **104** is actuated, the voltage between terminals **104** and **106** must be less than or equal to 1.5 volts for at least 10 microseconds (time C-F), as shown in FIG. **5A**. Thus when actuated, camera **100** provides an internal switch closure (not shown) between terminals **104** and **106** of hot shoe **104** (FIGS. **1** and **2**), thereby simultaneously actuating flash **112** and CLS **300**.

Operation of Present Embodiment, FIGS. **4** and **5B**—When switch **306** (FIG. **4**) is closed, voltage from a positive terminal of battery **304** is applied to the upper terminals of resistors **408** and **410** via a conduit **412**. In normal use, gate **414** of transistor **402** draws almost no current, typically nanoamperes, and therefore is held at a positive potential by connection to the lower terminal of resistor **408**, thereby normally placing transistor **402** into an “ON” state and charging capacitor **420** to a voltage that is equal to the potential of battery **304**, minus a negligible voltage drop through resistor **408**. A typical resistance value for resistor **408** ranges between tens of thousands of ohms to one megohm. In this “ON” state, transistor **402** assumes a very low resistance to current between drain **416** and source **418**. A typical value of this resistance is on the order of milliohms. When transistor **402** is in the “ON” state, current flows from the positive terminal of battery **304**, through closed switch **306**, conduit **412**, resistor **410**, LED **400**, and transistor **402**, and returns to the negative terminal of battery **304** via conduit **310**, thereby causing LED **400** to emit light (time A-B). This can be the light that is used for focusing camera **100** prior to recordation of an image. The value of resistor **410** is chosen so as to limit current flowing through LED **400** to a safe value, typically 0.5 Amperes. A typical value of resistor **410** is 10 ohms. A typical voltage value of battery **304** is between 3 and 10 volts.

When switch **306** is closed, CLS **300** is activated and LED **400** emits light (time A-B, FIG. **5B**). When camera **100** is actuated for recordation of an image, conduits **308** and **310** are electrically connected together for a period of time that is greater than 10  $\mu$ s (time B-G). During this time, current flows from resistor **408** and capacitor **420** and through diode **422**, reducing the potential on gate **414** and across capacitor **420** to a value that is less than or equal to about 2 volts, accounting for a well-known voltage drop of 0.5 volts across diode **422**. During the time interval B-G, the voltage applied to gate **414** with reference to the voltage on conduit **310** is less than 2 volts for at least 10 microseconds (time C-F). Transistor **402** is selected so that a potential difference of 2 volts or less between gate **414** and source **418** causes transistor **402** to assume an “OFF” state, i.e., a state in which no current passes through transistor **402**, LED **400**, and resistor **410**. When transistor **402** is in an “OFF” state (time B-G), no current flows through LED **400** and LED **400** emits no light. During time C-F, PLS **112** (FIG. **2**) is actuated and emits light for recordation of a subject’s image. After the camera’s switch closure of  $\geq 10$   $\mu$ s has elapsed (time F), conduits **308** and **310** are no longer connected together and no current flows through diode **422**. This enables current flowing through resistor **408** to charge capacitor **420**, thereby raising the electrical potential of gate **414** to a value above 2 volts and placing transistor **402** into an “ON” state, causing LED **400** to emit light again (time G). The values of resistance of resistor **408** and capacitance of capacitor **420** are selected based on a desired delay time for return to an “ON”, or emissive, state of LED **400** (time F-G, see below). If resistor **408** has a value of 1 megohm and capacitor **420**



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has a value of 0.1 microfarad, transistor **402** will resume an “ON” state approximately 0.1 second after the end of camera **100**’s nominal 10  $\mu$ s switch closure pulse. Other time constant values can be used as desired.

FIG. **6** is a block diagram showing operational steps for this aspect of the present embodiment. Prior to the START (block **600**), all components in CLS **300** are mechanically and electrically connected and ready for use. HSA **200** is mounted, secured, and connected between shoes **104** and **108** as shown in FIG. **2**. Electrical conduit **308** connects conduit **206** to the circuitry in CLS **300** and electrical conduit **310** electrically connects adapter terminal **200** to the circuitry in CLS **300** as shown in FIGS. **2** through **4**. LED **400** in CLS **300** is directed toward a subject (not shown) to be recorded. CLS **300** is activated by closure of switch **306** (block **602**) and LED **400** emits light that is directed at a subject that is to be recorded. Camera **100** is activated and aimed generally at the same subject (block **604**). An operator (not shown) arranges camera **100** for a focus operation and commences focusing, i.e., the operator views an image of a subject through a lens, on a digital display, or on a frosted glass and adjusts camera **100** to focus on the subject (block **606**). An operator actuates camera **100** via actuator **102** (block **608**). The potential difference between terminals **308** and **310** assumes a value less than or equal to 2 volts, thereby rendering transistor **402** in an “OFF” state and extinguishing illumination from LED **400** (block **610**). At approximately the same time, camera **100** activates flash **112** for recordation via contacts **202** and **204** and HSA **200** (block **612**). A short time later, at least 10 microseconds per the ISO standard (FIG. **5A**), transistor **402** returns to an “ON” condition and LED **400** again emanates light (block **614**). The series of events in FIG. **6** is complete (block **616**).

#### ALTERNATIVE ARRANGEMENTS—FIGS. 7A-7F

The apparatuses shown in the present disclosure can be arranged and connected in various ways and still meet the stated goal of extinguishing a modeling and focusing light during recordation of an image. FIG. **7A** shows an arrangement similar to that shown in FIGS. **2** and **3** except that CLS **300** and HSA **200** are joined together in a single unit. FIG. **7B** shows other means of actuation of CLS **300**, i.e., via light, fiber optic, radio, Bluetooth, and Wi-Fi (a trademark of the Wi-Fi Alliance that uses parts of the IEEE **802** protocol for wireless communication) in addition to electrical conduits. FIG. **7C** shows actuation of CLS **300** by direct connection to internal circuitry of camera **100** using any of the above additional methods. FIG. **7D** shows the use of CLS **300** in conjunction with a flash **100A** that is built into camera **100**. FIG. **7E** shows the use of a CLS **300A** that is a part of camera **100** such as the camera’s own visible focusing light. **7F** shows the combination of CLS **300** and flash **112** in a single unit.

#### ALTERNATIVE ASPECT OF AN EMBODIMENT—FIGS. **5B**, **8A** and **8B**

FIG. **8A** shows an alternative aspect of the embodiment shown in FIG. **2**. In the event that LED **402** (or an alternative source such as an incandescent or electrical discharge light source) does not extinguish before flash **112** is actuated (time B-D), it is possible for light from LED **402** to be present when flash **112** is actuated for recordation of an image by camera **100**. This can happen when transistor **402** has sufficient capacitance between gate **414** and source **418**

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to slow the transition of conduit **308** from its pre-actuation value, relative to that of conduit **310**, to the 2 volts necessary to trigger flash **112** (time B-D). In this case, it is desirable to introduce a time delay in the actuation of flash **112** until LED **402** is fully extinguished (time B-C). A delay in actuation of flash **112** is accomplished by adding a delay device **800** between conduit **206** and contact **202** via a conduit **206A**. Delay device **800** can be a 20 microsecond delay, model GB20P0ZXXX, manufactured by Allen Avionics, Inc., of River Grove, IL, U.S.A., for example. Alternatively, delay device **800** can be a resistor-capacitor delay circuit such as the one shown in FIG. **8B**. Typical values for resistor **802** and capacitor **804** are 1 megohm and 0.1 microfarad, respectively, for a time delay of 0.1 second, although other values can be used.

#### SUMMARY RAMIFICATIONS AND SCOPE

I have devised and described a method and apparatus that provides modeling and focusing illumination for use with a camera, that extinguishes the modeling and focusing illumination during recordation of an image by the camera, and then optionally reinstates the modeling and focusing illumination after recordation of the image. This new and unexpected series of events are improvements to the prior art that enable a photographer to have complete control over lighting of a subject during image recordation without interference by a focusing light that may cause specular reflections, shadows, or other unwanted lighting effects. My apparatus is compatible with existing hot shoe flash adapters and can be incorporated within a camera. It can also be incorporated into a flash accessory for mounting on the hot shoe of a camera.

The apparatus and methods enumerated in this disclosure are merely exemplary. Those skilled in the art of photography may see that steps and objects can be added or changed without changing the nature of the disclosure. For example, instead of using hot shoes, wired, Bluetooth, Wi-Fi, and fiber-optic connections between a camera, a CLS, an external flash can be substituted for part or all of the electromechanical connections shown above. The embodiments described herein can be combined in alternate arrangements to accommodate various lighting requirements.

Instead of promptly returning transistor **402** to an “ON” condition and causing LED **400** to return to an emitting state after a flash, circuitry can be added to further delay or even halt the return of transistor **402** to its “ON” state, thereby extinguishing LED **400** for a longer period of time than required by the ISO standard. Instead of a battery, a battery eliminator device such as a plug-in power supply can be used to power CLS **300**. Instead of recordation of a single image, a camera can be operated in a well-known Multiple Exposure Mode wherein CLS **300** and PLS **112** operate alternately during capture and recordation of a predetermined number of images. Instead of ceasing to emit light during actuation, CLS **300** can emit light at a reduced intensity that will not interfere with lighting provided by PLS **112**.

Thus the scope should be determined by the appended claims and their legal equivalents, and not just by the examples given.

The invention claimed is:

1. A method for photographing a subject, comprising:

(a) providing a camera with a hot shoe, wherein said hot shoe comprises at least two electrical conduits that are briefly connected together when said camera is actuated for recordation of an image of said subject,



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(b) providing a pulsed light source connected to said hot shoe and said two electrical conduits, wherein said pulsed light source activates said electrical conduits, (c) providing a continuous light source with an actuating circuit, wherein said actuating circuit is connected to said two electrical conduits, and (d) activating said camera, said pulsed light source, and said continuous light source, (e) actuating said camera, whereby when said camera is actuated, said two electrical conduits are briefly connected together, thereby actuating said pulsed light source and causing said pulsed light source to emit light for recordation of said image of said subject by said camera, while extinguishing said continuous light source during said recordation of said image by said camera.

2. The method of claim 1, further including providing a first delay circuit in series with at least one of said conduits that delays actuation of said pulsed light source for a predetermined period of time after said hot shoe on said camera is actuated.

3. The method of claim 1, further including a second delay circuit in said actuating circuit of said continuous light source that delays emission of light from said continuous light source for a predetermined period of time after said pulsed light source has been actuated.

4. The method of claim 1, wherein said continuous light source comprises a light source selected from the group consisting of light-emitting diodes, incandescent light sources, and electrical discharge light sources.

5. The method of claim 1, wherein said continuous light source and said actuating circuit are contiguous with said housing of said pulsed light source.

6. The method of claim 1, further providing means that are contained within said camera and selected from the group consisting of electrical conduit, light, fiber optic, radio, Bluetooth, and Wi-Fi and are arranged to actuate said continuous light source and said pulsed light source when said camera is actuated for recordation of an image.

7. The method of claim 1, further including providing a first delay circuit in series with at least one of said conduits that delays actuation of said pulsed light source for a predetermined period of time after said hot shoe on said camera is actuated, further including providing a second delay circuit in said actuating circuit of said continuous light source that delays emission of light from said continuous light source for a predetermined period of time after said pulsed light source has been actuated, wherein said continuous light source comprises a light source selected from the group consisting of light-emitting diodes, incandescent light sources, and electrical discharge light sources, and further providing a hot shoe adapter between said hot shoe of said camera and said hot shoe of said pulsed light source, wherein said first and said second conduits of said hot shoe of said camera and said hot shoe of said pulsed light source are electrically connected and mechanically engaged by said hot shoe adapter between said hot shoe of said camera and said hot shoe of said pulsed light source.

8. The method of claim 7, wherein said actuating circuit is connected to said electrical conduits on said hot shoe adapter between said hot shoe of said camera and said hot shoe of said pulsed light source via means selected from the group consisting of electrical conduit, light, fiber optic, radio, Bluetooth, and Wi-Fi.

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9. A hot shoe triggerable focusing light accessory for a camera, comprising:

- a camera with a first hot shoe having at least first and second electrical conduits, wherein said first and said second conduits are electrically connected together when said camera is actuated,
- a second hot shoe that is mechanically engaged with and electrically connected to said first hot shoe, wherein said first and said second electrical conduits on said first and said second hot shoes are electrically connected to said first and said second electrical conduits on said first hot shoe, and wherein said second hot shoe further includes a normally-unlit pulsed light source that is contained in a housing and that emits light when said first and said second hot shoes are actuated by said camera,
- a normally-lit continuous light source having an actuating circuit that is electrically connected to said first and said second electrical conduits on said first and said second hot shoes, wherein said actuating circuit causes said continuous light source to cease emitting light when said first hot shoe is actuated by said camera, wherein said continuous light source comprises a light source selected from the group consisting of light-emitting diodes, incandescent light sources, and electrical discharge light sources,

further including a first delay circuit that delays emission of light from said continuous light source for a predetermined period of time after said pulsed light source has been actuated, further including a second delay circuit in series with at least one of said first and said second electrical conduits between said first and said second hot shoes, whereby when said first and said second conduits of said first hot shoe are electrically connected together when said camera is actuated, said pulsed light source is arranged to emit light after a time delay introduced by said second delay circuit, whereby when said camera is actuated, said continuous light source ceases to emit light and said pulsed light source emits light.

10. A system for recordation of an image, comprising:

- a first hot shoe on a camera having at least first and second electrical conduits that are briefly connected together when said camera is activated and actuated,
- a second hot shoe on a pulsed light source having at least first and second electrical conduits that are connected to said first and said second electrical conduits of said first hot shoe of said camera, wherein when said pulsed light source is energized, a potential difference between said two electrical conduits has a first predetermined value when said camera is activated but not actuated, and a second predetermined value when said camera is activated and actuated, wherein when said camera is actuated said second predetermined value of said potential is present between said two electrical conduits, said pulsed light source is activated and briefly emits light,
- a continuous light source selected from the group consisting of light-emitting diodes, incandescent light sources, and electrical discharge light sources, wherein said continuous light source further includes first and second electrical conduits that are connected to said first and said second electrical conduits of said first hot shoe on said camera and said first and said second electrical conduits of said pulsed light source, wherein when said second predetermined value of said potential

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is present between said two electrical conduits, said continuous light source is actuated and ceases emitting light,  
wherein said system for recodation of an image further includes a delay circuit with a predetermined delay 5 time that is inserted in series with at least one of said electrical conduits between said first hot shoe on said camera and said second hot shoe on said pulsed light source, whereby when said hot shoe on said camera is actuated, said pulsed light source is actuated after said 10 delay time,  
whereby said continuous light source is extinguished while said pulsed light source emits light.

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