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(54) Title: VEHICLE INTERIOR LIGHTING SYSTEM

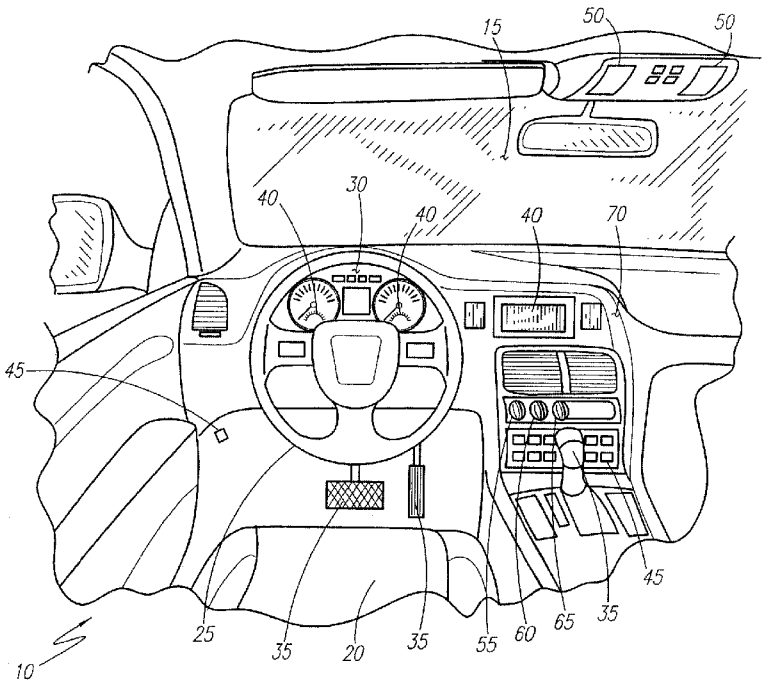

FIG. 1

(57) Abstract: A vehicle interior lighting system includes a controller that controls the color and/or intensity of illumination devices of an interior of a vehicle, a selector control that switches color and/or intensity controls to various groups of illumination devices, a color control that controls light color and an intensity control that controls light intensity. The controller includes a microcontroller, the illumination devices include tricolor light emitting diodes, the selector control includes a multi-position switch, and the color and intensity controls include potentiometers.

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— *of inventorship (Rule 4.17(iv))*

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VEHICLE INTERIOR LIGHTING SYSTEM

CROSS-REFERENCE TO RELATED APPLICATIONS

[0001] This application claims the benefit of priority to United States Patent Application No. 13/904,674, filed on May 29, 2013.

TECHNICAL FIELD

[0002] The present invention relates generally to vehicle interior lighting systems and, in particular, to an intensity adjustable and color adjustable lighting system for a vehicle interior.

BACKGROUND ART

[0003] Many vehicle cabs are equipped with an overhead dome light and map lights for cab visibility, door lights for safe entry and exit, backlit instrument panels and controls, a lit vanity mirror and glove box. Traditionally vehicle interior lighting is viewed primarily as functional. For example, a certain amount of light is needed to illuminate a selected area within the interior of the vehicle cab and a certain amount of light is needed to backlight the instrumentation panel of the vehicle to be visible at night. Almost always the illumination was provided from incandescent bulbs and was almost always white light. Further, and with the exception of certain instrument backlighting, most vehicle lighting does not include adjustable intensity.

[0004] While vehicle interior lighting scheme were useful and effective for their functional purposes, the achieved lighting effects were seldom attractive. Over the last couple of years LED's (Light-Emitting Diodes) have made significant inroads into motor vehicle lighting systems. While initially the new LED lighting was limited to headlights and taillights, LED's gradually found their way into vehicle interior lighting. New vehicles now use LED's rather extensively for passenger compartment general lighting, instrumentation lighting and warning lights.

[0005] LED's typically last longer than the vehicles they are installed in. Thus bulb replacement may become a thing of the past. In addition, LED's have reduced power consumption, which enables smaller, and thus cheaper, power wiring. The lower power consumption enables redirection of available electrical power to other devices and applications that are becoming increasingly common in today's motor vehicles.

[0006] However, many people find that LED's produce light that is too bright, harsh, and generally unappealing. Bright lights of LED's are particularly troublesome at night. While driving at night, the use of bright compartment interior lighting either by a passenger or driver creates discomfort and poor night vision for the driver because of the reflection of the bright light from the windshield into the driver's eyes. This creates a dangerous condition, particularly during emergencies.

[0007] Accordingly, there remains a need for interior vehicle lighting, without the disadvantages as described above.

SUMMARY OF THE INVENTION

[0008] The inventor has recognized the aforementioned inherent problems and lack in the art and observed that there remains a need for aesthetically improved vehicle interior lighting. Particularly useful would be LED vehicle interior lighting that can be adjusted in both intensity and color. Ideally such LED vehicle interior lighting would enable variable lighting schemes and would improve driver safety by reducing excessive light reflections while driving at night.

[0009] The principles of the disclosed vehicle interior lighting system may provide aesthetically improved interior lighting. Those principles specifically provide for LED vehicle interior lighting that can be adjusted in both intensity and color. Such LED vehicle interior lighting enables aesthetically attractive lighting schemes at relatively low cost and with easy driver adjustability. The LED vehicle interior lighting provides numerous colors and is highly configurable in lighting intensities.

[0010] In one embodiment, the disclosed vehicle interior lighting system may include a controller, a selector control applying a user adjustable selector input to the controller, a color control applying a user adjustable color input to the controller, an intensity control applying a user adjustable intensity input to the controller and a plurality of illumination devices emitting light, the light including a color and an intensity. The controller controls the color of the illumination devices based on a color input. The controller controls the intensity of the illumination devices based on an intensity input.

[0011] In another embodiment, the disclosed vehicle interior lighting system may include a control device, a multi-position selector control applying a user adjustable selector input to the control device, a color adjustment potentiometer applying a user adjustable color input to the control device, an intensity adjustment potentiometer applying a user adjustable intensity input to the control device, an instrument cluster having instrument illumination devices emitting light having a color and an intensity, and an array of indicators having indicator illumination devices emitting light having a color and an intensity. The control device controls the color of the instrument illumination devices based on a color input. The control device controls the color of the indicator illumination devices based on a color input. The control device controls the intensity of the instrument illumination devices based on an intensity input. The control device controls the intensity of the indicator illumination devices based on an intensity input.

[0012] In an example implementation, when in a first position, the instrument illumination devices, the indicator illumination devices, and the compartment interior illumination devices are off. When in a second position, the controller sets the intensity and color of the instrument illumination devices. When in a third position, the controller sets the intensity and color of the indicator illumination devices. When in a fourth position, the controller sets the intensity and color of the compartment interior illumination devices. When in a fifth position, the controller sets the intensity and color of the instrument illumination devices, the indicator illumination devices, and the compartment interior illumination devices on an even and consistent manner.

[0013] In another embodiment, the controller is a microcontroller, the vehicle interior lighting system includes a programming input port for receiving an operating program, and the microcontroller is a flash programmable microcontroller.

[0014] In yet another embodiment, the disclosed vehicle interior lighting system may include a first control device for turning the instrument illumination devices on/off, a second control device for turning the indicator illumination devices on/off, and a third control device for turning the compartment interior illumination devices on/off. The vehicle interior lighting system may also include a vehicle operation control device for selectively applying external electrical power to the vehicle interior lighting system.

[0015] Furthermore, the described features and advantages of the disclosed vehicle interior lighting system can be combined in various manners and embodiments as one skilled in the relevant art will recognize after reading the present disclosure. The disclosure can be practiced without one or more of the features and advantages described in any particular embodiment.

[0016] Further advantages of the present disclosure will become apparent from a consideration of the drawings and ensuing description.

BRIEF DESCRIPTION OF THE DRAWINGS

[0017] The advantages and features of the present invention will become better understood with reference to the following more detailed description and claims taken in conjunction with the accompanying drawings in which like elements are identified with like symbols and in which:

[0018] FIG. 1 is an isometric view of one embodiment of the disclosed vehicle interior lighting system, shown installed in a motor vehicle passenger compartment, according to the present invention;

[0019] FIG. 2 is an electrical block diagram depicting major components of the vehicle interior lighting system of FIG. 1; and

[0020] FIG. 3 is an electrical schematic of the major components of the vehicle interior lighting system of FIGS. 1 and 2, specifically including a multi-color LED driving circuit.

DESCRIPTION OF EMBODIMENTS

[0021] The best mode for carrying out the invention is presented in terms of the described embodiments, herein depicted within FIGS. 1 through 3, and a person skilled in the art will appreciate that many other embodiments of the invention are possible without deviating from the basic concept of the invention, and that any such work around will also fall under scope of this invention. It is envisioned that other styles and configurations of the present invention can be easily incorporated into the teachings of the present invention, and only one particular configuration shall be shown and described for purposes of clarity and disclosure and not by way of limitation of scope.

[0022] It can be appreciated that, although such terms as first, second, etc. may be used herein to describe various elements, these elements should not be limited by these terms. These terms are only used to distinguish one element from another element. Thus, a first element discussed below could be termed a second element without departing from the scope of the present invention. In addition, as used herein, the singular forms "a", "an" and "the" are intended to include the plural forms as well, unless the context clearly indicates otherwise. It also will be understood that, as used herein, the term "comprising" or "comprises" is open-ended, and includes one or more stated elements, steps or functions without precluding one or more unstated elements, steps or functions. Relative terms such as “front” or “rear” or “left” or “right” or “top” or “bottom” or "below" or "above" or "upper" or "lower" or "horizontal" or "vertical" may be used herein to describe a relationship of one element, feature or region to another element, feature or region as illustrated in the figures. It should be understood that these terms are intended to encompass different orientations of the device in addition to the orientation depicted in the figures. It should also be understood that when an element is referred to as being "connected" to another element, it can be directly connected to the other element or intervening elements may be present. In contrast, when an element is referred to as being "directly connected" to another element, there are no

intervening elements present. It should also be understood that the sizes and relative orientations of the illustrated elements are not shown to scale, and in some instances they have been exaggerated for purposes of explanation.

[0023] Referring to FIGS. 1-3, disclosing a vehicle interior lighting system (herein described as the "system") 10, where like reference numerals represent similar or like parts. The system 10 generally includes a lighting system for the interior of a motor vehicle having variable (e.g., multiple) intensity settings and variable (e.g., multiple) color settings, and combinations of the two.

[0024] Referring now to FIG. 1, showing the system 10 installed in a motor vehicle passenger compartment 15. The passenger compartment 15 may include well-known devices such as a driver's seat 20, a steering wheel 25, an instrument cluster 30, and vehicle control devices 35, such as a gas pedal and a brake.

[0025] The instrument cluster 30 may include multiple illumination devices 40, multiple LED indicator lights 45, and multiple passenger compartment interior lights 50. For example, the instrument cluster 30 may include all of the lighting devices typically seen within a motor vehicle passenger compartment 15 during night driving. The system 10 may enable driver and/or passenger control of the color and intensity level of the instrument cluster illumination devices 40, the LED indicator lights 45 and/or the passenger compartment interior lights 50, either concurrently (e.g., they all change at the same time) or independently (e.g., only one group of lights is adjusted).

[0026] To that end the system 10 may include a multi-position selector control switch 55, a color adjustment potentiometer 60, and an intensity adjustment potentiometer 65, all of which may be located on a dashboard 70 of the motor vehicle passenger compartment 15. The operations of the multi-position selector control switch 55, the color adjustment potentiometer 60, and the intensity adjustment potentiometer 65 are described in more detail herein below.

[0027] Referring to FIG. 2, electrical power for the system 10 may be provided by a vehicle electrical system 75 (e.g., a vehicle battery). The system 10 may be

protected by an overcurrent protective device 80, such as one or more fuses. For example, electrical power passing through the overcurrent protective device 80 (e.g., fuse) may be switched by a vehicle operation control device 85, such as an ignition circuit or a relay. The switched power is applied to a main control module 90, to a first multi-color LED driving circuit 95, to a second multi-color LED driving circuit 100, and to a third multi-color LED driving circuit 105.

[0028] The main control module 90 may sense the positions of the multi-position selector control switch 55, the color adjustment potentiometer 60, and the intensity adjustment potentiometer 65. The multi-position selector control switch 55 may include five (5) positions. For example, the first position may be an OFF position. The second position may select the first multi-color LED driving circuit 95, which provides lighting for the instrument cluster illumination devices 40 (FIG. 1) for color and intensity adjustments. The third position may select the second multi-color LED driving circuit 100, which provides lighting for the LED indicator lights 45 (FIG. 1) for color and intensity adjustments. The fourth position may select the third multi-color LED driving circuit 105, which provides lighting for the passenger compartment interior lights 50 (FIG. 1) for color and intensity adjustments. The fifth position may select all of the multi-color LED driving circuits (e.g., driving circuits 95, 100, and 105) for simultaneous color and intensity adjustments. For example, the fifth position may control all three of the multi-color LED driving circuits 95, 100, and 105 at the same time while positions two through four independently control individual multi-color LED driving circuits 95, 100, and 105.

[0029] In an example embodiment, in positions two through five of the multi-position selector control switch 55, the respective resistances of the color adjustment potentiometer 60 and the intensity adjustment potentiometer 65 may be observed and/or collected by the main control module 90. The main control module 90 may selectively (e.g., based on the position of the multi-position selector control switch 55) apply a signal that is representative of the resistance for the first multi-color LED driving circuit 95, to the second multi-color LED driving circuit 100, and/or the third multi-color LED driving circuit 105.

[0030] In another example embodiment, the signals may be determined by a microcontroller 140. The microcontroller 140 may be integrated within the main control

module 90. However, applicable logic might be provided by any number of other types of devices such as discrete logic, a RAM or EPROM, a programmable logic controller, or the like, all of which are well known in the art.

[0031] In an example construction, the output of the first multi-color LED driving circuit 95 may be applied to one or more tricolor (e.g., RGB) LED's 110 through one or more resistors 115. While FIG. 2 shows only three tricolor LED's 110 and three first resistors, those skilled in the art will appreciate that the actual number may be much higher (e.g., being up to a hundred) by continuing the parallel connection scheme illustrated in FIG. 2. Thus, the actual number of tricolor LED's 110 and resistors 115 associated with the first multi-color LED driving circuit 95 is not intended to be a limiting factor of the present disclosure as different applications may use different numbers.

[0032] Illumination control of the tricolor LED's 110 associated with the first multi-color LED driving circuit 95 may be provided by a first control device 120. For example, the first control device 10 may be a logic circuit, relay contacts or the like. When in an open position, the first control device 120 may deactivate the tricolor LED's 110 connected to it, thus extinguishing the instrument cluster illumination devices 40 (FIG. 1). For example, during daytime driving, when the headlights are turned off, or the like. When in a closed position, such as at night, the tricolor LED's 110 connected to the first control device 120 may be lit.

[0033] Similarly, the output of the second multi-color LED driving circuit 100 may be passed to tricolor (e.g., RGB) LED's 110 through resistors 115. While FIG. 2 shows only three tricolor LED's 110 associated with the second multi-color LED driving circuit 100, the actual number may be much higher (e.g., being up to a hundred) by continuing the parallel connection scheme as depicted in FIG. 2. Thus, the actual number of tricolor LED's 110 and resistors 115 associated with the second multi-color LED driving circuit 100 is not intended to be a limiting factor of the present disclosure as different applications may use different numbers.

[0034] Illumination control of the tricolor LED's 110 associated with the second multi-color LED driving circuit 100 may be provided by a second control device 125

(e.g., a logic circuit, relay contacts or the like). When in an open position, the second control device 125 may deactivate the tricolor LED's 110 connected to it, thus extinguishing the LED indicator lights 45 or switches light (FIG. 1). Again, this may occur during daytime driving, or when the headlights are off, or the like. The second multi-color LED driving circuit 100 may control the color and/or brightness of the LED indicator lights 45, such as a radio on/off switch, a radio/CD switch, a car fog switch, door lock and unlock switches, door handles lights, release lever light of the glove box, window switches, A/C switch, max/min heater switch, and associated other switches, handles, or release levers.

[0035] Similarly, the output of the third multi-color LED driving circuit 105 may be passed to tricolor (e.g., RGB) LED's 110 through resistors 115. While FIG.2 depicts only three tricolor LED's 110 associated with the third multi-color LED driving circuit 105, the actual quantity can be much more (e.g., being up to a hundred) by continuing the parallel connection scheme shown in FIG.2. Thus, the actual number of tricolor LED's 110 and resistors 115 associated with the third multi-color LED driving circuit 105 is not intended to be a limiting factor of the present disclosure as different applications may use different numbers.

[0036] Illumination control of the tricolor LED's 110 associated with the third multi-color LED driving circuit 105 may be provided by a third control device 130. For example, the third control device 130 may be a door pin switch, a trunk pin switch, a dash-mounted control switch, or the like. This may enable both automatic and manual control of the passenger compartment interior lights 50, which may be located at various positions within the motor vehicle passenger compartment 15 (FIG. 1). For example, the tricolor LED's 110 associated with the third multi-color LED driving circuit 105 may aid in entry, egress or simple illumination of interior surfaces of the passenger compartment 15. Therefore, the output of the third multi-color LED driving circuit 105 may control the color and/or brightness of the car interior lights 50.

[0037] Referring to FIG. 3, which illustrates an electrical schematic diagram depicting major components of the first multi-color LED driving circuit 95, the second multi-color LED driving circuit 100, and/or the third multi-color LED driving circuit 105. In an example embodiment, and except for the actual number of tricolor LED's 110, the

construction, features, and operation for the first multi-color LED driving circuit 95, the second multi-color LED driving circuit 100, and the third multi-color LED driving circuit 105 may be substantially identical. Accordingly, each of the multi-color LED driving circuits 95, 100, and 105 may include a similar driving circuit 135.

[0038] The driving circuit 135 may incorporate a microcontroller 140 as the main controlling component of the system 10. For example, the microcontroller 140 may be a CMOS FLASH-based 8-bit microcontroller in a forty-pin package. As a specific, non-limiting example, the microcontroller 140 may be a PIC16F887 or equivalent component.

[0039] In an example construction, the microcontroller 140 may include two hundred fifty-six (256) bytes of EEPROM data memory, two comparators, fourteen channels of 10-bit Analog-to-Digital (A/D) converter, a synchronous serial port, and an Enhanced Universal Asynchronous Receiver Transmitter (EUSART).

[0040] Those skilled in the art will appreciate that many other types of microcontrollers may be used and, thus, the specific example of microcontroller 140 is not intended to be a limiting factor of the present disclosure. However, the PIC16F887 is widely available, widely used, low cost, well supported by its manufacturer, and has a small number of op-codes that makes programming relatively simple.

[0041] In an example implementation, microcontroller 140 timing may be supplied to the driving circuit 135 by a quartz oscillator 145. Power may be supplied by a voltage regulator 150. Resistors 155 may be included to control current levels, as required. The microcontroller 140 may runs in accord with a customized program, which may be written, for example, in the C programming language.

[0042] For example, the customized program may controls the microcontroller 140 to change the color of the tricolor LED's 110 (FIG. 2) with up to two hundred fifty-five different color combinations. Programming may be downloaded to the microcontroller 140 using an interface connector 160. A series of output transistors 165 may produce a four-wire output connection 170, which connects to the tricolor LED's 110 (FIG. 2).

[0043] The color may be governed by the color adjustment potentiometer 60, while the intensity may be controlled by the adjustment potentiometer 65 (FIG. 1). To that end, the resistances of the color adjustment potentiometer 60 and the adjustment potentiometer 65 may be digitized, such as by use of built-in A/D converters. The digitized results may be applied (e.g., after further processing) to the tricolor LED's 110 (FIG. 2) via the four-wire output connection 170.

[0044] Those skilled in the art will appreciate that other configurations of the disclosed system 10 may be easily incorporated into the teachings of the present disclosure, and only certain configurations have been shown and described for purposes of clarity and disclosure and not by way of limitation of scope.

[0045] The example embodiments of the disclosed system 10 may be used by in a simple and effortless manner with little or no training. The disclosed system 10 may be constructed in general accordance with FIG. 2 and FIG. 3 and may be installed in general accordance with FIG. 1.

[0046] The present disclosure recognizes and takes into account that the disclosed system 10 may be adapted as standard or optional equipment on new motor vehicles. However, the disclosed system 10 may be adapted into an aftermarket kit for an existing motor vehicle.

[0047] Throughout the present disclosure, the disclosed system 10 is described in terms of a specific, non-limiting example as being connected to and/or utilized with an automobile. Those skilled in the art will appreciate that the disclosed system 10 may be connected to and/or utilized with any type of motor vehicle including automobiles, trucks, vans, SUV's, buses, boats, motorcycles, and planes.

[0048] Following installation in accordance with FIGS. 1-3, the disclosed system 10 may be ready for operation. In an example method for illuminating a vehicle interior, a user located in the motor vehicle passenger compartment 15 (e.g., the driver) may program the desired color and/or intensity of the instrument cluster illumination devices 40,

the LED indicator lights 45, and the passenger compartment interior lights 50 (FIG. 1) either independently or concurrently.

[0049] For example, to program independently, the driver may place the multi-position selector control switch 55 in the second position to adjust the lighting for the instrument cluster illumination devices 40. That enables the driver to adjust the color adjustment potentiometer 60 and the intensity adjustment potentiometer 65 to the desired levels for the instrument cluster illumination devices 40.

[0050] Next, the driver may position the multi-position selector control switch 55 in the third position and adjust the lighting for the LED indicator lights 45 (FIG. 1). That enables the driver to adjust the color adjustment potentiometer 60 and the intensity adjustment potentiometer 65 to the desired levels for the LED indicator lights 45.

[0051] Next, the driver may position the multi-position selector control switch 55 in the fourth position to adjust the lighting for the passenger compartment interior lights 50 (FIG. 1). That enables the driver to adjust the color adjustment potentiometer 60 and the intensity adjustment potentiometer 65 to the desired levels for the passenger compartment interior lights 50.

[0052] The foregoing enables independent light and illumination levels for the instrument cluster illumination devices 40, the LED indicator light 45, and the passenger compartment interior lights 50 (FIG. 1).

[0053] Should the same colors and/or intensity levels be desired for all lighting circuits, the driver may place the multi-position selector control switch 55 to the fifth position. That enables the color adjustment potentiometer 60 and intensity adjustment potentiometer 65 to control the intensity for all lighting circuits at once.

[0054] During operation of a motor vehicle equipped with the disclosed system 10, the operation of the instrument cluster illumination devices 40, the LED indicator lights 45, and the passenger compartment interior lights 50 (FIG. 1) may continue in an automatic and transparent manner as directed by the first control device 120, the second

control devices 125, and the third control device 130 (FIG. 2). Should operation of any lighting circuit be desired or caused, the driver is rewarded with illumination at his desired intensity and with his preferred color.

[0055] Those skilled in the art will appreciate that the teachings of the present disclosure may be incorporated into multiple configurations such as, but not limited to: a multi-color flashlight, a multi-color stand light or tall lamp stand, a multiple mode status indicator, an ambient lighting system, and the like.

[0056] The foregoing embodiments of the disclosed vehicle interior lighting system have been presented for purposes of illustration and description. They are not intended to be exhaustive or to limit the present disclosure and/or method of use to the precise forms and/or embodiments disclosed. It can be appreciated by one skilled in the art that other styles, configuration, modifications and variations can be incorporated into the teachings of the present disclosure upon reading the specification and that the embodiments shown and described are for the purposes of clarity and disclosure and to limit the scope. The embodiments shown and described were chosen in order to best explain the principles and practical application of the vehicle interior lighting system, and to thereby enable others skilled in the art to best utilize the invention and various embodiments with various modifications as are suited to the particular use contemplated. It is understood that various omissions or substitutions of equivalents are contemplated as circumstance may suggest or render expedient. The present application includes such modifications and is limited only by the scope of the claims.

CLAIMS

What is claimed is:

1. A vehicle interior lighting system, comprising:

a controller;

a selector control applying a user adjustable selector input to said controller;

a color control applying a user adjustable color input to said controller;

an intensity control applying a user adjustable intensity input to said controller; and

a plurality of illumination devices emitting light, said light comprising a color and an intensity,

wherein said controller controls said color of said illumination devices based on a color input, and

wherein said controller controls said intensity of said illumination devices based on an intensity input.

2. The system of claim 1, wherein each illumination device of said plurality of illumination devices comprises a light-emitting diode.

3. The system of claim 3, wherein said light emitting diode comprises a tri-color light-emitting diode.

4. The system of claim 1, wherein said color control is a potentiometer.

5. The system of claim 1, wherein said intensity control is a potentiometer.

6. The system of claim 1, wherein said controller comprises an Analog to Digital converter for digitizing said intensity input.

7. The system of claim 1, wherein said selector control comprises a multi-position switch.

8. The system of claim 7, wherein said multi-position switch comprises five positions.

9. The system of claim 8, wherein said plurality of illumination devices comprising at least one vehicle instrument illumination device, at least one vehicle indicator illumination device, and at least one vehicle compartment interior illumination device, and wherein said instrument illumination device, said indicator illumination devices and said compartment interior illumination device each comprises a color and an intensity.

10. The system of claim 9, wherein when said multi-position switch is in a first position said instrument illumination device, said indicator illumination device and said compartment interior illumination device are off.

11. The system of claim 9, wherein when said multi-position switch is in a second position said controller sets said intensity and said color of said instrument illumination device.

12. The system of claim 9, wherein when said multi-position switch is in a third position said controller sets said intensity and said color of said indicator illumination device.

13. The system of claim 9, wherein when said multi-position switch is in a fourth position said controller sets said intensity and said color of said compartment interior illumination device.

14. The system of claim 9, wherein when said selector control is in a fifth position said controller concurrently sets said intensity and said color of said instrument illumination devices, said indicator illumination device and said compartment interior illumination device.

15. The system of claim 9, comprising:

a first control device for turning said instrument illumination device on and off;

a second control device for turning said indicator illumination device on and off; and

a third control device for turning said compartment interior illumination devices on and off.

16. The system of claim 1, wherein said controller comprises a microcontroller.

17. The system of claim 16, wherein said microcontroller comprises a programming input port for receiving an operating program.

18. The vehicle system of claim 16, wherein said microcontroller comprises a flash programmable microcontroller.

19. The system of claim 1, comprising a vehicle operation control device for selectively applying external electrical power.

20. A vehicle interior lighting system, comprising:

a control device;

a multi-position selector control applying a user adjustable selector input to said control device;

a color adjustment potentiometer applying a user adjustable color input to said control device;

an intensity adjustment potentiometer applying a user adjustable intensity input to said control device;

an instrument cluster having instrument illumination devices emitting light having a color and an intensity; and,

an array of indicators having indicator illumination devices emitting light having a color and an intensity,

wherein said control device controls said color of said instrument illumination devices based on a color input,

wherein said control device controls said color of said indicator illumination devices based on a color input,

wherein said control device controls said intensity of said instrument illumination devices based on an intensity input, and

wherein said control device controls said intensity of said indicator illumination devices based on an intensity input.

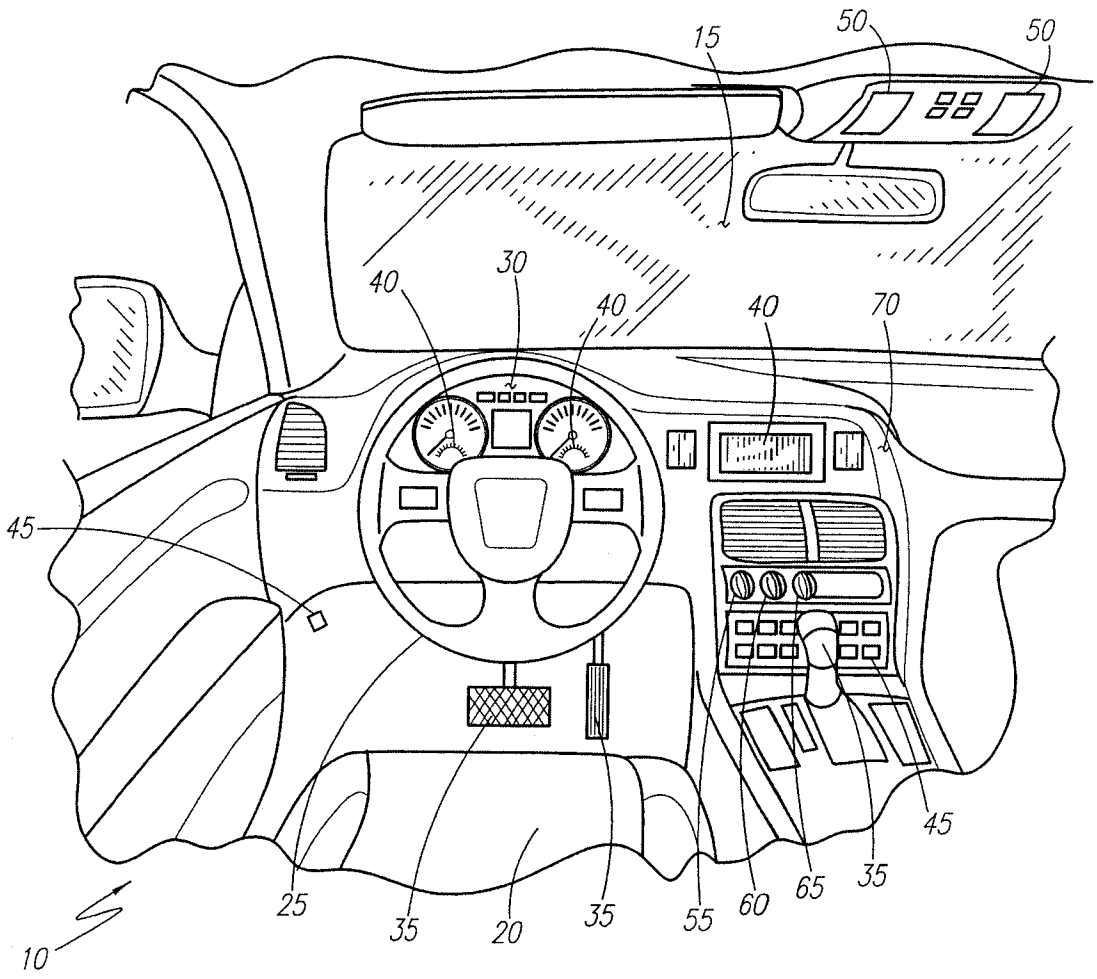


FIG. 1

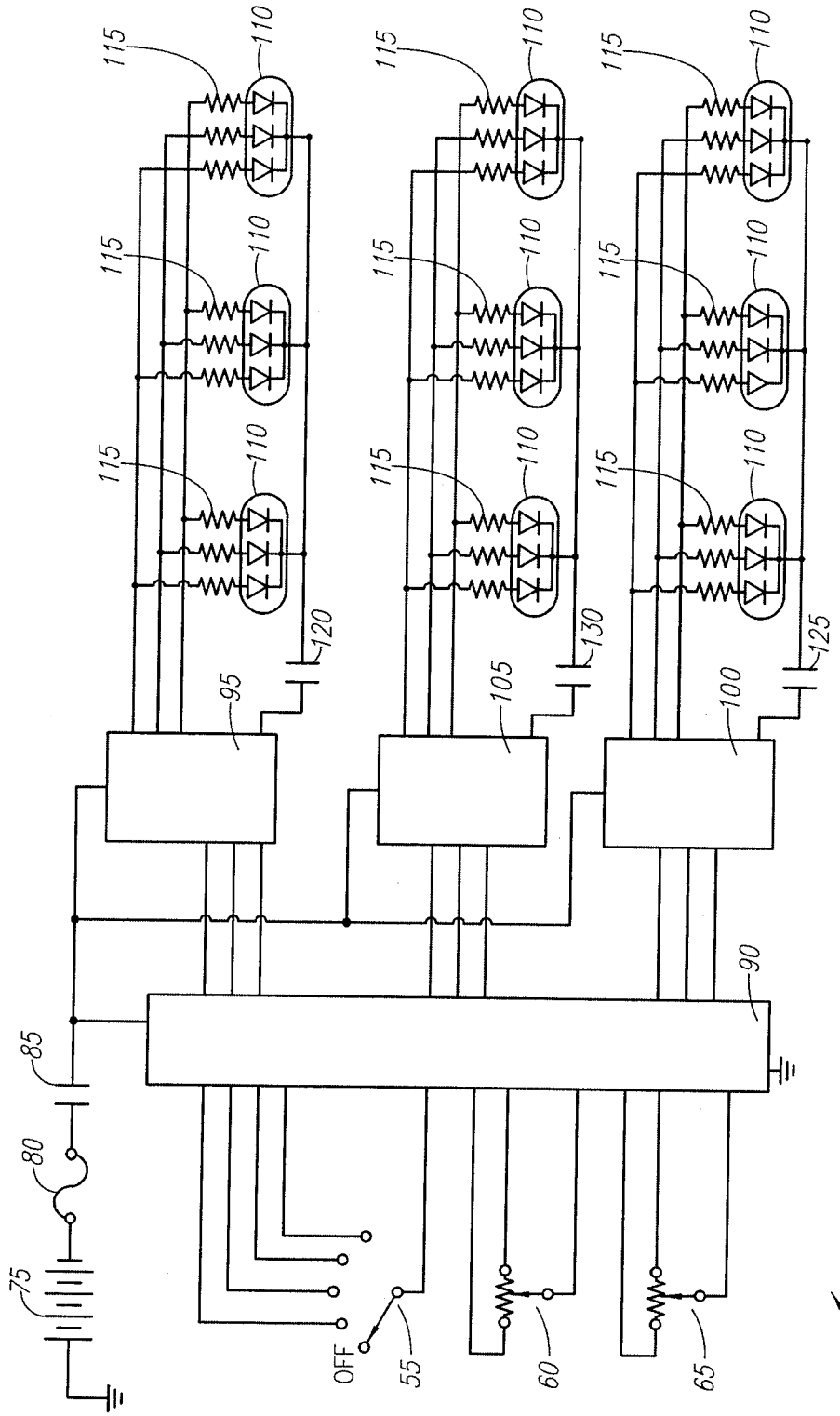
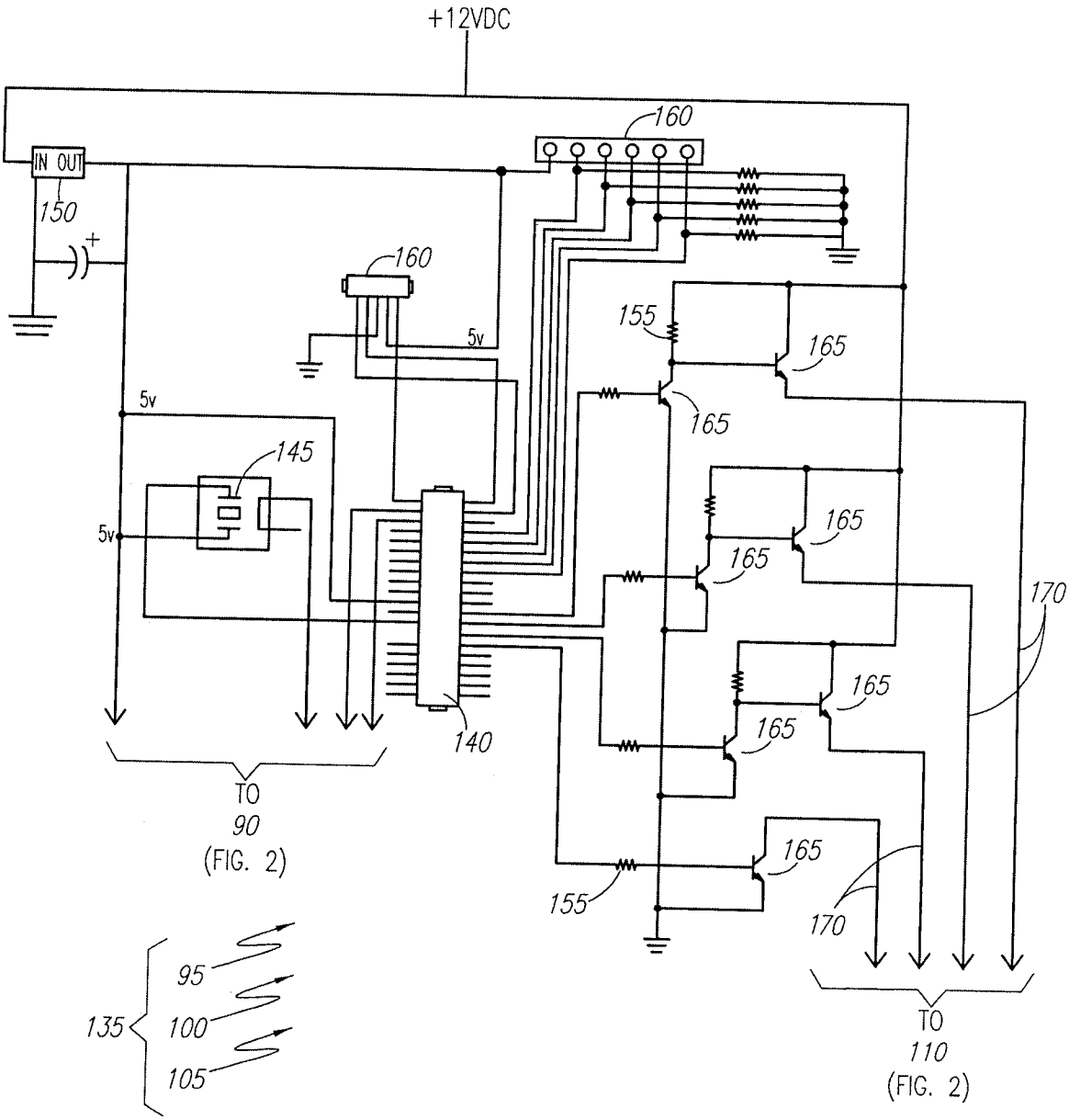


FIG. 2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TO
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(FIG. 2)
135
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TO
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(FIG. 2)

FIG. 3

INTERNATIONAL SEARCH REPORT

International application No.
PCT/CA2014/000402

A. CLASSIFICATION OF SUBJECT MATTER
IPC: ***B60Q 3/04*** (2006.01), ***B60K 37/04*** (2006.01), ***B60K 37/06*** (2006.01)

According to International Patent Classification (IPC) or to both national classification and IPC

B. FIELDS SEARCHED

Minimum documentation searched (classification system followed by classification symbols)
IPC (2006.01): B60Q 3/04, B60K 37/04, B60K 37/06 in combination with keywords

Documentation searched other than minimum documentation to the extent that such documents are included in the fields searched

Electronic database(s) consulted during the international search (name of database(s) and, where practicable, search terms used)
Databases: TotalPatent, Canadian Patent Database
Keywords: lighting, color control, intensity control

C. DOCUMENTS CONSIDERED TO BE RELEVANT

Category*	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
X	US 7385359 B2 (DOWLING K. et al.) 10 June 2008 (10-06-2008) * Fig. 8; Abstract; Claim 12; Col. 6, line 59 – Col. 26, line 55 *	1-20
A	JP 2005212667 A (NAOTAKA H.) 11 August 2005 (11-08-2005) * Entire document *	1-20
A	JP 2004237891 A (MAYUMI Y. et al.) 26 August 2004 (26-08-2004) * Entire document *	1-20

☐ Further documents are listed in the continuation of Box C.

☑ See patent family annex.

*	Special categories of cited documents:
"A"	document defining the general state of the art which is not considered to be of particular relevance
"E"	earlier application or patent but published on or after the international filing date
"L"	document which may throw doubts on priority claim(s) or which is cited to establish the publication date of another citation or other special reason (as specified)
"O"	document referring to an oral disclosure, use, exhibition or other means
"P"	document published prior to the international filing date but later than the priority date claimed
"T"	later document published after the international filing date or priority date and not in conflict with the application but cited to understand the principle or theory underlying the invention
"X"	document of particular relevance; the claimed invention cannot be considered novel or cannot be considered to involve an inventive step when the document is taken alone
"Y"	document of particular relevance; the claimed invention cannot be considered to involve an inventive step when the document is combined with one or more other such documents, such combination being obvious to a person skilled in the art
"&"	document member of the same patent family

Date of the actual completion of the international search 11 June 2014 (11-06-2014)	Date of mailing of the international search report 24 July 2014 (24-07-2014)
Name and mailing address of the ISA/CA Canadian Intellectual Property Office Place du Portage I, C114 - 1st Floor, Box PCT 50 Victoria Street Gatineau, Quebec K1A 0C9 Facsimile No.: 001-819-953-2476	Authorized officer Andy Wong (819) 953-1562

INTERNATIONAL SEARCH REPORT
Information on patent family members

International application No.
PCT/CA2014/000402

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