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Hsieh

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(54) **WIRELESS LIGHT CONTROL SYSTEM WITH CONTROL APPARATUS AND METHOD THEREOF**

(75) Inventor: **Chung-hsin Hsieh**, Taipei (TW)

(73) Assignee: **Dartpoint Technology Co., Ltd.**, Taipei (TW)

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H05B 39/04 (2006.01)
H05B 41/36 (2006.01)

(52) **U.S. Cl.**
USPC **315/149**; 315/152; 315/155; 315/158

(58) **Field of Classification Search**
USPC 315/129, 134, 149–159, 312
See application file for complete search history.

(56) **References Cited**

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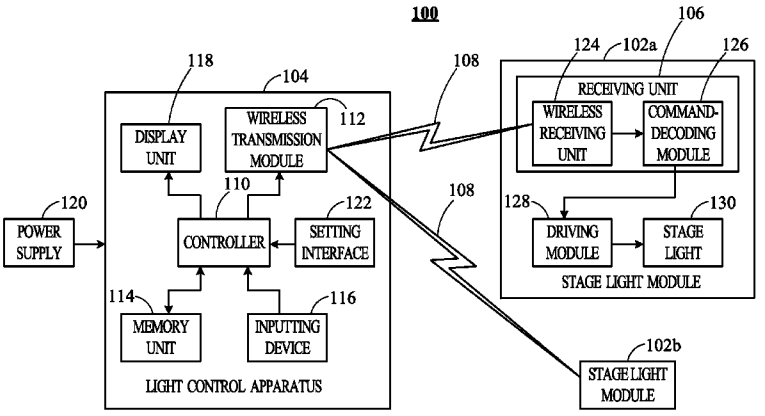
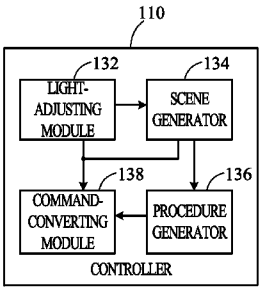
Primary Examiner — Anh Tran
(74) *Attorney, Agent, or Firm* — Cheng-Ju Chiang

(57) **ABSTRACT**

A wireless light control system with control apparatus for stage lights and method thereof are described. The light control apparatus in the wireless light control system communicates with the wireless receiver via a wireless connection. The wireless transmitter transmits the light control command, the scene control command and the procedure control command to the wireless receiver wherein the light control command includes a lighting parameter, a lighting duration parameter, a brightness parameter and light color parameters so that the stage light modules can switches the lighting status, the lighting duration, the brightness and the light colors based on Digital Multiplex 512 (DMX512) of the light control standard protocol. Further, the wireless light control system effectively simplifies the control architecture of the stage light modules.

20 Claims, 5 Drawing Sheets





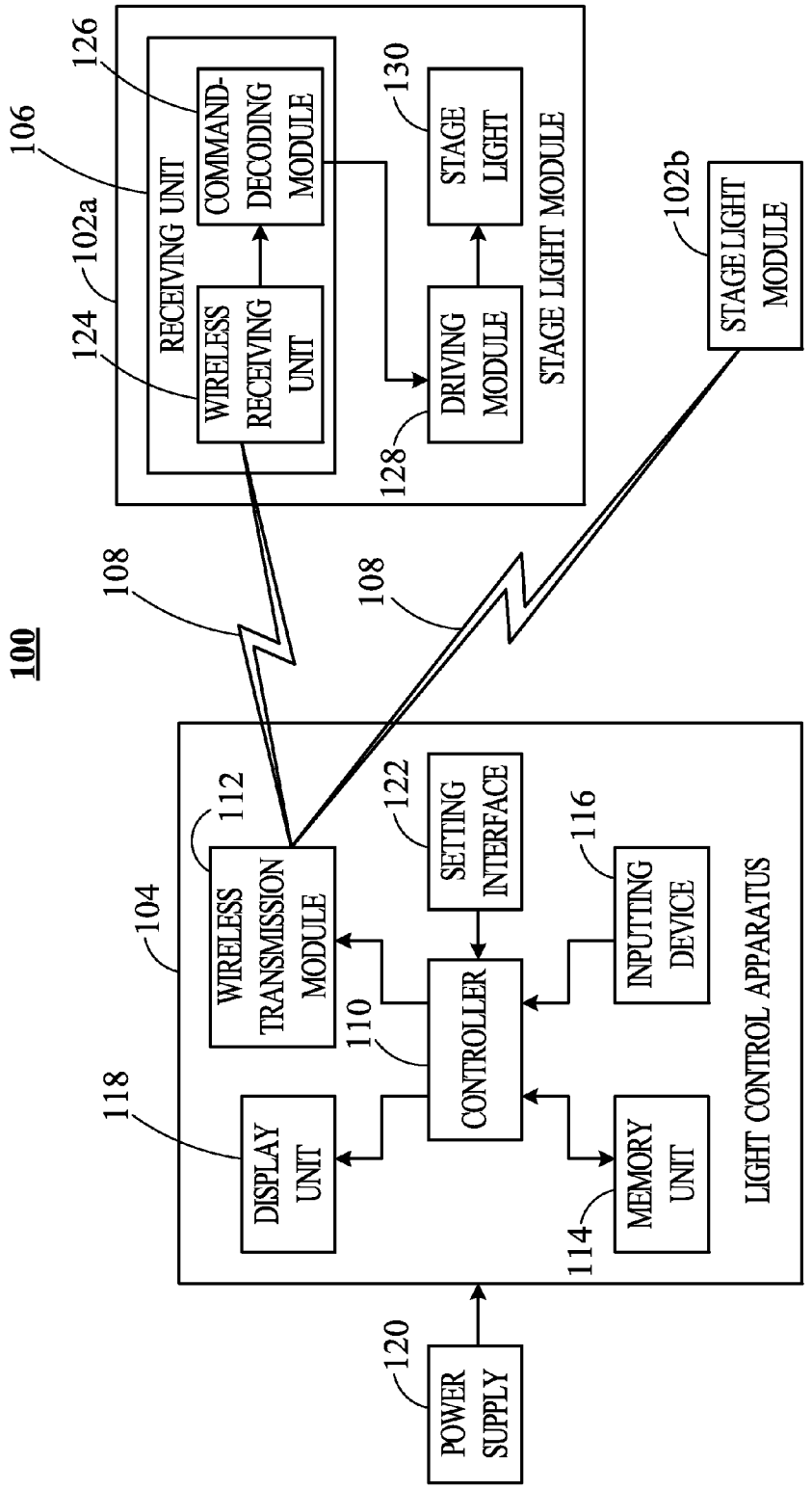

100
LIGHT CONTROL APPARATUS
WIRELESS TRANSMISSION MODULE
112
104
SETTING INTERFACE
122
INPUTTING DEVICE
116
CONTROLLER
110
DISPLAY UNIT
118
MEMORY UNIT
114
POWER SUPPLY
120
108
108
STAGE LIGHT MODULE
102b
STAGE LIGHT MODULE
RECEIVING UNIT
106
WIRELESS RECEIVING UNIT
124
102a
COMMAND-DECODING MODULE
126
DRIVING MODULE
128
STAGE LIGHT
130

FIG. 1

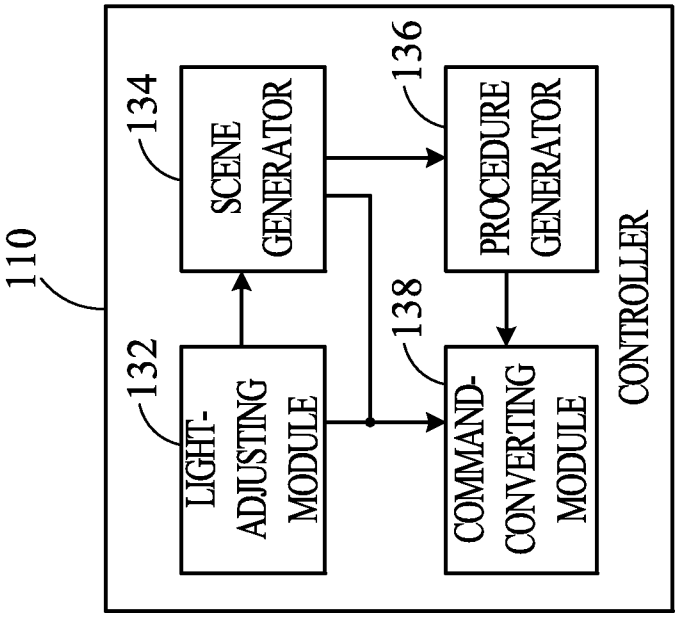

110
132
LIGHT-ADJUSTING MODULE
134
SCENE GENERATOR
136
PROCEDURE GENERATOR
138
COMMAND-CONVERTING MODULE
CONTROLLER

FIG. 2

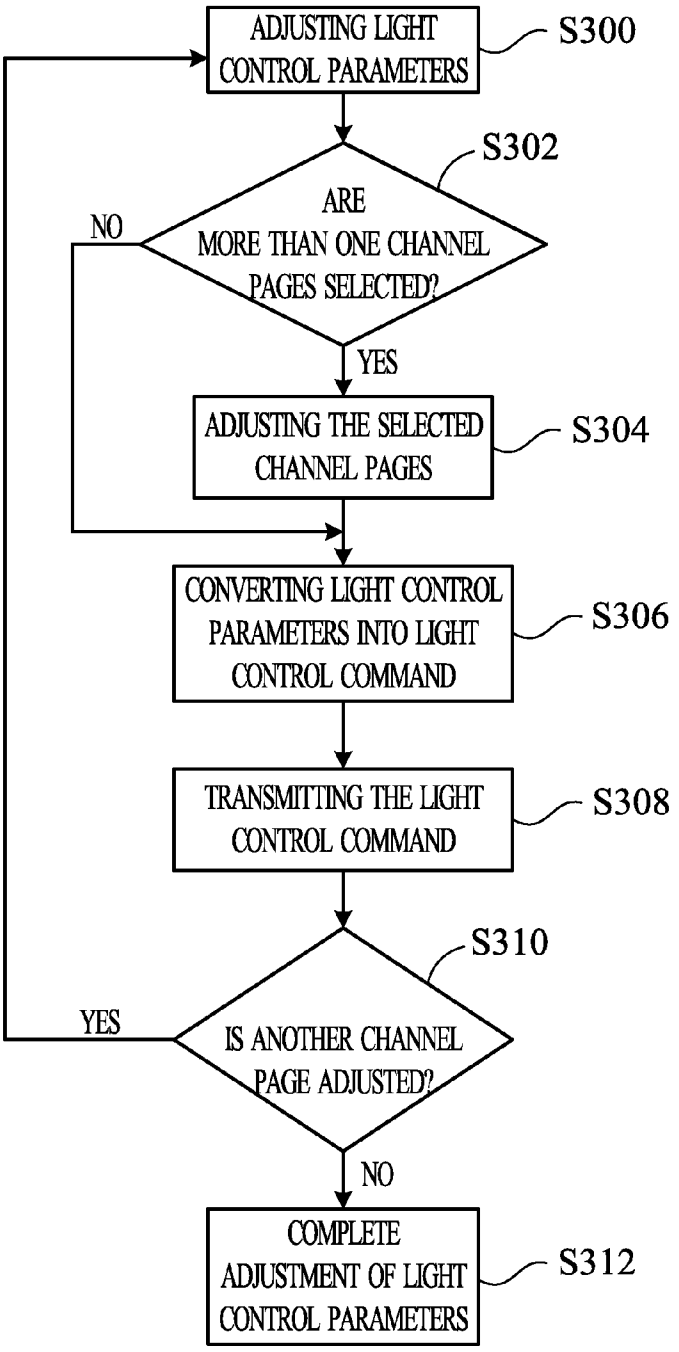

ADJUSTING LIGHT CONTROL PARAMETERS
S300
S302
ARE MORE THAN ONE CHANNEL PAGES SELECTED?
NO
YES
ADJUSTING THE SELECTED CHANNEL PAGES
S304
CONVERTING LIGHT CONTROL PARAMETERS INTO LIGHT CONTROL COMMAND
S306
TRANSMITTING THE LIGHT CONTROL COMMAND
S308
S310
IS ANOTHER CHANNEL PAGE ADJUSTED?
YES
NO
COMPLETE ADJUSTMENT OF LIGHT CONTROL PARAMETERS
S312

FIG. 3A

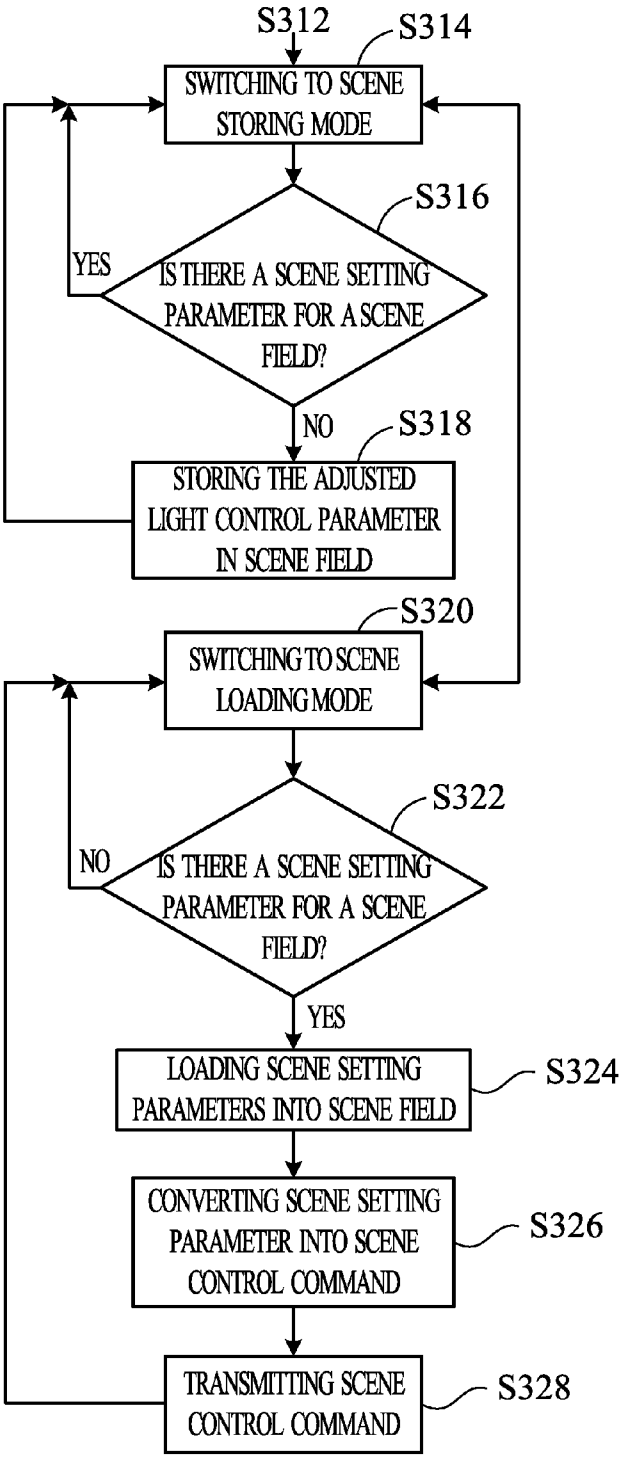

S312
S314
SWITCHING TO SCENE STORING MODE
S316
YES
IS THERE A SCENE SETTING PARAMETER FOR A SCENE FIELD?
NO
S318
STORING THE ADJUSTED LIGHT CONTROL PARAMETER IN SCENE FIELD
S320
SWITCHING TO SCENE LOADING MODE
S322
NO
IS THERE A SCENE SETTING PARAMETER FOR A SCENE FIELD?
YES
LOADING SCENE SETTING PARAMETERS INTO SCENE FIELD
S324
CONVERTING SCENE SETTING PARAMETER INTO SCENE CONTROL COMMAND
S326
TRANSMITTING SCENE CONTROL COMMAND
S328

FIG. 3B

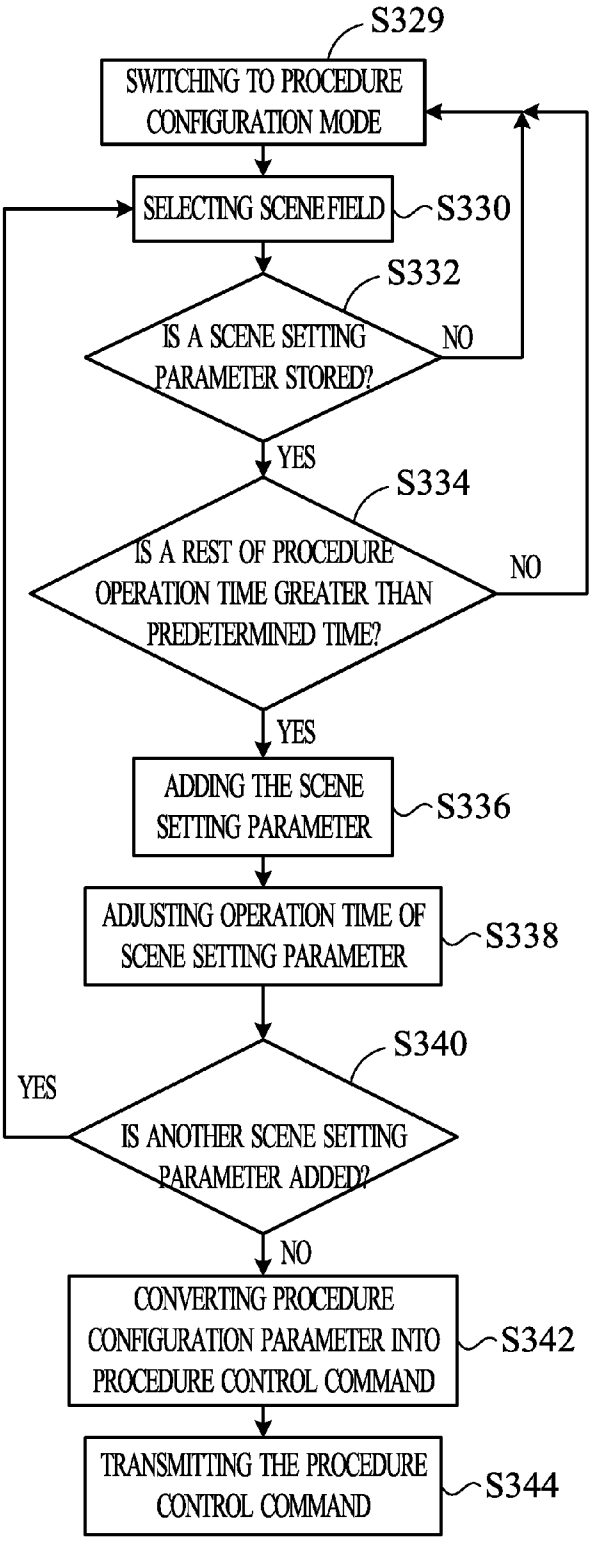

S329
SWITCHING TO PROCEDURE CONFIGURATION MODE
SELECTING SCENE FIELD
S330
S332
IS A SCENE SETTING PARAMETER STORED?
NO
YES
S334
IS A REST OF PROCEDURE OPERATION TIME GREATER THAN PREDETERMINED TIME?
NO
YES
ADDING THE SCENE SETTING PARAMETER
S336
ADJUSTING OPERATION TIME OF SCENE SETTING PARAMETER
S338
S340
YES
IS ANOTHER SCENE SETTING PARAMETER ADDED?
NO
CONVERTING PROCEDURE CONFIGURATION PARAMETER INTO PROCEDURE CONTROL COMMAND
S342
TRANSMITTING THE PROCEDURE CONTROL COMMAND
S344

FIG. 3C

WIRELESS LIGHT CONTROL SYSTEM WITH CONTROL APPARATUS AND METHOD THEREOF

FIELD OF THE INVENTION

The present invention relates to a control system and method thereof, and more particularly relates to a wireless light control system with control apparatus and method thereof for controlling light effects, such as lighting on and off statuses, lighting on and off duration, brightness and colors, of the stage light modules.

BACKGROUND OF THE INVENTION

Conventionally, a light control desk utilizes a plurality of cables to connect stage lights and a console therebetween. However, these cables positioned on the ground of the stage platform are interlaced with related stage equipments disadvantageously so that the arrangements, e.g. positions and area, of stage lights are restricted. For example, it is required to place the cables by requiring strenuous effort, which increases the configuration complexity of stage lights. In other words, the installation tasks of stage lights are apparently limited to be inconvenient for the usage of the stage light. Specifically, the control of conventional stage lights is connected together by the cables, e.g. power cords. However, since the stage light control for the purpose of various light effects is more and more complicated, it is necessary to use a variety of signal cables for connecting each of the stage lights besides power cords. Thus, the entire cable configurations of the stage lights are too complicated so that the maintenance of the cables and equipments connected to the stage lights requires much time and work. Moreover, the size of light control desk is very large, that is, the hardware architecture of light control desk occupies larger area and thus the light control desk cannot be portable. Therefore, the available positions and areas on the platform for the stage lights are severely limited, which results in reducing the installation flexibility of the stage lights. Consequently, there is a need to develop a novel light control system to solve the aforementioned problems.

SUMMARY OF THE INVENTION

One objective of the present invention is to provide a wireless light control system with control apparatus and method thereof by simplifying the control architecture of stage light modules for effectively shrinking the size of light control apparatus of the wireless light control system to increase the portability of light control apparatus.

Another objective of the present invention is to provide a wireless light control system with control apparatus and method thereof for controlling the operation of stage light modules by the wireless transmission technique to solve the problem of conventional limited installation tasks of stage lights which is inconvenient for the usage of the stage light.

According to the above objectives, the present invention sets forth a wireless light control system with control apparatus and method thereof. The wireless light control system has a light control apparatus, stage light modules and power supply. The light control apparatus communicates with the receiving unit of stage light modules via a wireless communication link. The light control apparatus includes a controller, a wireless transmission module, a memory unit, an inputting device, a display unit and a setting interface. The wireless transmission module, memory unit, inputting device, display unit and setting interface respectively are coupled with the controller. The power supply provides the power to the light control apparatus.

The controller further includes a light-adjusting module, a scene generator, a procedure generator and a command-converting module. The light-adjusting module has a plurality of channel pages wherein each of the channel pages has a plurality of channels and corresponds to each of the stage light modules. The channels correspond to a plurality of light control parameters respectively to allow the light-adjusting module to adjust the light control parameters. Furthermore, the scene generator checks whether a plurality of scene fields has a plurality of scene setting parameters correspondingly for determining either waiting for a scene setting parameter generated by the scene generator for the scene field or storing the adjusted light control parameter into the scene field. The scene generator further combines some of the light control parameters for forming each of scene setting parameters. That is, each of scene setting parameters is composed of some light control parameters of some channels in the channel pages and is applicable to specific scene light environment.

Further, the scene generator utilizes the inputting device to switch the scene generator to either a scene storing mode or a scene loading mode. During the scene storing mode, the scene generator checks whether one of the scene fields has one of the scene setting parameters to determine that either the scene generator remains in the scene storing mode if there is a scene setting parameter for the scene field or the adjusted light control parameters are stored into the scene field if no scene setting parameter is for the scene field. During the scene loading mode, the scene generator checks whether one of the scene fields has one of the scene setting parameters to determine that either the scene generator loads the scene setting parameter from the memory unit to the scene field if there is a scene setting parameter for the scene field or the scene generator remains in the scene loading mode until a scene setting parameter is generated for the scene field if no scene setting parameter is for the scene field.

The procedure generator checks whether one of the scene fields has one of the scene setting parameters to determine that either the procedure generator generates a procedure configuration parameter if there is a scene setting parameter for the scene field or the procedure generator remains in a procedure configuration mode until a scene setting parameter is generated for the scene field if no scene setting parameter is for the scene field. The procedure generator checks whether the rest of procedure operation time duration of the procedure configuration parameter is greater than a predetermined time. If yes, the scene setting parameter is added to the procedure configuration parameter, and if not, the procedure generator remains in the procedure configuration mode. The procedure generator adjusts the operation time duration of the scene setting parameters by the inputting device to complete the addition of the scene setting parameter to the procedure configuration parameter. The procedure configuration parameters are applicable to a series of light status changes so that the procedure generator serially connects the scene setting parameters for forming a variety of light effects.

The command-converting module converts the light control parameters and the scene setting parameters into a plurality of light control commands and a plurality of scene control commands respectively based on a light control protocol. The command-converting module converts the procedure configuration parameter based on the light control protocol for forming a procedure control command. For example, the light control protocol is Digital Multiplex (DMX) protocol.

According to the above-mentioned descriptions, a wireless light control system with control apparatus and method thereof in the present invention simplifies the control architecture of stage light modules for effectively shrinking the size of light control apparatus to increase the portability of light control apparatus. Further, the present invention utilizes the wireless transmission technique of stage light modules to solve the problem of conventional limited installation tasks of stage lights which is inconvenient for the usage of the stage light.

BRIEF DESCRIPTION OF THE DRAWINGS

The foregoing aspects and many of the attendant advantages of this invention will become more readily appreciated as the same becomes better understood by reference to the following detailed description, when taken in conjunction with the accompanying drawings, wherein:

FIG. **1** is a schematic block diagram of a wireless light control system for stage lights according to one embodiment of the present invention;

FIG. **2** is a detailed schematic block diagram of a controller of wireless light control system shown in FIG. **1** according to one embodiment of the present invention; and

FIGS. **3**A-**3**C are flow charts of wireless light control method according to one embodiment of the present invention.

DETAILED DESCRIPTION OF THE PREFERRED EMBODIMENTS

FIG. **1** is a schematic block diagram of a wireless light control system **100** according to one embodiment of the present invention. The wireless light control system **100** controls a plurality of stage light modules **102***a*, **102***b* and includes a light control apparatus **104**, stage light modules **102***a*, **102***b* and a power supply **120**. The light control apparatus **104** communicates with the receiving unit **106** of stage light modules **102***a*, **102***b* via a wireless communication link **108**. The light control apparatus **104** is electrically connected to the power supply **120**. In the above case, two stage light modules **102***a*, **102***b* are employed. However, more than two stage light modules **102***a*, **102***b* can be applicable to the wireless light control system **100** wherein each of stage light modules **102***a*, **102***b* has an address which serves as the identification information of stage light modules **102***a*, **102***b* by the light control apparatus **104**.

The light control apparatus **104** includes a controller **110**, a wireless transmission module **112**, a memory unit **114**, an inputting device **116**, a display unit **118** and a setting interface **122**. The wireless transmission module **112**, memory unit **114**, inputting device **116**, display unit **118** and setting interface **122** respectively are coupled with the controller **110**. The setting interface **122** coupled with the controller **110** is capable of updating the control programs and calibrating the control parameters of the controller **110**. The power supply **120** provides the power to the light control apparatus **104**. For example, the power supply **120** may be battery or external power source. Preferably, the light control apparatus **104** is a portable control device.

The controller **110** generates light control command, scene control command and procedure control command for controlling the light effects, such as lighting on and off statuses, lighting on and off duration, brightness and color levels of the stage light modules **102***a*, **102***b*, and for identifying the addresses of stage light modules **102***a*, **102***b*. The controller **110** further converts light control parameters, scene control parameters and procedure control parameters according to light control protocol to allow light control commands, scene setting commands and procedure configuration commands to be compatible with the light control protocol, e.g. Digital Multiplex 512 (DMX512) protocol, or the like.

Please refer to FIG. **1** and FIG. **2**. FIG. **2** is a detailed schematic block diagram of a controller **110** of wireless light control system **100** shown in FIG. **1** according to one embodiment of the present invention. The controller **110** further includes a light-adjusting module **132**, a scene generator **134**, a procedure generator **136** and a command-converting module **138**. The light-adjusting module **132** is coupled with the scene generator **134** which is coupled with the procedure generator **136**. The light-adjusting module **132**, scene generator **134**, and procedure generator **136** are coupled with the command-converting module **138**, respectively.

The light-adjusting module **132** has a plurality of channel pages wherein each of the channel pages has a plurality of channels and corresponds to each of the stage light modules respectively. The channels correspond to a plurality of light control parameters respectively to allow the light-adjusting module **132** to adjust the magnitudes of the light control parameters. The light-adjusting module **132** checks whether more than one channel pages are selected to determine either simultaneously adjusting the light control parameters of the selected channel pages or adjusting the light control parameters of the selected channel pages respectively. Specifically, if more than one channel pages are selected, the light-adjusting module **132** simultaneously adjusts the light control parameters of the selected channel pages. If only one channel page at a time is selected, the light-adjusting module **132** adjusts the light control parameters of the selected channel pages respectively. Furthermore, the scene generator **134** checks whether a plurality of scene fields has a plurality of scene setting parameters correspondingly for determining either waiting for a scene setting parameter generated by the scene generator **134** for the scene field or storing the adjusted light control parameter into the scene field. The scene generator **134** further combines some of the light control parameters for forming each of scene setting parameters. That is, each of scene setting parameters is composed of some light control parameters of some channels in the channel pages and is applicable to specific scene light environment.

In one embodiment, the light-adjusting module **132** includes twelve channel pages which can be displayed on the display unit **118** wherein each of channel page having twelve channels corresponds one of stage light modules **102***a*, **102***b*. For example, when the light control apparatus **104** simultaneously adjusts the brightness of stage light modules **102***a*, **102***b*, the light-adjusting module **132** modifies the first channel values corresponding to the first channel page (mapped to stage light module **102***a*) by adjusting the brightness parameter for changing the luminance of stage light modules **102***a*, **102***b*. The first channel value of the second channel page (mapped to stage light module **102***b*) is also adjusted according to the above-mentioned manner with respect to the first channel page.

Similarly, the light-adjusting module **132** adjusts the second channel value of the first channel page corresponding to the stage light modules **102***a*, **102***b* by using the parameter of lighting on and off duration for changing the lighting on and off duration value. Further, the second channel value of the second channel page (mapped to stage light module **102***b*) is also be adjusted. The light-adjusting module **132** adjusts the third channel value of the first channel page corresponding to the stage light modules **102***a*, **102***b* by using the parameter of light colors for changing the color levels of stage light mod-

ules **102***a*, **102***b*. Further, the third channel value of the second channel page (mapped to stage light module **102***b*) is also be adjusted. The light-adjusting module **132** adjusts the fourth channel value of the first channel page corresponding to the stage light modules **102***a*, **102***b* by using the parameter of lighting on and off status for changing the on/off status of stage light modules **102***a*, **102***b* to determine the lighting on and off status. Further, the fourth channel value of the second channel page (mapped to stage light module **102***b*) is also be adjusted. In other words, the parameters of lighting on and off status, lighting on and off duration, brightness and colors of the stage light modules are respectively mapped to a channel. On condition that the light-adjusting module **132** of controller **110** adjusts the parameters, the lighting on and off status, lighting on and off duration, brightness and color levels of the stage light modules **102***a*, **102***b* can be adjusted by corresponding channels respectively.

Further, the scene generator **134** utilizes the inputting device **116** to switch the scene generator **134** to either a scene storing mode or a scene loading mode. During the scene storing mode, the scene generator **134** checks whether one of the scene fields has one of the scene setting parameters to determine that either the scene generator **134** remains in the scene storing mode if there is a scene setting parameter for the scene field or the adjusted light control parameters are stored into the scene field if no scene setting parameter is for the scene field. During the scene loading mode, the scene generator **134** checks whether one of the scene fields has one of the scene setting parameters to determine that either the scene generator **134** loads the scene setting parameter from the memory unit **114** to the scene field if there is a scene setting parameter for the scene field or the scene generator **134** remains in the scene loading mode until a scene setting parameter is generated for the scene field if no scene setting parameter is for the scene field.

The procedure generator **136** checks whether one of the scene fields has one of the scene setting parameters to determine that either the procedure generator **136** generates a procedure configuration parameter if there is a scene setting parameter for the scene field or the procedure generator **136** remains in a procedure configuration mode until a scene setting parameter is generated for the scene field if no scene setting parameter is for the scene field. The procedure generator **136** checks whether the rest of procedure operation time duration of the procedure configuration parameter is greater than a predetermined time and if yes, the scene setting parameter is added to the procedure configuration parameter, and if not, the procedure generator **136** remains in the procedure configuration mode. The procedure generator **136** adjusts the operation time duration of the scene setting parameters by the inputting device **116** to complete the addition of the scene setting parameter to the procedure configuration parameter. The procedure configuration parameters are applicable to a series of light status changes by serially connecting the scene setting parameters for forming a variety of light effects.

The command-converting module **138** converts the light control parameters and the scene setting parameters into a plurality of light control commands and a plurality of scene control commands respectively based on a light control protocol. The command-converting module **138** converts the procedure configuration parameter based on the light control protocol for forming a procedure control command.

The controller **110** of the light control apparatus **104** integrates the light-adjusting module **132**, scene generator **134**, procedure generator **136** and command-converting module **138** for effectively shrinking the size of light control apparatus **104**. For example, the light-adjusting module **132**, scene generator **134**, and procedure generator **136** may be software programs, firmware programs, and/or hardware circuits. In one embodiment, the display unit **118** is capable of displaying the channel page of light-adjusting module **132**, scene generator **134**, and procedure generator **136**. That is, the display unit **118** functions as multiple page display for further reducing the size of the light control apparatus **104** in the wireless light control system **100**.

Please refer to FIG. **1** again. The wireless transmission module **112** transmits light control command, a scene control command and the procedure control command of the stage light modules **102***a*, **102***b* based on wireless transmission protocol, e.g. radio frequency transmission protocol. The memory unit **114** is used to store the light control parameters, the scene setting parameters and procedure configuration parameter. In one embodiment, the memory unit **114** may be non-volatile memory, e.g. flash memory. The inputting device **116** is used to input the light control parameters to the controller **110** for inputting light control parameters by keyboard and/or touching the display unit **118**. The display unit **118** displays the light control parameters, the channel page and the channels of the light control commands, displays the scene setting parameters of the scene control commands, and the procedure configuration parameters of the procedure control command. For example, the display unit **118** may be liquid crystal display (LCD) and/or light-emitted diode (LED) display panel, or any type of display devices.

Each of receiving units **106** corresponding to the stage light modules **102***a*, **102***b* respectively includes a wireless receiving unit **124** and a command-decoding module **126**. The wireless receiving unit **124** is coupled with the command-decoding module **126** which is coupled with the driving module **128**. The driving module **128** drives the stage lights **130**. In one embodiment, the power provided to the receiving units **106** is supplied by the batter and/or external power source. As shown in FIG. **1**, each of receiving units **106** is built in each of stage light modules **102***a*, **102***b* correspondingly. In another case, each of receiving units **106** is connected to each of stage light modules **102***a*, **102***b* correspondingly by external cables.

The wireless transmission module **112** transmits a light control command, a scene control command and the procedure control command based on radio frequency transmission protocol. The wireless receiving unit **124** receives the light control commands, the scene control commands and the procedure control command based on the wireless transmission protocol. The command-decoding module **126** decodes the light control commands, the scene control commands and the procedure control commands for generating driving command based on the light control protocol. In one embodiment, the stage light modules **102***a*, **102***b* utilizes the driving module **128** to perform the driving command for controlling the light effects of stage light modules, such as lighting on and off status, lighting on and off duration, brightness and color levels of the stage lights **130**.

According to above-mentioned descriptions, the light control apparatus **104** integrates the light-adjusting module **132**, scene generator **134**, procedure generator **136** and command-converting module **138** into the controller **110** for effectively shrinking the size of light control apparatus **104** of the wireless light control system **100** to increase the portability of light control apparatus **104** so that the control architecture of stage light modules **102***a*, **102***b* are effectively simplifies. That is, the light control apparatus **104** utilized the integrated the light control apparatus **104** and the controller **110** to

operate the stage light modules **102***a*, **102***b* anytime and anywhere regardless of the limited installation tasks and arrangement of stage lights.

Further, the wireless light control system **100** utilizes the wireless transmission module **112** of light control apparatus **104** to transmit the light control command, scene control command and procedure control command. Additionally, the wireless light control system **100** utilizes the wireless receiving unit **124** of receiving unit **106** receives the light control command, scene control command and procedure control command from light control apparatus **104** to solve the problem, which affects the stage arrangement, of conventional cable connection between the light control desk and stage light modules.

Please refer to FIGS. **1-2** and FIG. **3**A-**3**C. FIGS. **3**A-**3**C are flow charts of wireless light control method according to one embodiment of the present invention. A wireless light control method controls a plurality of stage light modules **102***a*, **102***b* in a wireless light control system **100**. The wireless light control system **100** has a light control apparatus **104** and the stage light modules **102***a*, **102***b*, and the light control apparatus **104** further includes a controller **110**, a wireless transmission module **112**, a memory unit **114**, an inputting device **116**, a display unit **118** and a setting interface **122**. The receiving unit **106** includes a wireless receiving unit **124** and a command-decoding module **126**.

The controller **110** further includes a light-adjusting module **132**, a scene generator **134**, a procedure generator **136** and a command-converting module **138**, and wherein the light-adjusting module **132** has a plurality of channel pages, each of the channel pages having a plurality of channels corresponds to each of the stage light modules **102***a*, **102***b*, the channels correspond to a plurality of light control parameters respectively. The method includes the following steps.

In step S**300**, the light-adjusting module **132** adjusts the light control parameters of one channel page via the inputting device **116**.

In step S**302**, the light-adjusting module **132** checks whether more than one channel pages are selected. If yes, proceed to step S**304**, and if not, proceed to step S**306**.

In step S**304**, the light-adjusting module **132** adjusts the channels of the selected channel pages via the inputting device **116** for simultaneously adjusting the light control parameters of the channels of the selected channel pages, and proceed to step S**306**.

In step S**306**, the command-converting module **138** converts the light control parameters into a light control command based on a light control protocol. For example, the light control protocol is Digital Multiplex 512 (DMX512) protocol.

In step S**308**, the wireless transmission module **112** transmits the light control command to the stage light modules **102***a*, **102***b* based on a wireless transmission protocol for controlling the light effects of the stage lights. For example, the wireless transmission protocol is radio frequency transmission protocol.

In step S**310**, the light-adjusting module **132** check whether the light control parameters of another channel page are adjusted. If yes, return to step S**300** until the light control parameters of another channel page are adjusted completely, and if not, proceed to step S**312** to adjust the light control parameters completely.

As shown in FIG. **3**B, after the step S**312**, further including the following steps:

In step S**314**, the scene generator **134** is switched to a scene storing mode by the inputting device **116**, wherein the scene generator **134** has a plurality of scene fields corresponding to a plurality of memory sectors of the memory unit **114**.

In step S**316**, the scene generator **134** checks whether one of the scene fields has a scene setting parameter. If yes, return to step S**314** so that the scene generator **134** remains in the scene storing mode, and if not, proceed to step S**318**, wherein the scene setting parameter is composed of some light control parameters of the channel pages.

In step S**318**, the scene generator **134** stores the adjusted light control parameters of the channel pages into the scene field and returns to step S**314**.

In step S**320**, the inputting device **116** switches the scene generator **134** from the scene storing mode to a scene loading mode.

In step S**322**, the scene generator **134** checks whether a scene setting parameter is generated by the scene generator **134** for the scene field. If yes, proceed to S**324**, and if not, return to step S**320** to allow the scene generator **134** to remain in the scene loading mode until a scene setting parameter is generated for the scene field. Steps S**316** and S**322** are used to identify whether a scene setting parameter is for the scene field in the scene loading mode and scene storing mode.

In step S**324**, the scene generator **134** loads the scene setting parameters to the scene field.

In step S**326**, the command-converting module **138** converts the scene setting parameters based on a light control protocol for forming a scene control command.

In step S**328**, the wireless transmission module **112** transmits the scene control command to the stage light modules **102***a*, **102***b* according to a wireless transmission protocol for controlling the light effects of the stage light modules **102***a*, **102***b*, and returns to step S**320**.

As shown in FIG. **3**C, after the step S**328**, further including the following steps:

In step S**329**, the inputting device **116** switches the procedure generator **136** to be in the procedure configuration mode.

In step S**330**, the inputting device **116** selects a scene field.

In step S**332**, the procedure generator **136** checks whether the scene field has a scene setting parameter. If yes, proceed to step S**334**, and if not, return to step S**329** so that the procedure generator **136** remain in the procedure configuration mode until a scene setting parameter is generated for the scene field.

In step S**334**, the procedure generator **136** checks whether a rest of procedure operation time duration of the procedure configuration parameter is greater than a predetermined time. If yes, proceed to step S**336**, and if not, return to step S**329** so that the procedure generator **136** remains in the procedure configuration mode.

In step S**336**, the scene setting parameter is added to the procedure configuration parameter.

In step S**338**, the inputting device **116** adjusts the operation time duration of scene setting parameter to complete the addition of the scene setting parameter to the procedure configuration parameter.

In step S**340**, the procedure generator **136** checks whether another scene setting parameter is continuously added to the procedure configuration parameter. If yes, return to step S**330**, and if not, proceed to step S**342**.

In step S**342**, the command-converting module **138** converts the procedure configuration parameter into a procedure control command based on light control protocol.

In step S**344**, the wireless transmission module **112** transmits the procedure control command to the stage light modules **102***a*, **102***b* based on wireless transmission protocol for controlling the light effects of the stage light modules **102***a*, **102***b*.

According to the above-mentioned steps S300 through S344, the light control apparatus **104** integrates the light-adjusting module **132**, scene generator **134**, procedure generator **136** and command-converting module **138** into the controller **110** for effectively shrinking the size of light control apparatus **104** of the wireless light control system **100** to increase the portability of light control apparatus **104** so that the control architecture of stage light modules **102***a*, **102***b* are effectively simplifies.

Therefore, the light control apparatus integrates the light-adjusting module, scene generator, procedure generator and command-converting module into the controller for effectively shrinking the size of light control apparatus of the wireless light control system to increase the portability of light control apparatus so that the control architecture of stage light modules are effectively simplifies. Further, in the wireless light control system with control apparatus and method thereof, the light control apparatus utilizes the wireless transmission module to transmit the light control parameters of lighting on and off status, lighting on and off duration, brightness and color levels of the stage light modules. Additionally, the wireless light control system utilizes the wireless receiving unit of receiving unit to receive the light control command, scene control command and procedure control command from light control apparatus to solve the problem of conventional limited installation tasks of stage lights which is inconvenient for the usage of the stage light.

As is understood by a person skilled in the art, the foregoing preferred embodiments of the present invention are illustrative rather than limiting of the present invention. It is intended that they cover various modifications and similar arrangements be included within the spirit and scope of the appended claims, the scope of which should be accorded the broadest interpretation so as to encompass all such modifications and similar structure.

What is claimed is:

1. A wireless light control system with a control apparatus for controlling a plurality of stage light modules, the wireless light control system comprising:

a light control apparatus, comprising:

a controller having a light-adjusting module, a scene generator and a command-converting module, wherein the light-adjusting module has a plurality of channel pages, each of the channel pages having a plurality of channels corresponds to each of the stage light modules, and the channels correspond to a plurality of light control parameters respectively to allow the light-adjusting module to adjust the light control parameters, wherein the scene generator checks whether a plurality of scene fields has a plurality of scene setting parameters correspondingly for determining either waiting for a scene setting parameter generated by the scene generator for the scene field or storing the adjusted light control parameter into the scene field, and the scene generator further combines some of the light control parameters for forming each of scene setting parameters, and wherein the command-converting module converts the light control parameters and the scene setting parameters into a plurality of light control commands and a plurality of scene control commands respectively based on a light control protocol;

a wireless transmission module, coupled with the controller, transmitting the light control commands and the scene control commands to the stage light modules according to a wireless transmission protocol;

a memory unit, coupled with the controller, storing the light control parameters and the scene setting parameters; and

a display unit, coupled with the controller, displaying the light control parameters of the light control commands, the channel pages and the channels, and displaying the scene setting parameters of the scene control commands; and

a plurality of receiving units coupled with the light control apparatus respectively and corresponding to the stage light modules respectively, receiving the light control commands and the scene control commands for driving the stage light modules.

2. The wireless light control system of claim **1**, wherein the light-adjusting module checks whether more than one channel pages are selected to determine either simultaneously adjusting the light control parameters of the selected channel pages or adjusting the light control parameters of the selected channel pages respectively.

3. The wireless light control system of claim **1**, wherein the light control apparatus further comprises an inputting device, coupled with the controller, switching the scene generator to either a scene storing mode or a scene loading mode.

4. The wireless light control system of claim **3**, wherein during the scene storing mode, the scene generator checks whether one of the scene fields has one of the scene setting parameters to determine that either the scene generator remains in the scene storing mode if there is a scene setting parameter for the scene field or the adjusted light control parameters are stored into the scene field if no scene setting parameter is for the scene field.

5. The wireless light control system of claim **3**, wherein during the scene loading mode, the scene generator checks whether one of the scene fields has one of the scene setting parameters to determine that either the scene generator loads the scene setting parameter from the memory unit to the scene field if there is a scene setting parameter for the scene field or the scene generator remains in the scene loading mode until a scene setting parameter is generated for the scene field if no scene setting parameter is for the scene field.

6. The wireless light control system of claim **3**, wherein the light control apparatus further comprises a procedure generator, coupled with the scene generator, serially connecting the scene setting parameters for forming a variety of light effects.

7. The wireless light control system of claim **6**, wherein the procedure generator checks whether one of the scene fields has one of the scene setting parameters to determine that either the procedure generator generates a procedure configuration parameter or the procedure generator remains in a procedure configuration mode until a scene setting parameter is generated for the scene field.

8. The wireless light control system of claim **7**, wherein the procedure generator checks whether a rest of procedure operation time duration of the procedure configuration parameter is greater than a predetermined time, and if yes, the scene setting parameter is added to the procedure configuration parameter, and if not, the procedure generator remains in the procedure configuration mode.

9. The wireless light control system of claim **8**, wherein the inputting device adjusts the operation time duration of the scene setting parameters to complete the addition of the scene setting parameter to the procedure configuration parameter.

10. The wireless light control system of claim **7**, wherein the command-converting module converts the procedure configuration parameter into a procedure control command based on the light control protocol and the wireless transmission module transmits the procedure control command to the stage

light modules based on the wireless transmission protocol for controlling the light effects of the stage light modules.

11. The wireless light control system of claim **1**, wherein each of the receiving units further comprises:

a wireless receiving unit, coupled with the wireless transmission module, receiving the light control parameters of the light control commands and the scene setting parameters of the scene control commands based on the wireless transmission protocol; and

a command-decoding module, coupled with the wireless receiving unit, decoding the light control commands and the scene control commands based on the light control protocol for driving the stage light modules.

12. The wireless light control system of claim **1**, wherein the light control protocol is Digital Multiplex 512 (DMX512) protocol.

13. The wireless light control system of claim **1**, wherein the light control parameters is selected from one group consisting of a lighting on and off value, a lighting on and off duration value, a brightness value, a light colors, an address value and the combination thereof.

14. A wireless light control method for controlling a plurality of stage light modules in a wireless light control system, wherein the wireless light control system has a light control apparatus and the stage light modules, wherein the light control apparatus further comprises a controller, a wireless transmission module, a memory unit, an inputting device and a display unit, wherein the controller further comprises a light-adjusting module, a scene generator, a procedure generator and a command-converting module, and wherein the light-adjusting module has a plurality of channel pages, each of the channel pages having a plurality of channels corresponds to each of the stage light modules, and the channels correspond to a plurality of light control parameters respectively, the method comprising the steps of:

(a) adjusting the light control parameters of one channel page by the light-adjusting module via the inputting device;

(b) converting the light control parameters into a light control command based on a light control protocol by the command-converting module;

(c) transmitting the light control command to the stage light modules based on a wireless transmission protocol for controlling a plurality of light effects of the stage light modules by the wireless transmission module;

(d) checking whether the light-adjusting module adjusts the light control parameters of another channel page, wherein if yes, return to step (a) until the light control parameters of another channel page are adjusted completely, and if not, completely adjusting the light control parameters;

(e) switching the scene generator to a scene storing mode by the inputting device, wherein the scene generator has a plurality of scene fields corresponding to a plurality of memory sectors of the memory unit;

(f) checking whether one of the scene fields has a scene setting parameter by the scene generator, wherein if yes, return to step (e) and the scene generator remains in the scene storing mode, and if not, proceed to step (g), and wherein the scene setting parameter is composed of some light control parameters of the channel pages; and

(g) storing the adjusted light control parameters of the channel pages into the scene field and returning to step (e).

15. The wireless light control method of claim **14**, after the step (a), further comprising the steps of:

(a1) checking whether more than one channel pages are selected by the light-adjusting module, wherein if yes, proceed to step (a2), and if not, proceed to step (b); and

(a2) adjusting the channels of the selected channel pages by the light-adjusting module via the inputting device for simultaneously adjusting the light control parameters of the channels of the selected channel pages, and proceeding to step (b).

16. The wireless light control method of claim **14**, after the step (g), further comprising the steps of:

(g1) switching the scene generator from the scene storing mode to a scene loading mode by the inputting device;

(g2) checking whether one scene setting parameter is generated by the scene generator for the scene field, wherein if yes, proceed to (g3), and if not, return to step (g1) to allow the scene generator to remain in the scene loading mode until the scene setting parameter is generated for the scene field;

(g3) loading the scene setting parameters to the scene field by the scene generator;

(g4) converting the scene setting parameters based on a light control protocol for forming a scene control command by the command-converting module; and

(g5) transmitting the scene control command to the stage light modules according to a wireless transmission protocol for controlling the light effects of the stage light modules, and returning to step (g1).

17. The wireless light control method of claim **16**, after the step (g5), further comprising the steps of:

(h1) switching the procedure generator to be in a procedure configuration mode by the inputting device;

(h2) selecting one scene field by the inputting device;

(h3) checking whether the scene field has a scene setting parameter by the procedure generator, wherein if yes, proceed to step (h4), and if not, return to step (h1) so that the procedure generator remains in the procedure configuration mode until a scene setting parameter is generated for the scene field;

(h4) checking whether a rest of procedure operation time duration of the procedure configuration parameter is greater than a predetermined time wherein if yes, proceed to step (h5), and if not, the procedure generator remains in the procedure configuration mode;

(h5) adding the scene setting parameter to the procedure configuration parameter; and

(h6) adjusting the operation time duration of scene setting parameter by the inputting device to complete the addition of the scene setting parameter to the procedure configuration parameter.

18. The wireless light control method of claim **17**, after the step (h6), further comprising the steps of:

(h7) checking whether another scene setting parameter is continuously added to the procedure configuration parameter by the procedure generator, wherein if yes, return to step (h2), and if not, proceed to step (h8);

(h8) converting the procedure configuration parameter into a procedure control command based on light control protocol by the command-converting module; and

(h9) transmitting the procedure control command to the stage lights based on wireless transmission protocol for controlling the light effects of the stage light modules by the wireless transmission module.

19. The wireless light control method of claim **14**, wherein the light control protocol is Digital Multiplex 512 (DMX512) protocol.

20. The wireless light control method of claim **14**, wherein the light control parameters are selected from one group

consisting of a lighting on and off value, a lighting on and off duration value, a brightness value, a light colors, an address value and the combination thereof.

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