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(54) DEVICE FOR RECORDING AND REPRODUCING ILLUMINATION SCENES

(57) The invention comprises a microprocessor (2) designed to receive commands from the real-time audio control protocol (OSC) and generate DMX (Digital Multiplex) illumination control commands, a DMX driver (3) for connection to an external illumination installation for the control thereof, and an interface (5) connected to the microprocessor (2) for receiving the OSC commands sent from a reproduction device (8) for generating and sending OSC commands. It is characterized in that it also comprises a memory (6) connected to the microprocessor (2) for storing the data that define the frames of the DMX protocol, on the basis of the OSC commands received, organized into illumination scenes and shows, the microprocessor (2) being designed so as to control the editing, recording and reproduction of the illumination scenes and shows stored in the memory (6) on the basis of said commands received from the OSC protocol.

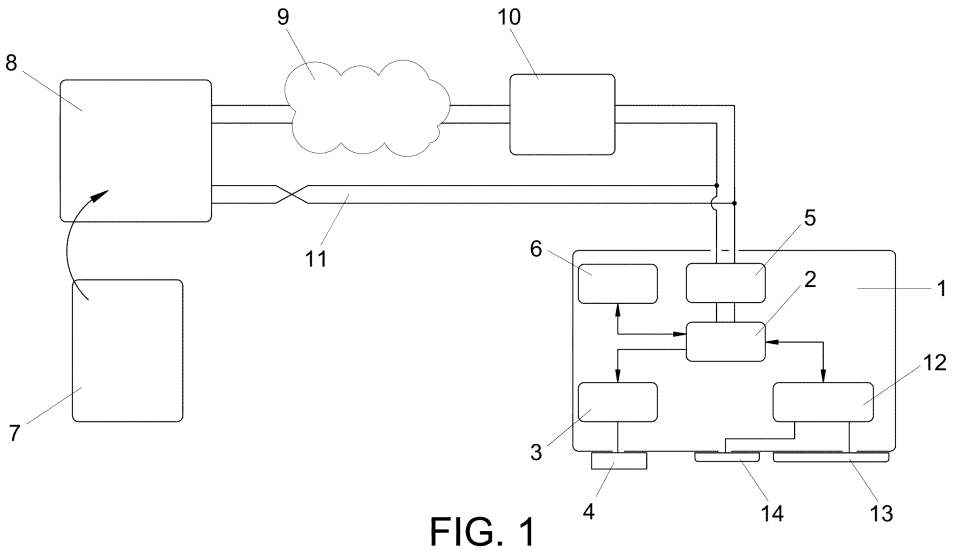

FIG. 1

EP 2 849 018 A1

Description

OBJECT OF THE INVENTION

[0001] The invention relates to a device that aims to control the editing, recording and reproduction of illumination scenes and shows in order to control an illumination installation. The device of the invention carries out the control on the basis of receiving commands from the conventional protocol known as real-time audio control protocol (OSC, Open Sound Control, which is a protocol developed for sharing musical information in real time). The OSC commands are sent from a reproduction device for generating and sending OSC commands, which is made up of a mobile or fixed device.

[0002] The invention may be applied to the control of any illumination installation, such as illumination installations for theatrical shows, musical performances, etc., or for any illumination installation in premises or areas in which the control of their illumination is desired.

BACKGROUND OF THE INVENTION

[0003] The use of devices provided to carry out the control of illumination installations is known in the state of the art, for which the device comprises a microprocessor that is designed to receive conventional commands from the OSC protocol, on the basis of which it generates conventional commands from the DMX protocol (Digital Multiplex, which is a protocol used in the lighting industry that enables communication between the illumination control equipment and the light sources themselves) such that the device is connected to an external illumination installation for the control thereof. The microprocessor is connected to an interface through which the OSC commands are received, generated in a reproduction device for generating and sending OSC commands, which delivers them to the microprocessor in which the DMX commands are generated. Therefore, the conventional devices enable the illumination installations to be controlled on the basis of the OSC protocol.

[0004] Therefore, the OSC protocol is conventionally used to carry out the control of audio devices, and which may simultaneously be applied to a device for controlling illumination scenes, which generates the DMX commands in order to carry out said control, as already noted.

[0005] Devices for controlling illumination scenes do not enable the control of the editing, recording and reproduction of illumination scenes and shows to be carried out, but instead they only implement real-time control without being able to record it for subsequent editing and/or reproduction thereof when desired by a user.

DESCRIPTION OF THE INVENTION

[0006] In order to achieve the objectives and resolve the drawbacks that are noted above, the invention has developed a new device that enables the recording and reproduction of illumination scenes to be carried out in the same device, for which it is based on the use of an illumination control device that, like the conventional devices, comprises a microprocessor designed to receive commands from the OSC protocol and generate DMX commands, for which the microprocessor is connected to a DMX driver through which the connection of the device to an external illumination installation for the control thereof is carried out. Moreover, it comprises an interface, which is connected to the microprocessor, and through which it connects to a local area network in order to receive the OSC commands that, for example, are sent from a conventional reproduction device for sending and generating said OSC commands.

[0007] Furthermore, it comprises a memory connected to the microprocessor for storing the data that define frames of the DMX protocol commands, and which are obtained on the basis of the OSC commands received. The DMX frames are stored organized into illumination scenes and shows. Moreover, the microprocessor is designed to control the editing, recording and reproduction of the DMX scenes and shows stored in the memory on the basis of said commands received from the OSC protocol, a capability that cannot be carried out with the devices of the state of the art.

[0008] It must be noted that an illumination scene is a DMX-512 frame with its 512 illumination channels at a certain value.

[0009] A show is a set of illumination scenes. The values of the DMX-512 frame are provided by the values stored in the illumination scenes.

[0010] In the preferred embodiment of the invention, the memory is a flash memory, but clearly it may be any other type of memory that enables the aforementioned capability to be carried out.

[0011] The interface, which is connected to the microprocessor, and through which the connection to the reproduction device is carried out, may be an interface with a connection to a local area network, such as an Ethernet network, or an interface with a connection to a crossover cable; in order to receive OSC commands from the reproduction device for generating and sending OSC commands to the microprocessor, through said local area network or through the crossover cable.

[0012] The device for generating and sending OSC commands comprises means for accessing the local area network, such as wired means or wireless means, such that the device for generating and sending OSC commands may be of the fixed type, such as a computer, or of the mobile type such as a tablet, smartphone, etc.

[0013] Therefore, via the described configuration of the invention, carrying out the control of the recording, editing and reproduction of DMX frame scenes on the basis of commands from the OSC protocol is enabled.

[0014] In order to aid a better understanding of this specification, and forming an integral part of the same, a single figure in which the subject matter of the invention has been represented as an illustrative and non-limiting

example is attached below.

BRIEF OUTLINE OF THE FIGURE

[0015] **Figure 1.-** Shows a functional block diagram of a possible exemplary embodiment of the device of the invention, and of the elements that are connected to the same in order to enable the receipt of commands from the OSC protocol to be carried out.

DESCRIPTION OF THE PREFERRED EMBODIMENT

[0016] What follows is a description of the invention based on the figure mentioned above.

[0017] The device 1 of the invention comprises a microprocessor 2 that is designed to receive commands from the OSC protocol and generate DMX commands in order to control an illumination installation. For this purpose, the device 1 comprises a DMX driver 3 (Digital Multiplex) that is connected via a connector 4 to the illumination installation (not shown in the figure) that is external to the device 1, for control thereof.

[0018] The DMX driver 3 transforms the TTL electric protocol from the microprocessor 2 to an RS-485 protocol, such that the connector 4 is an RS-485 connector.

[0019] In order to receive the OSC commands, the device 1 comprises an interface 5 through which a reproduction device 6 for generating and sending OSC commands is connected, as shall be described below. The interface 5 may be an impedance adaptor or a line transformer that is an element that transforms the signals received into electrical signals that may be understood by the microprocessor 2.

[0020] The main novelty of the invention lies in the fact that the device 1 is equipped with a memory 6, which is a flash memory in the exemplary embodiment such that the microprocessor 2 is designed to store the data that define the frames of the DMX protocol, on the basis of the OSC commands received. The storage of said frames in the memory is carried out such that they are organized into illumination scenes and shows.

[0021] As already mentioned, a show is a set of linked scenes whose reproduction is carried out at a certain speed, with a certain length and with a time spread between them. And a scene is essentially a DMX frame.

[0022] In this way, the memory 6 stores a set of shows, the corresponding scenes thereof and the different time parameters that have been described, such that it enables the control of the recording, reading, deletion, etc. from the microprocessor 2 to be carried out, thus enabling the control of the editing, recording and reproduction of the illumination scenes and shows stored in the memory 6 on the basis of the commands received from the OSC protocol, which cannot be carried out with the devices of the state of the art.

[0023] In order to enable the OSC commands to be generated, the use of a conventional editor 7 is provided, which is made up of a computer, through which the control environments are generated, i.e. those graphic interfaces that are installed in a reproduction device 8 so that it may generate and send the OSC commands to the device 1. Therefore, a user uses the device 8 to control the light and/or sound installation.

[0024] The reproduction device 8 is connected to the device 1 via a local area network 9 (LAN), such as an Ethernet network for example, for which the corresponding Ethernet concentrator 10 is used, through which the connection to the impedance adaptor 5 of the device 1 is carried out in order to receive the OSC commands. The connection to Ethernet 9 may be carried out wirelessly or via a cable. The reproduction device 8 may be mobile, such as a Tablet or Smartphone, etc. or fixed, such as a computer.

[0025] Moreover, in the event that the device 8 is of the fixed type, the connection thereof to the impedance adaptor 9 may be carried out via a crossover cable 11 in order to send the OSC commands through the same.

[0026] Furthermore, the device 1 incorporates the corresponding interface 12 through which the connection of the microprocessor 2 to a display screen 13 and to the set of buttons and switches 14 that are on the outer portion of the device 1 is carried out, which enables the user to interact autonomously with the device on the information stored therein, and without the need for the intervention of the reproduction device 8.

[0027] The graphic environment generated in the editor 7, contains different buttons, sliders, potentiometers, labels, parameter editing boxes, etc. necessary to change the values as well as the definition of the instructions of the OSC commands, which the variation of the graphic elements produces.

[0028] Thus, the editor 7 enables any graphic environment that a user may need to be generated, the distribution of said graphic environment may even be done by the user him/herself.

[0029] The reproduction device 8 reproduces the graphic environment generated, which is provided with an OSC command interpreter and on which the generated graphic environment runs, in order to enable the different OSC commands that enable the illumination installation to be controlled through the device 1 of the invention to be sent.

[0030] Said OSC command interpreter is a software layer of the command library type.

[0031] In this way, the microprocessor 2 carries out the instructions provided by the OSC commands that come from the reproduction device 8, such that in the event that it is connected to the device 1 through the Ethernet network 9, the microprocessor 2 is designed to receive Ethernet frames, decode them, obtain the OSC orders or the ARNET frames inserted therein and implement the appropriate actions aimed at generating the DMX frame that is to be obtained in the connector 4 according to the description above.

[0032] Furthermore, the microprocessor 2, apart from incorporating the program that controls the operation of

the device (firmware), incorporates a web page that is accessible from any browser and through which configuration parameters such as the IP (Internet Protocol), DMX universe, the mask for ARNET frames, etc. may be modified.

[0033] The OSC commands generated by the device 8 contain the values for each scene and the place in which it must be stored, such that the device 1 receives these commands and stores the data in the memory 6.

[0034] Once the memory is loaded with the different shows, the user may use any reproduction console device capable of reproducing OSC commands to launch and even edit the programmed scenes/shows.

Claims

1. **A device for recording and reproducing illumination scenes,** that comprises:

   - a microprocessor (2) designed to receive commands from the real-time audio control protocol (OSC) and generate DMX (Digital Multiplex) illumination control commands, and which is connected to
   - a DMX driver (3) for connection to an external illumination installation for control thereof;
   - an interface (5), connected to the microprocessor (2) for receiving the OSC commands that are sent from a reproduction device (8) for generating and sending OSC commands;

   Characterized in that:

   the device (1) also comprises a memory (6) that is connected to the microprocessor (2) for storing the data that define the frames of the DMX protocol, on the basis of the OSC commands received, organized into illumination scenes and shows; the microprocessor (2) being designed so as to control the editing, recording and reproduction of the illumination scenes and shows stored in the memory (6) on the basis of said commands received from the OSC protocol.

2. **The device for recording and reproducing illumination scenes,** according to claim 1, **characterized in that** the interface (5) through which the OSC commands are received, which is connected to the microprocessor (2), is selected between an interface with a local area network (9) connection, and an interface with a crossover cable (11) connection, in order to connect the device (1) to the reproduction device (8) through said local area network (9) or the crossover cable (11).

3. **The device for recording and reproducing illumination scenes,** according to claim 2, **characterized in that** the reproduction device (8) for generating and sending OSC commands comprises means for accessing the local area network, selected between wired means and wireless means.

4. **The device for recording and reproducing illumination scenes,** according to claim 1, **characterized in that** the memory (6) is a flash memory.

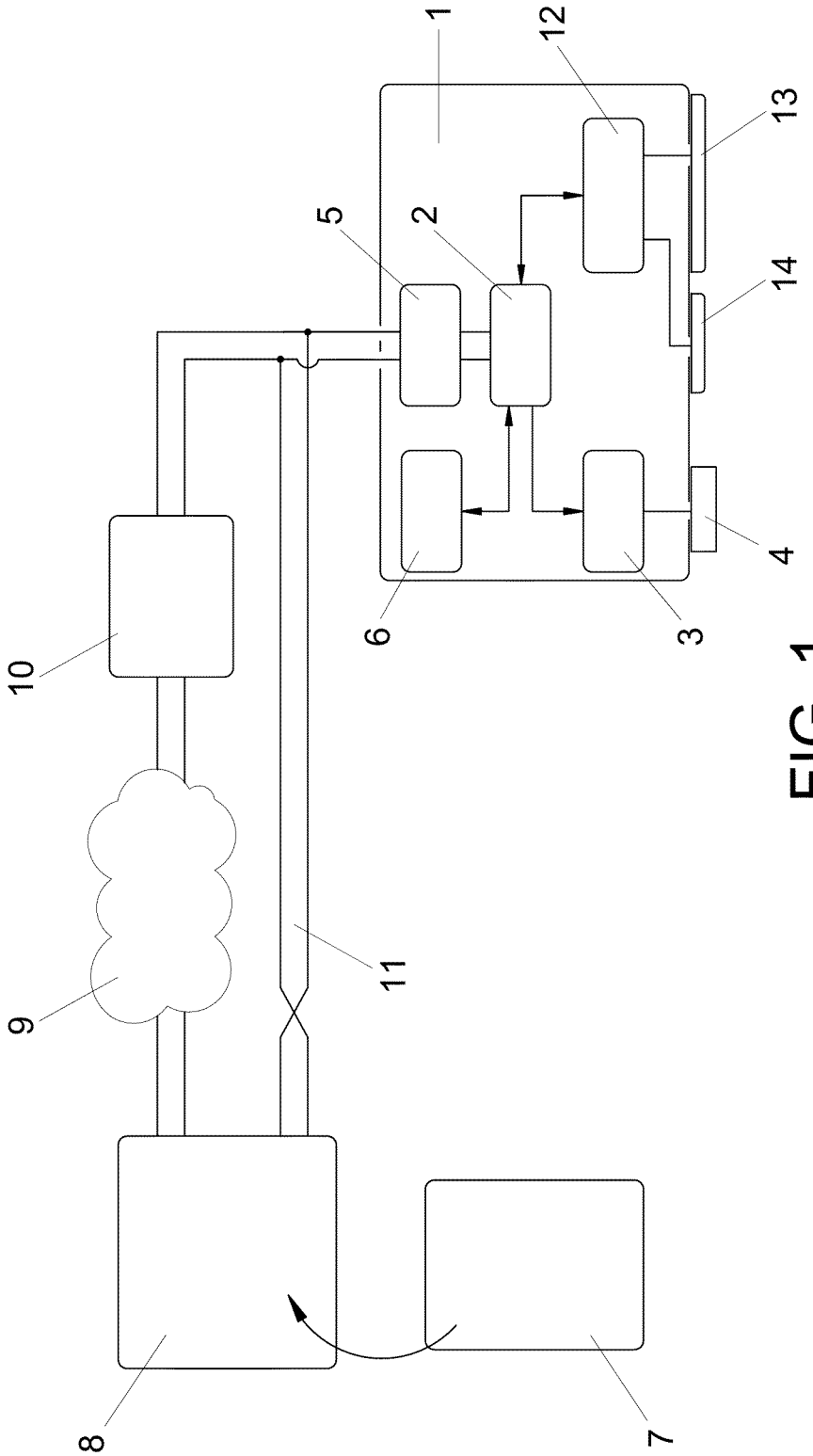

FIG. 1

INTERNATIONAL SEARCH REPORT

International application No.
PCT/ES2013/070119

A. CLASSIFICATION OF SUBJECT MATTER

See extra sheet

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)
G05D, G06F, H05B

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

Electronic data base consulted during the international search (name of data base and, where practicable, search terms used)

EPODOC, INVENES, WPI, INSPEC, INTERNET

C. DOCUMENTS CONSIDERED TO BE RELEVANT

Category*	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
X	CUECORE SOLID-STATE CONTROL, MANUAL, 2011. [retrieved on 08.07.2013]. Retrieved from Internet: <URL: http://www.asl.ch/downloads/cuecore_manual_en_3.pdf>	1-4
X	ART SSC SOLID-STATE CONTROL, MANUAL, 05/01/2012. [retrieved on 08.07.2013]. Retrieved from Internet: <URL: http://web.archive.org/web/20120105074200/http://elationlighting.com/pdffiles/art-ssc-user-manual.pdf>	1-4
A	KR 20110076378 A (UNIV DONGGUK IND ACAD COOP) 06/07/2011, abstract, figures. Retrieved from World Patent Index in Epoque Database.	1-3
A	ES 2350666 A1 (EQUIPSON S A) 26/01/2011, column 1, line 62-column 2, line 40; column 2, line 53-column 4, line 53; figure.	1, 4

☐ Further documents are listed in the continuation of Box C. ☒ See patent family annex.

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"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 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	Date of mailing of the international search report
09/07/2013	**(17/07/2013)**
Name and mailing address of the ISA/ OFICINA ESPAÑOLA DE PATENTES Y MARCAS Paseo de la Castellana, 75 - 28071 Madrid (España) Facsimile No.: 91 349 53 04	Authorized officer M. Lloris Meseguer Telephone No. 91 3495494

Form PCT/ISA/210 (second sheet) (July 2009)

INTERNATIONAL SEARCH REPORT

Information on patent family members

International application No.
PCT/ES2013/070119

Patent document cited in the search report	Publication date	Patent family member(s)	Publication date
KR20110076378 A	06.07.2011	NONE	
ES2350666 A1	26.01.2011	NONE	

Form PCT/ISA/210 (patent family annex) (July 2009)

INTERNATIONAL SEARCH REPORT

International application No.

PCT/ES2013/070119

CLASSIFICATION OF SUBJECT MATTER

G05D25/02 (2006.01)
G06F3/00 (2006.01)
H05B37/02 (2006.01)

Form PCT/ISA/210 (extra sheet) (July 2009)