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(54) Title: A SIGNAL TRANSMISSION METHOD SUITABLE FOR USING IN DISPLAY DEVICES AND A DISPLAY DEVICE

(57) Abstract: The present invention relates to a video wall which is formed by connecting a plurality of display devices via cables used for transmitting video signals and which comprises a remote control signal receiver.



Description**A SIGNAL TRANSMISSION METHOD SUITABLE FOR USING IN DISPLAY DEVICES AND A DISPLAY DEVICE**

- [0001] The present invention relates to a video wall which is formed by connecting a plurality of display devices to each other.
- [0002] Video wall products which are formed by connecting a plurality of display devices in a cascading manner are used in a number of fields. Especially separately configuring each display device of the video wall during the installation phase requires an excessive amount of labor and time. Moreover, identically configuring each display device in the video wall matrix is a process which should be carried out carefully and which is prone to error.
- [0003] In the state of the art United States Patent Application No. US6536042, an infrared distribution module which receives and distributes the infrared signals forming the remote control signals is disclosed.
- [0004] In the state of the art Chinese Patent Application No. CN103501450, an external device is disclosed, wherein the remote control signals are received, processed and distributed.
- [0005] The aim of the present invention is the realization of a signal transmission method which solves the inconvenience caused by the cables in the video wall systems.
- [0006] The signal transmission method realized in order to attain the aim of the present invention, explicated in the first claim and the respective claims thereof, provides that after being transmitted to a display device, the signal received from the remote control signal receiver is transmitted to other display devices via the cable used for transmitting the video signal. By using one of the unused (reserved) pins on the cable used for transmitting the video signal, the display device receiving the remote control signal transmits the remote control signal to the other display devices. Thus, by forming the video wall system by connecting the display devices via the video transmission cables, the need for making additional adjustments or using additional cables is eliminated, thus providing savings in time and labor.

- [0007] In the signal transmission method, in order to prevent any problems in the transmission of the remote control signal in case the source providing video input to the video wall is an external source such as computer, media player, etc. and the external source device transmits a signal via the reserved pin while transmitting the video signal, the external signals on the reserved pin are blocked. The blocking process can be carried out continuously or can be carried out upon receiving a signal from the remote control. By means of the blocking process carried out when the signal is received from the remote control, the function provided by the outer source device via the reserved pin can be also used.
- [0008] In another embodiment of the present invention, in the signal transmission method, the remote control signal transmitted via the reserved pin is amplified. In order to prevent the weakening of the remote control signal while being transmitted from device to device in a video wall system comprising a plurality of display devices, the signal is amplified in the display device.
- [0009] The display device of the present invention comprises a blocking circuit which blocks other signals other than the remote control signal on the reserved pin of the cable through which the video signal is transmitted so as to allow the smooth operation of the signal transmission method of the present invention. The display device further comprises an amplifier circuit which amplifies the remote control signal transmitted via the reserved pin.
- [0010] Detailed Description of the Invention
- [0011] The video wall system is formed by connecting a plurality of display devices by means of cables which transmit images via the inputs and outputs. The system also contains a remote control signal receiver. The display devices are connected to each other by means of conventional cables, for example high-definition multimedia interface cables.
- [0012] The signal transmission method of the present invention is suitable for using in the above-described video wall system and provides that the remote control signal received from the signal receiver is transmitted via the reserved pin in the cable group which transmits the video signal to the display devices. The remote control signal receivers, which are preferably

operated with infrared signals, of a plurality of display devices in the video wall system are deactivated, and a single remote control signal receiver is used in the entire system, thus problems which may occur in case a plurality of receivers are used are eliminated. The remote control signal is detected by the receiver and transmitted to the display device to which the receiver is connected, and then transmitted, by means of relevant circuit components, to the reserved pin in the cable through which the video signal is transmitted. The remote control signal is transmitted to the next display device via the reserved pin, and then transmitted to all display devices in the video wall system in the same manner. Thus, the display devices are connected to each other only via video signal transmission cables, eliminating the clutter of cables.

- [0013] In the signal transmission method of the present invention, signals other than the remote control signal transmitted via the reserved pin are blocked. In some cases other signals may be transmitted via the reserved pins of the cables through which the video signal is transmitted. In this case, when the remote control signal is desired to be transmitted via the reserved pin, different signals may interfere with each other, causing problems. In order to solve said problems, the signal, if any, present on the reserved pin in the video input source is blocked, and the remote control signal is transmitted to the free reserved pin. In a version of this embodiment, the blocking process is carried out only when a signal is received by the remote control signal receiver.
- [0014] In the signal transfer method of the present invention, the remote control signal transmitted via the reserved pin is amplified. The remote control signal weakens while passing from a display device to another. In order to prevent the weakening of the remote control signal in a video wall system comprising a plurality of display devices, the signal is amplified while being transmitted from one display device to another.
- [0015] The display device of the present invention further comprises an amplifier circuit which amplifies the remote control signal transmitted via the reserved pin and wherein the above-described signal transmission method is used. The display device amplifies the remote control signal in the

above-described signal transmission method suitable for using in the video walls.

- [0016] In another embodiment of the present invention, the display device comprises a video source input and a blocking circuit which is disposed after the video source input and which blocks other signals other than the remote control signal transmitted via the reserved pin. The blocking circuit can be a buffer circuit which blocks a certain frequency or an on/off circuit which completely blocks the external signal.
- [0017] By means of the present invention, the problem of cable clutter encountered in the video wall systems is solved by transmitting the remote control signal together with the video signal. Since the remote control signal is transmitted serially, the need for components such as relay, etc. is eliminated. Since the signal is amplified in the display device, the need for external power sources for amplification is eliminated.

Claims

1. A signal transmission method suitable for using in a video wall system which is formed by connecting a plurality of display devices via cables used for transmitting video signals and which comprises a remote control signal receiver, **characterized in that** the remote control signal received by the signal receiver is transmitted via the reserved pin in the cable group which transmits video signals to the display devices.
2. A signal transmission method as in Claim 1, **characterized in that** signals other than the remote control signal transmitted via the reserved pin are blocked.
3. A signal transmission method as in Claim 1 or 2, **characterized in that** the remote control signal transmitted via the reserved pin is amplified.
4. A display device wherein a signal transmission method as in any one of the above claims is used, **comprising** an amplifier circuit which amplifies the remote control signal transmitted via the reserved pin.
5. A display device as in Claim 4, **characterized by** a video source input and a blocking circuit which is disposed after the video source input and which blocks other signals other than the remote control signal transmitted via the reserved pin.

INTERNATIONAL SEARCH REPORT

International application No
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A. CLASSIFICATION OF SUBJECT MATTER

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ADD.

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)

H04N G09G G06F

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)

EPO-Internal

C. DOCUMENTS CONSIDERED TO BE RELEVANT

Category*	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
X	WO 2012/078219 A1 (THOMSON LICENSING [FR]; FRANCIS SCOTT RUSSELL [US] ET AL.) 14 June 2012 (2012-06-14) figure 1 page 4, line 13 - line 23 page 6, line 5 - line 14 -----	1-5
X	US 2018/152752 A1 (HYEON BYEONG-CHEOL [KR]) 31 May 2018 (2018-05-31) figure 8 paragraph [0087] - paragraph [0090] -----	1
A		2-5



Further documents are listed in the continuation of Box C.



See patent family annex.

* Special categories of cited documents :

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Information on patent family members

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		EP 2649790 A1	16-10-2013
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