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(54) **IMAGE DISPLAY APPARATUS AND METHOD FOR OPERATING THE SAME**

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CPC *G06F 3/038* (2013.01)
USPC **345/157**; 345/156

(57) **ABSTRACT**

A method for operating an image display apparatus includes receiving a pairing request signal from a first remote controller, performing pairing with the first remote controller, receiving a pairing request signal from a second remote controller, confirming attributes of content which is being used, and determining whether pairing with the second remote controller is performed based on the confirmed attributes of the content. An image display apparatus includes an interface configured to receive a pairing request signal from a remote controller, a display configured to display predetermined content, and a controller configured to receive a pairing request signal from a second remote controller in a state of performing pairing with a first remote controller and to determine whether pairing with the second remote controller is performed based on attributes of the predetermined content. Accordingly, user convenience can be increased by variously and conveniently using the plurality of remote controllers.

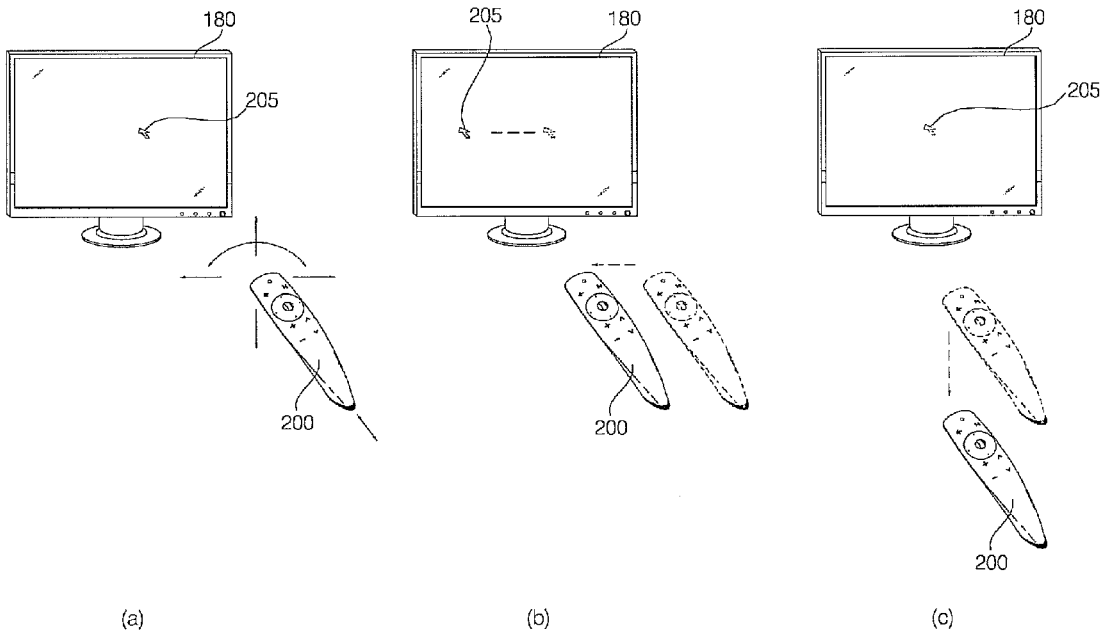


FIG. 1

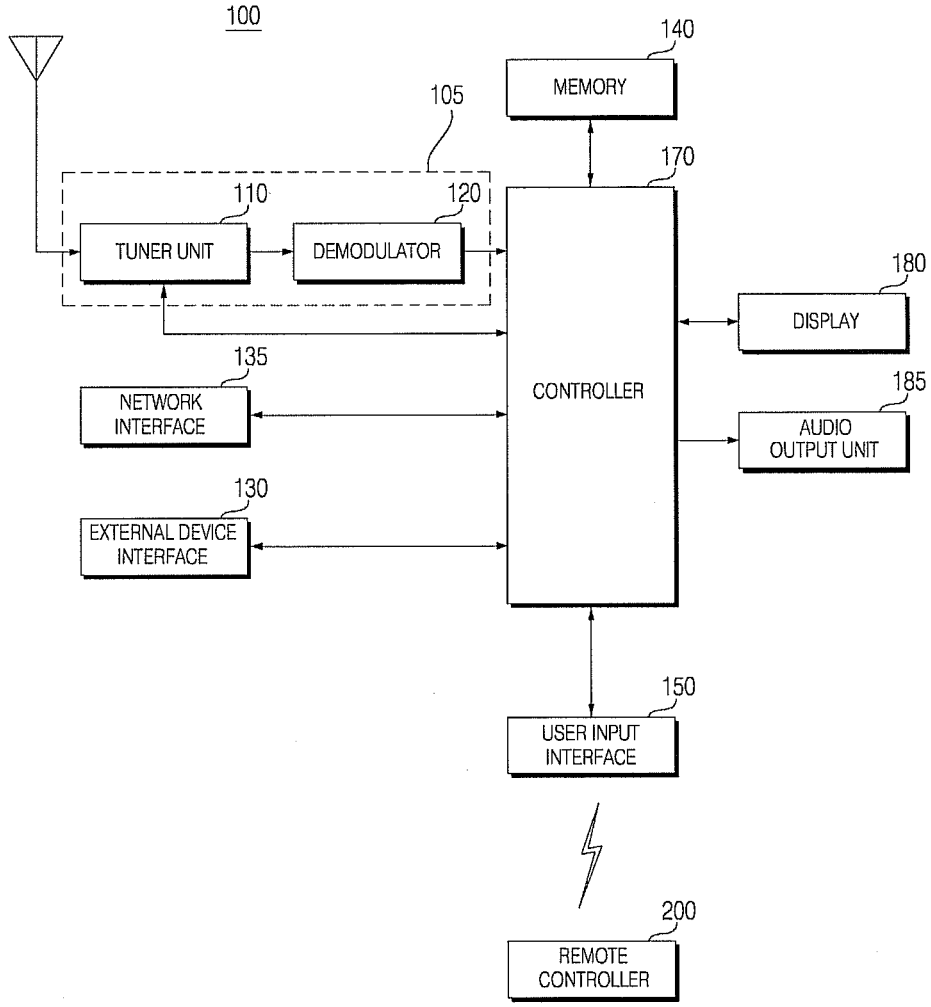

100
140
MEMORY
105
170
110
120
TUNER UNIT
DEMODULATOR
180
DISPLAY
135
NETWORK INTERFACE
CONTROLLER
185
AUDIO OUTPUT UNIT
130
EXTERNAL DEVICE INTERFACE
150
USER INPUT INTERFACE
200
REMOTE CONTROLLER

FIG. 2

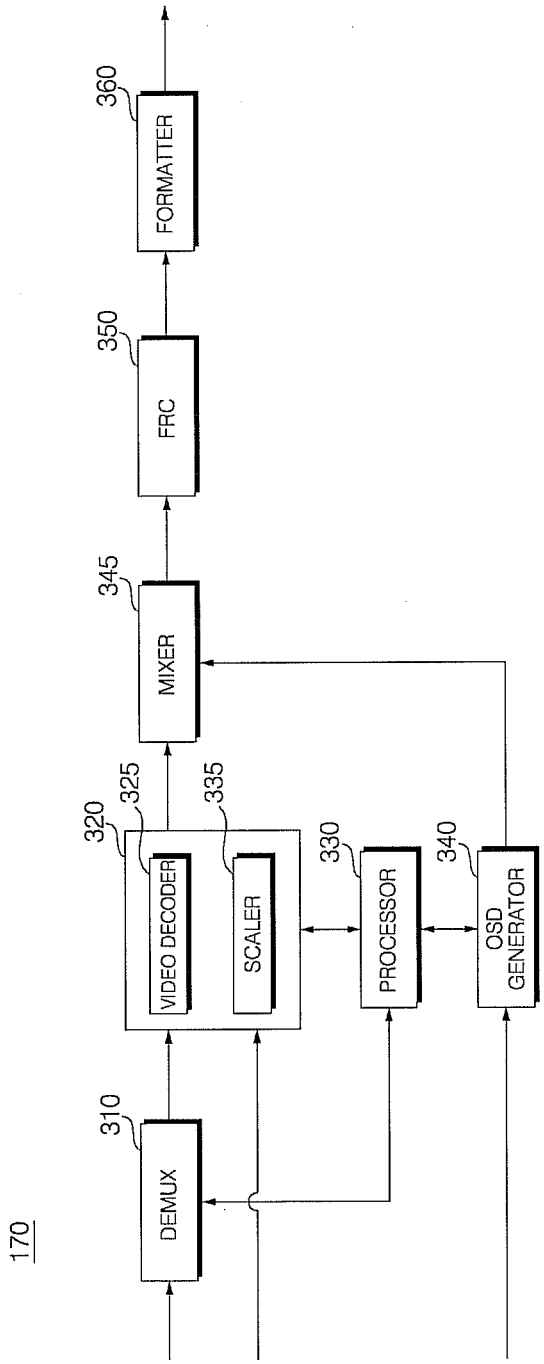

170
310
DEMUX
320
325
VIDEO DECODER
335
SCALER
330
PROCESSOR
340
OSD GENERATOR
345
MIXER
350
FRC
360
FORMATTER

FIG. 3

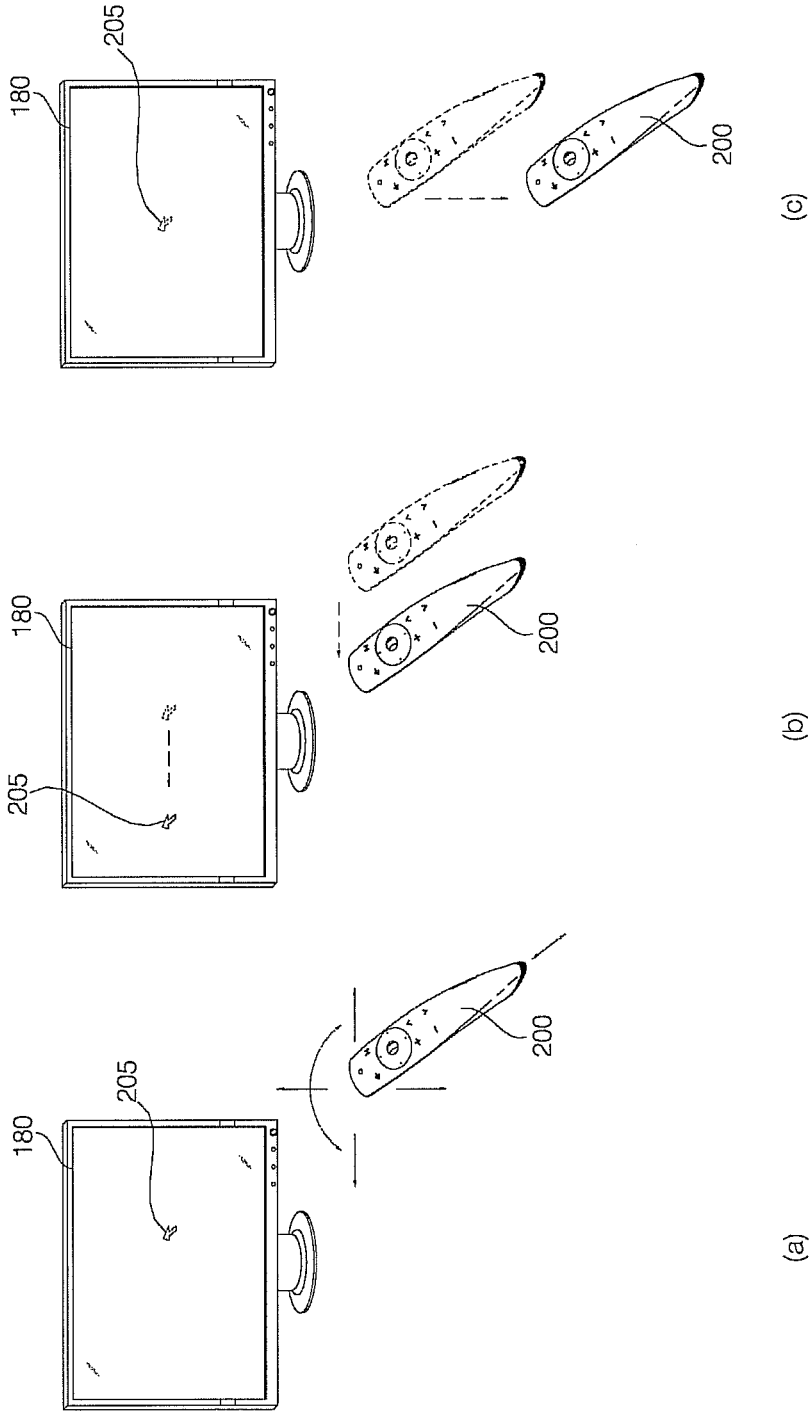


FIG. 4

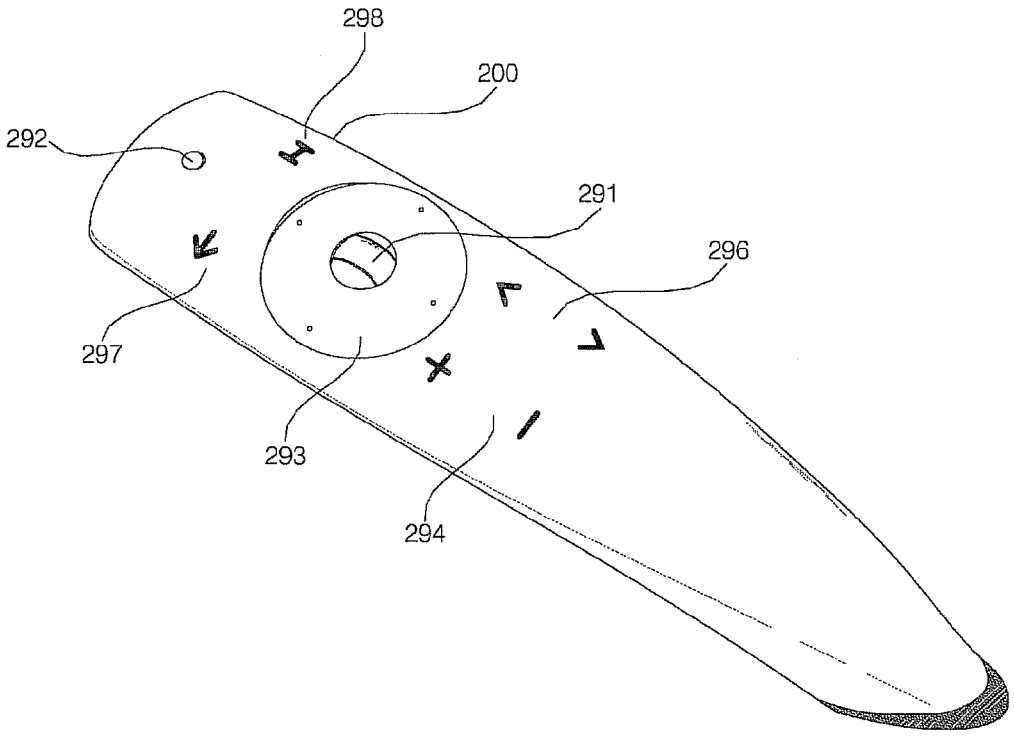


FIG. 5

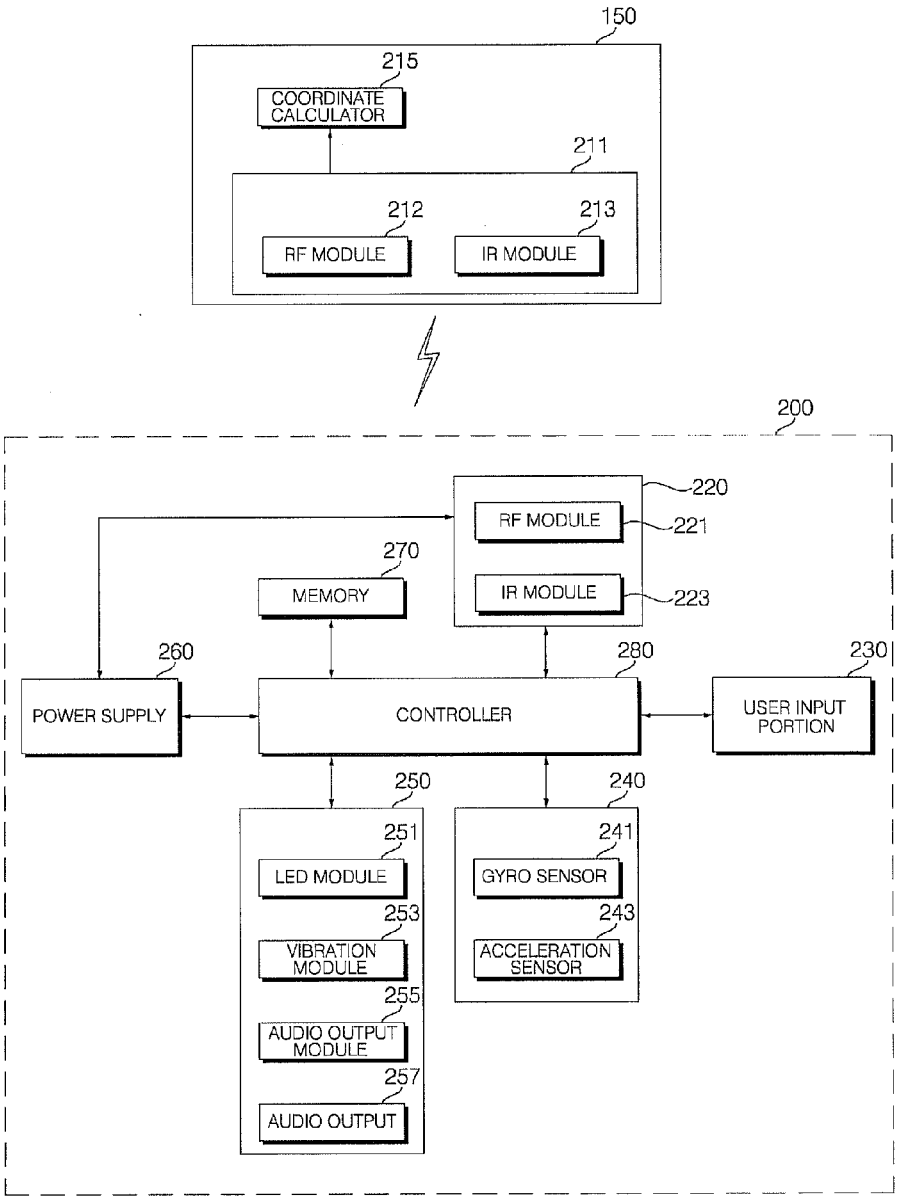

150
215
COORDINATE CALCULATOR
211
212
RF MODULE
213
IR MODULE
200
220
RF MODULE
221
270
MEMORY
IR MODULE
223
260
280
230
POWER SUPPLY
CONTROLLER
USER INPUT PORTION
250
240
251
LED MODULE
241
GYRO SENSOR
253
VIBRATION MODULE
243
ACCELERATION SENSOR
255
AUDIO OUTPUT MODULE
257
AUDIO OUTPUT

FIG. 6

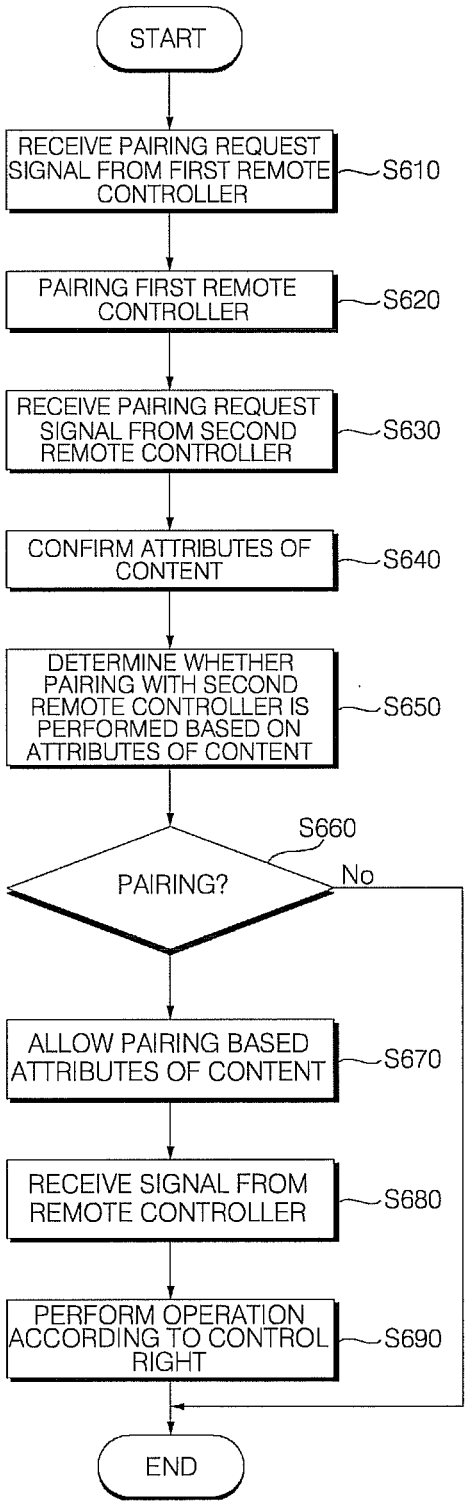

START
RECEIVE PAIRING REQUEST SIGNAL FROM FIRST REMOTE CONTROLLER
S610
PAIRING FIRST REMOTE CONTROLLER
S620
RECEIVE PAIRING REQUEST SIGNAL FROM SECOND REMOTE CONTROLLER
S630
CONFIRM ATTRIBUTES OF CONTENT
S640
DETERMINE WHETHER PAIRING WITH SECOND REMOTE CONTROLLER IS PERFORMED BASED ON ATTRIBUTES OF CONTENT
S650
S660
PAIRING?
No
ALLOW PAIRING BASED ATTRIBUTES OF CONTENT
S670
RECEIVE SIGNAL FROM REMOTE CONTROLLER
S680
PERFORM OPERATION ACCORDING TO CONTROL RIGHT
S690
END

FIG. 7

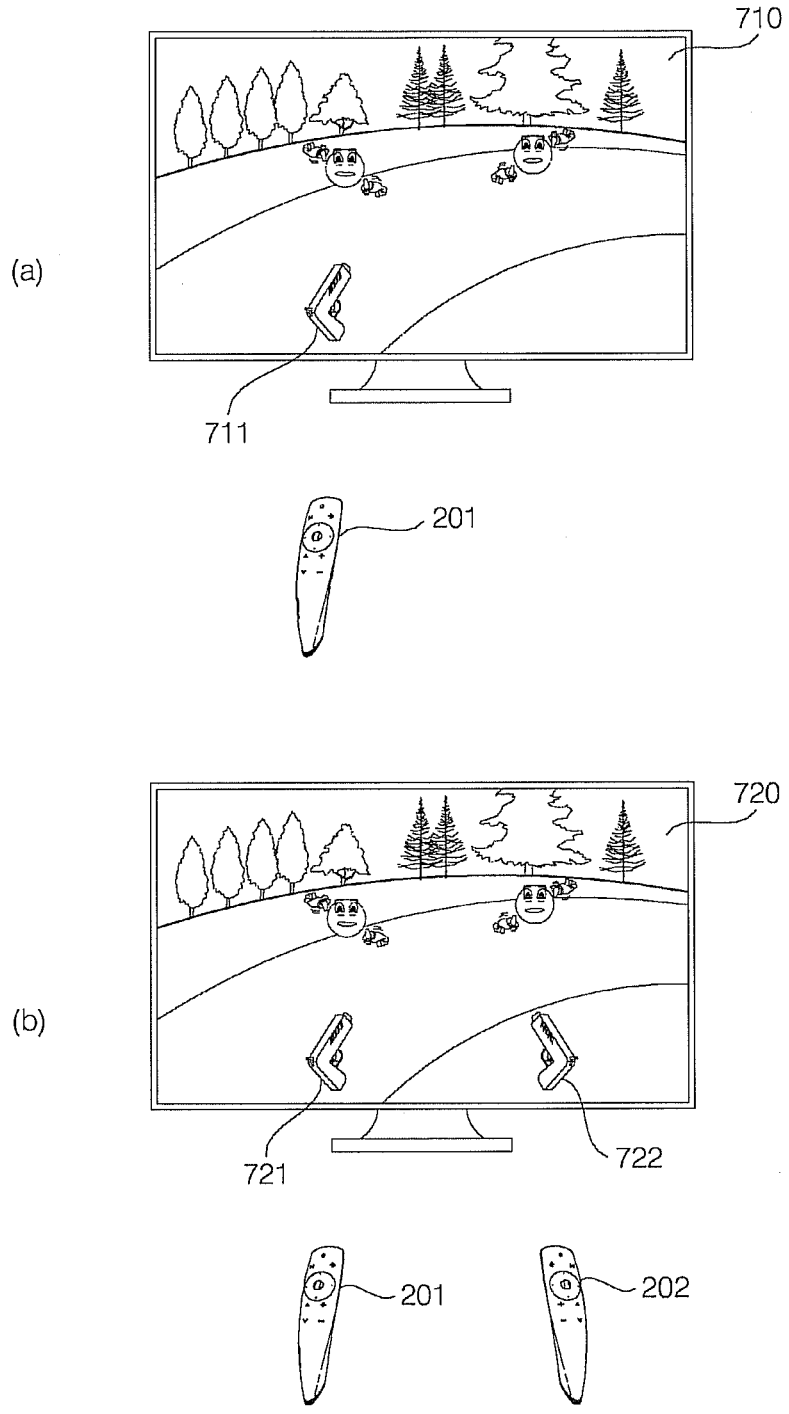


FIG. 8

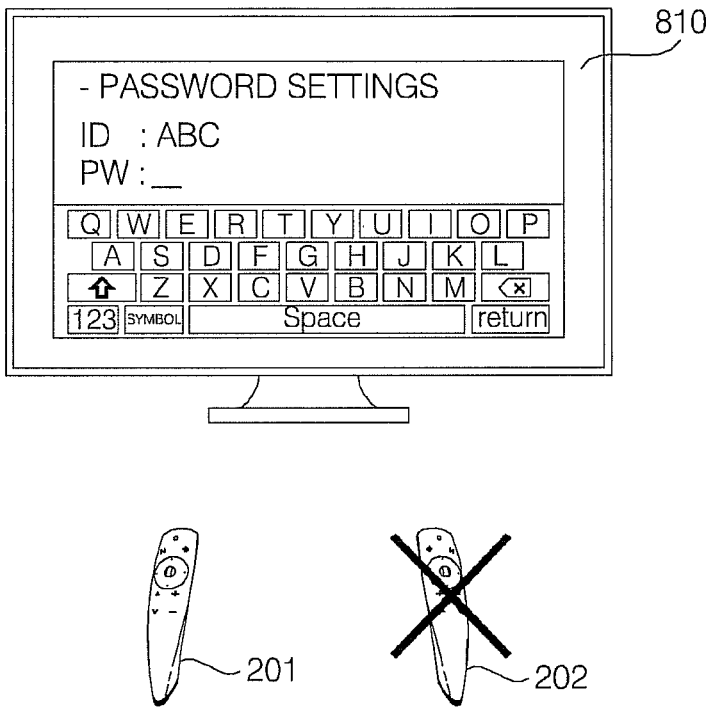
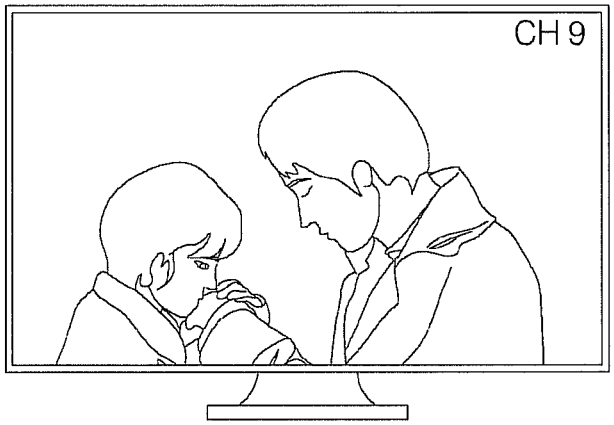
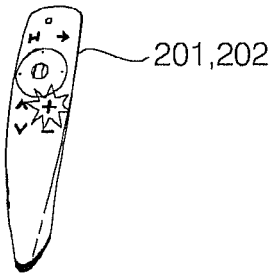

810
- PASSWORD SETTINGS
ID : ABC
PW : _
Q W E R T Y U I O P
A S D F G H J K L
Z X C V B N M
123 SYMBOL Space return
201
202

FIG. 9

(a)





(b)

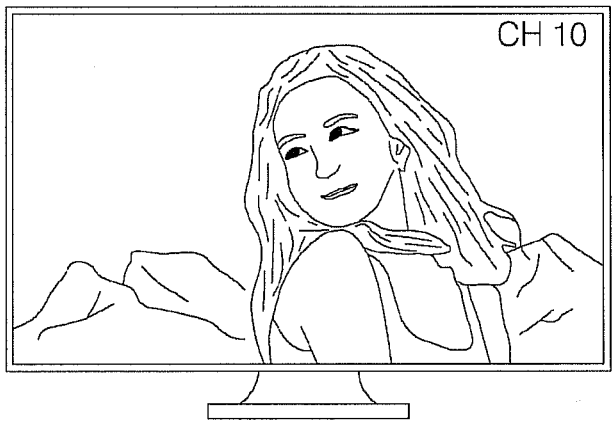


FIG. 10a

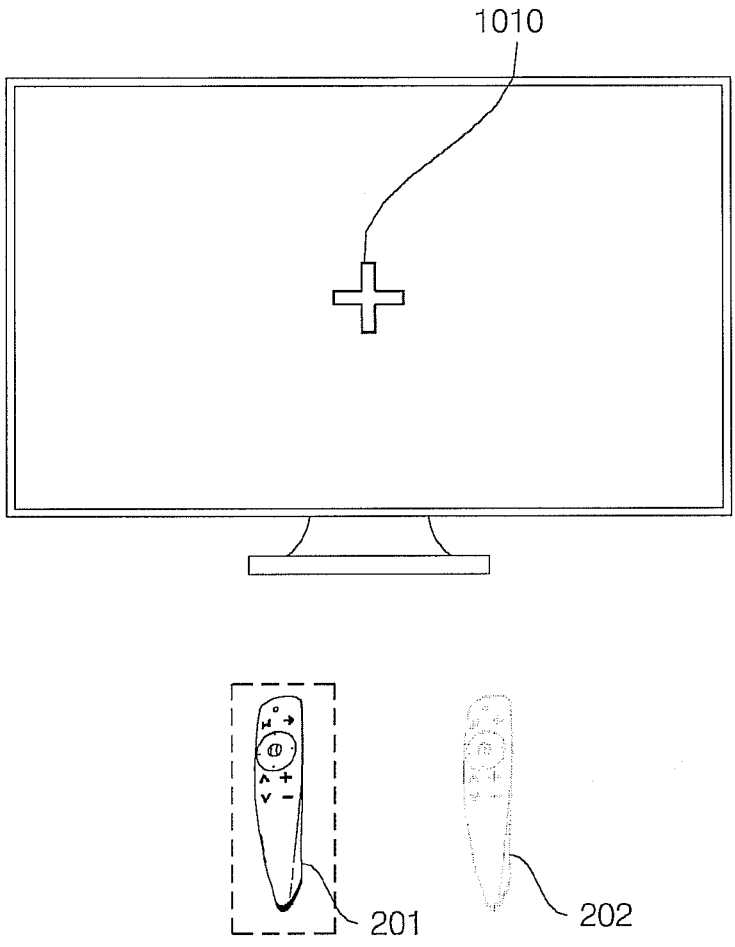


FIG. 10b

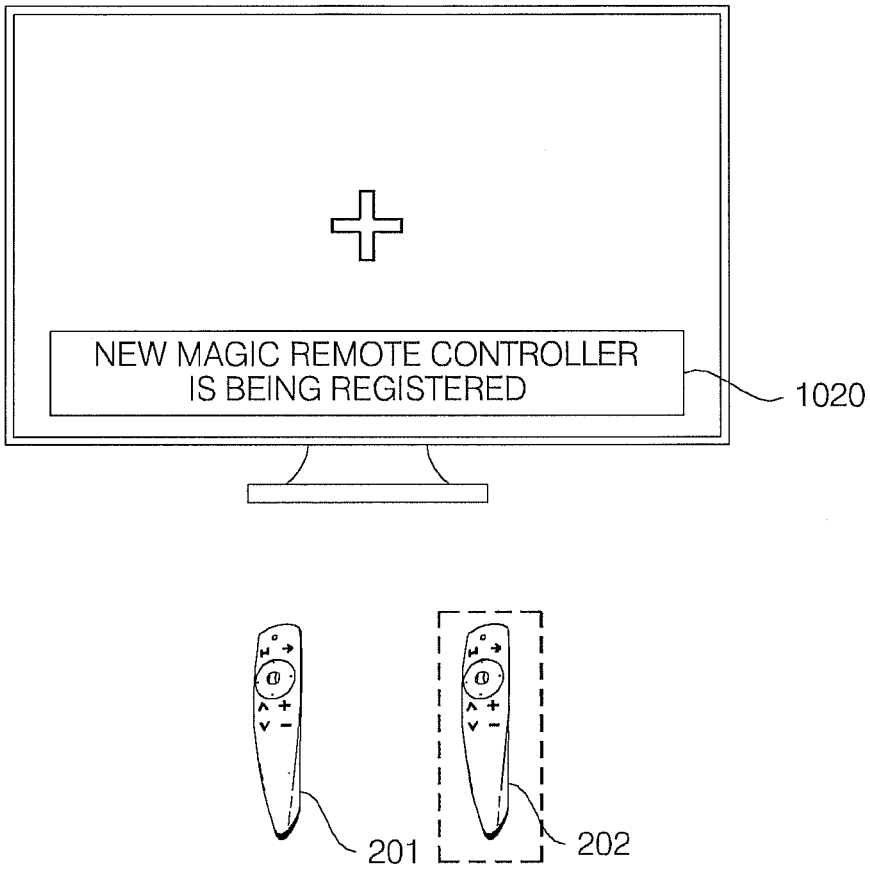

NEW MAGIC REMOTE CONTROLLER
IS BEING REGISTERED
1020
201
202

FIG. 10c

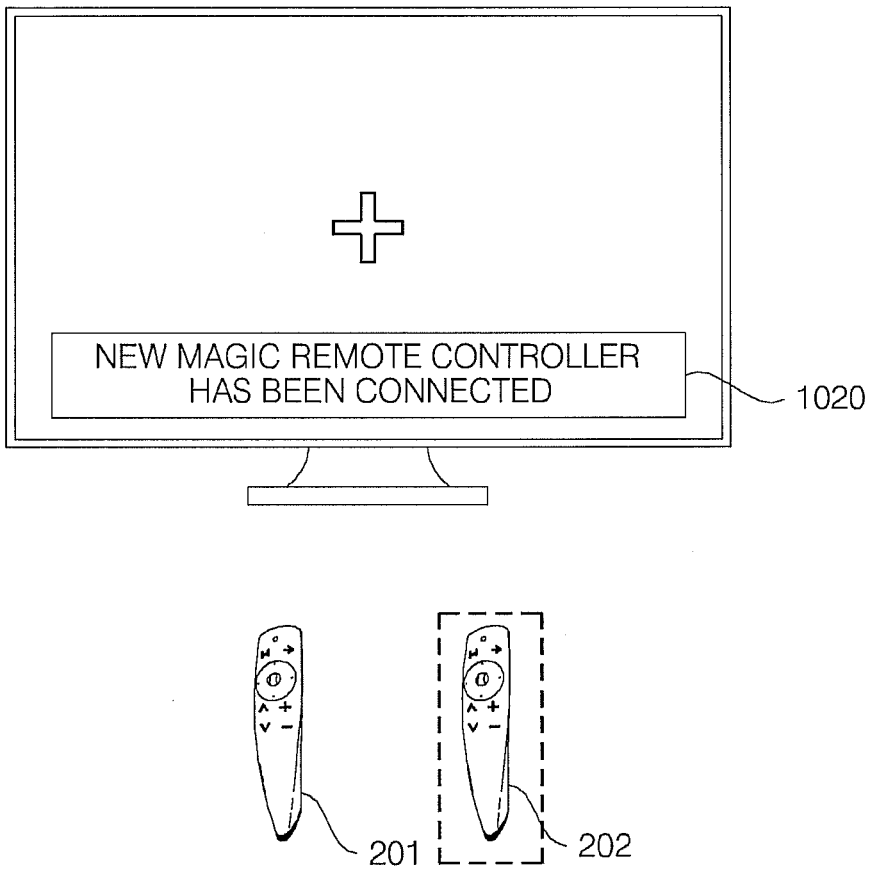

NEW MAGIC REMOTE CONTROLLER
HAS BEEN CONNECTED
1020
201
202

FIG. 11a

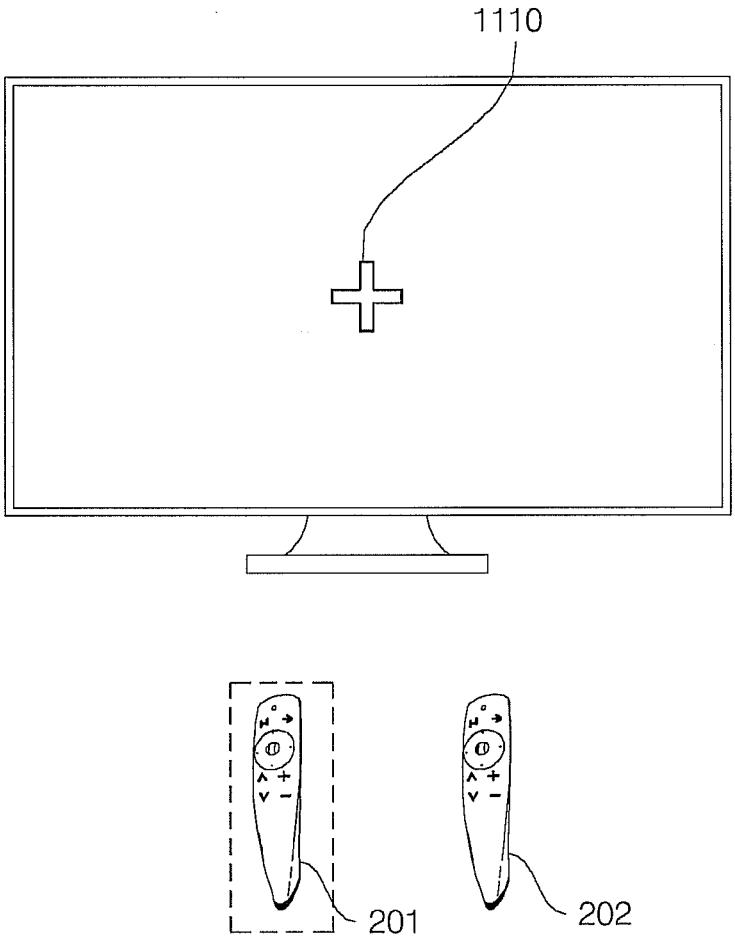


FIG. 11b

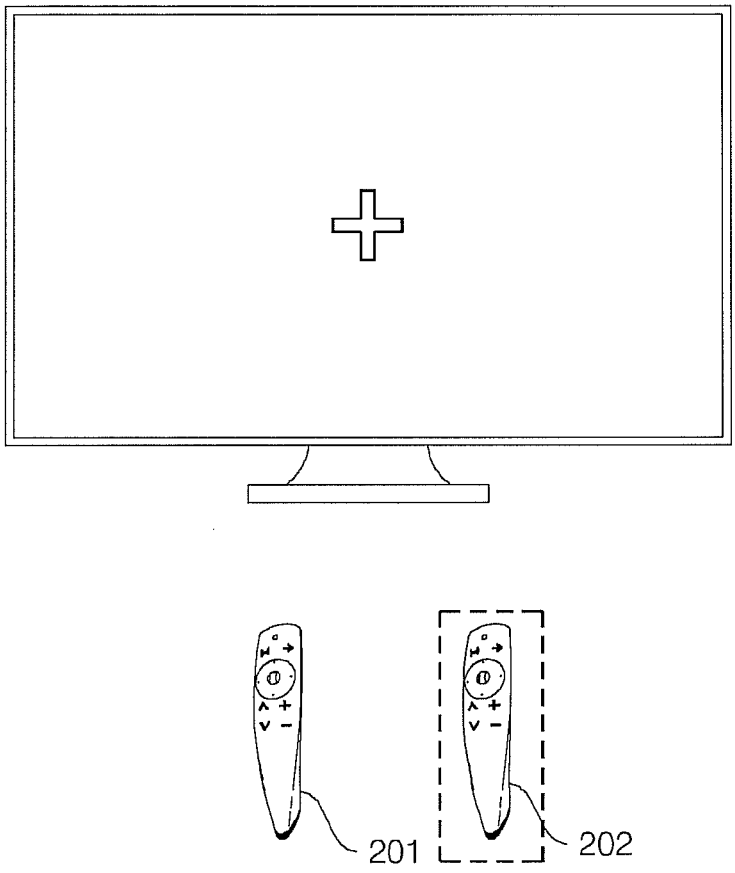


FIG. 11c

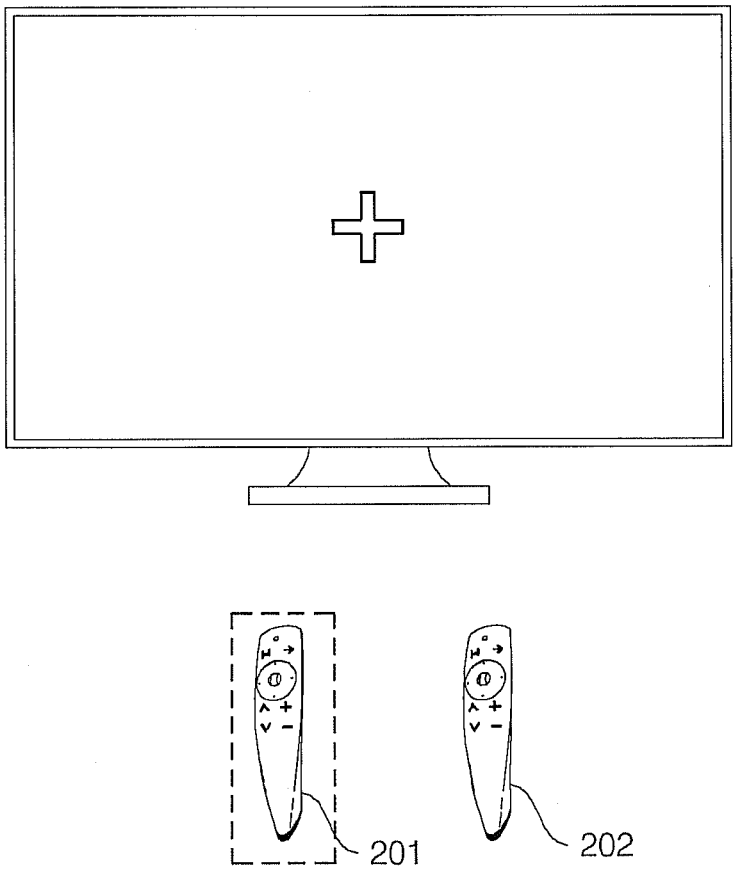


FIG. 12a

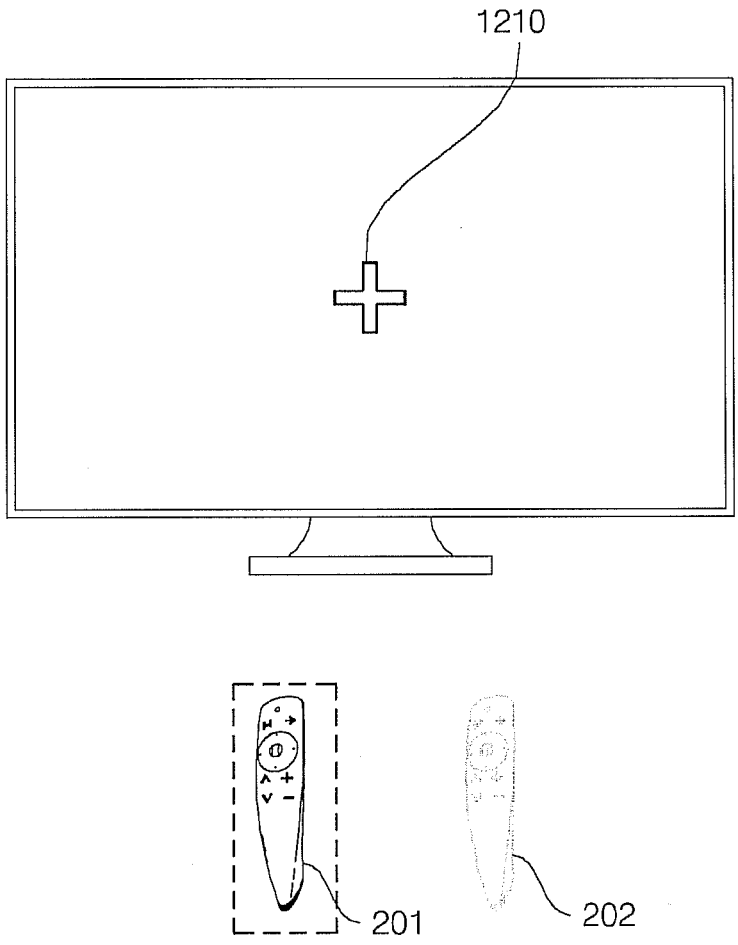


FIG. 12b

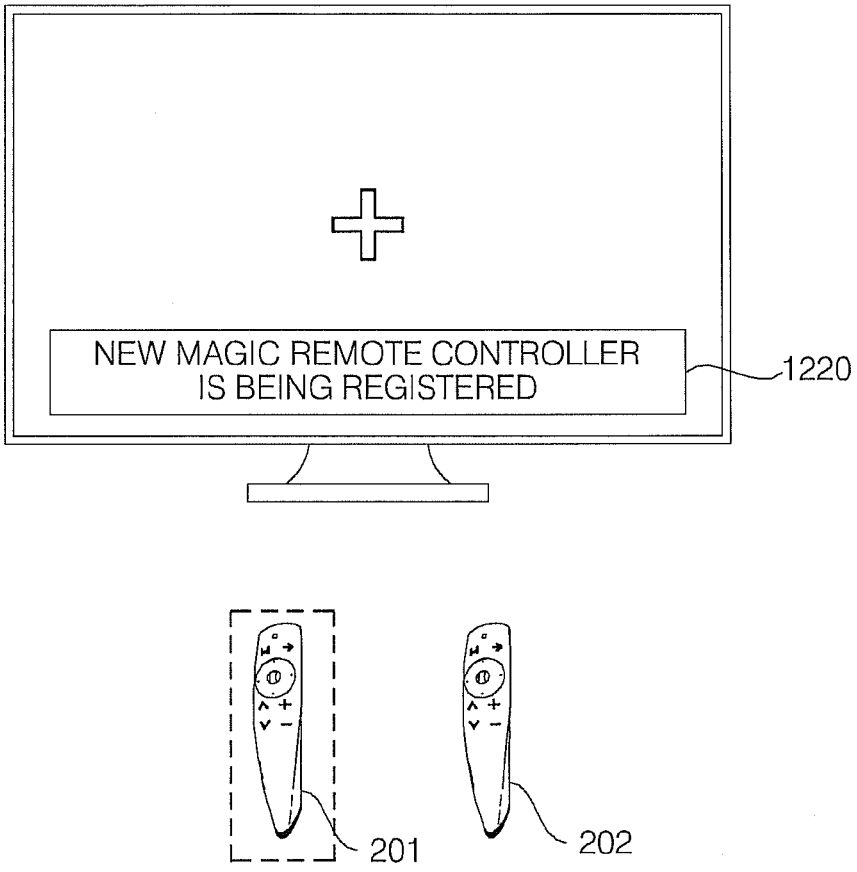

NEW MAGIC REMOTE CONTROLLER
IS BEING REGISTERED
1220
201
202

FIG. 12c

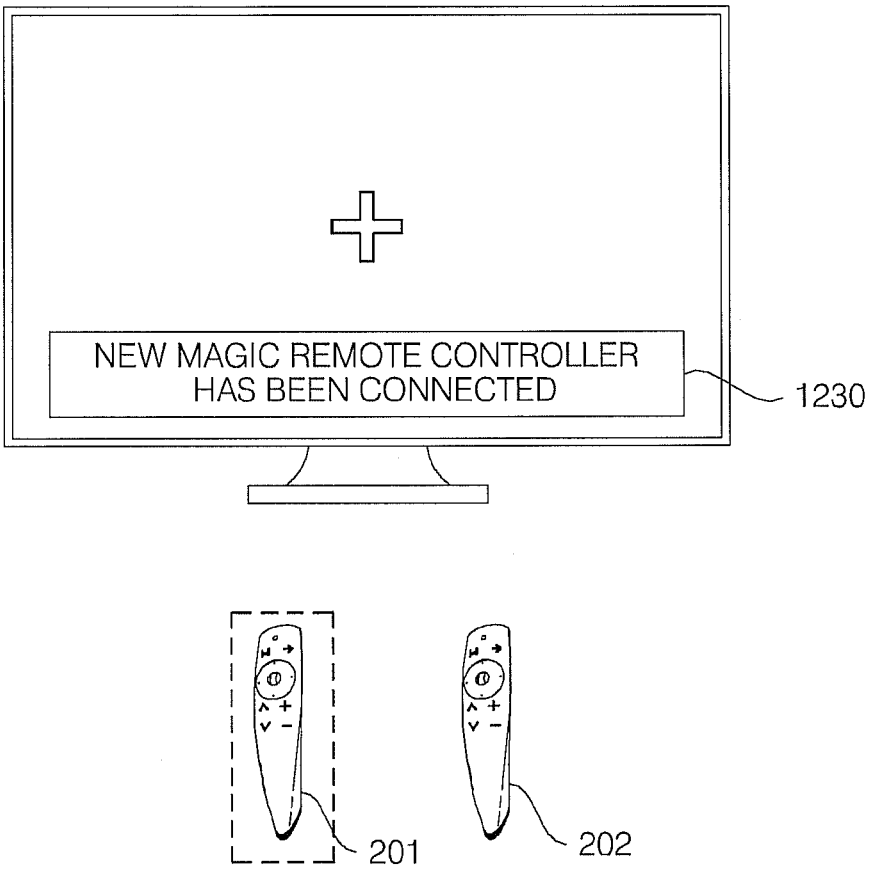

NEW MAGIC REMOTE CONTROLLER
HAS BEEN CONNECTED
1230
201
202

FIG. 13a

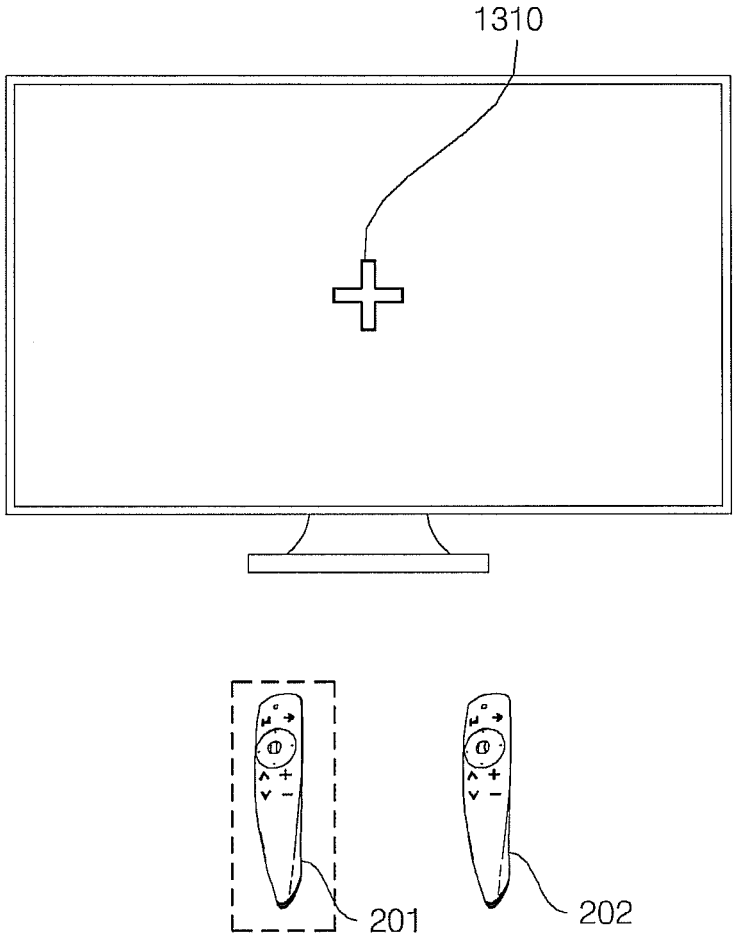


FIG. 13b

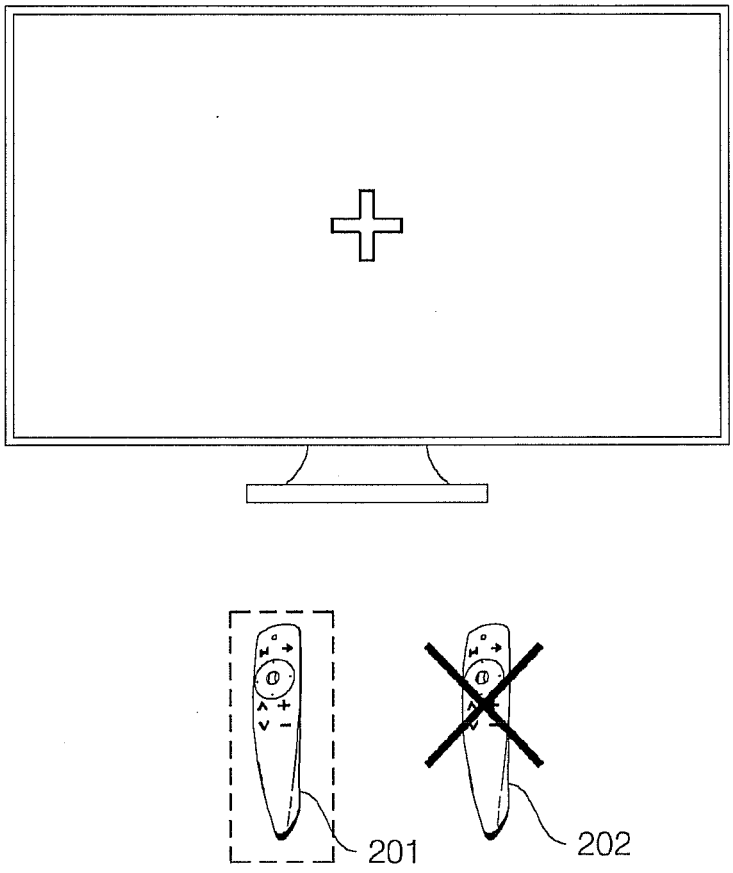


FIG. 13c

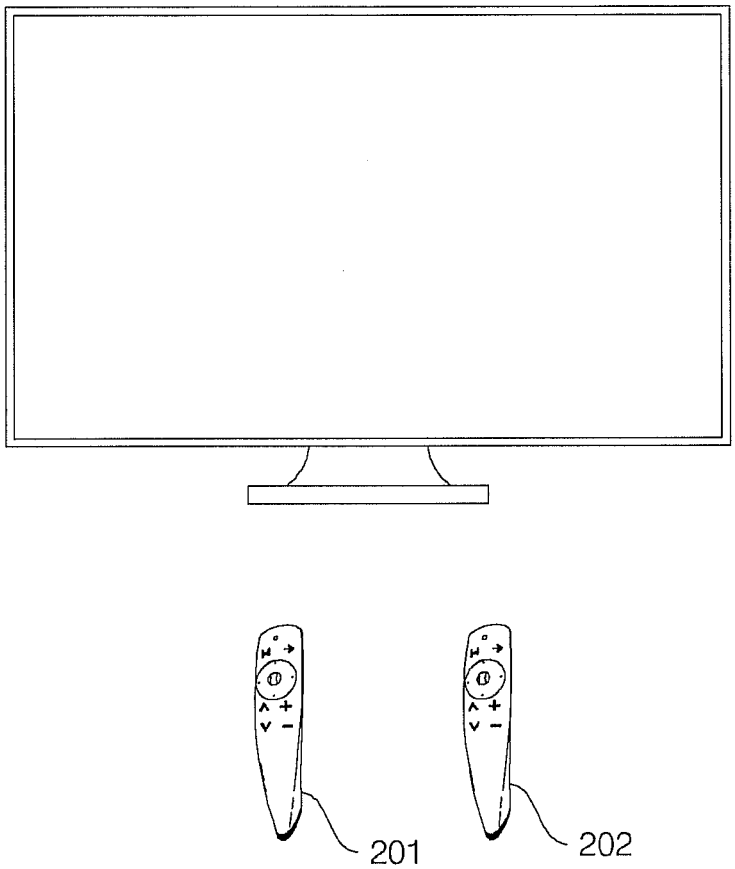


FIG. 13d

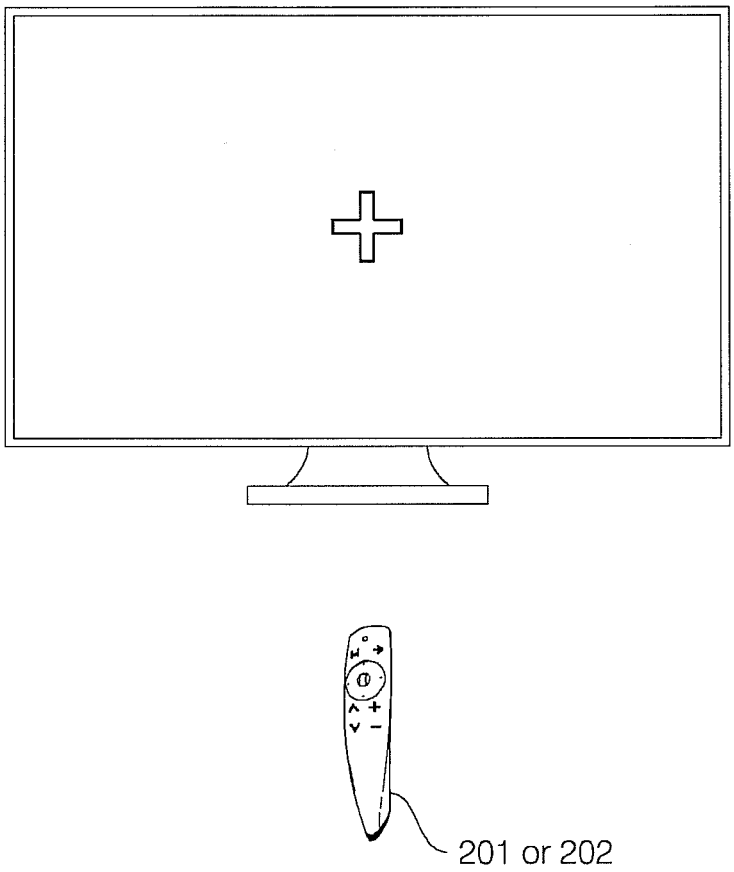


FIG. 14

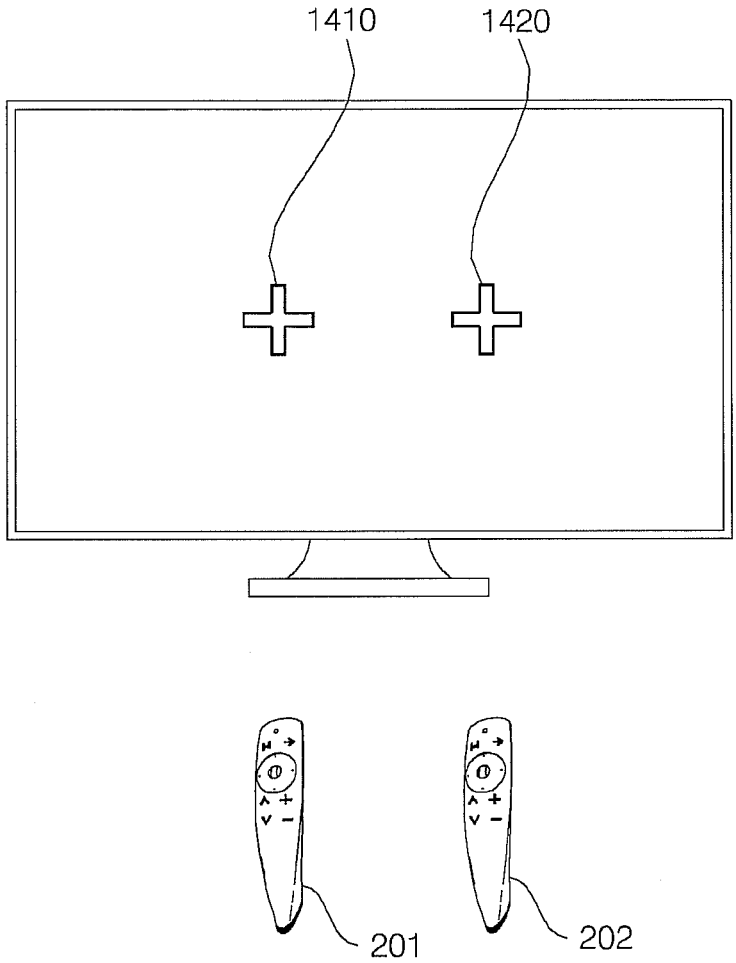


FIG. 15

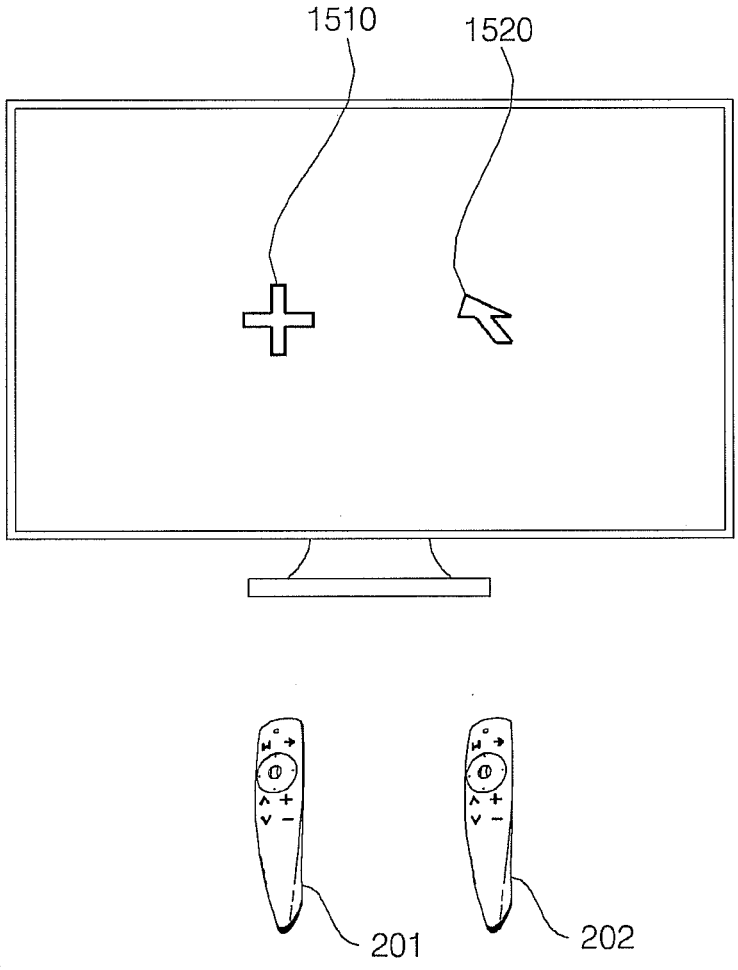


IMAGE DISPLAY APPARATUS AND METHOD FOR OPERATING THE SAME

CROSS-REFERENCE TO RELATED APPLICATION

[0001] This application claims the priority benefit of U.S. Provisional Patent Application No. 61/582,616, filed on Jan. 3, 2012 in the USPTO, the disclosure of which is incorporated herein by reference.

BACKGROUND OF THE INVENTION

[0002] 1. Field of the Invention

[0003] The present invention relates to an image display apparatus and a method for operating the same, and more particularly to an image display apparatus which is capable of efficiently and conveniently performing pairing with a plurality of remote controllers so as to increase user convenience, and a method for operating the same.

[0004] 2. Description of the Related Art

[0005] An image display apparatus functions to display images to a user. A user can view a broadcast program using an image display apparatus. The image display apparatus can display a broadcast program selected by the user on a display from among broadcast programs transmitted from broadcasting stations. The recent trend in broadcasting is a worldwide transition from analog broadcasting to digital broadcasting.

[0006] Digital broadcasting transmits digital audio and video signals. Digital broadcasting offers many advantages over analog broadcasting, such as robustness against noise, less data loss, ease of error correction, and the ability to provide clear, high-definition images. Digital broadcasting also allows interactive viewer services, compared to analog broadcasting.

[0007] In order to operate an image display apparatus, a remote controller is used. As operations executed in an image display apparatus have been variously changed, various functions of the remote controller have been further required. Accordingly, in an image display apparatus using a remote controller, various methods for increasing user convenience have been researched.

SUMMARY OF THE INVENTION

[0008] Therefore, the present invention has been made in view of the above problems, and it is an object of the present invention to provide an image display apparatus which is capable of increasing user convenience, and a method for operating the same.

[0009] Another object of the present invention is to provide an image display apparatus which is capable of efficiently operating by performing pairing with a plurality of remote controllers using various methods according to circumstances and granting control rights to the plurality of remote controllers, and a method for operating the same.

[0010] In accordance with an aspect of the present invention, the above and other objects can be accomplished by the provision of a method for operating an image display apparatus including receiving a pairing request signal from a first remote controller, performing pairing with the first remote controller, receiving a pairing request signal from a second remote controller, confirming attributes of content which is being used, and determining whether pairing with the second remote controller is performed based on the confirmed attributes of the content.

[0011] In accordance with another aspect of the present invention, there is provided an image display apparatus including an interface configured to receive a pairing request signal from a remote controller, a display configured to display predetermined content, and a controller configured to receive a pairing request signal from a second remote controller in a state of performing pairing with a first remote controller and to determine whether pairing with the second remote controller is performed based on attributes of the predetermined content.

[0012] According to the embodiments of the present invention, it is possible to determine whether pairing with a plurality of remote controllers is performed according to attributes of content which is being used and to grant control rights to the plurality of remote controllers. Accordingly, it is possible to increase user convenience by variously and conveniently using the plurality of remote controllers.

BRIEF DESCRIPTION OF THE DRAWINGS

[0013] The above and other objects, features and other advantages of the present invention will be more clearly understood from the following detailed description taken in conjunction with the accompanying drawings, in which:

[0014] FIG. **1** is a block diagram showing the internal configuration of an image display apparatus according to an embodiment of the present invention;

[0015] FIG. **2** is a block diagram showing the internal configuration of a controller of FIG. **1**;

[0016] FIG. **3** is a diagram showing a method of controlling a remote controller of FIG. **1**;

[0017] FIG. **4** is a perspective view of a remote controller according to an embodiment of the present invention;

[0018] FIG. **5** is a block diagram showing the internal configuration of a remote controller according to an embodiment of the present invention;

[0019] FIG. **6** is a flowchart illustrating a method for operating an image display apparatus according to an embodiment of the present invention; and

[0020] FIGS. **7** to **15** are views referred to for describing various examples of the method for operating the image display apparatus according to various embodiments of the present invention.

DETAILED DESCRIPTION OF THE PREFERRED EMBODIMENTS

[0021] Exemplary embodiments of the present invention will be described with reference to the attached drawings.

[0022] The terms "module" and "unit" attached to describe the names of components are used herein to aid in understanding of the components and thus should not be constructed as having specific meanings or roles. Accordingly, the terms "module" and "unit" may be used interchangeably.

[0023] FIG. **1** is a block diagram showing the internal configuration of the image display apparatus according to an embodiment of the present invention.

[0024] Referring to FIG. **1**, the image display apparatus **100** according to the embodiment of the present invention includes a broadcast reception unit **105**, an external device interface **130**, a memory **140**, a user input interface **150**, a sensor unit (not shown), a controller **170**, a display **180** and an audio output unit **185**.

[0025] The broadcast reception unit **105** may include a tuner unit **110**, a demodulator **120** and a network interface

135. As needed, the broadcast reception unit **105** may include only the tuner unit **110** and the demodulator **120** or only the network interface **135**.

[0026] The tuner unit **110** tunes to a Radio Frequency (RF) broadcast signal corresponding to a channel selected by a user from among RF broadcast signals received through an antenna or RF broadcast signals corresponding to all channels previously stored in the image display apparatus. The tuned RF broadcast is converted into an Intermediate Frequency (IF) signal or a baseband Audio/Video (AV) signal.

[0027] For example, the tuned RF broadcast signal is converted into a digital IF signal DIF if it is a digital broadcast signal and is converted into an analog baseband AV signal (Composite Video Banking Sync/Sound Intermediate Frequency (CVBS/SIF)) if it is an analog broadcast signal. That is, the tuner unit **110** may process a digital broadcast signal or an analog broadcast signal. The analog baseband AV signal (CVBS/SIF) output from the tuner unit **110** may be directly input to the controller **170**.

[0028] The tuner unit **110** may be capable of receiving RF broadcast signals from an Advanced Television Systems Committee (ATSC) single-carrier system or from a Digital Video Broadcasting (DVB) multi-carrier system.

[0029] The tuner unit **110** may sequentially select a number of RF broadcast signals corresponding to all broadcast channels previously stored in the image display apparatus by a channel storage function from a plurality of RF signals received through the antenna and may convert the selected RF broadcast signals into IF signals or baseband A/V signals.

[0030] The tuner unit **110** may include a plurality of tuners in order to receive broadcast signals of a plurality of channels. Alternatively, the tuner unit may include a single tuner for simultaneously receiving broadcast signals of a plurality of channels.

[0031] The demodulator **120** receives the digital IF signal DIF from the tuner unit **110** and demodulates the digital IF signal DIF.

[0032] The demodulator **120** may perform demodulation and channel decoding, thereby obtaining a stream signal TS. The stream signal may be a signal in which a video signal, an audio signal and a data signal are multiplexed.

[0033] The stream signal output from the demodulator **120** may be input to the controller **170** and thus subjected to demultiplexing and A/V signal processing. The processed video and audio signals are output to the display **180** and the audio output unit **185**, respectively.

[0034] The external device interface **130** may serve to transmit or receive data to or from an external device (not shown) connected thereto. For interfacing, the external device interface **130** may include an A/V Input/Output (I/O) unit (not shown) and/or a wireless communication module (not shown).

[0035] The external device interface **130** may be connected to an external device such as a Digital Versatile Disc (DVD) player, a Blu-ray player, a game console, a camera, a camcorder, or a computer (e.g., a laptop computer), wirelessly or by wire so as to perform an input/output operation with respect to the external device.

[0036] The A/V I/O unit externally receives video and audio signals from the external device. The wireless communication unit may perform short-range wireless communication with another electronic apparatus.

[0037] The network interface **135** serves as an interface between the image display apparatus **100** and a wired/wireless network such as the Internet. The network interface **135** may receive content or data provided by an Internet or content provider or a network operator over a network.

[0038] The network interface **135** performs data communication with an electronic apparatus located near the image display apparatus **100**. At this time, the network interface **135** may receive apparatus information of another electronic apparatus or remote controllable channel information, frequency information or code information of another electronic apparatus.

[0039] The memory **140** may store various programs necessary for the controller **170** to process and control signals, and may also store processed video, audio and data signals.

[0040] The memory **140** may temporarily store a video, audio and/or data signal received from the external device interface **130**. The memory **140** may store information about a predetermined broadcast channel by the channel storage function of a channel map.

[0041] In addition, the memory **140** may store infrared (IR) format key codes for controlling other electronic apparatuses as IR signals and store an IR format key database of a plurality of electronic apparatuses.

[0042] While the memory **140** is shown in FIG. **1** as being configured separately from the controller **170**, to which the present invention is not limited, the memory **140** may be incorporated into the controller **170**.

[0043] The user input interface **150** transmits a signal input by the user to the controller **170** or transmits a signal received from the controller **170** to the user.

[0044] For example, the user input interface **150** may transmit/receive various user input signals such as a power-on/off signal, a channel selection signal, and a screen setting signal from a remote controller **200**, may provide the controller **170** with user input signals received from local keys (not shown), such as inputs of a power key, a channel key, and a volume key, and setting values, or provide the controller **170** with a user input signal received from a sensor unit (not shown) for sensing a user gesture, or transmit a signal received from the controller **170** to a sensor unit (not shown).

[0045] According to an embodiment of the present invention, the user input interface **150** may receive personal information from the remote controller **200**. The user input interface **150** may further receive information about a web server accessed using the personal information in addition to the personal information.

[0046] For example, if a mobile terminal **300** and the remote controller **200** are within a predetermined distance of each other to perform a near field communication (NFC), the remote controller **200** may receive the personal information stored in the mobile terminal **300**. The remote controller **200** may transmit the personal information to the image display apparatus **100** according to an IR method or an radio frequency (RF) method. At this time, the user input interface **150** sends the received personal information to the controller **170**.

[0047] The personal information may include personal ID information, password information, personal email information, etc. of the mobile terminal **300**. Alternatively, the personal information may include personal ID information, password information, personal email information, etc. of the image display apparatus **100**. Alternatively, the personal information may include personal ID information, password information, etc. of various electronic apparatus, which may be commonly used, including the mobile terminal **300**. Alternatively, the personal information may include personal ID

information, password information, etc. of a predetermined web server previously stored in the mobile terminal **300**. Alternatively, the personal information may include personal ID information, password information, etc. of a predetermined server web which may be used in the mobile terminal **300**, the image display apparatus **100**, etc. Alternatively, the personal information may include personal ID information, password information, etc. of a server connected to the image display apparatus **100**.

[0048] That is, the personal information may be necessary to log in to an electronic apparatus or service.

[0049] The user input interface **150** may receive apparatus information of another electronic apparatus or remote controllable channel information, frequency information or code information of another electronic apparatus from an electronic apparatus located near the image display apparatus **100** through the remote controller **200**.

[0050] The controller **170** may demultiplex the stream signal received from the tuner unit **110**, the demodulator **120**, or the external device interface **130** into a number of signals, process the demultiplexed signals into audio and video data, and output the audio and video data.

[0051] The video signal processed by the controller **170** may be displayed as an image on the display **180**. The video signal processed by the controller **170** may also be transmitted to an external output device through the external device interface **130**.

[0052] The audio signal processed by the controller **170** may be output to the audio output unit **185**. Also, the audio signal processed by the controller **170** may be transmitted to the external output device through the external device interface **130**.

[0053] While not shown in FIG. **1**, the controller **170** may include a DEMUX, a video processor, etc., which will be described in detail later with reference to FIG. **2**.

[0054] The controller **170** may control the overall operation of the image display apparatus **100**. For example, the controller **170** controls the tuner unit **110** to tune to an RF signal corresponding to a channel selected by the user or a previously stored channel.

[0055] The controller **170** may control the image display apparatus **100** by a user command input through the user input interface **150** or an internal program.

[0056] The controller **170** may control the display **180** to display images. The image displayed on the display **180** may be a Two-Dimensional (2D) or Three-Dimensional (3D) still or moving image.

[0057] The controller **170** may generate and display a predetermined object of an image displayed on the display **180** as a 3D object. For example, the object may be at least one of a screen of an accessed website (newspaper, magazine, etc.), an electronic program guide (EPG), various menus, a widget, an icon, a still image, a moving image, text, etc.

[0058] The controller **170** recognizes the position of the user based on an image captured by a camera unit (not shown). For example, a distance (z-axis coordinate) between the user and the image display apparatus **100** may be detected. An x-axis coordinate and a y-axis coordinate in the image display apparatus **100** corresponding to the position of the user may be detected.

[0059] According to an embodiment of the present invention, the controller **170** may control login based on the personal information received from the remote controller **200**. At this time, login may be login of the image display apparatus **100**, login of a server connected to the image display apparatus **100**, or login of a predetermined web server to which a user subscribes using personal information thereof.

[0060] For example, if the user logs in to the image display apparatus **100** using personal ID information and password information received from the remote controller **200**, the controller **170** may control the display **180** to display a personal screen of the user set according to a user account. If there is an image which is being viewed, the controller **170** may control the display **180** to display a personal setting screen along with the image which is being viewed. Alternatively, the controller **170** may switch the image which is being viewed to a personal setting screen.

[0061] As another example, if the user logs in to the server connected to the image display apparatus **100**, the controller **170** may control the display **180** to display a server access screen received from the server. More specifically, the screen may be an app server screen. If there is an image which is being viewed, the controller **170** may control the display **180** to display a server access screen along with the image which is being viewed. Alternatively, the controller **170** may switch the image which is being viewed to a server access screen.

[0062] As another example, if the received personal information is personal information of another electronic apparatus and, more particularly, a predetermined web server accessed by the mobile terminal **300**, the controller **170** may control the image display apparatus **100** to access the web server and control the display **180** to display a screen of the accessed web server. This web server may provide a social network service. If there is an image which is being viewed, the controller **170** may control the display **180** to display the screen of the accessed web server along with the image which is being viewed. Alternatively, the controller **170** may switch the image which is being viewed to the screen of the accessed web server.

[0063] The controller **170** may control a power supply (not shown) for supplying power to the image display apparatus **100** if the image display apparatus **100** is in an off state when the personal information is received. That is, if the user input interface **150** receives the personal information in a standby mode, the controller **170** may switch the standby mode to a wakeup mode and control the power supply to supply power to various modules or units.

[0064] The controller **170** may determine whether each electronic apparatus is connected according to the personal information from the remote controller **200** based on apparatus information of another electronic apparatus located near the image display apparatus **100** or remote controllable channel information, frequency information or code information of another electronic apparatus, which is received from the network interface **135** or the user input interface **150**, and control the display **180** to display an object indicating that another electronic apparatus has been logged in.

[0065] Alternatively, the controller **170** may control transmission of apparatus information, channel information, frequency information and code information to the remote controller **200**, based on apparatus information of another electronic apparatus located near the image display apparatus **100** or remote controllable channel information, frequency information or code information of another electronic apparatus.

[0066] Although not shown, a channel browsing processor for generating a thumbnail image corresponding to a channel signal or an external input signal may be further included. The

channel browsing processor may receive the stream signal TS output from the demodulator **120** or the stream signal output from the external device interface **130**, extract an image from the received stream signal, and generate a thumbnail image. The generated thumbnail image may be decoded into a stream form to be input to the controller **170** together with the decoded image. The controller **170** may display a thumbnail list including a plurality of thumbnail images on the display **180** using the input thumbnail image.

[0067] The thumbnail list may be displayed in a brief viewing method of displaying the thumbnail list in a part of an area in a state of displaying a predetermined image or may be displayed in a full viewing method of displaying the thumbnail list in a full area. The thumbnail images in the thumbnail list may be sequentially updated.

[0068] The display **180** converts the video signal, the data signal, the OSD signal and the control signal processed by the controller **170** or the video signal, the data signal and the control signal received by the external device interface **130** and generates a drive signal.

[0069] The display **180** may be a Plasma Display Panel (PDP), a Liquid Crystal Display (LCD), an Organic Light-Emitting Diode (OLED) display or a flexible display. In particular, the display **180** may be a 3D display.

[0070] If the display **180** is a touchscreen, the display **180** may function as not only an output device but also as an input device.

[0071] The audio output unit **185** receives the audio signal processed by the controller **170** and outputs the received audio signal as sound.

[0072] The camera unit (not shown) captures images of a user. The camera unit (not shown) may be implemented by one camera, but the present invention is not limited thereto. That is, the camera unit may be implemented by a plurality of cameras. The camera unit (not shown) may be embedded in the image display apparatus **100** at the upper side of the display **180** or may be separately provided. Image information captured by the camera unit (not shown) may be input to the controller **170**.

[0073] The controller **170** may sense a user gesture from an image captured by the camera unit (not shown), a signal sensed by the sensor unit (not shown), or a combination of the captured image and the sensed signal.

[0074] The remote controller **200** transmits user input to the user input interface **150**. For transmission of user input, the remote controller **200** may use various communication techniques such as Bluetooth, RF communication, IR communication, Ultra Wideband (UWB), ZigBee and near field communication (NFC).

[0075] In addition, the remote controller **200** may receive a video signal, an audio signal or a data signal from the user input interface **15**. The remote controller **200** output the received signals visually or audibly based on the received video, audio or data signal.

[0076] The remote controller **200** according to the embodiment of the present invention may receive information by near field communication with a predetermined electronic apparatus. The information may include personal ID information and password information which may be used in the mobile terminal, the image display apparatus or the electronic apparatus, as described above.

[0077] The remote controller **200** may transmit the received personal information to the image display apparatus **100**. As this time, an IR method or an RF method may be used as the communication method.

[0078] In the embodiment of the present invention, it is assumed that the remote controller **200** is a pointing device for displaying a pointer corresponding to user motion. That is, the remote controller **200** may transmit personal information to the image display apparatus **100** using an RF method.

[0079] The remote controller **200** may further receive information about a web server accessed using the personal information in addition to the personal information. For example, the remote controller **200** may receive web server information of a social network service which is being logged in to and accessed by the mobile terminal. Such web server information is also transmitted to the image display apparatus **100**.

[0080] The remote controller **200** may receive apparatus information of another electronic apparatus or remote controllable channel information, frequency information or code information of another electronic apparatus from an electronic apparatus located near the image display apparatus **100**. Based on the information about another electronic apparatus, a channel, frequency or code may be allocated to the electronic apparatus so as to perform remote control.

[0081] The above-described image display apparatus **100** may be a fixed or mobile digital broadcast receiver capable of receiving a digital broadcast.

[0082] The block diagram of the image display apparatus **100** illustrated in FIG. **1** is only exemplary. Depending upon the specifications of the image display apparatus **100** in actual implementation, the components of the image display apparatus **100** may be combined or omitted or new components may be added. That is, two or more components may be incorporated into one component or one component may be configured as separate components, as needed. In addition, the function of each block is described for the purpose of describing the embodiment of the present invention and thus specific operations or devices should not be construed as limiting the scope and spirit of the present invention.

[0083] Unlike FIG. **1**, the image display apparatus **100** may not include the tuner unit **110** and the demodulator **120** shown in FIG. **1** and may receive broadcast content via the network interface **135** or the external device interface **135** and play the broadcast content back.

[0084] FIG. **2** is a block diagram showing the internal configuration of the controller illustrated in FIG. **1**.

[0085] Referring to FIG. **2**, the controller **170** according to the embodiment of the present invention may include a DEMUX **310**, a video processor **320**, a processor **330**, an OSD generator **340**, a mixer **345**, a Frame Rate Converter (FRC) **350**, and a formatter **360**. The controller **170** may further include an audio processor (not shown) and a data processor (not shown).

[0086] The DEMUX **310** demultiplexes an input stream. For example, the DEMUX **310** may demultiplex an MPEG-2 TS into a video signal, an audio signal, and a data signal. The stream signal input to the DEMUX **310** may be received from the tuner unit **110**, the demodulator **120** or the external device interface **135**.

[0087] The video processor **320** may process the demultiplexed video signal. For video signal processing, the video processor **320** may include a video decoder **325** and a scaler **335**.

[0088] The video decoder **325** decodes the demultiplexed video signal and the scaler **335** scales the resolution of the decoded video signal so that the video signal can be displayed on the display **180**.

[0089] The video decoder **325** may be provided with decoders that operate based on various standards.

[0090] The processor **330** may control the overall operation of the image display apparatus **100** or the controller **170**. For example, the processor **330** controls the tuner unit **110** to tune to an RF signal corresponding to a channel selected by the user or a previously stored channel.

[0091] The processor **330** may control overall operation of the image display apparatus **100** or the controller **170**. For example, the processor **330** may control the tuner unit **110** to tune to an RF broadcast corresponding to an RF signal corresponding to a channel selected by the user or a previously stored channel.

[0092] The processor **330** may control the image display apparatus **100** by a user command input through the user input interface **150** or an internal program.

[0093] The processor **330** may control data transmission of the network interface **135** or the external device interface **130**.

[0094] The processor **330** may control the operation of the DEMUX **310**, the video processor **320** and the OSD generator **340** of the controller **170**.

[0095] The OSD generator **340** generates an OSD signal autonomously or according to user input. For example, the OSD generator **340** may generate signals by which a variety of information is displayed as graphics or text on the display **180**, according to user input signals. The OSD signal may include various data such as a User Interface (UI), a variety of menus, widgets, icons, etc. Also, the OSD signal may include a 2D object and/or a 3D object.

[0096] The OSD generator **340** may generate a pointer which can be displayed on the display according to a pointing signal received from the remote controller **200**. In particular, such a pointer may be generated by a pointing signal processor and the OSD generator **340** may include such a pointing signal processor (not shown). Alternatively, the pointing signal processor (not shown) may be provided separately from the OSD generator **340**.

[0097] In association with the embodiment of the present invention, the OSD generator **340** may generate or configure a set personal screen if the user logs in to the image display apparatus **100**. Alternatively, the OSD generator **340** may generate or configure at least a part of a server access screen so as to display a server access screen received from a server on the display **180** if the user logs in to the accessed server. Alternatively, the OSD generator **340** may generate or configure at least a part of a web server access screen based on information about a web server which is being accessed using personal information.

[0098] The mixer **345** may mix the decoded video signal processed by the video processor **320** with the OSD signal generated by the OSD generator **340**. Each of the OSD signal and the decoded video signal may include at least one of a 2D signal and a 3D signal. The mixed video signal is provided to the FRC **350**.

[0099] The FRC **350** may change the frame rate of an input image. The FRC **350** may maintain the frame rate of the input image without frame rate conversion.

[0100] The formatter **360** changes the format of the signal mixed by the mixer **345**, that is, the OSD signal and decoded video signal, to be suitable for the display **180**. For example, the formatter **360** may convert a received signal into an RGB data signal. The RGB signal may be output in the form of a Low Voltage Differential Signal (LVDS) or mini-LVDS.

[0101] The formatter **360** may separate a 2D video signal and a 3D video signal, for 3D video display. The formatter **360** may change the format of a 3D video signal or convert a 2D video signal into a 3D video signal.

[0102] The audio processor (not shown) of the controller **170** may process the demultiplexed audio signal. For audio signal processing, the audio processor may have various decoders.

[0103] The audio processor (not shown) of the controller **170** may also adjust the bass, treble or volume of the audio signal.

[0104] The data processor (not shown) of the controller **170** may process the demultiplexed data signal. For example, if the demultiplexed data signal was encoded, the data processor may decode the data signal. The encoded data signal may be Electronic Program Guide (EPG) information including broadcasting information such as the start time and end time of broadcast programs of each channel.

[0105] Although the formatter **360** performs 3D processing after the signals from the OSD generator **340** and the video processor **320** are mixed by the mixer **345** in FIG. **2**, the present invention is not limited thereto and the mixer may be located at a next stage of the formatter.

[0106] The block diagram of the controller **170** shown in FIG. **2** is exemplary. The components of the block diagrams may be integrated or omitted, or a new component may be added according to the specifications of the controller **170**.

[0107] In particular, the FRC **350** and the formatter **360** may be included separately from the controller **170**.

[0108] FIG. **3** is a diagram showing a method of controlling a remote controller of FIG. **1**.

[0109] FIG. **3**(*a*) illustrates a pointer **205** representing movement of the remote controller **200** displayed on the display **180**.

[0110] The user may move or rotate the remote controller **200** up and down, side to side (FIG. **3**(*b*)), and back and forth (FIG. **3**(*c*)). The pointer **205** displayed on the display **180** of the image display apparatus corresponds to the movement of the remote controller **200**. Since the pointer **205** moves in accordance with the movement of the remote controller **200** in a 3D space, the remote controller **200** may be referred to as a pointing device.

[0111] Referring to FIG. **3**(*b*), if the user moves the remote controller **200** to the left, the pointer **205** moves to the left on the display **180** of the image display apparatus.

[0112] Information about the movement of the remote controller **200** sensed by the sensor of the remote controller **200** is transmitted to the image display apparatus. The image display apparatus may calculate the coordinates of the pointer **205** from the information about the movement of the remote controller **200**. Then, the image display apparatus may display the pointer **205** at the calculated coordinates.

[0113] Referring to FIG. **3**(*c*), while pressing a predetermined button of the remote controller **200**, the user moves the remote controller **200** away from the display **180**. Then, a selection area corresponding to the pointer **205** may be zoomed in and enlarged on the display **180**. On the contrary, if the user moves the remote controller **200** toward the display **180**, the selection area corresponding to the pointer **205** is zoomed out and thus contracted on the display **180**. Alternatively, when the remote controller **200** moves away from the

display **180**, the selection area may be zoomed out and when the remote controller **200** approaches the display **180**, the selection area may be zoomed in.

[0114] With the predetermined button pressed in the remote controller **200**, the up, down, left and right movements of the remote controller **200** may be ignored. That is, when the remote controller **200** moves away from or approaches the display **180**, only the back and forth movements of the remote controller **200** are sensed, while the up, down, left and right movements of the remote controller **200** are ignored. Unless the predetermined button is pressed in the remote controller **200**, the pointer **205** moves in accordance with the up, down, left or right movement of the remote controller **200**.

[0115] The speed and direction of the pointer **205** may correspond to the speed and direction of the remote controller **200**.

[0116] FIG. **4** is a perspective view of a remote controller according to an embodiment of the present invention and FIG. **5** is a block diagram showing the internal configuration of a remote controller according to an embodiment of the present invention.

[0117] Referring to FIG. **4**, the pointing device **201** according to the embodiment of the present invention may include various input keys, input buttons, etc.

[0118] For example, the pointing device **201** may include an okay key **291**, a menu key **292**, a 4-direction key **293**, a channel control key **294**, and a volume control key **296**.

[0119] For example, the okay key **291** may be used to select a menu or item, the menu key **292** may be used to display a predetermined menu, the 4-direction key **294** may be used to move a pointer or indicator up, down, left and right, the channel control key **294** may be used to move a channel up or down, and the volume control key **296** may be used for volume control.

[0120] The pointing device **201** may further include a back key **297** and a home key **298**. For example, the back key **297** may be used to move a screen to a previous screen and the home key **298** may be used to move a screen to a home screen.

[0121] As shown in FIG. **4**, the okay key **291** may further include a scroll function. For the scroll function, the okay key **291** may be implemented as a wheel key. That is, if the okay key **291** is pushed, the okay key **291** is used to select a menu or item and, if the okay key **291** is scrolled up or down, the okay key **291** is used to scroll a display screen or switch a list page.

[0122] More specifically, when the okay key **291** is scrolled for image searching in a state in which an image having a size greater than the size of the display is displayed on the display **180**, an image region which is not currently displayed is displayed on the display. As another example, if the okay key **291** is scrolled in a state in which a list page is displayed on the display **180**, a previous page or a next page of a current page may be displayed.

[0123] Such a scroll function may be included separately from the okay key **291**.

[0124] The four-direction key **293** may include up, down, left and right keys in a circular shape as shown in FIG. **4**. Touch input using the four-direction key **293** may be possible. For example, if a touch operation from the up key to the down key in the four-direction key **293** is performed, a set function may be input or performed according to the touch input.

[0125] Referring to FIG. **5**, the remote controller **200** may include a radio transceiver **220**, a user input portion **230**, a sensor portion **240**, an output portion **250**, a power supply **260**, a memory **270**, and a controller **280**.

[0126] The radio transceiver **220** transmits and receives signals to and from any one of the image display devices according to the embodiments of the present invention. Among the image display apparatuses according to the embodiments of the present invention, for example, one image display apparatus **100** will be described.

[0127] In accordance with the exemplary embodiment of the present invention, the remote controller **200** may be provided with an RF module **221** for transmitting and receiving signals to and from the image display device **100** according to an RF communication standard. Also, the remote controller **200** may include an IR module **223** for transmitting and receiving signals to and from the image display device **100** according to an IR communication standard.

[0128] In addition, the remote controller **200** may further include an NFC module (not shown) for NFC with an electronic apparatus.

[0129] The remote controller **200** may transmit information about movement of the remote controller **200** to the image display apparatus **100** via the RF module **221**.

[0130] The remote controller **200** may receive the signal from the image display apparatus **100** via the RF module **221**. The remote controller **200** may transmit commands associated with power on/off, channel switching, volume change, etc. to the image display device **100** through the IR module **223**.

[0131] According to the present embodiment, the remote controller **200** may receive personal information by NFC with a predetermined electronic apparatus.

[0132] The remote controller **200** may transmit the received personal information to the image display apparatus **100**. At this time, an IR method or an RF method may be used as a communication method.

[0133] The remote controller **200** may further receive information about a web server which is being accessed using the personal information, in addition to the personal information. For example, the remote controller **200** may receive web server information of a social network service which is being logged in and accessed by the mobile terminal **300**. Such web server information may also be transmitted to the image display apparatus **100**.

[0134] The remote controller **200** may receive apparatus information of another electronic apparatus or remote controllable channel information, frequency information or code information of another electronic apparatus. Based on the information about another electronic apparatus, a channel, frequency or code may be allocated to the electronic apparatus so as to perform remote control.

[0135] The user input portion **230** may include a keypad, a key (button), a touch pad or a touchscreen. The user may enter a command related to the image display device **100** to the remote controller **200** by manipulating the user input portion **230**. If the user input portion **230** includes hard keys, the user may enter commands related to the image display device **100** to the remote controller **200** by pushing the hard keys. If the user input portion **230** is provided with a touchscreen, the user may enter commands related to the image display device **100** to the remote controller **200** by touching soft keys on the touchscreen. Also, the user input portion **230** may have a variety of input means which may be manipulated by the user, such as a scroll key, a jog key, etc., to which the present invention is not limited.

[0136] The sensor portion **240** may include a gyroscopic sensor **241** or an acceleration sensor **243**. The gyroscopic sensor **241** may sense information about movement of the remote controller **200**.

[0137] For example, the gyroscopic sensor **241** may sense information about movement of the remote controller **200** along x, y and z axes. The acceleration sensor **243** may sense information about the velocity of the remote controller **200**. The sensor portion **240** may further include a distance measurement sensor for sensing a distance from the display **180**. Alternatively, the sensor portion **240** may include a geomagnetic sensor for detecting flow of a magnetic field generated by earth and detecting a compass bearing to detect change in the compass bearing.

[0138] The output portion **250** may output a video or audio signal corresponding to manipulation of the user input portion **230** or a signal transmitted by the image display device **100**. The user may be aware from the output portion **250** whether the user input portion **230** has been manipulated or the image display device **100** has been controlled.

[0139] For example, the output portion **250** may include a Light Emitting Diode (LED) module **251** for illuminating when the user input portion **230** has been manipulated or a signal is transmitted to or received from the image display device **100** through the radio transceiver **220**, a vibration module **253** for generating vibrations, an audio output module **255** for outputting audio, or a display module **257** for outputting video.

[0140] The power supply **260** supplies power to the remote controller **200**. When the remote controller **200** is kept stationary for a predetermined time, the power supply **260** blocks power from the remote controller **200**, thereby preventing waste of power. When a predetermined key of the remote controller **200** is manipulated, the power supply **260** may resume power supply.

[0141] The memory **270** may store a plurality of types of programs required for control or operation of the remote controller **200**, or application data. When the remote controller **200** transmits and receives signals to and from the image display device **100** wirelessly through the RF module **221**, the remote controller **200** and the image display device **100** perform signal transmission and reception in a predetermined frequency band. The controller **280** of the remote controller **200** may store information about the frequency band in which to wirelessly transmit and receive signals to and from the image display device **100** paired with the remote controller **200** in the memory **270** and refer to the information.

[0142] The memory **270** may store IR format key codes for controlling other electronic apparatuses as IR signals and store an IR format key database of a plurality of electronic apparatuses.

[0143] The controller **280** provides overall control to the remote controller **200**. The controller **280** may transmit a signal corresponding to predetermined key manipulation on the user input portion **230** or a signal corresponding to an movement of the remote controller **200** sensed by the sensor portion **240** to the image display device **100** through the radio transceiver **220**.

[0144] The controller **280** may control transmission of the received personal information to the image display apparatus **100** through the radio transceiver **220** by NFC with an electronic apparatus. In particular, if predetermined key input of the user input portion **230** is performed, the controller **280** may control transmission of the received personal information to the image display apparatus **100** through the radio transceiver **220**.

[0145] In addition, the controller **280** may control transmission of the received personal information to an electronic apparatus other than the image display apparatus **100**. At this time, different channels, frequencies or codes may be used with respect to electronic apparatuses. Such channels, frequencies or codes may be based on apparatus information or remote controllable channel information, frequency information or code information previously received from another electronic apparatus.

[0146] The user input interface **150** of the image display device **100** may have a radio transceiver **211** for wirelessly transmitting and receiving signals to and from the remote controller **200**, and a coordinate calculator **215** for calculating the coordinates of the pointer corresponding to an operation of the remote controller **200**.

[0147] The user input interface **150** may transmit and receive signals wirelessly to and from the remote controller **200** through an RF module **212**. The user input interface **150** may also receive a signal from the remote controller **200** through an IR module **213** based on the IR communication standard.

[0148] The coordinate calculator **215** may calculate the coordinates (x, y) of the pointer to be displayed on the display **180** by correcting handshaking or errors from a signal corresponding to an operation of the remote controller **200** received through the radio transceiver **211**.

[0149] A signal transmitted from the remote controller **200** to the image display apparatus **100** through the user input interface **150** is provided to the controller **180** of the image display device **100**. The controller **180** may identify information about an operation of the remote controller **200** or key manipulation on the remote controller **200** from the signal received from the remote controller **200** and control the image display device **100** according to the information.

[0150] In another example, the remote controller **200** may calculate the coordinates of the pointer corresponding to the operation of the remote controller and output the coordinates to the user input interface **150** of the image display device **100**. The user input interface **150** of the image display device **100** may then transmit information about the received coordinates to the controller **180** without correcting handshaking or errors.

[0151] As another example, the coordinate calculator **215** may not be included in the user input interface **150** but may be included in the controller **170**.

[0152] FIG. **6** is a flowchart illustrating a method for operating an image display apparatus according to an embodiment of the present invention, and FIGS. **7** to **15** are views referred to for describing various examples of the method for operating the image display apparatus according to various embodiments of the present invention.

[0153] Referring to the figures, the interface **150** of the image display apparatus **100** may receive a pairing request signal from the first remote controller **201** (S**610**) and may perform pairing with the first remote controller (S**620**).

[0154] Hereinafter, an embodiment of step S**610** of receiving the pairing request signal and step S**620** of performing pairing will be described in greater detail.

[0155] The first remote controller **201** and the image display apparatus **100** may transmit and receive a signal to and from each other through a frequency channel for manage-

ment. Information about the frequency channel for management may be stored in the memory **270** of the first remote controller **201** or the memory **140** of the image display device **100**.

[0156] The first remote controller **201** may refer to the information about the frequency channel for management stored in the memory **270** and request pairing from the image display apparatus **100** using the frequency channel for management according to the information. If the frequency channel for management is used, the first remote controller **201** may transmit and receive a signal according to an RF communication protocol to and from the image display apparatus **100** before pairing.

[0157] If the first remote controller **201** is reset, if a user manipulates a pairing request button, for example, an OK button, or if a power-on command of the image display apparatus **100** is input to the first remote controller **201**, the first remote controller **201** may transmit a signal including a pairing request packet to the image display apparatus **100**.

[0158] The controller **280** of the first remote controller **201** may transmit the pairing request signal to the image display apparatus **100** through the RF module **221** of the radio transceiver **220** by referring to the information about the frequency channel for management stored in the memory **270**.

[0159] The image display apparatus **100** may receive the pairing request packet transmitted by the first remote controller **201** through the RF module **221** of the radio transceiver **220** of the image display apparatus. The image display apparatus **100** may transmit a signal including information about a frequency channel for pairing to the first remote controller **201** in response to the received pairing request packet.

[0160] The first remote controller **201** may receive the information about the frequency channel for pairing transmitted by the image display apparatus **100** through the RF module **221** of the radio transceiver **220** and scan the frequency channel included in the transmitted frequency channel information.

[0161] The first remote controller **201** selects an optimal frequency channel obtained as the scanning result as the frequency channel for pairing. The optimal frequency channel may be a frequency channel capable of best receiving data or a frequency channel having highest power. In addition, the first remote controller **201** may select a frequency channel which is not used in another remote controller as the frequency channel for pairing. In addition, the first remote controller **201** may set a frequency channel having lowest noise or interference as the frequency channel for pairing.

[0162] The first remote controller **201** transmits the information about the selected channel to the image display apparatus **100**. The image display apparatus **100** selects the frequency channel for pairing according to the received channel information and finishes pairing between the first remote controller **201** and the image display apparatus **100**.

[0163] Thereafter, if a predetermined button or key of the user input unit **230** is manipulated or if the first remote controller **201** is moved, the controller **280** of the paired first remote controller **201** may transmit a signal corresponding to manipulation of the predetermined button or key or movement of the first remote controller to the image display apparatus **100** through the RF module **221**. The image display apparatus **100** may grant a control right to the paired first remote controller **201** and perform corresponding operation based on the signal received from the first remote controller **201**.

[0164] In the present specification, the image display apparatus **100** granting the control right to the predetermined remote controller **200** means that the image display apparatus operates based on a signal received from the remote controller **200** to which the control right is granted and ignores a signal received from a remote controller **200** to which the control right is not granted and does not operate according to the signal.

[0165] While pairing with the first remote controller **201** has been performed or is being performed, the pairing request signal may be received from a second remote controller **202** (S**630**).

[0166] The controller **170** of the image display apparatus **100** confirms the attributes of content which is being used in response to receipt of the pairing request signal (S**640**) and determines whether pairing with the second remote controller is performed based on the confirmed attributes of the content (S**650**).

[0167] For example, if game content is currently used through the image display apparatus **100**, a plurality of remote controllers may be required and thus the controller **170** determines that pairing with the second remote controller is performed.

[0168] Referring to FIG. **7**, predetermined game content, e.g., a shooting game, may be used through the image display apparatus **100**. In this case, a first player may control a screen **710** and a gun **711** using the first remote controller **201**. If the shooting game is content which may be used by a plurality of players, the game may be played when a second player performs pairing or manipulation of the second remote controller **202**. The first and second remote controller **201** and **202** may control different objects **721** and **722** on a screen **720**.

[0169] Accordingly, a remote controller which is being manipulated is registered and used as the first player and then subsequently manipulated remote controllers are registered and used as the second and third players.

[0170] Alternatively, if a specific user logs in to the image display apparatus **100** so as to use a personalized service such as a social network service, the controller **170** determines that pairing with the second remote controller is not performed.

[0171] As shown in FIG. **8**, if a security function or service such as password settings **810** is used, only one remote controller, e.g., the first remote controller **201**, may be set to be manipulated.

[0172] Alternatively, as shown in FIG. **9**, the first and second remote controllers **201** and **202** may be set to perform basic manipulation such as channel change or volume change.

[0173] Pairing with the second remote controller may be performed based on the confirmed attributes of the content (S**660**). In this case, according to embodiments, a step of displaying pairing progress information of the second remote controller on the display **180** may be further included.

[0174] In addition, a step of displaying one or two pointers on the display **180** based on the confirmed attributes of the content may be further included.

[0175] If pairing with the second remote controller is also performed (S**660**), the controller **170** may grant a control right to at least one of the first remote controller and the second remote controller based on the confirmed attributes of the content (S**670**).

[0176] The controller **170** may grant a control right to the first remote controller or the second remote controller accord-

ing to content attributes such that the image display apparatus **100** is controlled using only one remote controller in at least a specific situation.

[0177] Alternatively, the controller **170** may grant a control right to both the first remote controller and the second remote controller. In this case, according to embodiments, priority is given to any one of the first remote controller and the second remote controller such that a command of a remote controller with high priority is executed first.

[0178] When a signal is received from at least one remote controller (S**680**) in a state in which pairing with the first remote controller **201** and the second remote controller **202** is performed, the controller **170** may control to perform operation based on a signal of a predetermined remote controller according to the control right (S**690**).

[0179] In step S**690** of performing operation according to the control right, operation may be variously performed according to control right, priority or user or manufacturer settings.

[0180] For example, the method for operating the image display apparatus according to one embodiment of the present invention may further include performing operation corresponding to operation of the first remote controller if the first remote controller is operating. That is, the controller **170** may control preferential execution of a command received from the remote controller which is being manipulated.

[0181] In this case, after operation of the first remote controller is finished, a step of receiving a signal from the first remote controller or the second remote controller and a step of performing operation based on the signal received from the first remote controller or the second remote controller may be further included. The controller **170** may control performance of operation corresponding to the first input signal of the remote controller after operation of the first remote controller is finished.

[0182] In addition, if the display of the pointer is finished as operation of the first remote controller is finished and a signal is received from the first remote controller or the second remote controller, a step of displaying the pointer again may be further included. The controller **170** may control performance of operation corresponding to the first input signal of the remote controller after operation of the first remote controller is finished.

[0183] Alternatively, the method for operating the image display apparatus according to one embodiment of the present invention may further include a step of performing operation corresponding to only the signal received from any one remote controller according to predetermined priority if, in a state in which any one of the paired first and second remote controllers is operating, the other remote controller operates. The controller **170** may control operation corresponding to the signal received from any one remote controller to be performed according to predetermined priority and control the signal received from the other remote controller to be ignored.

[0184] The method for operating the image display apparatus according to one embodiment of the present invention may further include a step of releasing pairing with the first remote controller based on the confirmed attributes of the content. The controller **170** may determine that pairing with the second remote controller is not performed if the confirmed content allows only one remote controller. Alternatively, the controller **170** may control pairing with the first remote controller to be released if it is determined that pairing with the second remote controller for newly requesting pairing is performed.

[0185] The method for operating the image display apparatus according to one embodiment of the present invention may further include a step of displaying a first pointer in correspondence with pairing with the first remote controller.

[0186] In this case, a step of performing pairing with the second remote controller and a step of moving the first pointer in correspondence with motion of at least one of the first remote controller and the second controller may be further included.

[0187] Alternatively, a step of performing pairing with the second remote controller, a step of displaying a second pointer according to pairing with the second remote controller, and a step of moving the first pointer in correspondence with motion of the first remote controller and moving the second pointer in correspondence with motion of the second remote controller may be further included. The controller **170** may control the first pointer and the second pointer to have different display states.

[0188] FIGS. **10***a* to **10***c* show one of embodiments in which only one remote controller operates.

[0189] Referring to FIGS. **10***a* to **10***c*, a first user may control the image display apparatus **100** using the paired first remote controller **201**. For example, the first user may control a pointer **1010** displayed in correspondence with motion of the first remote controller **201** using the first remote controller **201**.

[0190] A dotted line surrounding the remote controller in the figures of the present specification means a remote controller which is operating.

[0191] Thereafter, if the first user or a second user manipulates a predetermined key, e.g., an "OK" key, corresponding to a request for pairing with the second controller **202**, the controller **170** may determine whether pairing with the second remote controller **202** is performed according to content attributes.

[0192] If it is determined that pairing with the second remote controller **202** is performed, pairing progress information **1020** and **1030** indicating that pairing with the second remote controller is being performed or has been performed may be displayed on the display **180**.

[0193] In the embodiment of FIGS. **10***a* to **10***c*, the newly registered remote controller, e.g., the second remote controller **202**, is preferred over the first remote controller **201**. Accordingly, it is possible to control the image display apparatus **100** or the pointer **1010** using the newly paired second remote controller **202**.

[0194] FIGS. **11***a* to **11***c* show one of embodiments in which only one remote controller operates. More specifically, FIGS. **11***a* to **11***c* show an embodiment in which the remote controller operates in a state in which priority is given to a newly input signal.

[0195] As shown in FIG. **11***a*, if a predetermined signal is received from the second remote controller **202** through the interface **150** while the first remote controller **201** is operating, that is, while the pointer **110** is moved using the first remote controller **201**, the controller **170** may control operation of the first remote controller **201** to be finished and control performance of operation corresponding to the signal received from the second remote controller **202** as shown in FIG. **11***b*.

[0196] As shown in FIG. **11***c*, when the predetermined signal is received from the first remote controller **201**, the controller **170** may control operation of the second remote controller **202** to be finished and control performance of operation corresponding to the signal received from the first remote controller **201**.

[0197] FIGS. **12***a* to **12***c* show one of embodiments in which only one remote controller operates.

[0198] Referring to FIGS. **12***a* to **12***c*, a first user may control the image display apparatus **100** using the paired first remote controller **201**. For example, the first user may control the pointer **1210** displayed in correspondence with motion of the first remote controller **201** using the first remote controller **201**.

[0199] If the first user or the second user manipulates a predetermined key, e.g., an "OK" key, corresponding to a request for pairing with the second remote controller **202**, the controller **170** may determine whether pairing with the second remote controller **202** is performed according to content attributes.

[0200] If it is determined that pairing with the second remote controller **202** is performed, the display **180** may display pairing progress information **1220** and **1230** indicating that pairing with the second remote controller is being performed or has been performed may be displayed on the display **180**.

[0201] In the embodiment of FIGS. **10***a* to **10***c*, the newly registered remote controller, e.g., the second remote controller **202**, is preferred over the first remote controller **201**.

[0202] However, in the embodiment of FIGS. **12***a* to **12***c*, the previously registered remote controller, that is, the first remote controller **201** may be preferred over the second remote controller **202**. Therefore, after pairing with the second remote controller **202** is finished, it is possible to control the image display apparatus **100** or the pointer **1210** using the previously paired first remote controller **201**.

[0203] Even after operation of the first remote controller **201** is finished, the image display apparatus **100** may operate in correspondence with any newly operated remote controller.

[0204] Referring to FIGS. **13***a* to **13***d*, the display of the pointer may be finished as operation of the first remote controller is finished and the pointer may be displayed again if a signal is received from the first remote controller or the second remote controller.

[0205] First, as shown in FIG. **13***a*, if a predetermined signal is received from the second remote controller **202** through the interface **150** while the first remote controller **201** is operating, that is, while the pointer **130** is moved using the first remote controller **201**, the controller **170** may control operation of the first remote controller **201** to be maintained and control operation corresponding to the signal received from the second remote controller **202** to be ignored as shown in FIG. **13***b*.

[0206] Then, if operation of the first remote controller **201** is finished, the display of the pointer may be finished and hidden from the screen as shown in FIG. **13***c*. Accordingly, the user may be intuitively aware that the image display apparatus may be controlled using any remote controller.

[0207] As shown in FIG. **13***d*, if a signal is received from the first remote controller or the second remote controller, the controller **170** may display the pointer again and control performance of operation corresponding thereto.

[0208] FIGS. **14** and **15** show an example in which two points are displayed according to pairing with the first and second remote controller **201** and **202** and one pointer is controlled using the first and second remote controllers **201** and **202**.

[0209] Referring to FIGS. **14** and **15**, a first pointer **1410** may be displayed on the display **180** in correspondence with pairing with the first remote controller **201** and a second pointer **1420** may be displayed on the display **180** in correspondence with pairing with the second remote controller **202**. In this case, the first pointer **1410** may be moved in correspondence with motion of the first remote controller **201** and the second pointer **1420** may be moved in correspondence with motion of the second remote controller **202**.

[0210] As shown in FIG. **15**, the first pointer **1510** and the second pointer **1520** may have different display states. The controller **170** may control the first pointer **1510** and the second pointer **1520** to be differently displayed in terms of at least one of the shape, the size and the color or control the first pointer **1510** and the second pointer **1520** to have predetermined identification marks.

[0211] According to the embodiments of the present invention, it is possible to determine whether pairing with a plurality of remote controllers is performed according to content attributes and to grant a control right to at least one of the plurality of remote controllers. Accordingly, it is possible to increase user convenience by variously and conveniently using the plurality of remote controllers according to content.

[0212] The method for operating an image display apparatus according to the foregoing embodiments may be implemented as code that can be written to a computer-readable recording medium and can thus be read by a processor. The computer-readable recording medium may be any type of recording device in which data can be stored in a computer-readable manner. Examples of the computer-readable recording medium include a ROM, a RAM, a CD-ROM, a magnetic tape, a floppy disk, an optical data storage, and a carrier wave (e.g., data transmission over the Internet). The computer-readable recording medium can be distributed over a plurality of computer systems connected to a network so that computer-readable code is written thereto and executed therefrom in a decentralized manner. Functional programs, code, and code segments needed for realizing the embodiments herein can be construed by one of ordinary skill in the art.

[0213] Although the preferred embodiments of the present invention have been disclosed for illustrative purposes, those skilled in the art will appreciate that various modifications, additions and substitutions are possible, without departing from the scope and spirit of the invention as disclosed in the accompanying claims.

What is claimed is:

1. A method for operating an image display apparatus, the method comprising:

receiving a pairing request signal from a first remote controller;

performing pairing with the first remote controller;

receiving a pairing request signal from a second remote controller;

confirming attributes of content which is being used; and

determining whether pairing with the second remote controller is performed based on the confirmed attributes of the content.

2. The method according to claim **1**, further comprising granting a control right to at least one of the first remote

controller and the second remote controller based on the confirmed attributes of the content.

3. The method according to claim **1**, further comprising performing pairing with the second remote controller based on the confirmed attributes of the content.

4. The method according to claim **3**, further comprising displaying pairing progress information of the second remote controller on a display.

5. The method according to claim **3**, further comprising performing operation corresponding to operation of the first remote controller if the first remote controller is operating.

6. The method according to claim **5**, further comprising:

receiving a signal from the first remote controller or the second remote controller after operation of the first remote controller is finished; and

performing operation based on the signal received from the first remote controller or the second remote controller.

7. The method according to claim **6**, further comprising finishing the display of a pointer as operation of the first remote controller is finished and displaying the pointer again if a signal is received from the first remote controller or the second remote controller.

8. The method according to claim **3**, further comprising performing operation corresponding to only a signal received from any one remote controller according to predetermined priority if, in a state of operating any one of the paired first and second remote controllers, the other remote controller operates.

9. The method according to claim **1**, further comprising releasing pairing with the first remote controller based on the confirmed attributes of the content.

10. The method according to claim **1**, further comprising displaying one or two pointers based on the confirmed attributes of the content.

11. The method according to claim **1**, further comprising displaying a first pointer in correspondence with pairing with the first remote controller.

12. The method according to claim **11**, further comprising:
performing pairing with the second remote controller; and
moving the first pointer in correspondence with motion of at least one of the first remote controller and the second remote controller.

13. The method according to claim **11**, further comprising:
performing pairing with the second remote controller; and
displaying a second pointer in correspondence with pairing with the second remote controller;
moving the first pointer in correspondence with motion of the first remote controller and moving the second pointer in correspondence with motion of the second remote controller.

14. The method according to claim **13**, wherein the first pointer and the second pointer have different display states.

15. An image display apparatus comprising:
an interface configured to receive a pairing request signal from a remote controller;
a display configured to display predetermined content; and
a controller configured to receive a pairing request signal from a second remote controller in a state of performing pairing with a first remote controller and to determine whether pairing with the second remote controller is performed based on attributes of the predetermined content.

16. The image display apparatus according to claim **15**, wherein the controller grants a control right to at least one of the first remote controller and the second remote controller based on the attributes of the predetermined content.

17. The image display apparatus according to claim **15**, wherein the controller controls pairing with the second remote controller based on the attributes of the predetermined content.

18. The image display apparatus according to claim **17**, wherein the controller controls display of pairing progress information of the second remote controller on the display.

19. The image display apparatus according to claim **17**, wherein the controller controls one or two pointers on the display based on the attributes of the content.

20. The image display apparatus according to claim **17**, wherein, if two pointers are displayed, the controller controls the two pointers to be differently displayed.

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