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(12) **United States Patent**
Hirabayashi

(10) **Patent No.: US 9,924,124 B2**
(45) **Date of Patent: Mar. 20, 2018**

(54) **VIDEO DISPLAY APPARATUS AND TERMINAL APPARATUS**

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(72) Inventor: **Masayuki Hirabayashi**, Ibaraki (JP)

(73) Assignee: **HITACHI MAXELL, LTD.**, Osaka (JP)

(*) Notice: Subject to any disclaimer, the term of this patent is extended or adjusted under 35 U.S.C. 154(b) by 0 days.

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PCT Pub. Date: **Jun. 12, 2014**

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(30) **Foreign Application Priority Data**

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(51) **Int. Cl.**
H04N 5/50 (2006.01)
H04N 5/44 (2011.01)
(Continued)

(52) **U.S. Cl.**
CPC ***H04N 5/4403*** (2013.01); ***G06Q 30/0267*** (2013.01); ***H04N 5/44*** (2013.01);
(Continued)

(58) **Field of Classification Search**
CPC H04N 21/433; H04N 21/4852; H04N 5/50; H04N 5/4403; H04N 5/44; H04N 7/173;
(Continued)

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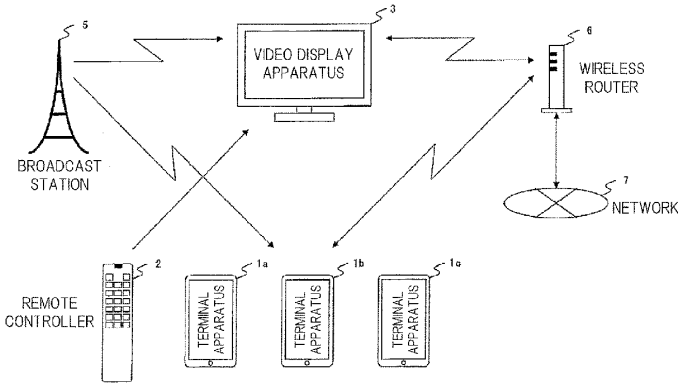
Assistant Examiner — Mustafizur Rahman
(74) *Attorney, Agent, or Firm* — McDermott Will & Emery LLP

(57) **ABSTRACT**

The present invention provides user-friendly video display apparatus and terminal apparatus. In the present invention, a terminal apparatus having a function of remotely controlling a video display apparatus includes a communication unit that transmits a command related to setting of the video display apparatus and receives status information, a signal receiving unit that receives a signal output from a broadcast station and decodes a video content, a memory unit that stores a content of a command including a channel of the video content, and a display unit that displays the video content and various types of information. In this terminal apparatus, the communication unit transmits an identification code specific to the terminal apparatus when transmitting the command, and when the status information is received after a channel of the video display apparatus is set by remote control, the video content of the channel stored in
(Continued)



the memory unit is decoded by the signal receiving unit and is displayed on the display unit.

2 Claims, 29 Drawing Sheets

(51) **Int. Cl.**
H04N 21/433 (2011.01)
G06Q 30/02 (2012.01)

(52) **U.S. Cl.**
CPC ***H04N 5/50*** (2013.01); ***H04N 21/433*** (2013.01); *H04N 2005/443* (2013.01); *H04N 2005/4433* (2013.01); *H04N 2005/4442* (2013.01); *H04N 2005/4444* (2013.01)

(58) **Field of Classification Search**
CPC H04N 2005/443; H04N 2005/4433; H04N 2005/4442; H04N 2005/4444
USPC 348/731, 732, 725, 723, 719, 716, 714, 348/706, 705, 14.07, 158, 231.3, 376, 348/510, 552, 553, 563, 564, 567, 576; 725/32, 34, 37, 30, 38, 40, 60, 54, 100, 725/110, 114; 455/343.3, 428; 340/10.42; 709/231, 203
See application file for complete search history.

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2012/0173753	A1 *	7/2012	Moorthy	H04N 21/23406 709/231
2012/0223819	A1 *	9/2012	Burgess	H04B 5/0031 340/10.42
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FIG. 1

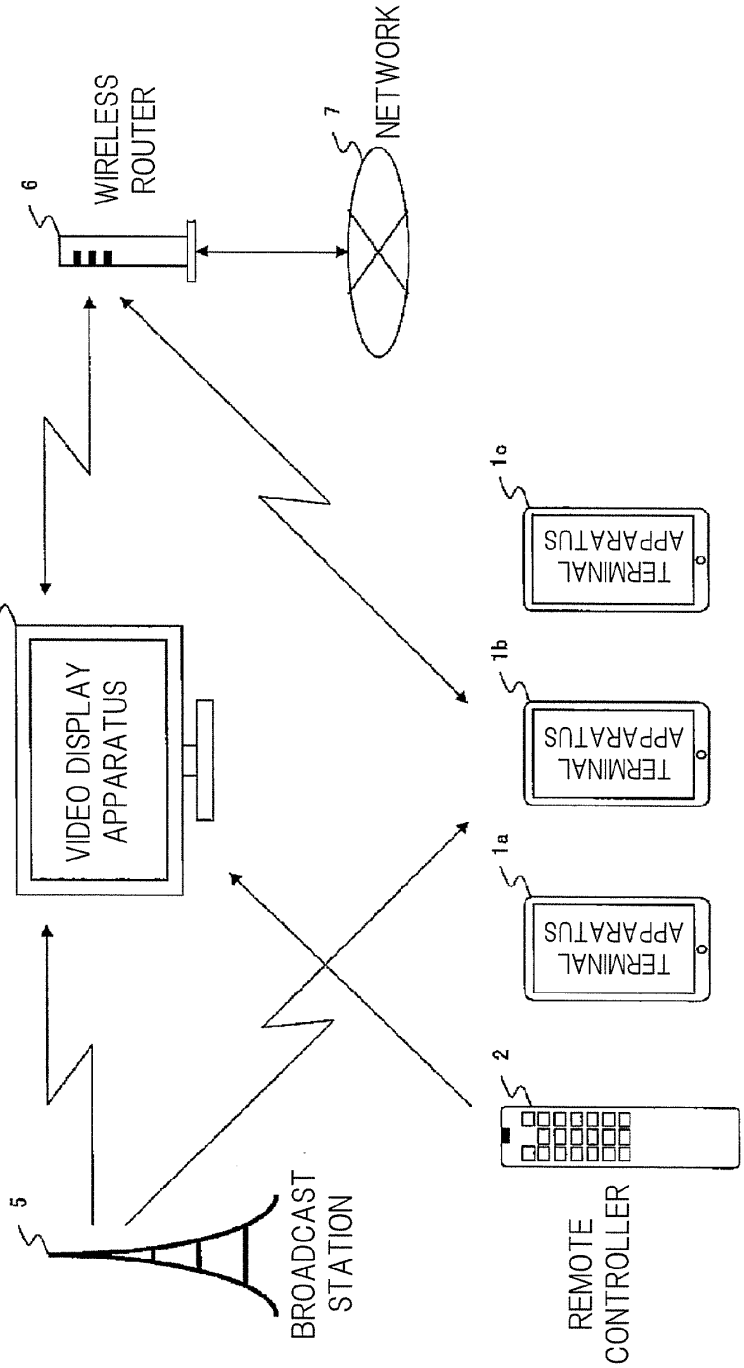

WIRELESS ROUTER
6
NETWORK
7
VIDEO DISPLAY APPARATUS
3
TERMINAL APPARATUS
1c
TERMINAL APPARATUS
1b
TERMINAL APPARATUS
1a
REMOTE CONTROLLER
2
BROADCAST STATION
5

FIG. 2

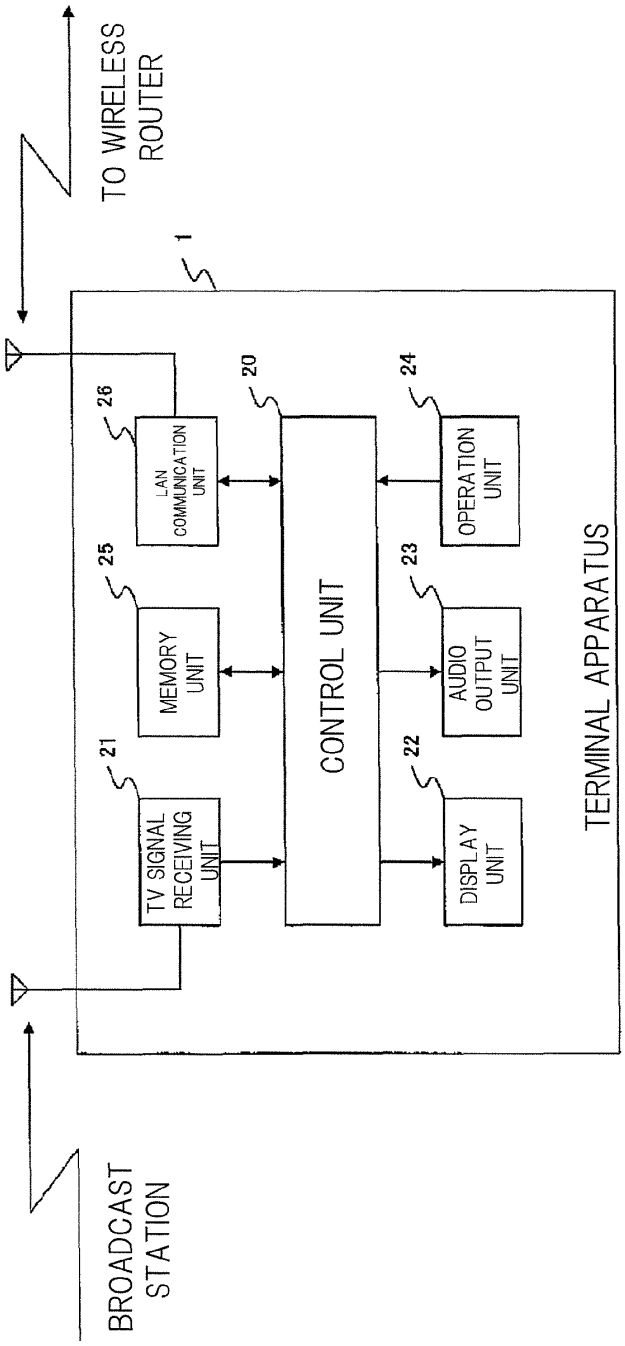

TO WIRELESS ROUTER
1
20
24
26
LAN COMMUNICATION UNIT
OPERATION UNIT
25
23
MEMORY UNIT
CONTROL UNIT
AUDIO OUTPUT UNIT
21
22
TV SIGNAL RECEIVING UNIT
DISPLAY UNIT
TERMINAL APPARATUS
BROADCAST STATION

FIG. 3

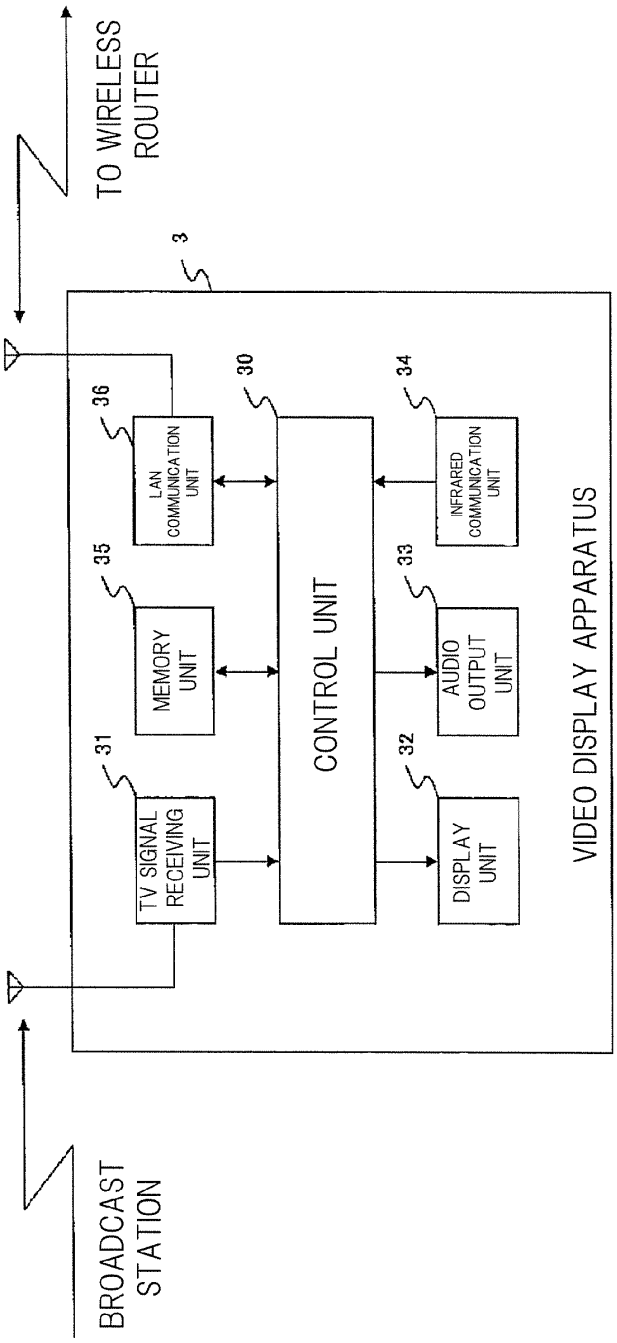

TO WIRELESS ROUTER
3
VIDEO DISPLAY APPARATUS
30
CONTROL UNIT
36
LAN COMMUNICATION UNIT
34
INFRARED COMMUNICATION UNIT
35
MEMORY UNIT
33
AUDIO OUTPUT UNIT
31
TV SIGNAL RECEIVING UNIT
32
DISPLAY UNIT
BROADCAST STATION

FIG. 4

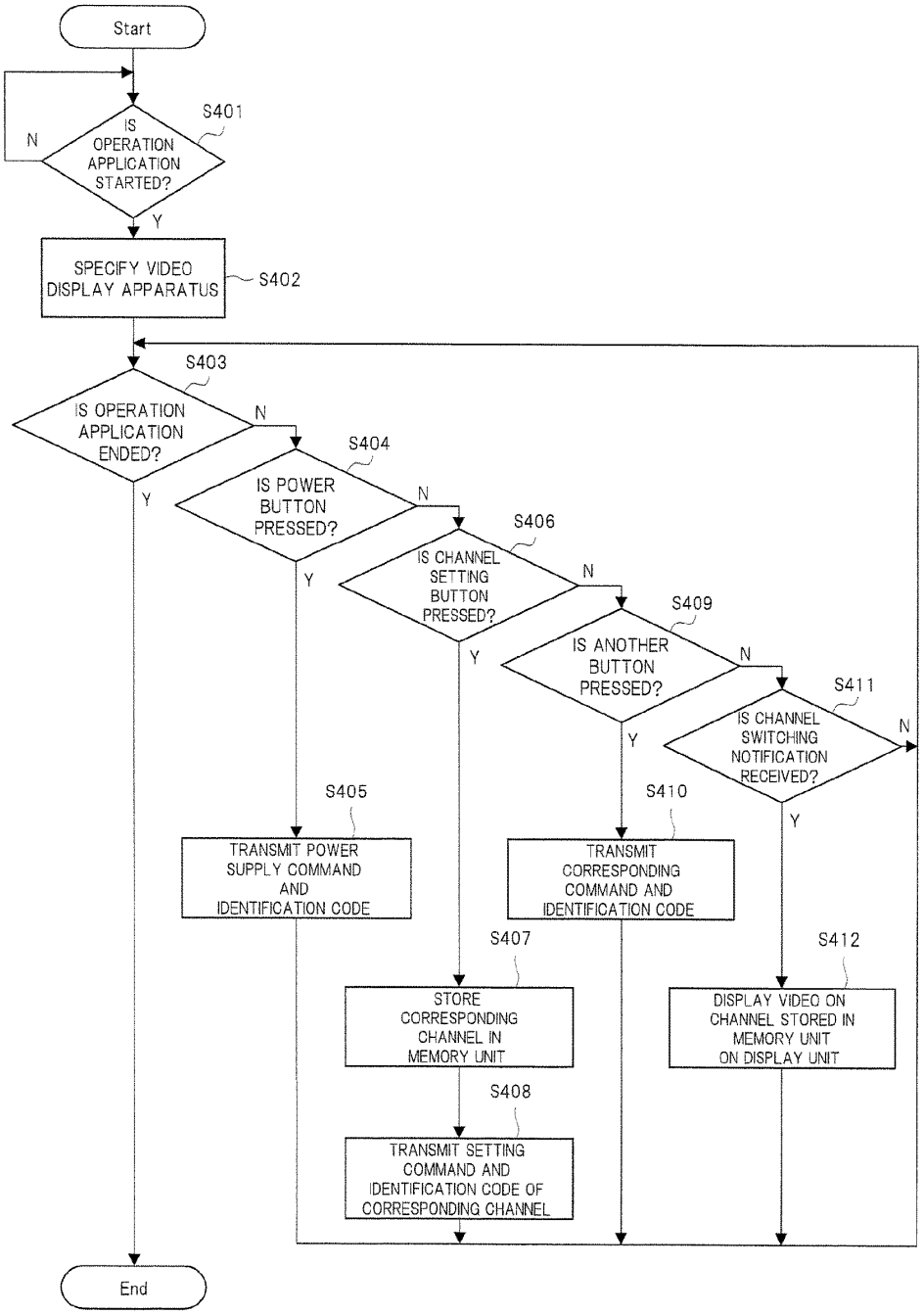
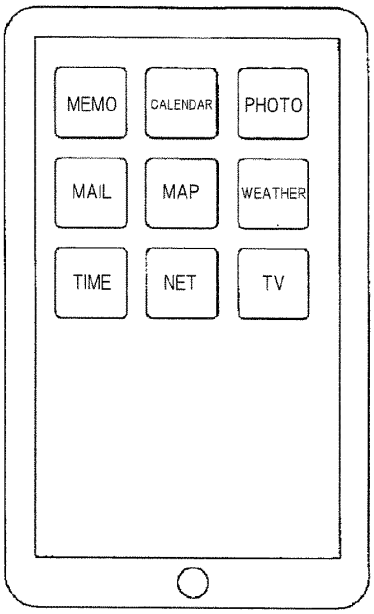

Start
S401
IS OPERATION APPLICATION STARTED?
N
Y
SPECIFY VIDEO DISPLAY APPARATUS
S402
S403
IS OPERATION APPLICATION ENDED?
N
Y
S404
IS POWER BUTTON PRESSED?
N
Y
S406
IS CHANNEL SETTING BUTTON PRESSED?
N
Y
S409
IS ANOTHER BUTTON PRESSED?
N
Y
S411
IS CHANNEL SWITCHING NOTIFICATION RECEIVED?
N
Y
S405
TRANSMIT POWER SUPPLY COMMAND AND IDENTIFICATION CODE
S410
TRANSMIT CORRESPONDING COMMAND AND IDENTIFICATION CODE
S407
STORE CORRESPONDING CHANNEL IN MEMORY UNIT
S408
TRANSMIT SETTING COMMAND AND IDENTIFICATION CODE OF CORRESPONDING CHANNEL
S412
DISPLAY VIDEO ON CHANNEL STORED IN MEMORY UNIT ON DISPLAY UNIT
End

FIG. 5

(a)


MEMO
CALENDAR
PHOTO
MAIL
MAP
WEATHER
TIME
NET
TV

(b)

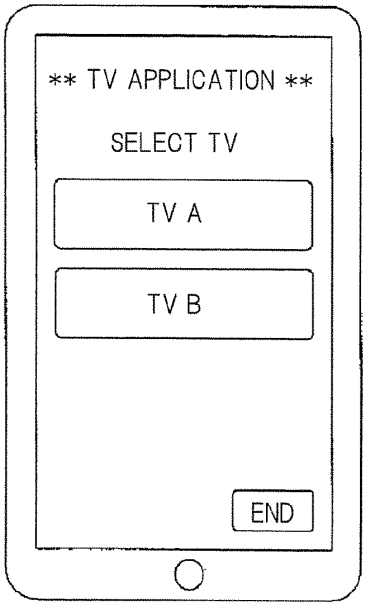
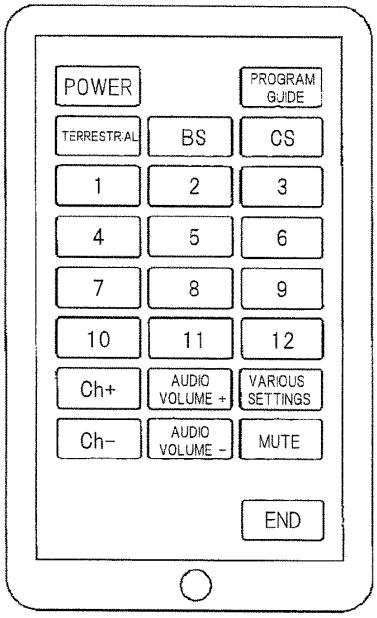

** TV APPLICATION **
SELECT TV
TV A
TV B
END

FIG. 5

(c)


POWER
PROGRAM GUIDE
TERRESTRIAL
BS
CS
1
2
3
4
5
6
7
8
9
10
11
12
Ch+
AUDIO VOLUME +
VARIOUS SETTINGS
Ch−
AUDIO VOLUME −
MUTE
END

(d)

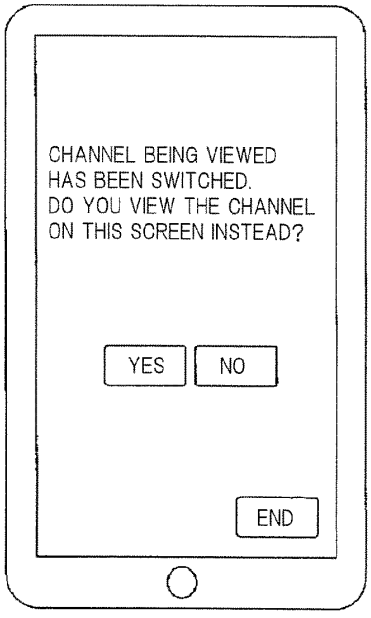

CHANNEL BEING VIEWED
HAS BEEN SWITCHED.
DO YOU VIEW THE CHANNEL
ON THIS SCREEN INSTEAD?
YES
NO
END

FIG. 6

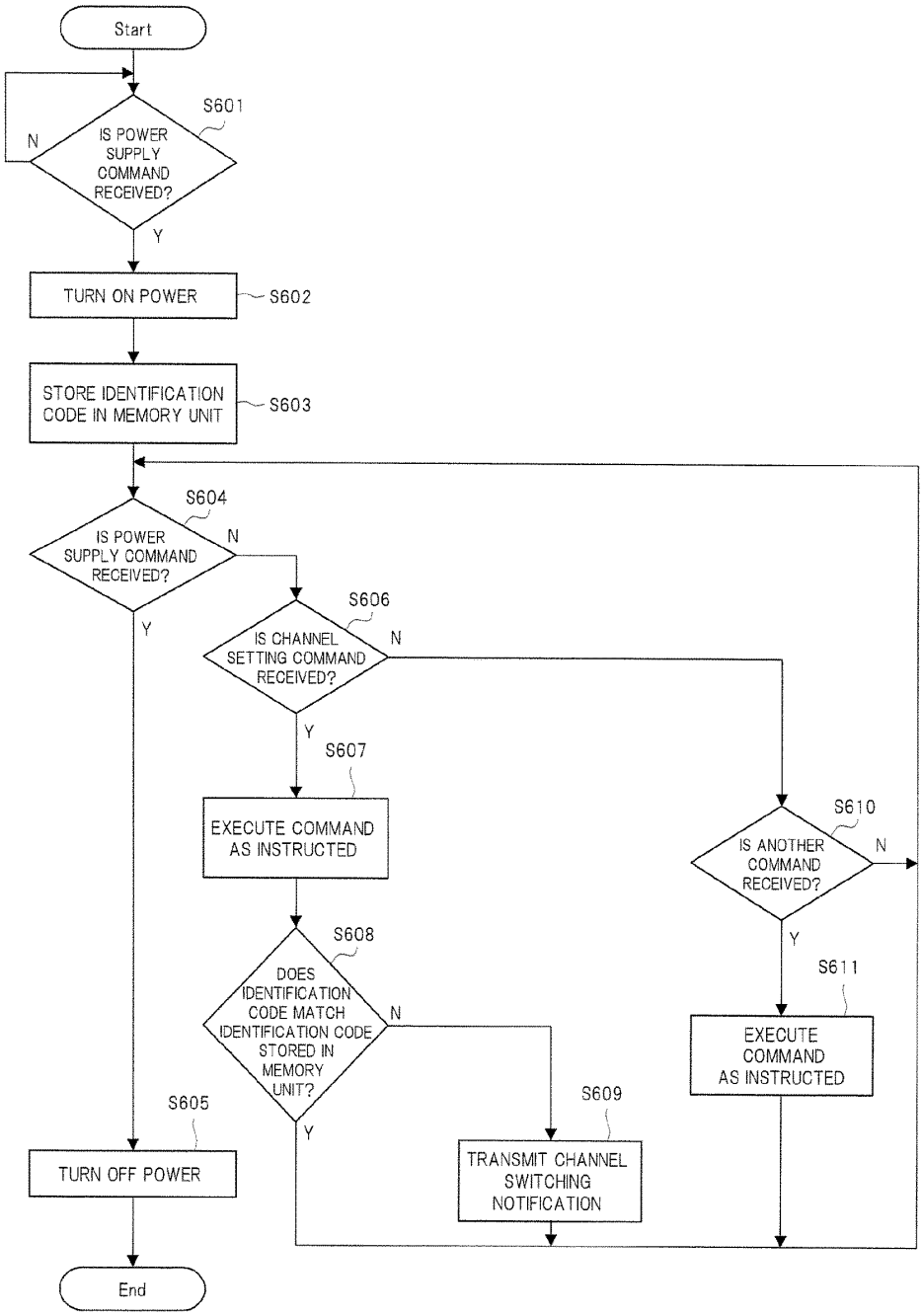

Start
S601
IS POWER SUPPLY COMMAND RECEIVED?
N
Y
TURN ON POWER
S602
STORE IDENTIFICATION CODE IN MEMORY UNIT
S603
S604
IS POWER SUPPLY COMMAND RECEIVED?
N
Y
S606
IS CHANNEL SETTING COMMAND RECEIVED?
N
Y
S607
EXECUTE COMMAND AS INSTRUCTED
S608
DOES IDENTIFICATION CODE MATCH IDENTIFICATION CODE STORED IN MEMORY UNIT?
N
Y
S609
TRANSMIT CHANNEL SWITCHING NOTIFICATION
S610
IS ANOTHER COMMAND RECEIVED?
N
Y
S611
EXECUTE COMMAND AS INSTRUCTED
S605
TURN OFF POWER
End

FIG. 7

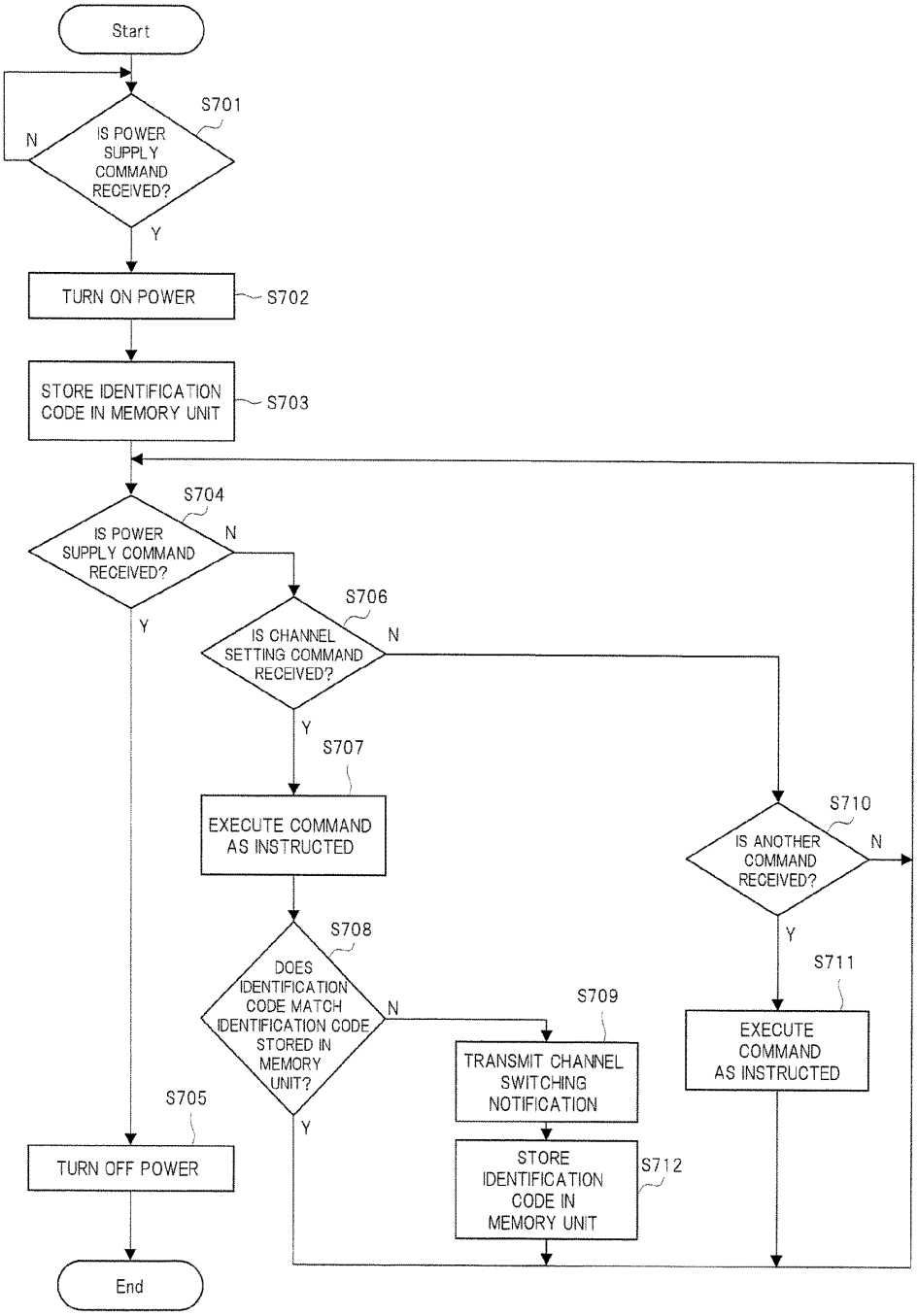

Start
S701
IS POWER SUPPLY COMMAND RECEIVED?
N
Y
TURN ON POWER
S702
STORE IDENTIFICATION CODE IN MEMORY UNIT
S703
S704
IS POWER SUPPLY COMMAND RECEIVED?
N
Y
S706
IS CHANNEL SETTING COMMAND RECEIVED?
N
Y
S707
EXECUTE COMMAND AS INSTRUCTED
S708
DOES IDENTIFICATION CODE MATCH IDENTIFICATION CODE STORED IN MEMORY UNIT?
N
Y
S709
TRANSMIT CHANNEL SWITCHING NOTIFICATION
STORE IDENTIFICATION CODE IN MEMORY UNIT
S712
S710
IS ANOTHER COMMAND RECEIVED?
N
Y
S711
EXECUTE COMMAND AS INSTRUCTED
S705
TURN OFF POWER
End

FIG. 8

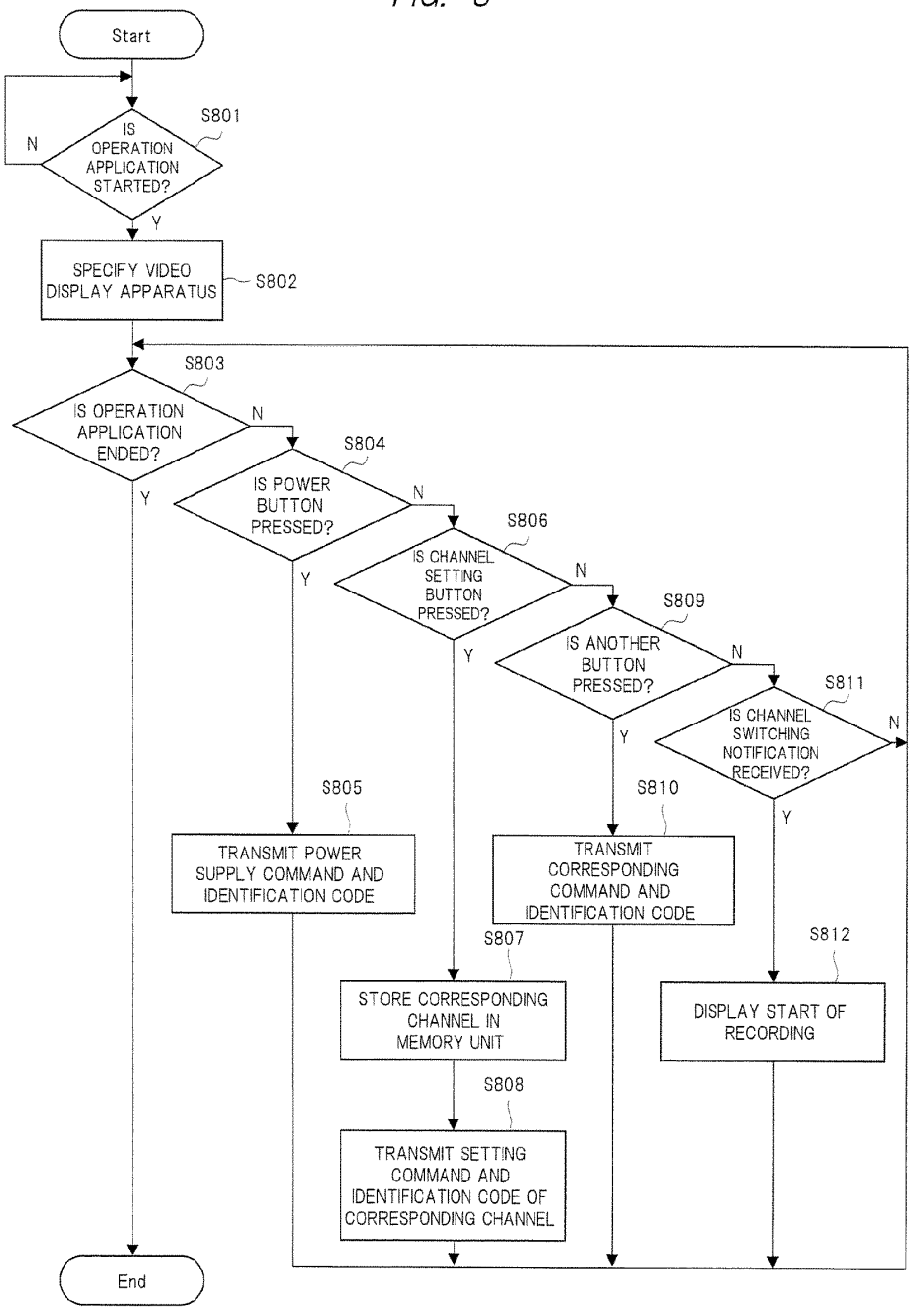

Start
S801
IS OPERATION APPLICATION STARTED?
N
Y
SPECIFY VIDEO DISPLAY APPARATUS
S802
S803
IS OPERATION APPLICATION ENDED?
N
Y
S804
IS POWER BUTTON PRESSED?
N
Y
S806
IS CHANNEL SETTING BUTTON PRESSED?
N
Y
S809
IS ANOTHER BUTTON PRESSED?
N
Y
S811
IS CHANNEL SWITCHING NOTIFICATION RECEIVED?
N
Y
S805
TRANSMIT POWER SUPPLY COMMAND AND IDENTIFICATION CODE
S810
TRANSMIT CORRESPONDING COMMAND AND IDENTIFICATION CODE
S807
STORE CORRESPONDING CHANNEL IN MEMORY UNIT
S808
TRANSMIT SETTING COMMAND AND IDENTIFICATION CODE OF CORRESPONDING CHANNEL
S812
DISPLAY START OF RECORDING
End

FIG. 9

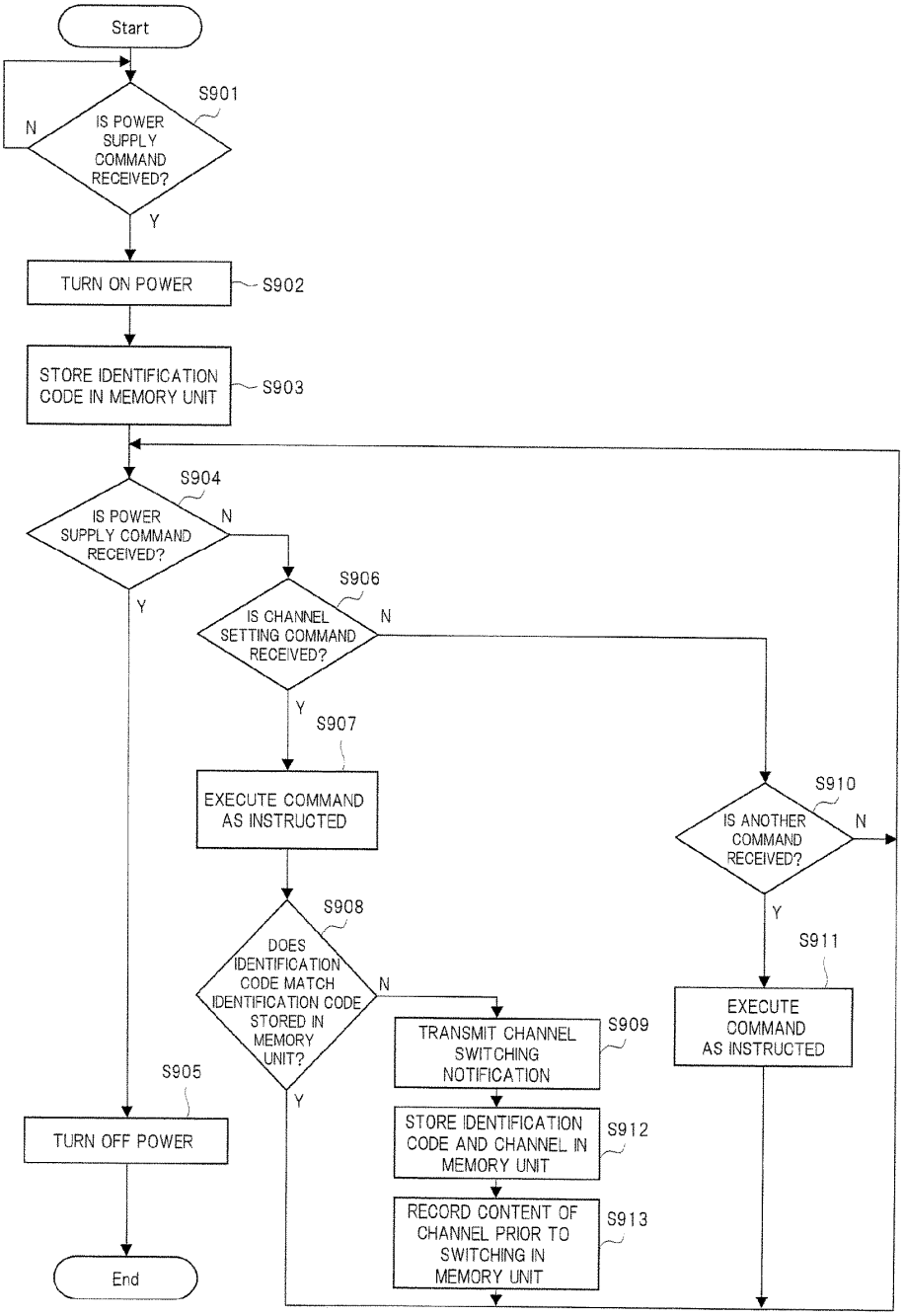

Start
S901
IS POWER SUPPLY COMMAND RECEIVED?
N
Y
TURN ON POWER
S902
STORE IDENTIFICATION CODE IN MEMORY UNIT
S903
S904
IS POWER SUPPLY COMMAND RECEIVED?
N
Y
S906
IS CHANNEL SETTING COMMAND RECEIVED?
N
Y
S907
EXECUTE COMMAND AS INSTRUCTED
S908
DOES IDENTIFICATION CODE MATCH IDENTIFICATION CODE STORED IN MEMORY UNIT?
N
Y
S909
TRANSMIT CHANNEL SWITCHING NOTIFICATION
S912
STORE IDENTIFICATION CODE AND CHANNEL IN MEMORY UNIT
S913
RECORD CONTENT OF CHANNEL PRIOR TO SWITCHING IN MEMORY UNIT
S910
IS ANOTHER COMMAND RECEIVED?
N
Y
S911
EXECUTE COMMAND AS INSTRUCTED
S905
TURN OFF POWER
End

FIG. 10

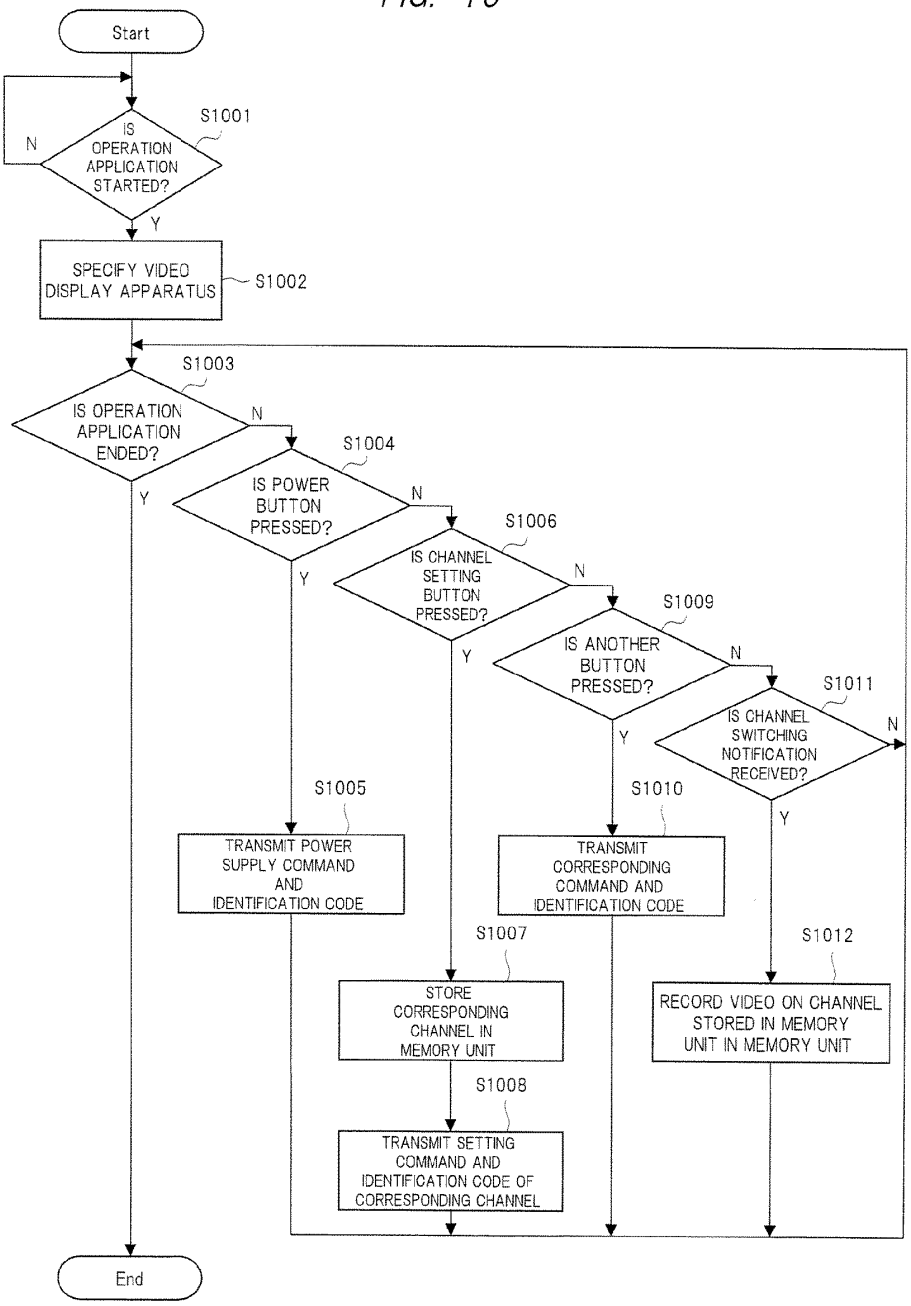

Start
S1001
IS OPERATION APPLICATION STARTED?
N
Y
SPECIFY VIDEO DISPLAY APPARATUS
S1002
S1003
IS OPERATION APPLICATION ENDED?
N
Y
S1004
IS POWER BUTTON PRESSED?
N
Y
S1006
IS CHANNEL SETTING BUTTON PRESSED?
N
Y
S1009
IS ANOTHER BUTTON PRESSED?
N
Y
S1011
IS CHANNEL SWITCHING NOTIFICATION RECEIVED?
N
Y
S1005
TRANSMIT POWER SUPPLY COMMAND AND IDENTIFICATION CODE
S1010
TRANSMIT CORRESPONDING COMMAND AND IDENTIFICATION CODE
S1007
STORE CORRESPONDING CHANNEL IN MEMORY UNIT
S1008
TRANSMIT SETTING COMMAND AND IDENTIFICATION CODE OF CORRESPONDING CHANNEL
S1012
RECORD VIDEO ON CHANNEL STORED IN MEMORY UNIT IN MEMORY UNIT
End

FIG. 11

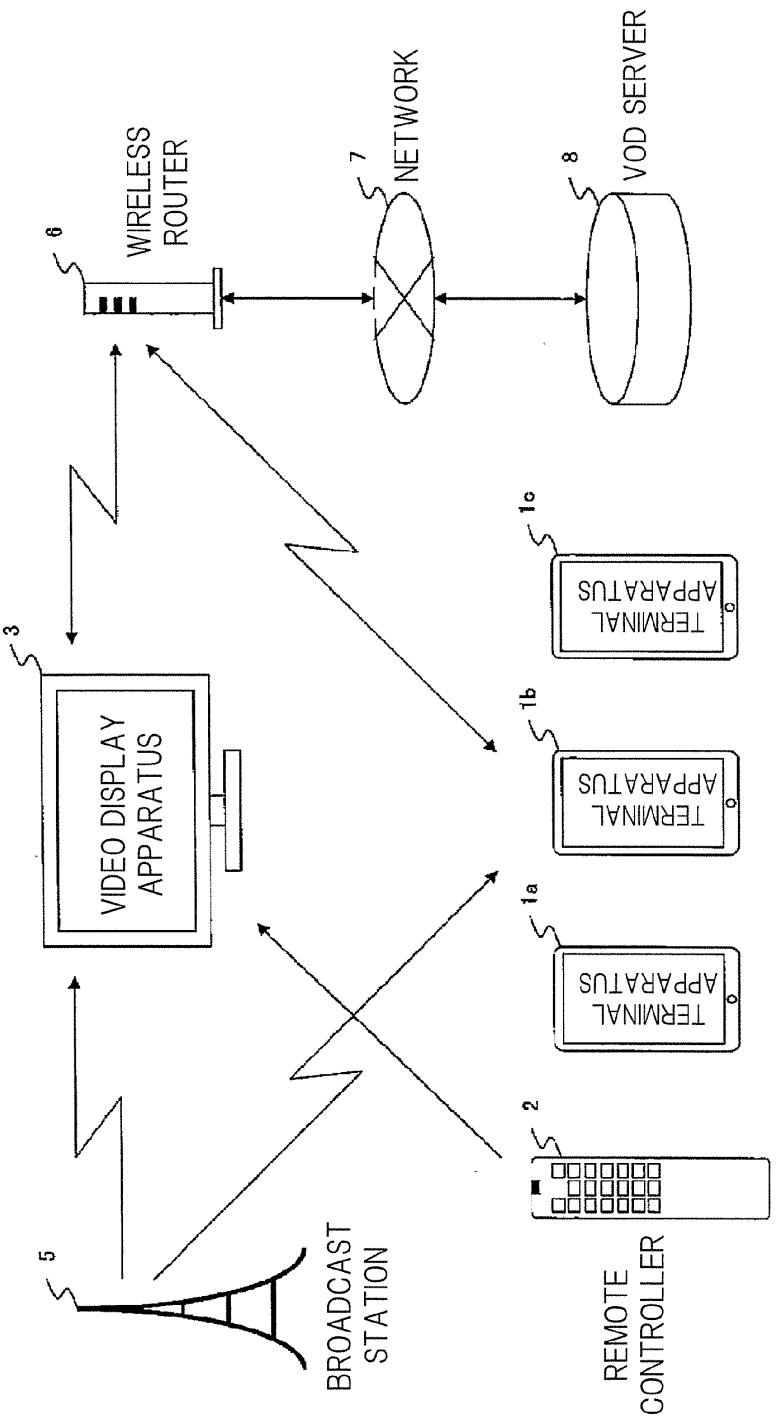

WIRELESS ROUTER
6
NETWORK
7
VOD SERVER
8
VIDEO DISPLAY APPARATUS
3
TERMINAL APPARATUS
1c
TERMINAL APPARATUS
1b
TERMINAL APPARATUS
1a
REMOTE CONTROLLER
2
BROADCAST STATION
5

FIG. 12

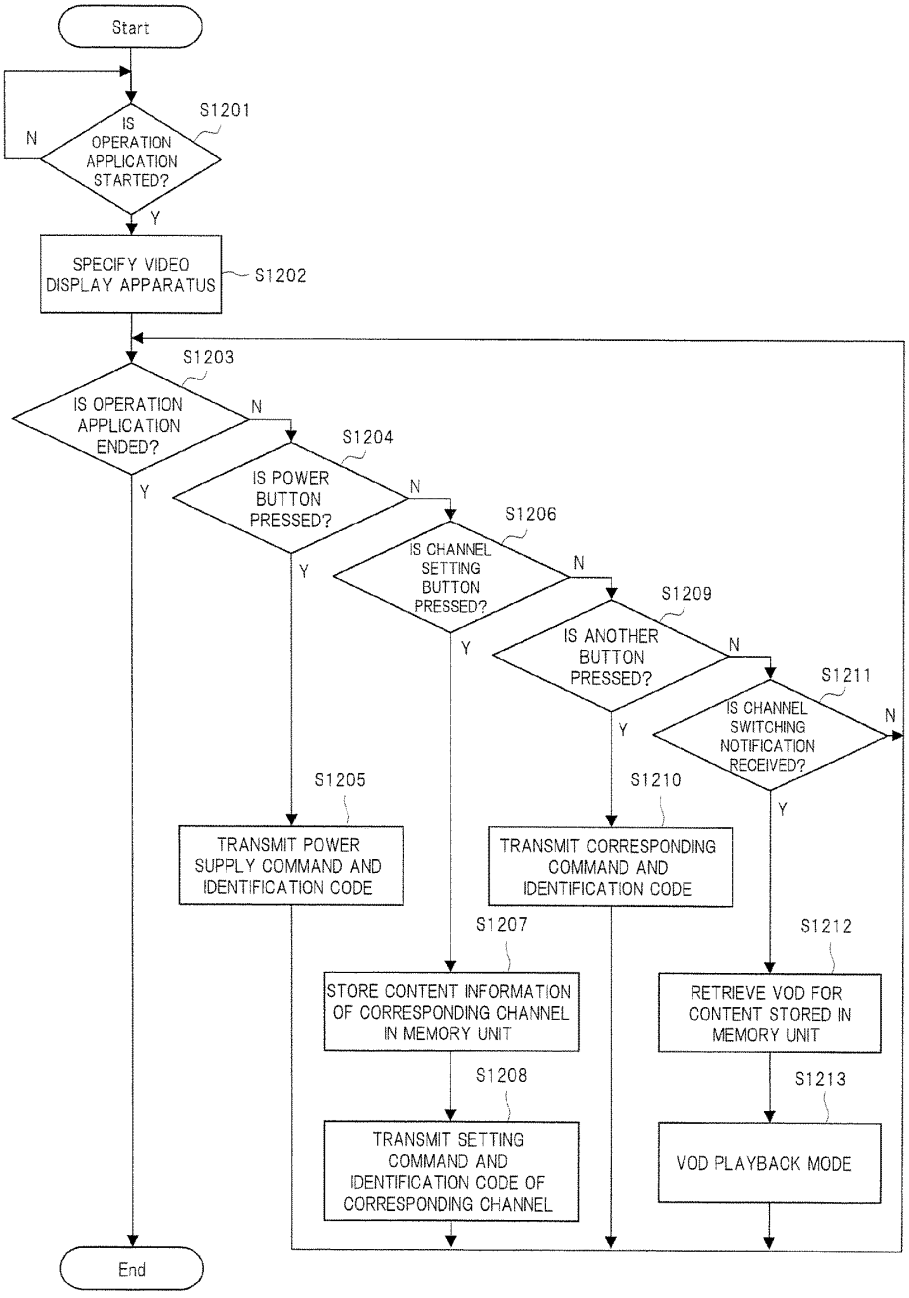
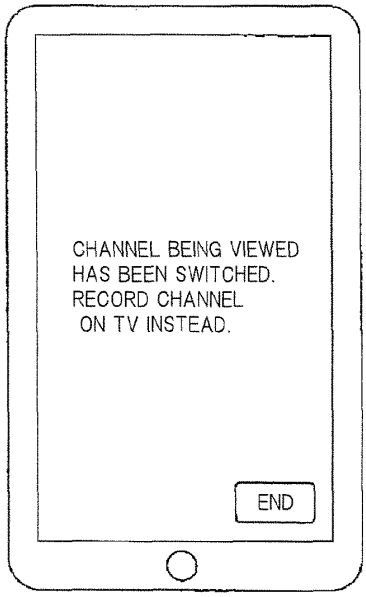

Start
S1201
IS OPERATION APPLICATION STARTED?
N
Y
SPECIFY VIDEO DISPLAY APPARATUS
S1202
S1203
IS OPERATION APPLICATION ENDED?
N
Y
S1204
IS POWER BUTTON PRESSED?
N
Y
S1206
IS CHANNEL SETTING BUTTON PRESSED?
N
Y
S1209
IS ANOTHER BUTTON PRESSED?
N
Y
S1211
IS CHANNEL SWITCHING NOTIFICATION RECEIVED?
N
Y
S1205
TRANSMIT POWER SUPPLY COMMAND AND IDENTIFICATION CODE
S1210
TRANSMIT CORRESPONDING COMMAND AND IDENTIFICATION CODE
S1207
STORE CONTENT INFORMATION OF CORRESPONDING CHANNEL IN MEMORY UNIT
S1208
TRANSMIT SETTING COMMAND AND IDENTIFICATION CODE OF CORRESPONDING CHANNEL
S1212
RETRIEVE VOD FOR CONTENT STORED IN MEMORY UNIT
S1213
VOD PLAYBACK MODE
End

FIG. 13

(a)


CHANNEL BEING VIEWED
HAS BEEN SWITCHED.
RECORD CHANNEL
ON TV INSTEAD.
END

(b)

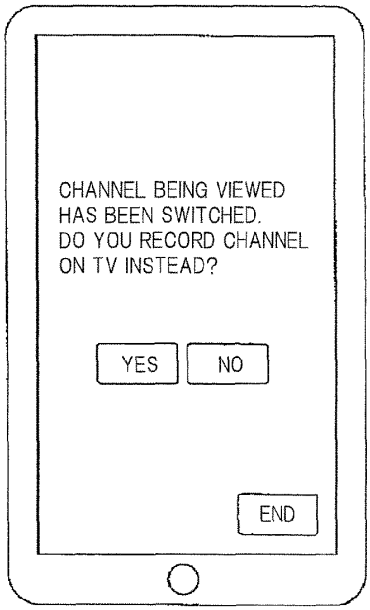
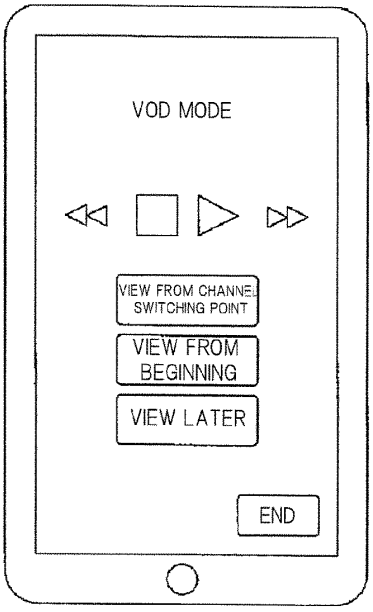

CHANNEL BEING VIEWED
HAS BEEN SWITCHED.
DO YOU RECORD CHANNEL
ON TV INSTEAD?
YES
NO
END

FIG. 13

(c)


VOD MODE
VIEW FROM CHANNEL SWITCHING POINT
VIEW FROM BEGINNING
VIEW LATER
END

(d)

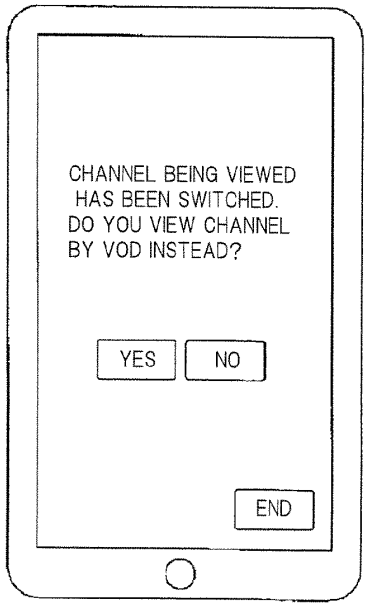

CHANNEL BEING VIEWED HAS BEEN SWITCHED. DO YOU VIEW CHANNEL BY VOD INSTEAD?
YES
NO
END

FIG. 14

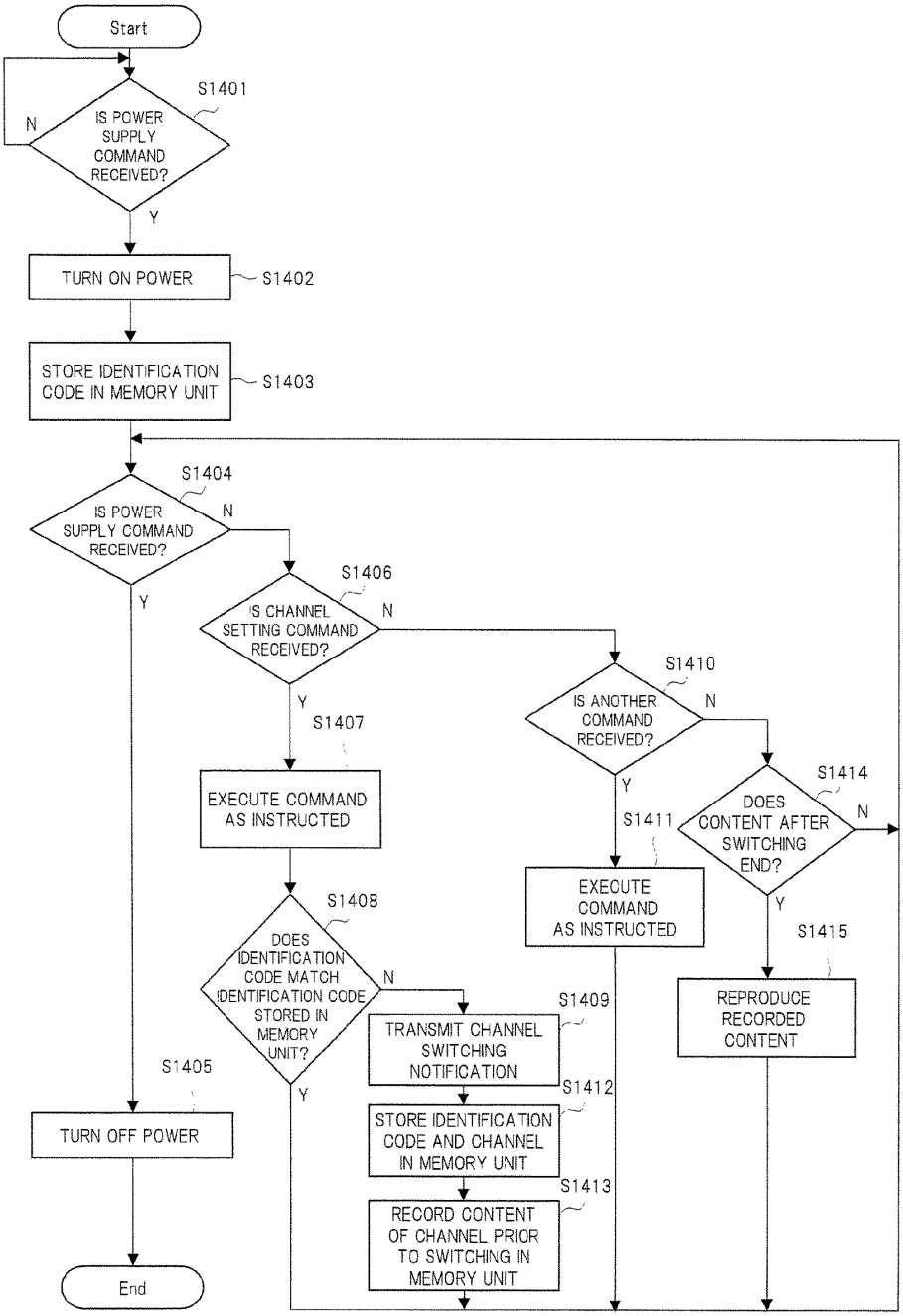

Start
S1401
IS POWER SUPPLY COMMAND RECEIVED?
N
Y
TURN ON POWER
S1402
STORE IDENTIFICATION CODE IN MEMORY UNIT
S1403
S1404
IS POWER SUPPLY COMMAND RECEIVED?
N
Y
S1406
IS CHANNEL SETTING COMMAND RECEIVED?
N
Y
S1407
EXECUTE COMMAND AS INSTRUCTED
S1408
DOES IDENTIFICATION CODE MATCH IDENTIFICATION CODE STORED IN MEMORY UNIT?
N
Y
S1409
TRANSMIT CHANNEL SWITCHING NOTIFICATION
S1412
STORE IDENTIFICATION CODE AND CHANNEL IN MEMORY UNIT
S1413
RECORD CONTENT OF CHANNEL PRIOR TO SWITCHING IN MEMORY UNIT
S1410
IS ANOTHER COMMAND RECEIVED?
N
Y
S1411
EXECUTE COMMAND AS INSTRUCTED
S1414
DOES CONTENT AFTER SWITCHING END?
N
Y
S1415
REPRODUCE RECORDED CONTENT
S1405
TURN OFF POWER
End

FIG. 15

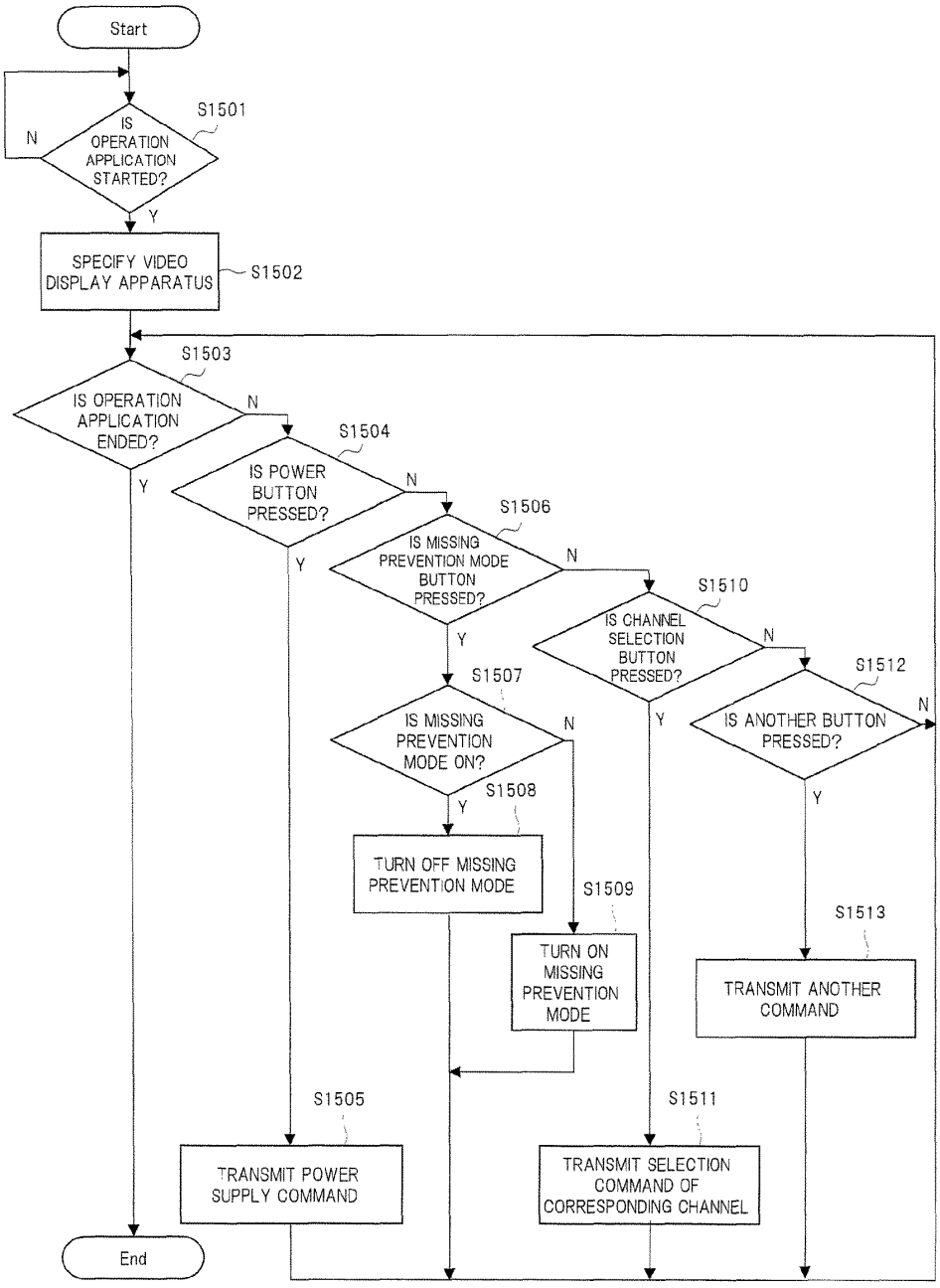

Start
S1501
IS OPERATION APPLICATION STARTED?
N
Y
SPECIFY VIDEO DISPLAY APPARATUS
S1502
S1503
IS OPERATION APPLICATION ENDED?
N
Y
S1504
IS POWER BUTTON PRESSED?
N
Y
S1506
IS MISSING PREVENTION MODE BUTTON PRESSED?
N
Y
S1510
IS CHANNEL SELECTION BUTTON PRESSED?
N
Y
S1512
IS ANOTHER BUTTON PRESSED?
N
Y
S1507
IS MISSING PREVENTION MODE ON?
N
Y
S1508
TURN OFF MISSING PREVENTION MODE
S1509
TURN ON MISSING PREVENTION MODE
S1513
TRANSMIT ANOTHER COMMAND
S1505
TRANSMIT POWER SUPPLY COMMAND
S1511
TRANSMIT SELECTION COMMAND OF CORRESPONDING CHANNEL
End

FIG. 16

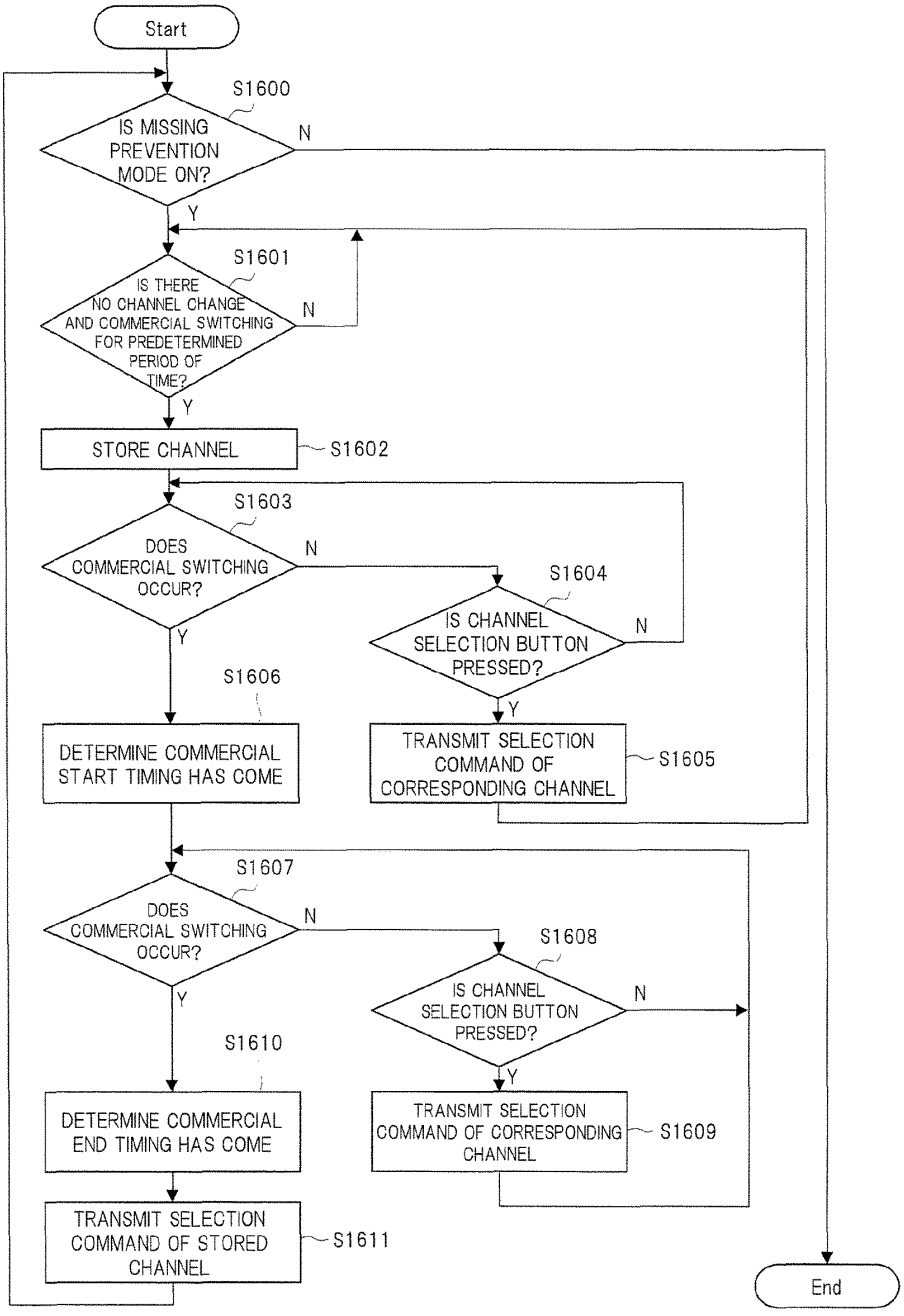

Start
S1600
IS MISSING PREVENTION MODE ON?
N
Y
S1601
IS THERE NO CHANNEL CHANGE AND COMMERCIAL SWITCHING FOR PREDETERMINED PERIOD OF TIME?
N
Y
STORE CHANNEL
S1602
S1603
DOES COMMERCIAL SWITCHING OCCUR?
N
Y
S1604
IS CHANNEL SELECTION BUTTON PRESSED?
N
Y
TRANSMIT SELECTION COMMAND OF CORRESPONDING CHANNEL
S1605
S1606
DETERMINE COMMERCIAL START TIMING HAS COME
S1607
DOES COMMERCIAL SWITCHING OCCUR?
N
Y
S1608
IS CHANNEL SELECTION BUTTON PRESSED?
N
Y
TRANSMIT SELECTION COMMAND OF CORRESPONDING CHANNEL
S1609
S1610
DETERMINE COMMERCIAL END TIMING HAS COME
TRANSMIT SELECTION COMMAND OF STORED CHANNEL
S1611
End

FIG. 17

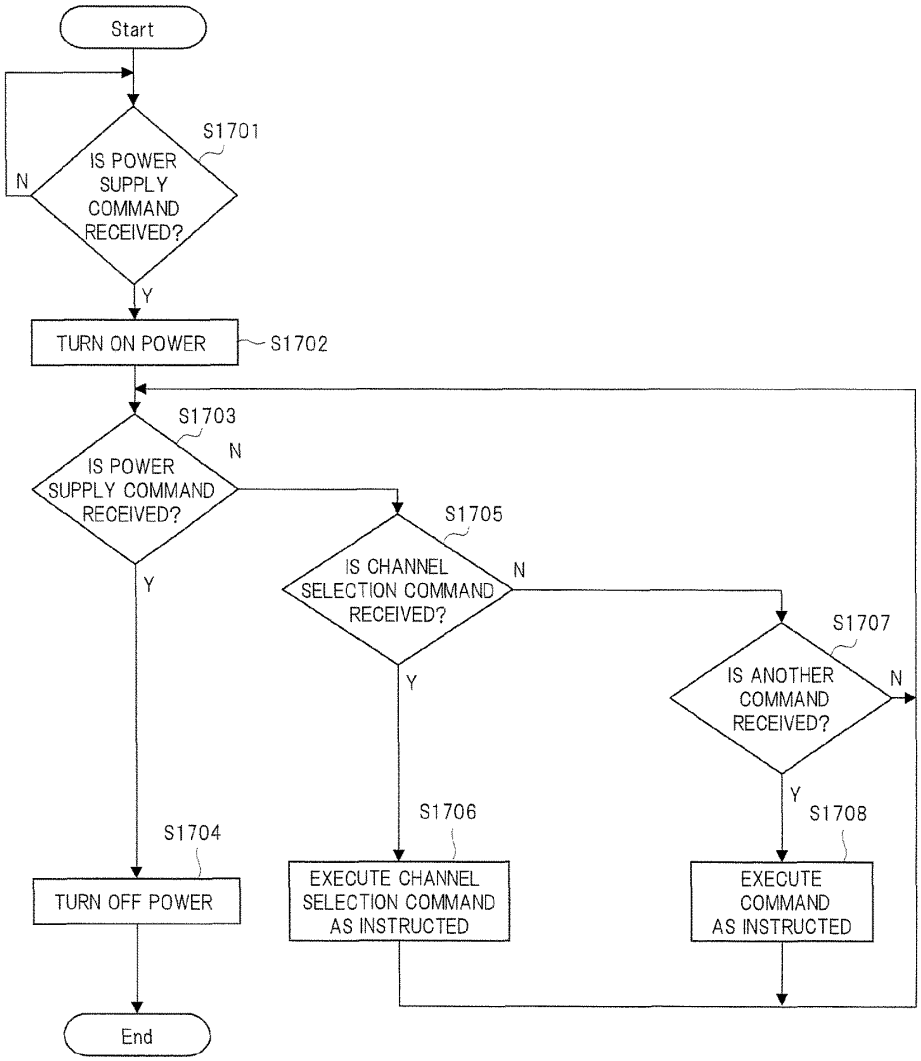

Start
S1701
IS POWER SUPPLY COMMAND RECEIVED?
N
Y
TURN ON POWER
S1702
S1703
IS POWER SUPPLY COMMAND RECEIVED?
N
Y
S1705
IS CHANNEL SELECTION COMMAND RECEIVED?
N
Y
S1707
IS ANOTHER COMMAND RECEIVED?
N
Y
S1704
TURN OFF POWER
S1706
EXECUTE CHANNEL SELECTION COMMAND AS INSTRUCTED
S1708
EXECUTE COMMAND AS INSTRUCTED
End

FIG. 18

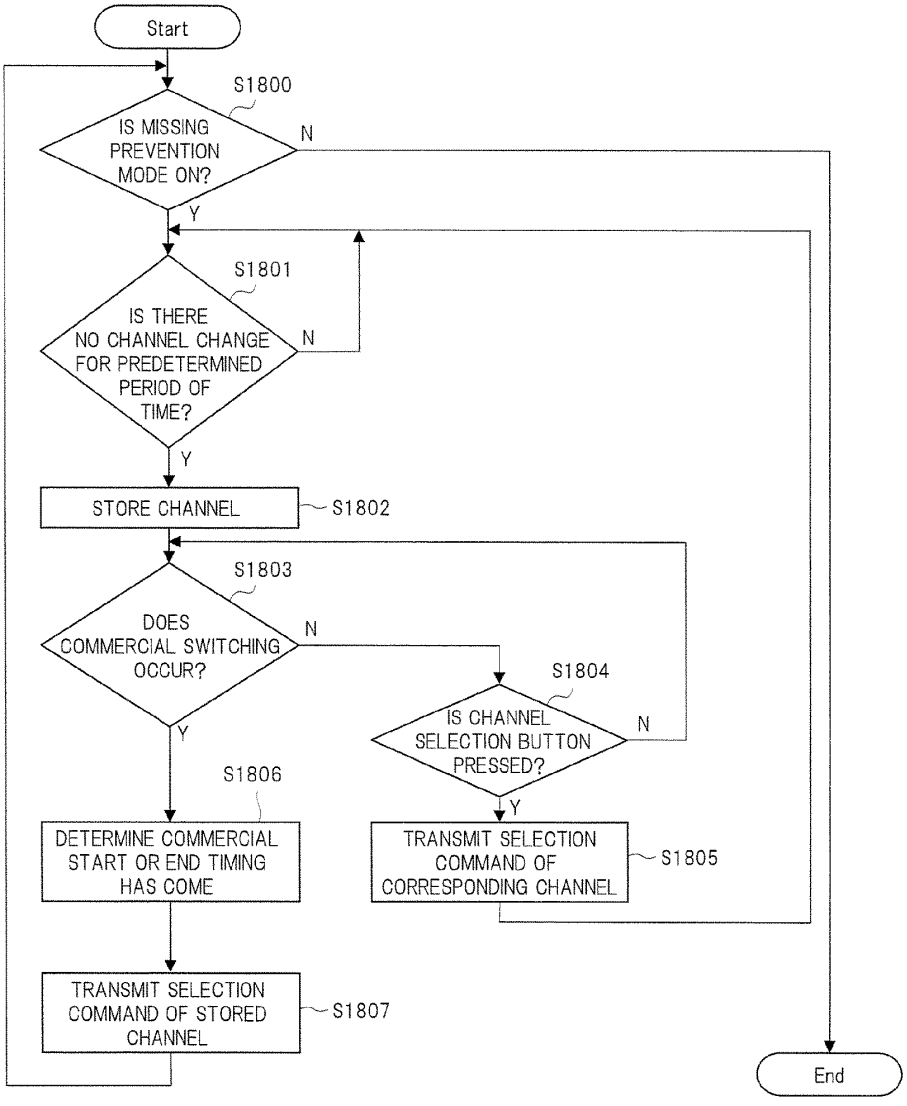

Start
S1800
IS MISSING PREVENTION MODE ON?
N
Y
S1801
IS THERE NO CHANNEL CHANGE FOR PREDETERMINED PERIOD OF TIME?
N
Y
STORE CHANNEL
S1802
S1803
DOES COMMERCIAL SWITCHING OCCUR?
N
Y
S1804
IS CHANNEL SELECTION BUTTON PRESSED?
N
Y
S1806
DETERMINE COMMERCIAL START OR END TIMING HAS COME
TRANSMIT SELECTION COMMAND OF CORRESPONDING CHANNEL
S1805
TRANSMIT SELECTION COMMAND OF STORED CHANNEL
S1807
End

FIG. 19

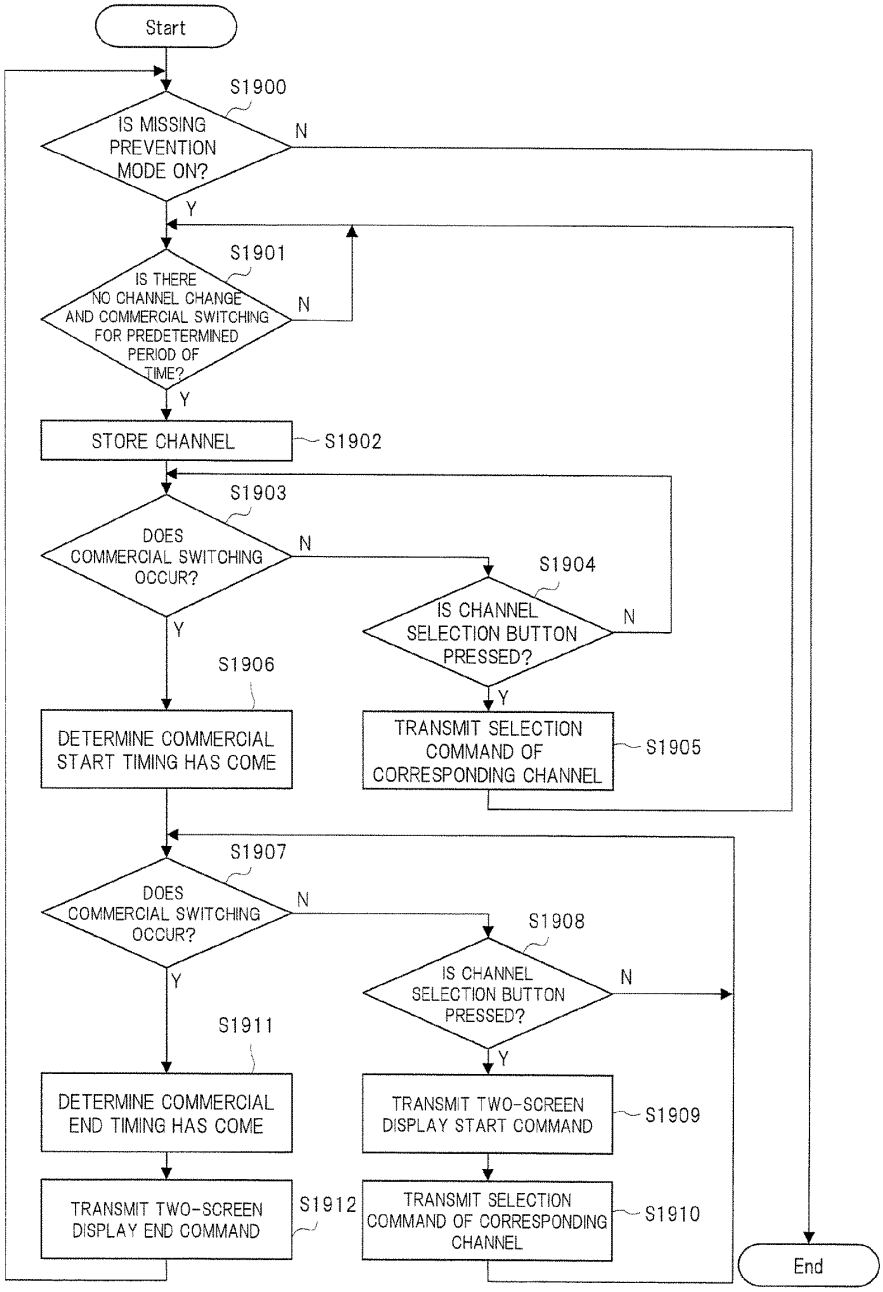

Start
S1900
IS MISSING PREVENTION MODE ON?
N
Y
S1901
IS THERE NO CHANNEL CHANGE AND COMMERCIAL SWITCHING FOR PREDETERMINED PERIOD OF TIME?
N
Y
STORE CHANNEL
S1902
S1903
DOES COMMERCIAL SWITCHING OCCUR?
N
Y
S1904
IS CHANNEL SELECTION BUTTON PRESSED?
N
Y
S1906
DETERMINE COMMERCIAL START TIMING HAS COME
TRANSMIT SELECTION COMMAND OF CORRESPONDING CHANNEL
S1905
S1907
DOES COMMERCIAL SWITCHING OCCUR?
N
Y
S1908
IS CHANNEL SELECTION BUTTON PRESSED?
N
Y
S1911
DETERMINE COMMERCIAL END TIMING HAS COME
TRANSMIT TWO-SCREEN DISPLAY START COMMAND
S1909
TRANSMIT TWO-SCREEN DISPLAY END COMMAND
S1912
TRANSMIT SELECTION COMMAND OF CORRESPONDING CHANNEL
S1910
End

FIG. 20

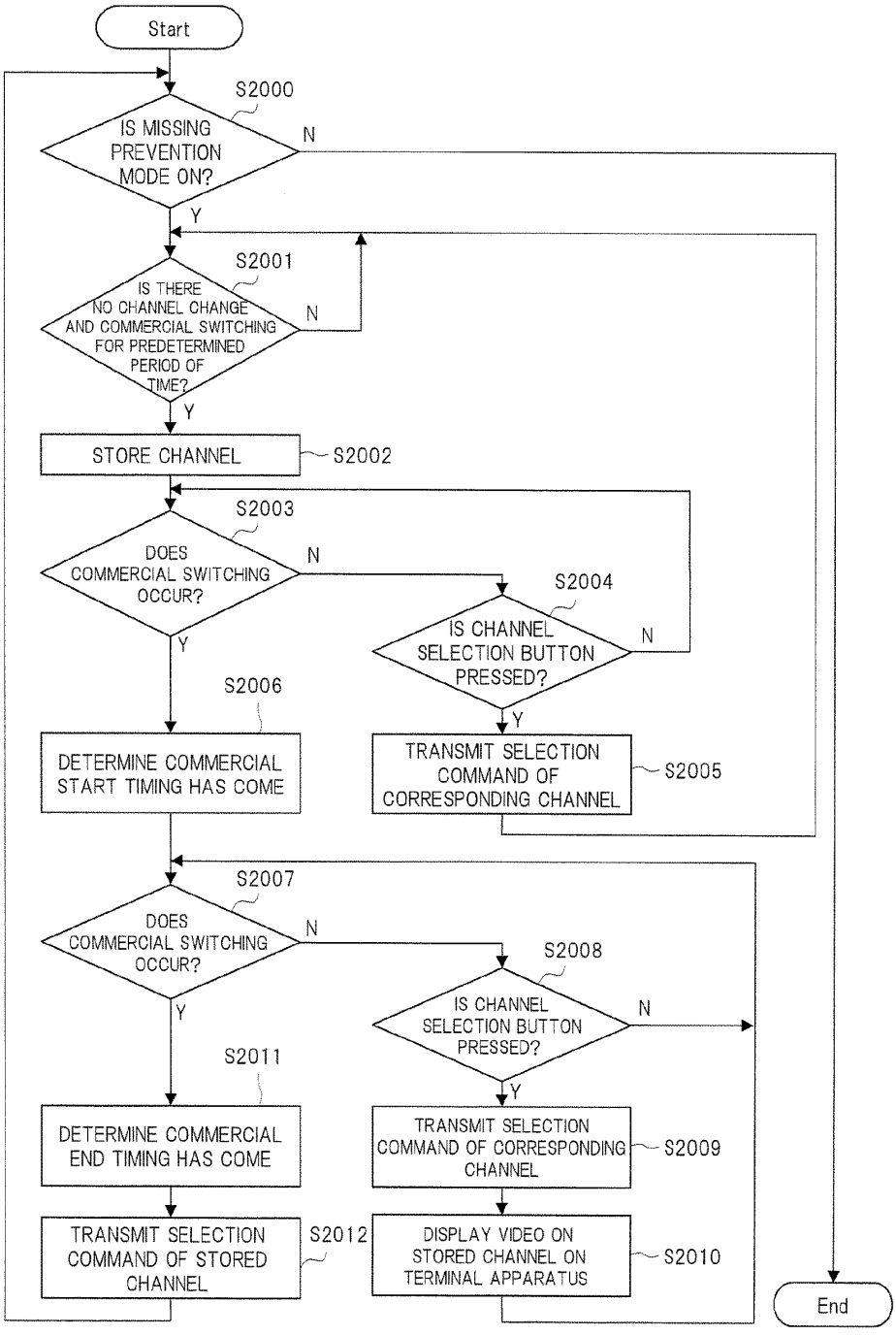

Start
S2000
IS MISSING PREVENTION MODE ON?
N
Y
S2001
IS THERE NO CHANNEL CHANGE AND COMMERCIAL SWITCHING FOR PREDETERMINED PERIOD OF TIME?
N
Y
STORE CHANNEL
S2002
S2003
DOES COMMERCIAL SWITCHING OCCUR?
N
Y
S2004
IS CHANNEL SELECTION BUTTON PRESSED?
N
Y
TRANSMIT SELECTION COMMAND OF CORRESPONDING CHANNEL
S2005
S2006
DETERMINE COMMERCIAL START TIMING HAS COME
S2007
DOES COMMERCIAL SWITCHING OCCUR?
N
Y
S2008
IS CHANNEL SELECTION BUTTON PRESSED?
N
Y
S2011
DETERMINE COMMERCIAL END TIMING HAS COME
TRANSMIT SELECTION COMMAND OF CORRESPONDING CHANNEL
S2009
TRANSMIT SELECTION COMMAND OF STORED CHANNEL
S2012
DISPLAY VIDEO ON STORED CHANNEL ON TERMINAL APPARATUS
S2010
End

FIG. 21

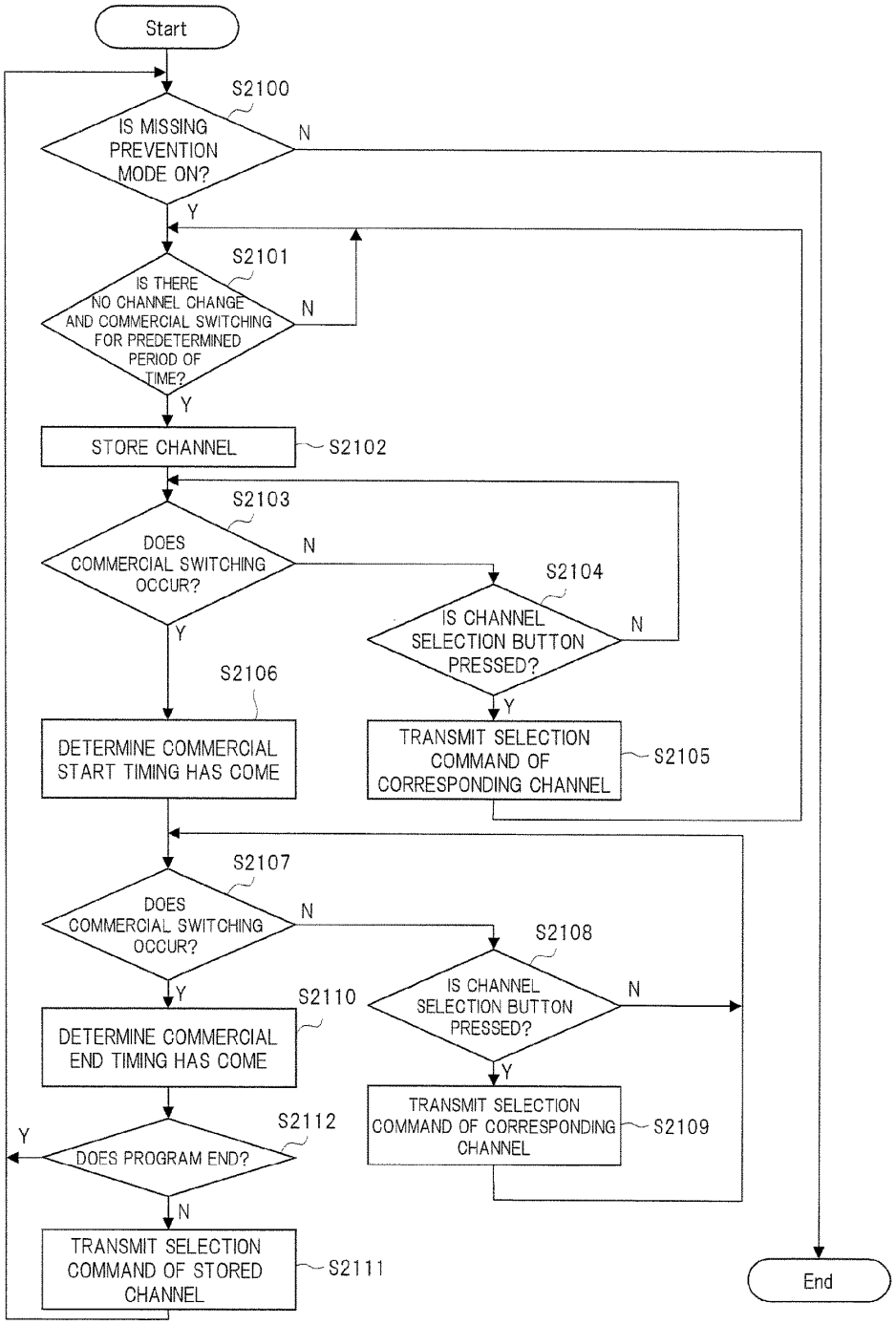

Start
S2100
IS MISSING PREVENTION MODE ON?
N
Y
S2101
IS THERE NO CHANNEL CHANGE AND COMMERCIAL SWITCHING FOR PREDETERMINED PERIOD OF TIME?
N
Y
STORE CHANNEL
S2102
S2103
DOES COMMERCIAL SWITCHING OCCUR?
N
Y
S2104
IS CHANNEL SELECTION BUTTON PRESSED?
N
Y
S2106
DETERMINE COMMERCIAL START TIMING HAS COME
TRANSMIT SELECTION COMMAND OF CORRESPONDING CHANNEL
S2105
S2107
DOES COMMERCIAL SWITCHING OCCUR?
N
Y
S2108
IS CHANNEL SELECTION BUTTON PRESSED?
N
Y
S2110
DETERMINE COMMERCIAL END TIMING HAS COME
TRANSMIT SELECTION COMMAND OF CORRESPONDING CHANNEL
S2109
S2112
DOES PROGRAM END?
Y
N
TRANSMIT SELECTION COMMAND OF STORED CHANNEL
S2111
End

FIG. 22

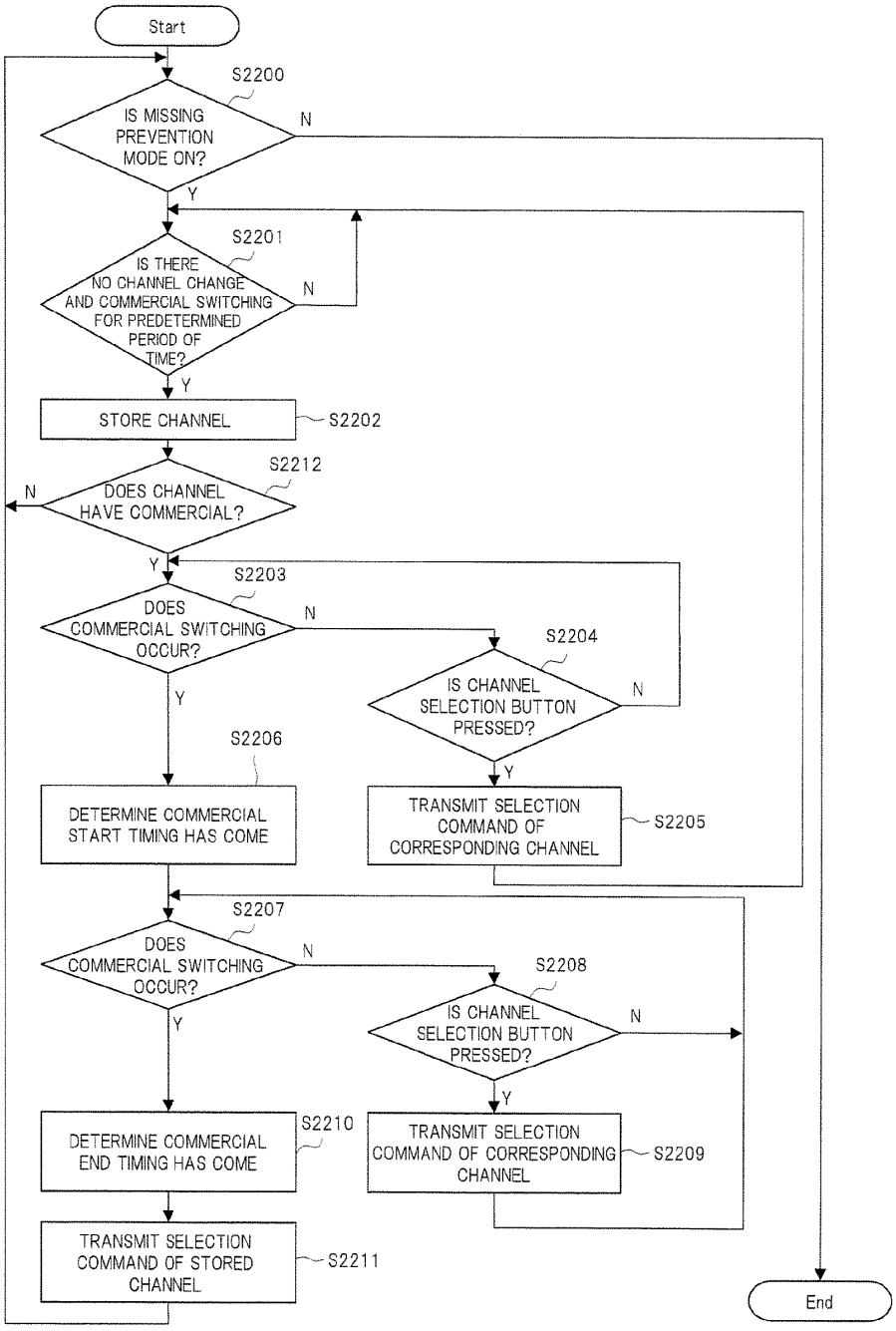

Start
S2200
IS MISSING PREVENTION MODE ON?
N
Y
S2201
IS THERE NO CHANNEL CHANGE AND COMMERCIAL SWITCHING FOR PREDETERMINED PERIOD OF TIME?
N
Y
STORE CHANNEL
S2202
S2212
DOES CHANNEL HAVE COMMERCIAL?
N
Y
S2203
DOES COMMERCIAL SWITCHING OCCUR?
N
Y
S2204
IS CHANNEL SELECTION BUTTON PRESSED?
N
Y
S2205
TRANSMIT SELECTION COMMAND OF CORRESPONDING CHANNEL
S2206
DETERMINE COMMERCIAL START TIMING HAS COME
S2207
DOES COMMERCIAL SWITCHING OCCUR?
N
Y
S2208
IS CHANNEL SELECTION BUTTON PRESSED?
N
Y
S2209
TRANSMIT SELECTION COMMAND OF CORRESPONDING CHANNEL
S2210
DETERMINE COMMERCIAL END TIMING HAS COME
S2211
TRANSMIT SELECTION COMMAND OF STORED CHANNEL
End

FIG. 23

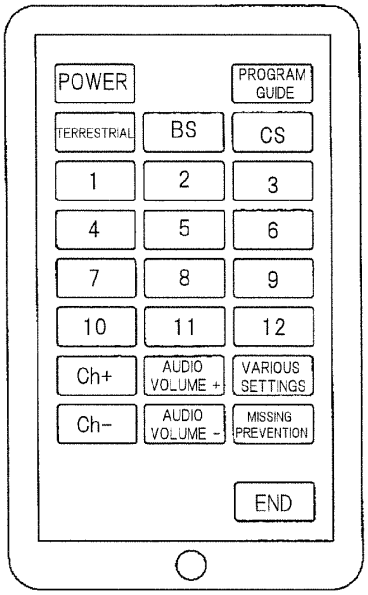

POWER
PROGRAM GUIDE
TERRESTRIAL
BS
CS
1
2
3
4
5
6
7
8
9
10
11
12
Ch+
AUDIO VOLUME +
VARIOUS SETTINGS
Ch−
AUDIO VOLUME −
MISSING PREVENTION
END

FIG. 24

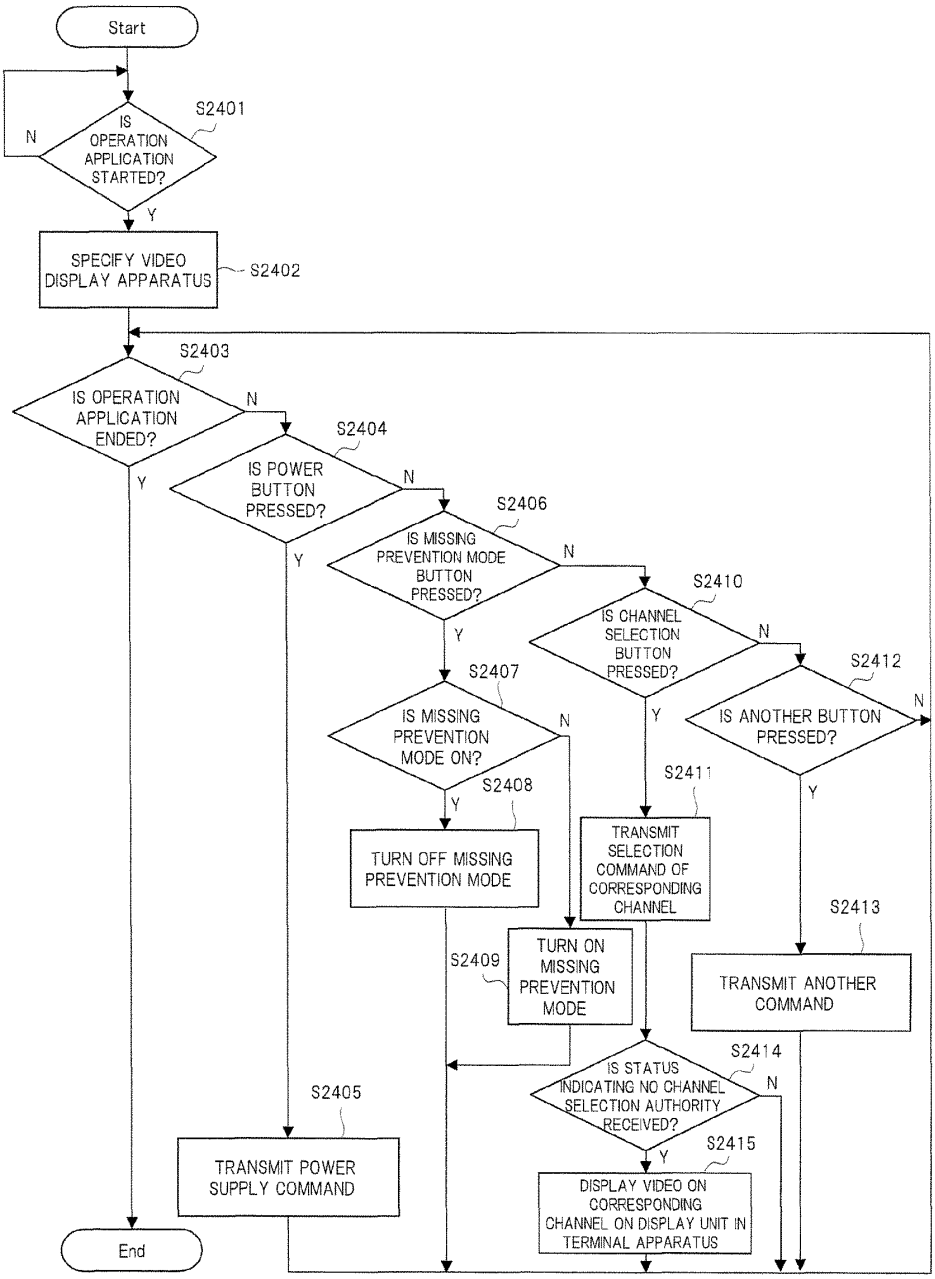

Start
S2401
IS OPERATION APPLICATION STARTED?
N
Y
SPECIFY VIDEO DISPLAY APPARATUS
S2402
S2403
IS OPERATION APPLICATION ENDED?
N
Y
S2404
IS POWER BUTTON PRESSED?
N
Y
S2406
IS MISSING PREVENTION MODE BUTTON PRESSED?
N
Y
S2410
IS CHANNEL SELECTION BUTTON PRESSED?
N
Y
S2412
IS ANOTHER BUTTON PRESSED?
N
Y
S2407
IS MISSING PREVENTION MODE ON?
N
Y
S2408
TURN OFF MISSING PREVENTION MODE
S2411
TRANSMIT SELECTION COMMAND OF CORRESPONDING CHANNEL
S2413
TRANSMIT ANOTHER COMMAND
S2409
TURN ON MISSING PREVENTION MODE
S2414
IS STATUS INDICATING NO CHANNEL SELECTION AUTHORITY RECEIVED?
N
Y
S2405
TRANSMIT POWER SUPPLY COMMAND
S2415
DISPLAY VIDEO ON CORRESPONDING CHANNEL ON DISPLAY UNIT IN TERMINAL APPARATUS
End

FIG. 25

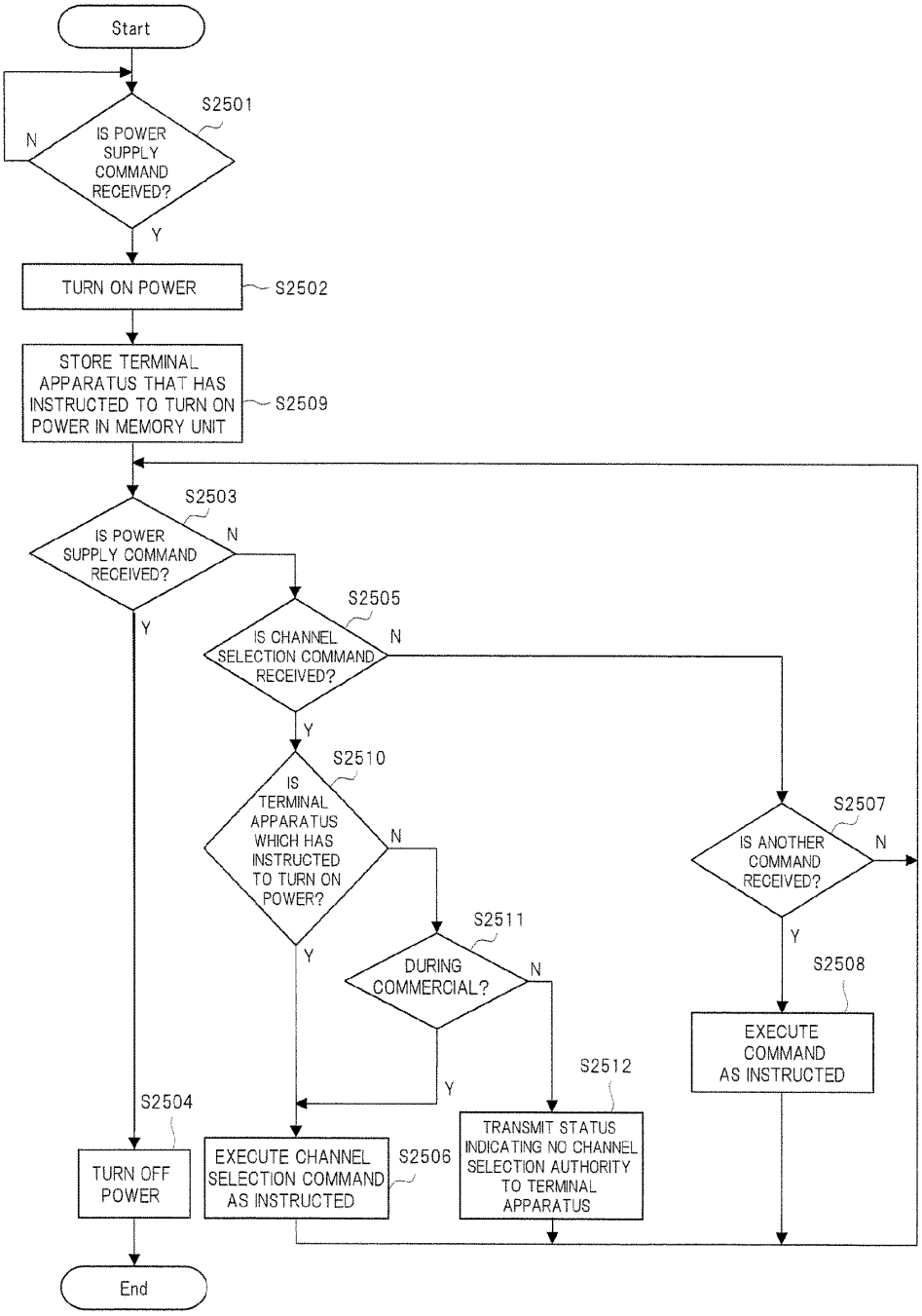

Start
S2501
IS POWER SUPPLY COMMAND RECEIVED?
N
Y
TURN ON POWER
S2502
STORE TERMINAL APPARATUS THAT HAS INSTRUCTED TO TURN ON POWER IN MEMORY UNIT
S2509
S2503
IS POWER SUPPLY COMMAND RECEIVED?
N
Y
S2505
IS CHANNEL SELECTION COMMAND RECEIVED?
N
Y
S2510
IS TERMINAL APPARATUS WHICH HAS INSTRUCTED TO TURN ON POWER?
N
Y
S2511
DURING COMMERCIAL?
N
Y
S2507
IS ANOTHER COMMAND RECEIVED?
N
Y
S2508
EXECUTE COMMAND AS INSTRUCTED
S2504
TURN OFF POWER
EXECUTE CHANNEL SELECTION COMMAND AS INSTRUCTED
S2506
S2512
TRANSMIT STATUS INDICATING NO CHANNEL SELECTION AUTHORITY TO TERMINAL APPARATUS
End

FIG. 26

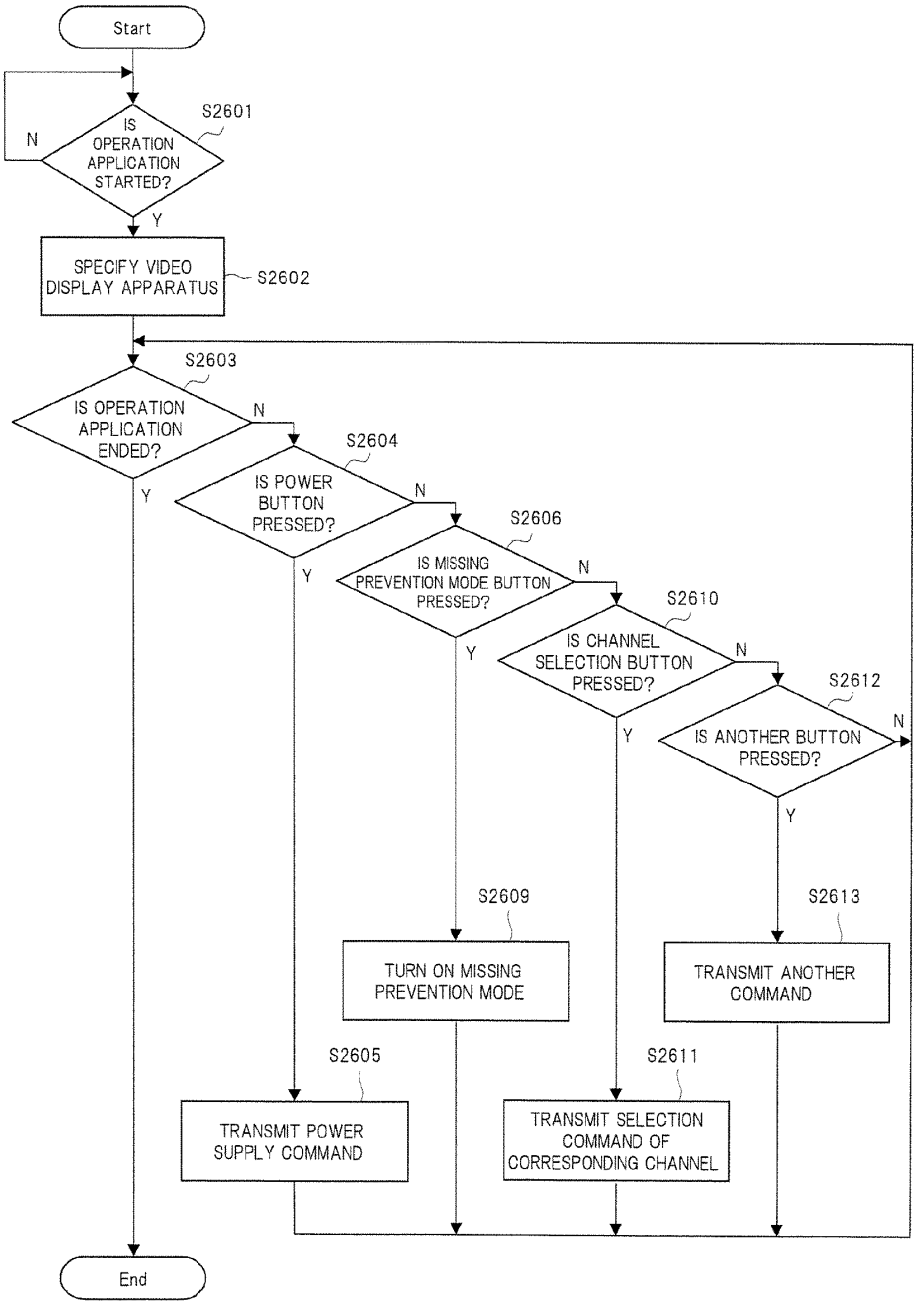
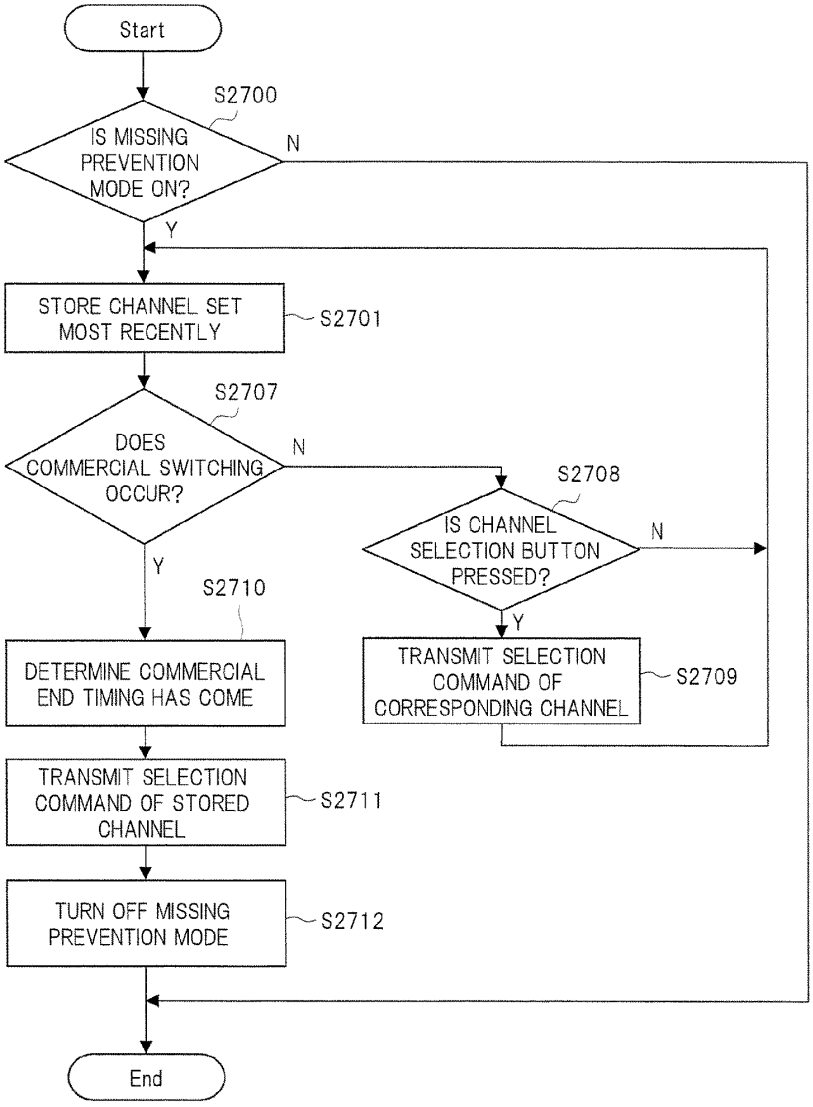

Start
S2601
IS OPERATION APPLICATION STARTED?
N
Y
SPECIFY VIDEO DISPLAY APPARATUS
S2602
S2603
IS OPERATION APPLICATION ENDED?
N
Y
S2604
IS POWER BUTTON PRESSED?
N
Y
S2606
IS MISSING PREVENTION MODE BUTTON PRESSED?
N
Y
S2610
IS CHANNEL SELECTION BUTTON PRESSED?
N
Y
S2612
IS ANOTHER BUTTON PRESSED?
N
Y
S2609
TURN ON MISSING PREVENTION MODE
S2613
TRANSMIT ANOTHER COMMAND
S2605
TRANSMIT POWER SUPPLY COMMAND
S2611
TRANSMIT SELECTION COMMAND OF CORRESPONDING CHANNEL
End

FIG. 27


Start
S2700
IS MISSING PREVENTION MODE ON?
N
Y
STORE CHANNEL SET MOST RECENTLY
S2701
S2707
DOES COMMERCIAL SWITCHING OCCUR?
N
S2708
IS CHANNEL SELECTION BUTTON PRESSED?
N
Y
Y
S2710
DETERMINE COMMERCIAL END TIMING HAS COME
TRANSMIT SELECTION COMMAND OF CORRESPONDING CHANNEL
S2709
TRANSMIT SELECTION COMMAND OF STORED CHANNEL
S2711
TURN OFF MISSING PREVENTION MODE
S2712
End

VIDEO DISPLAY APPARATUS AND TERMINAL APPARATUS

CROSS-REFERENCE TO RELATED APPLICATIONS

This application is the U.S. National Phase of PCT/JP2013/079953 filed Nov. 6, 2013, which claims priority to Japanese Patent Application No. 2012-267765 filed Dec. 7, 2012. The subject matter of each is incorporated herein by reference in entirety.

TECHNICAL FIELD

The present invention relates to a video display apparatus and a terminal apparatus.

BACKGROUND ART

As a background art in this technical field, there is Japanese Patent Application Laid-Open Publication No. 2009-65305 (Patent Document 1). An object of the invention described in this publication is "To provide a technique for appropriately providing a seamless viewing style without depending on places by a terminal apparatus and a large-screen information receiving terminal apparatus".

As a solution to this issue, the publication describes "An information receiving terminal apparatus includes means for transmitting mobile viewing information to a terminal apparatus, and a video information system controls a viewing environment for satisfying respective requests from two or more users, and is configured to enable the continuous viewing of a content viewed at the information receiving terminal apparatus by the transmission and reception of the content to and from the terminal apparatus and enable the continuous viewing conversely at the information receiving terminal of the content viewed at the terminal apparatus based on inter-terminal cooperation and center cooperation of time code information for continuing content viewing from the information receiving terminal apparatus to the terminal apparatus.".

Also, as another background art, there is Japanese Patent Application Laid-Open Publication No. 2001-275090 (Patent Document 2). An object described in this publication is "To provide a broadcast receiving apparatus capable of preventing a main story after a CM from being missed".

As a solution to this issue, the publication describes "A broadcast receiving apparatus **10** includes first and second tuners **13***a* and **13***b* that receive broadcasting and a RAM **18** that stores a received video, when a program on a channel which is being received by the first tuner **13***a* is being output, a predetermined amount of video of the program immediately before a most recent CM is stored in the RAM **18**, when an instruction to switch the channel to another channel is issued during the CM, the other channel is received by the second tuner **13***b* and a program on the other channel is output instead of the program on the channel being received by the first tuner **13***a*, and when the video immediately before the CM stored in the RAM **18** and the video on the channel being received by the first tuner **13***a* are approximate to each other, the end of the CM is output.".

RELATED ART DOCUMENTS

Patent Documents

Patent Document 1: Japanese Patent Application Laid-Open Publication No. 2009-65305

Patent Document 2: Japanese Patent Application Laid-Open Publication No. 2001-275090

SUMMARY OF THE INVENTION

Problems to be Solved by the Invention

As an effect of the invention, the above-mentioned Patent Document 1 describes "While viewing a content with a family in a living room by a large-screen receiving terminal apparatus (e.g., a television receiver), each individual can acquire information and data for the convenience of the individual by a terminal apparatus which is held at hand and carried by each individual.", and this is convenient to use when a plurality of users continue to view the same content. However, the Patent Document 1 does not take into consideration the case where the plurality of users respectively view different contents.

For example, Patent Document 1 does not particularly take into consideration the fact that, when a plurality of users view a television broadcasting by one video display apparatus and one of the users switches a channel, the other users cannot continue to view the channel before the switching.

Also, according to Patent Document 2, it is possible to prevent a main story after a CM from being missed.

However, Patent Document 2 describes "Event information including a type, a title, and a start time of an event such as a CM is incorporated into data for digital broadcasting.", and has an issue that the CM cannot be specified without such an operation.

Thus, an object of the present invention is to provide user-friendly video display apparatus and terminal apparatus.

Means for Solving the Problems

To solve the above-mentioned issue, for example, a configuration described in the scope of the claims is adopted.

The present application includes a plurality of means for solving the issue mentioned above, and one example thereof is a terminal apparatus having a remote control function of a video display apparatus, and the terminal apparatus includes: a communication unit that transmits a command related to setting of the video display apparatus and receives status information; a signal receiving unit that receives a signal output from a broadcast station and decodes a video content; a memory unit that stores a content of a command including a channel of the video content; and a display unit that displays the video content and various types of information. In the terminal apparatus, the communication unit transmits an identification code specific to the terminal apparatus when transmitting the command, and when the status information is received after a channel of the video display apparatus is set by remote control, the video content of the channel stored in the memory unit is decoded by the signal receiving unit and is displayed on the display unit.

Also, another example thereof is a terminal apparatus having a function of remotely controlling a video display apparatus that displays a video of a television program and a video serving as advertisement means accompanying a television program, and the terminal apparatus includes: a transmission unit that transmits a command related to setting of the video display apparatus; a television signal receiving unit that receives a television signal; and a memory unit that stores a channel that has been viewed without being switched for a predetermined period of time. In the terminal apparatus, the television signal receiving unit detects a start

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timing and an end timing of the video serving as the advertisement means, and when a channel selection button of a remote control function is pressed in a period of time from the start timing to the end timing, the transmission unit transmits a setting command of the channel, and further transmits a setting command of the channel stored in the memory unit in response to the end timing.

Effects of the Invention

According to the present invention, it is possible to provide user-friendly video display apparatus and terminal apparatus.

Issues, configurations, and effects other than the foregoing will become apparent from the following description of embodiments.

BRIEF DESCRIPTIONS OF THE DRAWINGS

FIG. **1** is a diagram illustrating a configuration of a video display system according to the first embodiment;

FIG. **2** is a block diagram illustrating a configuration of a terminal apparatus according to the first embodiment;

FIG. **3** is a block diagram illustrating a configuration of a video display apparatus according to the first embodiment;

FIG. **4** is a flowchart illustrating a process of the terminal apparatus according to the first embodiment;

FIG. **5**(*a*) illustrates an example of display on a screen of the terminal apparatus according to the first embodiment;

FIG. **5**(*b*) illustrates an example of display on a screen of the terminal apparatus according to the first embodiment;

FIG. **5**(*c*) illustrates an example of display on a screen of the terminal apparatus according to the first embodiment;

FIG. **5**(*d*) illustrates an example of display on a screen of the terminal apparatus according to the first embodiment;

FIG. **6** is a flowchart illustrating a process of the video display apparatus according to the first embodiment;

FIG. **7** is a flowchart illustrating a process of a video display apparatus according to the second embodiment;

FIG. **8** is a flowchart illustrating a process of a terminal apparatus according to the third embodiment;

FIG. **9** is a flowchart illustrating a process of a video display apparatus according to the third embodiment;

FIG. **10** is a flowchart illustrating a process of a video display apparatus according to the fourth embodiment;

FIG. **11** is a diagram illustrating a configuration of a video display system according to the fifth embodiment;

FIG. **12** is a flowchart illustrating a process of a terminal apparatus according to the fifth embodiment;

FIG. **13**(*a*) illustrates an example of display on a screen of the terminal apparatus according to the third embodiment;

FIG. **13**(*b*) illustrates an example of display on a screen of the terminal apparatus according to the third embodiment;

FIG. **13**(*c*) illustrates an example of display on a screen of the terminal apparatus according to the fifth embodiment;

FIG. **13**(*d*) illustrates an example of display on a screen of the terminal apparatus according to the fifth embodiment;

FIG. **14** is a flowchart illustrating a process of a video display apparatus according to the sixth embodiment;

FIG. **15** is a flowchart illustrating a process of a terminal apparatus according to the seventh embodiment;

FIG. **16** is a flowchart illustrating a missing prevention process of the terminal apparatus according to the seventh embodiment;

FIG. **17** is a flowchart illustrating a process of a video display apparatus according to the seventh embodiment;

FIG. **18** is a flowchart illustrating a missing prevention process of a terminal apparatus according to the eighth embodiment;

FIG. **19** is a flowchart illustrating a missing prevention process of a terminal apparatus according to the ninth embodiment;

FIG. **20** is a flowchart illustrating a missing prevention process of a terminal apparatus according to the tenth embodiment;

FIG. **21** is a flowchart illustrating a missing prevention process of a terminal apparatus according to the eleventh embodiment;

FIG. **22** is a flowchart illustrating a missing prevention process of a terminal apparatus according to the twelfth embodiment;

FIG. **23** illustrates an example of display on a screen of the terminal apparatus according to the seventh embodiment;

FIG. **24** is a flowchart illustrating a process of a terminal apparatus according to the thirteenth embodiment;

FIG. **25** is a flowchart illustrating a process of a video display apparatus according to the thirteenth embodiment;

FIG. **26** is a flowchart illustrating a process of a terminal apparatus according to the fourteenth embodiment; and

FIG. **27** is a flowchart illustrating a missing prevention process of the terminal apparatus according to the fourteenth embodiment.

DETAILED DESCRIPTION OF PREFERRED EMBODIMENTS

Hereinafter, embodiments will be described with reference to the drawings.

First Embodiment

FIG. **1** is a diagram illustrating a configuration of a video display system according to the first embodiment of the present invention. The video display system according to the present embodiment includes a plurality of terminal apparatuses **1** and a video display apparatus **3**.

The terminal apparatus **1** has a wireless communication function, and can transmit and receive various types of information to and from an Internet network. Also, the terminal apparatus **1** has a function of performing the control of the video display apparatus **3** in a remote place (hereinafter referred to as "remote control"), and a user can control a channel and an audio volume of the video display apparatus **3** by using the terminal apparatus **1**. When the plurality of terminal apparatuses **1** need to be distinguished from one another, the terminal apparatuses **1** are written as terminal apparatuses **1***a*, **1***b*, **1***c*, and the like.

A remote controller **2** is a control apparatus dedicated to the video display apparatus **3**, and can operate the video display apparatus **3** by infrared rays.

The video display apparatus **3** is an apparatus that receives and displays a video content, and can receive, for example, a television signal by wireless or by wire from a broadcast station **5** and display a video content based on the television signal. Also, the video display apparatus **3** can display a video content received from a network **7** via a wireless router **6**, for example, an Internet content of a URL (Uniform Resource Locator) specified by the user or the like. Thus, the video display apparatus **3** can receive and display a video content delivered from a delivery source specified by the user or the like, for example, a specific broadcast station **5** and URL. The number of video display apparatuses **3** is not limited to one and a plurality of video display appara-

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tuses **3** may be provided. Further, the terminal apparatus **1** also can receive and display the video content.

The broadcast station **5** is an apparatus that outputs a television signal.

The wireless router **6** has a wireless LAN (Local Area Network) function such as Wi-Fi (Wireless Fidelity), and can be connected to the network **7** via a communication network. The terminal apparatus **1** and the video display apparatus **3** can acquire and display a video content and various types of information from the internet network by being connected to the wireless router **6**. Alternatively, although an example in which the wireless router **6** and the video display apparatus **3** are connected to each other by wireless has been illustrated, they may be connected to each other by wire.

FIG. **2** is a block diagram illustrating a configuration of the terminal apparatus **1** illustrated in FIG. **1**.

A control unit **20** controls each of the units in the terminal apparatus **1**. The control unit **20** is made up of a CPU (Central Processing Unit) or any control circuit or a dedicated circuit such as an ASIC (Appreciation Specific IC).

A television signal receiving unit **21** is made up of a signal processing circuit including a tuner, a decoding circuit and others in addition to an antenna, and receives a television signal output from the broadcast station **5**, decodes a video and an audio, and sends the decoded video and audio to a display unit **22** and an audio output unit **23**.

The display unit **22** is, for example, a liquid crystal panel and displays various types of information. The audio output unit **23** is made up of, for example, an amplifier and a speaker, and outputs various types of audios. An operation unit **24** is, for example, a touch pad, and receives an operation by the user and transmits an instruction based on the operation to the control unit **20**. An apparatus obtained by integrating and combining the liquid crystal panel and the touch pad is generally referred to as a touch panel, and an example using the touch panel is described in the present embodiment.

A memory unit **25** is made up of a ROM (Read Only Memory), a RAM (Random Access Memory), a flash ROM, and the like, and stores a program for controlling the terminal apparatus **1**, various types of setting values and video contents, and the like.

A LAN communication unit **26** transmits various types of commands to the video display apparatus **3** via the wireless router **6** or the like by using, for example, Wi-Fi. Further, the LAN communication unit **26** receives status information or the like from the video display apparatus **3**. The command is information with which the terminal apparatus **1** performs the remote control of the video display apparatus **3**, and examples of the command include a power supply command for issuing an instruction to switch ON and OFF of a power supply and a setting command for designating a specific channel and audio volume. The status information includes information capable of specifying whether remote control can be performed. Alternatively, the LAN communication unit **26** may directly transmit and receive the command and the status information to and from the video display apparatus **3** without the wireless router **6** and the like by using, for example, infrared rays, Wi-Fi Direct, or Bluetooth (registered trademark).

When the command is transmitted, an identification code specific to the terminal apparatus **1** is also transmitted. An ID (identification) individually assigned to the terminal apparatus **1**, a telephone number, and the like can be applied as the identification code. Generally, since it is assumed that one user possesses one terminal apparatus **1**, for example, a user ID given to each user by a manufacturer of the terminal apparatus **1** may be applied. In this case, the user ID is previously stored in the terminal apparatus **1** based on an operation by the user or the like.

FIG. **3** is a block diagram illustrating a configuration of the video display apparatus **3** illustrated in FIG. **1**.

A control unit **30** controls each of the units in the video display apparatus **3**. The control unit **30** is made up of a CPU or any control circuit or a dedicated circuit such as an ASIC.

A television signal receiving unit **31** is made up of, for example, a signal processing circuit including a tuner and a decoding circuit in addition to an antenna, and receives a television signal output from the broadcast station **5**, decodes a video and an audio, and sends the decoded video and audio to a display unit **32** and an audio output unit **33**. The television signal receiving unit **31** includes a plurality of signal processing circuits described above or the like, and can simultaneously receive a plurality of channels.

The display unit **32** is made up of, for example, a liquid crystal panel, a plasma panel, or an organic EL (ElectroLuminescence) panel, and displays various types of video contents and various types of information.

An audio output unit **33** is made up of, for example, an amplifier and a speaker, and outputs various types of audios.

An infrared communication unit **34** receives a control command transmitted from a terminal apparatus having an infrared communication function or the dedicated remote controller **2** by using, for example, infrared rays, and transmits the instruction to the control unit **30**.

A memory unit **35** is made up of a ROM, a RAM, a flash ROM, and the like, and stores an identification code of the terminal apparatus **1**, which has transmitted a power supply command, in addition to a program for controlling the video display apparatus **3** and various types of setting and video contents. A storage such as an HDD (Hard Disc Drive) or a BD (Blu-ray (registered trademark) Disc) drive may be equipped.

A LAN communication unit **36** is connected to the wireless router **6** by wire or by wireless, and can receive a video content or the like from the Internet network or the like. Also, the LAN communication unit **36** receives various types of commands from the terminal apparatus **1** via the wireless router **6** or the like by using, for example, Wi-Fi. Also, the LAN communication unit **36** transmits status information to the terminal apparatus **1**. The LAN communication unit **36** may directly transit and receive the command and the status information to and from the terminal apparatus **1** without the wireless router **6** or the like by using, for example, infrared rays, Wi-Fi Direct, or Bluetooth.

FIG. **4** is a flowchart illustrating a process of the terminal apparatus **1** according to the first embodiment of the present invention. This flowchart illustrates the process in the case where the terminal apparatus **1** performs the remote control of the video display apparatus **3**.

In step S**401**, the terminal apparatus **1** waits until application software for performing the remote control of the video display apparatus **3** (hereinafter referred to as "operation application") is started based on an operation by a user.

FIG. **5** illustrates an example of various types of display on the touch-panel display unit **22** in the terminal apparatus **1**. FIG. **5** (*a*) illustrates a menu screen on which various types of application software are arranged in the terminal apparatus **1**. When the user presses, for example, a "television" button displayed on the touch panel, the operation application is started.

In step S**402**, the terminal apparatus **1** selects the video display apparatus **3** serving as a target of the remote control

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based on the operation by the user. FIG. **5** (*b*) illustrates an example of display on a selection screen in the case where there are two video display apparatuses **3** that can be selected as a target of the remote control. Here, it is assumed that a "television A" is selected.

When the video display apparatus **3** serving as a target of the remote control is selected, the terminal apparatus **1** displays various types of instructions that can be transmitted to the video display apparatus **3**. FIG. **5**(*c*) illustrates an example of display on an operation screen of the video display apparatus **3** in that case.

Next, in step S**403**, the terminal apparatus **1** confirms whether the user has performed an operation for ending the operation application. When the operation for ending the operation application, for example, the operation of pressing an "end" button displayed on the terminal apparatus **1** has been performed, the terminal apparatus **1** returns to a process of displaying a menu screen.

In step S**404**, the terminal apparatus **1** confirms whether the user has pressed a "power" button. When the "power" button displayed on the terminal apparatus **1** has been pressed, the terminal apparatus **1** transmits a power supply command and an identification code to the video display apparatus **3** (step S**405**), and repeats the process from step S**403**.

When the "power" button displayed on the terminal apparatus **1** has not been pressed, in step S**406**, the terminal apparatus **1** confirms whether the user has pressed a channel setting button of a remote control function. When a channel setting button such as a "1" button or a "2" button displayed on the terminal apparatus **1** has been pressed, the process proceeds to step S**407**, and the corresponding channel is stored in the memory unit **25**.

When the "1" button has been pressed, for example, "1" is stored in the memory unit **25**. However, when "Ch+" has been then pressed, "2" is stored in the memory unit **25**. When a setting command is specified by a relative value such as "Ch+" or "Ch−" like this, an absolute value such as "2" is substituted and stored.

Next, in step S**408**, the terminal apparatus **1** transmits a selection command and an identification code of the corresponding channel to the video display apparatus **3**, and repeats the process from step S**403**.

When the channel setting button displayed on the terminal apparatus **1** has not been pressed, in step S**409**, the terminal apparatus **1** confirms whether the other button has been pressed. Examples of the other button include an audio volume setting button.

When the user has issued an instruction to change setting of the video display apparatus **3**, the terminal apparatus **1** transmits a corresponding setting command and identification code to the video display apparatus **3** (step S**410**), and repeats the process from step S**403**.

When the other button displayed on the terminal apparatus **1** has not been pressed, in step S**411**, the terminal apparatus **1** confirms whether a channel switching notification has been received as status information.

When the channel switching notification has been received, the terminal apparatus **1** sets the channel stored in the memory unit **25** to the television signal receiving unit **31**, and displays a received video on the display unit **22** and outputs an audio from the audio output unit **23** (step S**412**), and repeats the process from step S**403**.

The channel switching notification is transmitted from the video display apparatus **3**. For example, when channel switching by the terminal apparatus **1***b* other than the terminal apparatus **1***a*, which has powered on the video display apparatus **3**, has occurred, the video display apparatus **3** transmits the channel switching notification as status information to the terminal apparatus **1***a*.

When the terminal apparatus **1** has not received the channel switching notification, the terminal apparatus **1** repeats the process from step S**403**.

FIG. **6** is a flowchart illustrating a process of the video display apparatus according to the first embodiment of the present invention. This flowchart illustrates the process performed when the video display apparatus **3** is remotely controlled by the terminal apparatus **1**.

In step S**601**, the video display apparatus **3** waits for receiving of a power supply command. When the power supply command has been received, the process proceeds to step S**602**, and the video display apparatus **3** is powered on. Then, in step S**603**, an identification code when the power supply command has been received is stored in the memory unit **35**. Here, it is assumed that an identification code of the terminal apparatus **1***a* has been received.

Next, in step S**604**, the video display apparatus **3** confirms whether the power supply command has been received again. When the power supply command has been received, the process proceeds to step S**605**, and the video display apparatus **3** is powered off, and the process ends.

While toggle control to repeat power on/off every time the video display apparatus **3** receives the power supply command is illustrated as an example in the present embodiment, a power-on command and a power-off command may be separated from each other.

When the video display apparatus **3** has not received the power supply command in step S**604**, the process proceeds to step S**606**, and the video display apparatus **3** confirms whether a channel setting command has been received. When the channel setting command has been received, the process proceeds to step S**607**, and the command is executed as instructed.

Next, in step S**608**, the video display apparatus **3** confirms whether an identification code when the channel setting command has been received matches the identification code stored in the memory unit **35**. When the identification codes match each other, the process from step S**604** is repeated.

When the identification codes do not match each other, the video display apparatus **3** transmits a channel switching notification as status information to the terminal apparatus **1***a* corresponding to the identification code stored in the memory unit **35** (step S**609**), and repeats the process from step S**604**.

Also, when the video display apparatus **3** has not received the channel setting command in step S**606**, the process proceeds to step S**610**, and the video display apparatus **3** confirms whether the other command has been received. When the other command has been received, the video display apparatus **3** executes the command as instructed (step S**611**), and repeats the process from step S**604**. Examples of the other command include an audio volume setting command.

When the other command has not been received, the process from step S**604** is repeated.

When the terminal apparatus **1***a* powers on the video display apparatus **3** by remote control in the above-described manner, the video display apparatus **3** is powered on.

Next, when the terminal apparatus **1***a* performs channel switching of the video display apparatus **3** by remote control, the channel of the video display apparatus **3** is switched as instructed. When another terminal apparatus **1***b* performs channel switching of the video display apparatus **3** by remote control, the channel of the video display apparatus **3**

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is switched as instructed, and a channel switching notification is transmitted as status information to the terminal apparatus **1***a*.

When the terminal apparatus **1***a* has received the channel switching notification, the terminal apparatus **1***a* displays the video of the channel prior to the switching by the terminal apparatus **1***b* on the display unit **22**, and outputs the audio thereof from the audio output unit **23**.

Note that it is also possible to ask the user whether the start of the display of the video and the output of the audio is permitted before the display of the video and the output of the audio are started. FIG. **5** (*d*) illustrates an example of display on a screen of the terminal apparatus **1** at this time. Alternatively, it is also possible to ask the user whether the display and output may be continued after they are started.

By the foregoing configuration, in the first embodiment of the present invention, when the channel of the video display apparatus set by the remote control from a terminal apparatus is switched by another terminal apparatus, a content displayed on the video display apparatus prior to the switching is displayed on the terminal apparatus. Even if a channel set by a user is switched by another user, the user can view the channel by using the terminal apparatus at hand without any particular operation. Thus, it is possible to prevent the content from being missed.

Second Embodiment

FIG. **7** is a flowchart illustrating a process of a video display apparatus according to the second embodiment of the present invention.

Since steps S**701** to S**707** are similar to steps S**601** to S**607** illustrated in FIG. **6**, the description thereof is omitted.

In step S**708**, the video display apparatus **3** confirms whether an identification code when a channel setting command has been received matches an identification code stored in the memory unit **35**. When the identification codes match each other, the video display apparatus **3** repeats the process from step S**704**.

When the identification codes do not match each other, the video display apparatus **3** transmits a channel switching notification as status information to the terminal apparatus **1***a* corresponding to the identification code stored in the memory unit **35** (step S**709**). Next, the video display apparatus **3** stores the identification code when the channel setting command has been received in the memory unit **35** (step S**712**), and repeats the process from step S**704**. Here, it is assumed that an identification code of the terminal apparatus **1***b* has been received.

Since steps S**710** to S**711** are similar to steps S**610** to S**611** illustrated in FIG. **6**, description thereof is omitted.

When the terminal apparatus **1***a* powers on the video display apparatus **3** by remote control in this manner, the video display apparatus **3** is powered on.

Next, when the terminal apparatus **1***a* performs channel switching of the video display apparatus **3** by remote control, the channel of the video display apparatus **3** is switched as instructed. When another terminal apparatus **1***b* performs channel switching of the video display apparatus **3** by remote control, the channel of the video display apparatus **3** is switched as instructed, and a channel switching notification is transmitted as status information to the terminal apparatus **1***a*.

When the terminal apparatus **1***a* receives the channel switching notification, the terminal apparatus **1***a* displays the video of the channel prior to the switching by the terminal apparatus **1***b* on the display unit **22**, and outputs an audio thereof from the audio output unit **23**.

When a terminal apparatus **1***c* further switches the channel of the video display apparatus **3** by remote control, the channel of the video display apparatus **3** is switched as instructed, and a channel switching notification is transmitted as status information to the terminal apparatus **1***b*.

When the terminal apparatus **1***b* receives the channel switching notification, the terminal apparatus **1***b* displays the video of the channel prior to the switching by the terminal apparatus **1***c* on the display unit **22**, and outputs an audio thereof from the audio output unit **23**.

By the foregoing configuration, in the second embodiment of the present invention, a similar effect to that in the first embodiment can be obtained.

Thus, when the channel of the video display apparatus set by the remote control from a terminal apparatus is switched by another terminal apparatus and the channel is further switched by still another terminal apparatus, a content displayed on the video display apparatus prior to the switching is displayed on each of the terminal apparatuses. Even if a channel set by a user is switched by another user, the user can view the channel by using the terminal apparatus at hand without any particular operation. Thus, it is possible to prevent the content from being missed.

Third Embodiment

FIG. **8** is a flowchart illustrating a process of a terminal apparatus **1** according to the third embodiment of the present invention. This flowchart illustrates the process performed when the terminal apparatus **1** performs the remote control of a video display apparatus **3**.

Since steps S**801** to S**810** are similar to steps S**401** to S**410** illustrated in FIG. **4**, description thereof is omitted.

In step S**811**, the terminal apparatus **1** confirms whether a channel switching notification has been received as status information.

When the channel switching notification has been received, the terminal apparatus **1** displays, on a display unit **22**, the start of recording of the video on the channel, which the user has viewed on the video display apparatus **3** so far, into the memory unit **35** of the video display apparatus **3** (step S**812**), and repeats the process from step S**803**. FIG. **13**(*a*) illustrates an example of display on a screen of the terminal apparatus **1**.

The channel switching notification is transmitted from the video display apparatus **3**. When channel switching by a terminal apparatus **1** other than the terminal apparatus **1**, which has powered on the video display apparatus **3**, has occurred, for example, the video display apparatus **3** transmits the channel switching notification as status information.

When the terminal apparatus **1** has not received the channel switching notification, it repeats the process from step S**803**.

FIG. **9** is a flowchart illustrating a process of the video display apparatus according to the third embodiment of the present invention. This flowchart illustrates the process performed when the video display apparatus **3** is remotely controlled by the terminal apparatus **1**.

Since steps S**901** to S**907** are similar to steps S**601** to S**607** illustrated in FIG. **6**, description thereof is omitted.

In step S**908**, the video display apparatus **3** confirms whether an identification code when a channel setting command has been received matches an identification code stored in the memory unit **35**. When the identification codes match each other, the video display apparatus **3** repeats the process from step S**904**.

When the identification codes do not match each other, the video display apparatus **3** transmits a channel switching notification as status information to the terminal apparatus

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1*a* corresponding to the identification code stored in the memory unit **35** (step S**909**). Next, in step S**912**, the video display apparatus **3** stores, in the memory unit **35**, the identification code and channel when the channel setting command has been received. Here, it is assumed that an identification code of the terminal apparatus **1***b* has been received. Next, the video display apparatus **3** sets the channel prior to the switching to a television signal receiving unit **31**, records the received video and audio to the memory unit **35** (step S**913**), and repeats the process from step S**904**.

The television signal receiving unit **31** can simultaneously receive a plurality of channels by setting the plurality of channels. When the channel stored in the memory unit **35** is set in the television signal receiving unit **31**, the channel setting displayed on the display unit **32** is left as it is.

Since steps S**910** to S**911** are similar to steps S**610** to S**611** illustrated in FIG. **6**, description thereof is omitted.

When the terminal apparatus **1***a* powers on the video display apparatus **3** by remote control in this manner, the video display apparatus **3** is powered on.

Next, when the terminal apparatus **1***a* performs channel switching of the video display apparatus **3** by remote control, a channel of the video display apparatus **3** is switched as instructed. When another terminal apparatus **1***b* performs channel switching of the video display apparatus **3** by remote control, the channel of the video display apparatus **3** is switched as instructed, and a channel switching notification is transmitted as status information to the terminal apparatus **1***a*.

Furthermore, the video display apparatus **3** records the content of the channel prior to the switching by the terminal apparatus **1***b* in the recording unit **35**.

Note that it is also possible to ask the user whether the start of the recording of the content is permitted before the recording of the content is started. FIG. **13**(*b*) illustrates an example of display on a screen of the terminal apparatus **1** at this time. Alternatively, it is also possible to ask the user whether the recording may be continued after it is started.

By the foregoing configuration, in the third embodiment of the present invention, a similar effect to that in the first embodiment can be obtained.

Furthermore, when the channel of the video display apparatus set by remote control from a terminal apparatus is switched by another terminal apparatus, a content displayed on the video display apparatus prior to the switching is recorded in the video display apparatus. Even if the channel set by a user is switched by another user, the content can be recorded in the video display apparatus without any particular operation by the user. Thus, it is possible to prevent the content from being missed.

Fourth Embodiment

FIG. **10** is a flowchart illustrating an operation of a terminal apparatus according to the fourth embodiment of the present invention. This flowchart illustrates a process performed when the terminal apparatus **1** remotely controls a video display apparatus **3**.

Since steps S**1001** to S**1010** are similar to steps S**401** to S**410** illustrated in FIG. **4**, description thereof is omitted.

In step S**1011**, the terminal apparatus **1** confirms whether a channel switching notification has been received.

When the channel switching notification has been received, the terminal apparatus **1** sets the channel stored in the memory unit **25** to the television signal receiving unit **21**, and records a received content in the memory unit **25** (step S**1012**), and repeats the process from step S**1003**.

The channel switching notification is transmitted from the video display apparatus **3**. For example, when channel switching by a terminal apparatus **1** other than the terminal apparatus **1**, which has powered on the video display apparatus **3**, has occurred, the video display apparatus **3** transmits the channel switching notification as status information.

When the channel switching notification has not been received, the terminal apparatus **1** repeats the process from step S**1003**.

When a terminal apparatus **1***a* powers on the video display apparatus **3** by remote control in this manner, the video display apparatus **3** is powered on.

Next, when the terminal apparatus **1***a* performs channel switching of the video display apparatus **3** by remote control, the channel of the video display apparatus **3** is switched as instructed. When another terminal apparatus **1***b* performs channel switching of the video display apparatus **3** by remote control, the channel of the video display apparatus **3** is switched as instructed, and the channel switching notification is transmitted as status information to the terminal apparatus **1***a*.

The terminal apparatus **1***a* records a content of the channel prior to the switching by the terminal apparatus **1***b* in the memory unit **25**.

Note that it is also possible to ask the user whether the start of the recording of the content is permitted before the recording is started. Alternatively, it is also possible to ask the user whether the recording may be continued after the recording is started.

By the foregoing configuration, in the fourth embodiment of the present invention, a similar effect to that in the first embodiment can be obtained.

Furthermore, when the channel of the video display apparatus set by remote control from a terminal apparatus is switched by another terminal apparatus, the content displayed on the video display apparatus prior to the switching is recorded in the terminal apparatus. Even if the channel set by a user is switched by another user, the content can be recorded in the terminal apparatus without any particular operation by the user. Thus, it is possible to prevent the content from being missed.

Fifth Embodiment

FIG. **11** is a diagram illustrating a configuration of a video display system according to the fifth embodiment of the present invention. The video display system according to the present embodiment includes a plurality of terminal apparatuses **1** and a video display apparatus **3**.

Since the terminal apparatuses **1**, a remote controller **2**, the video display apparatus **3**, a broadcast station **5**, a wireless router **6**, and a network **7** are similar to those illustrated in FIG. **1**, description thereof is omitted.

A VOD (Video On Demand) server **8** stores the same content as the content broadcasted from the broadcast station **5**, and delivers the stored content to the terminal apparatus **1** and the video display apparatus **3** through the network **7**.

FIG. **12** is a flowchart illustrating an operation of the terminal apparatus according to the fifth embodiment of the present invention. This flowchart illustrates the process performed when the terminal apparatus **1** remotely controls the video display apparatus **3**.

Since steps S**1201** to S**1206** are similar to steps S**401** to **9406** illustrated in FIG. **4**, description thereof is omitted.

In step S**1207**, the terminal apparatus **1** stores content information of a corresponding channel in the memory unit **25**.

Since steps S**1208** to S**1210** are similar to steps S**408** to S**410** illustrated in FIG. **4**, description thereof is omitted.

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In step S1211, the terminal apparatus 1 confirms whether a channel switching notification has been received as status information.

When the channel switching notification has been received, the terminal apparatus 1 retrieves the VOD server 8 for a content based on content information stored in the memory unit 25 (step S1212)

Next, in step S1213, the terminal apparatus 1 enters a VOD playback mode, and repeats the process from step S1203 when the VOD playback mode ends. FIG. 13(*c*) illustrates an example of display on an operation screen of the terminal apparatus 1 in the VOD playback mode. In addition to playback, fast-forward and rewind, a user can view the content from the point where the channel has been switched if the time when the channel has been switched is stored. Alternatively, the content can be viewed from the beginning or can also be viewed later.

The channel switching notification is transmitted from the video display apparatus 3. For example, when channel switching by a terminal apparatus 1 other than the terminal apparatus 1 which has switched the channel of the video display apparatus 3 has occurred, the video display apparatus 3 transmits the channel switching notification as status information.

When the channel switching notification has not been received, the terminal apparatus 1 repeats the process from step S1203.

When a terminal apparatus 1*a* powers on the video display apparatus 3 by remote control in this manner, the video display apparatus 3 is powered on.

Next, when the terminal apparatus 1*a* performs channel switching of the video display apparatus 3 by remote control, the channel of the video display apparatus 3 is switched as instructed. When another terminal apparatus 1*b* then performs channel switching of the video display apparatus 3 by remote control, the channel of the video display apparatus 3 is switched as instructed, and the channel switching notification is transmitted as status information to the terminal apparatus 1*a*.

When the channel switching notification is received, the terminal apparatus 1*a* retrieves the VOD for a content of the channel prior to the switching by the terminal apparatus 1*b*.

Note that it is also possible to ask the user whether the start of the retrieval for the content is permitted before the retrieval is started. FIG. 13 (*d*) illustrates an example of display on a screen of the terminal apparatus 1 at this time. For example, only when a "YES" button displayed on the screen is pressed, the terminal apparatus 1 may enter the VOD playback mode.

By the foregoing configuration, in the fourth embodiment of the present invention, a similar effect to that in the first embodiment can be obtained.

Furthermore, when the channel of the video display apparatus set by remote control from a terminal apparatus is switched by another terminal apparatus, a content displayed on the video display apparatus prior to the switching can be retrieved from the VOD and displayed on the terminal apparatus. Even if the channel set by a user is switched by another user, the user can retrieve the VOD without any particular operation and can view the channel by using the terminal apparatus at hand. Thus, it is possible to prevent the content from being missed.

Sixth Embodiment

FIG. 14 is a flowchart illustrating a process of a video display apparatus according to the sixth embodiment of the present invention. This flowchart illustrates the process performed when the video display apparatus 3 is remotely controlled by a terminal apparatus 1.

Since steps S1401 to S1407 are similar to steps S601 to S607 illustrated in FIG. 6, description thereof is omitted.

Since steps S1408 to S1409 are similar to steps S908 to S909 illustrated in FIG. 9, description thereof is omitted. Since steps S1412 to S1413 are similar to steps S912 to S913 illustrated in FIG. 9, description thereof is omitted.

In step S1410, it is confirmed whether another command has been received. When the other command has been received, the process proceeds to step S1411. When the other command has not been received, the process proceeds to step S1414. Since step S1411 is similar to step S611 illustrated in FIG. 6, description thereof is omitted.

In step S1414, it is confirmed whether a content after channel switching has ended. When the content after the channel switching has ended, the process proceeds to step S1415, and the video display apparatus 3 reproduces a recorded content. When the content after the channel switching has not ended, the video display apparatus 3 repeats the process from step S1404.

When the terminal apparatus 1*a* powers on the video display apparatus 3 by remote control in this manner, the video display apparatus 3 is powered on.

Next, when the terminal apparatus 1*a* performs channel switching of the video display apparatus 3 by remote control, the channel of the video display apparatus 3 is switched as instructed. When another terminal apparatus 1*b* performs channel switching of the video display apparatus 3 by remote control, the channel of the video display apparatus 3 is switched as instructed, and a channel switching notification is transmitted as status information to the terminal apparatus 1*a*.

Furthermore, the video display apparatus 3 records a content of the channel prior to the switching by the terminal apparatus 1*b* in the memory unit 35, and reproduces the content when the content of the channel after the switching ends.

By the foregoing configuration, in the sixth embodiment of the present invention, a similar effect to that in the first embodiment can be obtained.

Furthermore, when the channel of the video display apparatus set by remote control from a terminal apparatus is switched by another terminal apparatus, the content displayed on the video display apparatus prior to the switching is recorded in the video display apparatus, and the content is reproduced when the content of the channel after the switching ends. Even if a channel set by a user is switched by another user, the content is recorded and reproduced by the video display apparatus without any particular operation by the user. Thus, it is possible to prevent the content from being missed.

Seventh Embodiment

FIG. 15 is a flowchart illustrating an operation of a terminal apparatus 1 when the terminal apparatus 1 remotely controls a video display apparatus 3.

In step S1501, the terminal apparatus 1 waits until application software for performing the remote control of the video display apparatus 3 (hereinafter referred to as "operation application") is started based on an operation by the user.

FIG. 5 and FIG. 23 illustrate an example of various types of display on the touch-panel display unit 22 in the terminal apparatus 1. FIG. 5 (*a*) illustrates a menu screen on which various types of application software are arranged in the

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terminal apparatus **1**. When the user presses, for example, a "television" button displayed on the touch panel, the operation application is started.

In step **S1502**, the terminal apparatus **1** selects the video display apparatus **3** serving as a target of the remote control based on the operation by the user. FIG. **5** (*b*) illustrates an example of display on a selection screen in the case where there are two video display apparatuses **3** that can be selected as a target of the remote control. Here, it is assumed that a "television A" is selected.

When the video display apparatus **3** serving as a target of the remote control is selected, the terminal apparatus **1** displays various types of instructions that can be transmitted to the video display apparatus **3**. FIG. **23** illustrates an example of display on an operation screen of the video display apparatus **3** in that case.

Next, in step **S1503**, the terminal apparatus **1** confirms whether the user has performed an operation for ending the operation application. When the user has performed the operation for ending the operation application, for example, the operation of pressing an "end" button displayed on the terminal apparatus **1**, the terminal apparatus **1** returns to a process for displaying a menu screen.

In step **S1504**, the terminal apparatus **1** confirms whether the user has pressed a "power" button. When the user has pressed the "power" button displayed on the terminal apparatus **1**, the terminal apparatus **1** transmits a power supply command to the video display apparatus **3** (step **S1505**), and repeats the process from step **S1503**.

When the user has not pressed the "power" button displayed on the terminal apparatus **1**, the terminal apparatus **1** confirms whether the user has pressed a "missing prevention" mode button in step **S1506**. When the user has pressed the "missing prevention" mode button displayed on the terminal apparatus **1**, the terminal apparatus **1** switches ON and OFF of a missing prevention mode (step **S1507**). When the missing prevention mode is ON, the terminal apparatus **1** turns off the missing prevention mode in step **S1508**, and when the missing prevention mode is OFF, the terminal apparatus **1** turns on the missing prevention mode in step **S1509**. Then, the process from step **S1503** is repeated.

The missing prevention mode is for preventing a television program on an original channel from being missed after the end of a video of advertisement means accompanying the television program such as CM (Commercial Message, hereinafter referred to as "commercial") or announcement means such as an announcement of a program. More specifically, even if the user switches the channel after the start of the video of the advertisement means or the announcement means, the channel is switched to the original channel at the timing of the end of the video. Thus, for example, even if the user is viewing a television program on a channel A and switches the channel A to a channel B or a channel C after the television program is switched to a commercial, the display on the video display apparatus **3** is switched to the channel A at the timing at which the commercial on the channel A ends and is switched to the television program.

When the user has not pressed the "missing prevention" mode button displayed on the terminal apparatus **1**, the terminal apparatus **1** confirms whether the user has pressed a channel selection button of a remote control function in step **S1510**. When the user has pressed a channel selection button such as a "1" button or a "2" button displayed on the terminal apparatus **1**, the process proceeds to step **S1511**, and a selection command of a corresponding channel is transmitted to the video display apparatus **3** and the process from step **S1503** is repeated.

When the user has not pressed the channel selection button displayed on the terminal apparatus **1**, the terminal apparatus **1** confirms whether the user has pressed the other button in step **S1512**. Examples of other setting changes include switching of an audio volume.

When the user has issued an instruction to change setting of the video display apparatus **3**, the terminal apparatus **1** transmits a corresponding setting command to the video display apparatus **3** (step **S1513**), and the process from step **S1503** is repeated.

FIG. **16** is a flowchart illustrating a missing prevention process of the terminal apparatus **1**.

When the missing prevention mode of the terminal apparatus **1** is ON in step **S1600**, the process proceeds to step **S1601**, and when the missing prevention mode is OFF, the process ends.

In step **S1601**, the terminal apparatus **1** waits for an elapse of a predetermined period of time, e.g., five minutes during which the user does not change a channel and there is no commercial switching, and the terminal apparatus **1** stores the channel in the memory unit **25** in step **S1602**. The commercial switching mentioned here means switching from a television program to a commercial and switching from a commercial to a television program. Generally, there is a point in which an audio is silent between a television program and a commercial, and the timing at which the commercial switching occurs can be detected when a television signal is received by a television signal receiving unit **21** and a scene change where an audio is silent is detected.

Next, in step **S1603**, the terminal apparatus **1** receives a television signal of the channel stored in the memory unit **25** by using the television signal receiving unit **21**, and waits for the occurrence of the commercial switching. When the user has pressed a channel selection button of a remote control function while waiting for the occurrence of the commercial switching (step **S1604**), the terminal apparatus **1** transmits a selection command of a corresponding channel to the video display apparatus **3** (step **S1605**), and repeats the process from step **S1601**.

Through steps **S1601** to **S1605**, the terminal apparatus **1** detects the commercial switching after an elapse of a predetermined period of time without the channel change by the user, and determines that a commercial start timing has come (step **S1606**).

Next, in step **S1607**, the terminal apparatus **1** receives the television signal of the channel stored in the memory unit **25** by the television signal receiving unit **21**, and waits for the occurrence of the commercial switching. When the user has pressed the channel selection button of a remote control function while waiting for the occurrence of the commercial switching (step **S1608**), the terminal apparatus **1** transmits a selection command of a corresponding channel to the video display apparatus **3** (step **S1609**).

Also when the channel of the video display apparatus **3** is switched in step **S1609**, the terminal apparatus **1** waits for the occurrence of the commercial switching of the channel stored in the memory unit **25** in step **S1607**.

Through steps **S1607** to **S1609**, the terminal apparatus **1** detects the commercial switching after the start of the commercial, and determines that a commercial end timing has come (step **S1610**).

Next, in step **S1611**, the terminal apparatus **1** transmits the selection command of the channel stored in the memory unit **25** to the video display apparatus **3**, and repeats the process from step **S1600**. When the channel selection button of a remote control function has not been pressed in step **S1608**, the terminal apparatus **1** does not have to transmit the

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selection command of the channel stored in the memory unit **25** to the video display apparatus **3**.

FIG. **17** is a flowchart illustrating an operation of the video display apparatus **3**.

In step S**1701**, the video display apparatus **3** waits for receiving of a power supply command. When the power supply command has been received, the video display apparatus **3** is powered on (step S**1702**).

Next, in step S**1703**, it is confirmed whether the video display apparatus **3** has received the power supply command again. When the power supply command has been received, the video display apparatus **3** is powered off (step S**1704**). When the power supply command has not been received, the video display apparatus **3** confirms whether a channel selection command has been received in step S**1705**. When the channel selection command has been received, the video display apparatus **3** executes the channel selection command as instructed (step S**1706**), and repeats the process from step S**1703**.

When the channel selection command has not been received, the video display apparatus **3** confirms whether another command has been received in step S**1707**. When the other command has been received, the video display apparatus **3** executes the command as instructed (step S**1708**), and repeats the process from step S**1703**.

By the foregoing configuration, in the seventh embodiment of the present invention, the terminal apparatus **1** stores the channel when the user does not change a channel for a predetermined period of time, and transmits a selection command of the channel to the video display apparatus **3** in response to a commercial end timing.

Even if the user switches a channel during a commercial, the channel returns to the channel prior to the switching when the commercial ends. Thus, it is possible to prevent a television program on the channel, which has been being viewed by the user, from being missed.

Instead of the terminal apparatus **1**, the video display apparatus **3** may store the channel when the channel is not changed for a predetermined period of time, and the video display apparatus **3** itself may detect a commercial end timing and switch the channel to a corresponding channel.

Alternatively, instead of the configuration in which the terminal apparatus **1** or the video display apparatus **3** switches the channel in response to the commercial end timing, the user may be notified of the end of the commercial by a video or an audio, and the user himself/herself may operate the terminal apparatus **1** to switch the channel.

Eighth Embodiment

Next, the eighth embodiment of the present invention will be described below. A configuration, an effect, and the like in the present embodiment are similar to those in the seventh embodiment unless otherwise noted. Thus, a difference between the present embodiment and the seventh embodiment will be mainly described below, and description of common points is omitted as much as possible in order to avoid an overlap of the description.

FIG. **18** is a flowchart illustrating a missing prevention process of the terminal apparatus **1**.

When a missing prevention mode of the terminal apparatus **1** is ON in step S**1800**, the process proceeds to step S**1801**, and when the missing prevention mode is OFF, the process ends.

When a user has not changed a channel for a predetermined period of time, e.g., five minutes in step S**1801**, the terminal apparatus **1** stores the channel in the memory unit **25** in step **51802**.

Next, in step S**1803**, the terminal apparatus **1** receives a television signal of the channel stored in the memory unit **25** by a television signal receiving unit **21**, and waits for the occurrence of commercial switching. When the user has pressed a channel selection button of a remote control function while the terminal apparatus **1** waits for the occurrence of the commercial switching (step S**1804**), the terminal apparatus **1** transmits a selection command of a corresponding channel to the video display apparatus **3** (step S**1805**), and repeats the process from step S**1801**.

Through steps S**1801** to S**1805**, the terminal apparatus **1** detects the commercial switching after an elapse of a predetermined period of time without the channel change by the user, and determines that a commercial start or end timing has come (step S**1806**).

Next, in step S**1807**, the terminal apparatus **1** transmits the selection command of the channel stored in the memory unit **25** to the video display apparatus **3**, and repeats the process from step S**1800**.

By the foregoing configuration, in the eighth embodiment of the present invention, a similar effect to that in the seventh embodiment can be obtained.

Furthermore, since the terminal apparatus **1** stores the channel when the user does not change the channel for a predetermined period of time, and transmits a selection command of the channel to the video display apparatus **3** at the timing of start and end of the commercial, it is not necessary to distinguish the start and the end of the commercial, and the missing prevention process can be simplified.

Instead of the terminal apparatus **1**, the video display apparatus **3** may store the channel when the channel is not changed for a predetermined period of time, and the video display apparatus **3** itself may switch the channel to the corresponding channel at the timing of start or end of the commercial.

Alternatively, instead of the configuration in which the terminal apparatus **1** or the video display apparatus **3** switches the channel at the timing of start or end of the commercial, the user may be notified of the start or end of the commercial by a video or an audio, and the user himself/herself may operate the terminal apparatus **1** to switch the channel.

Ninth Embodiment

Next, the ninth embodiment of the present invention will be described below. A configuration, an effect, and the like in the present embodiment are also similar to those in the seventh embodiment unless otherwise noted. Thus, a difference between the present embodiment and the seventh embodiment will be mainly described below.

FIG. **19** is a flowchart illustrating a missing prevention process of the terminal apparatus **1**.

When a missing prevention mode of the terminal apparatus **1** is ON in step S**1900**, the process proceeds to step S**1901**, and when the missing prevention mode is OFF, the process ends.

Since steps S**1901** to S**1905** are similar to steps S**1601** to S**1605** illustrated in FIG. **16**, description thereof is omitted. Through steps S**1901** to S**1905**, the terminal apparatus **1** detects commercial switching after an elapse of a predetermined period of time without the channel change by the user, and determines that a commercial start timing has come (step S**1906**).

Next, in step S**1907**, the terminal apparatus **1** receives a television signal of the channel stored in the memory unit **25** by a television signal receiving unit **21**, and waits for the occurrence of the commercial switching. When the user has

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pressed a channel selection button of a remote control function while the terminal apparatus **1** waits for the occurrence of the commercial switching (step S**1908**), the terminal apparatus **1** transmits a two-screen display start command to the video display apparatus **3** (step S**1909**), and transmits a selection command of a corresponding channel for an added screen to the video display apparatus **3** (step S**1910**). When the user has pressed the channel selection button of a remote control function again while the terminal apparatus **1** waits for the occurrence of the commercial switching, the terminal apparatus **1** does not have to transmit the two-screen display start command in step S**1909**.

Also when a channel of the video display apparatus **3** has been switched in step S**1909**, the terminal apparatus **1** waits for the occurrence of the commercial switching of the channel stored in the memory unit **25** in step S**1907**.

Through steps S**1907** to S**1910**, the terminal apparatus **1** detects the commercial switching after the start of the commercial, and determines that a commercial end timing has come (step S**1911**).

Next, in step S**1912**, the terminal apparatus **1** transmits a two-screen display end command to the video display apparatus **3**, and repeats the process from step S**1900**. The screen added later is erased when the two-screen display ends. The two-screen display end command does not have to be transmitted when the screen has not been switched to the two-screen display.

By the foregoing configuration, in the ninth embodiment of the present invention, a similar effect to that in the seventh embodiment can be obtained.

Furthermore, the terminal apparatus **1** stores the channel when the user does not change a channel for a predetermined period of time, and when the channel selection button is pressed during the commercial, the terminal apparatus **1** switches the video display apparatus **3** to the two-screen display and displays the channel on the added screen. Then, the terminal apparatus **1** ends the two-screen display in response to the timing of the end of the commercial.

Since the video on the original channel can be confirmed by the two-screen display even when the channel is switched, the user can switch the channel without worrying about missing a television program.

Instead of the terminal apparatus **1**, the video display apparatus **3** may store the channel when the channel is not changed for a predetermined period of time, and the video display apparatus **3** itself may start and end the two-screen display.

Also, since the user can confirm both of the video on the original channel and the video on the channel after the switching by the two-screen display, the user himself/herself may operate the terminal apparatus **1** to end the two-screen display instead of the configuration in which the terminal apparatus **1** ends the two-screen display in response to the timing of the end of the commercial.

Tenth Embodiment

Next, the tenth embodiment of the present invention will be described below. A configuration, an effect, and the like in the present embodiment are similar to those in the seventh embodiment unless otherwise noted. Thus, a difference between the present embodiment and the seventh embodiment will be mainly described below.

FIG. **20** is a flowchart illustrating a missing prevention process of the terminal apparatus **1**.

When a missing prevention mode of the terminal apparatus **1** is ON in step S**2000**, the process proceeds to step S**2001**, and when the missing prevention mode is OFF, the process ends.

Since steps S**2001** to S**2005** are similar to steps S**1601** to S**1605** illustrated in FIG. **16**, description thereof is omitted. Through steps S**2001** to S**2005**, the terminal apparatus **1** detects commercial switching after an elapse of a predetermined period of time without the channel change by the user, and determines that a commercial start timing has come (step S**2006**).

Next, in step S**2007**, the terminal apparatus **1** receives a television signal of the channel stored in the memory unit **25** by a television signal receiving unit **21**, and waits for the occurrence of the commercial switching. When the user has pressed a channel selection button of a remote control function while the terminal apparatus **1** waits for the occurrence of the commercial switching (step S**2008**), the terminal apparatus **1** transmits a selection command of a corresponding channel to the video display apparatus **3** (step S**2009**), and displays a video on the channel stored in the memory unit **25** in the terminal apparatus **1** on the display unit **22** (step S**2010**).

Also when a channel of the video display apparatus **3** has been switched in step S**2009**, the terminal apparatus **1** waits for the occurrence of the commercial switching of the channel stored in the memory unit **25** in step S**2007**.

Through steps S**2007** to S**2010**, the terminal apparatus **1** detects the commercial switching after determining the commercial start timing, and determines that a commercial end timing has come (step S**2011**).

Next, in step S**2012**, the terminal apparatus **1** transmits a selection command of the channel stored in the memory unit **25** to the video display apparatus **3**, and repeats the process from step S**2000**.

By the foregoing configuration, in the tenth embodiment of the present invention, a similar effect to that in the seventh embodiment can be obtained.

Furthermore, the terminal apparatus **1** stores the channel when the user does not change a channel for a predetermined period of time, switches the channel of the video display apparatus **3** when a channel selection button is pressed during a commercial, and displays a video on the original channel on the screen of the terminal apparatus **1**. Then, the terminal apparatus **1** returns the channel of the video display apparatus **3** to the original channel in response to the commercial end timing.

Since the video on the original channel can be confirmed by the terminal apparatus **1** even when the channel has been switched, the user can switch the channel without worrying about missing a television program.

The video display apparatus **3** as well as the terminal apparatus **1** may also store the channel when the channel is not changed for a predetermined period of time, and the video display apparatus **3** itself may detect the commercial end timing to switch the channel to a corresponding channel.

Also, since the user can confirm the video on the original channel by the terminal apparatus **1**, the user himself/herself may operate the terminal apparatus **1** to end the two-screen display instead of the configuration in which the terminal apparatus **1** ends the two-screen display in response to the commercial end timing.

Eleventh Embodiment

Next, the eleventh embodiment of the present invention will be described below. A configuration, an effect, and the like in the present embodiment are similar to those in the seventh embodiment unless otherwise noted. Thus, a difference between the present embodiment and the seventh embodiment will be mainly described below.

FIG. **21** is a flowchart illustrating a missing prevention process of the terminal apparatus **1**.

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When a missing prevention mode of the terminal apparatus **1** is ON in step S**2100**, the process proceeds to step S**2101**, and when the missing prevention mode is OFF, the process ends.

Since steps S**2101** to S**2105** are similar to steps S**1601** to S**1605** illustrated in FIG. **16**, description thereof is omitted. Through steps S**2101** to S**2105**, the terminal apparatus **1** detects the commercial switching after an elapse of a predetermined period of time without the channel change by the user, and determines that a commercial start timing has come (step S**2106**).

Since steps S**2107** to S**2109** are similar to steps S**1607** to S**1609** illustrated in FIG. **16**, description thereof is omitted.

Through steps S**2107** to S**2109**, the terminal apparatus **1** detects the commercial switching after the start of the commercial, and determines that a commercial end timing has come (step S**2110**).

Next, in step S**2112**, the process is changed depending on whether a program on an original channel has ended. When the program has not ended, the process proceeds to step S**2111**, and the terminal apparatus **1** transmits a selection command of the channel stored in the memory unit **25** to the video display apparatus **3** and repeats the process from step S**2100**. When the program has ended, the process does not proceed to step S**2111**, and the process from step S**2100** is repeated.

By the foregoing configuration, in the eleventh embodiment of the present invention, a similar effect to that in the seventh embodiment can be obtained.

Furthermore, since the terminal apparatus **1** does not return the channel to the original channel when the program has ended, the terminal apparatus **1** does not erroneously switch the channel which the user wishes to view next.

Instead of the terminal apparatus **1**, the video display apparatus **3** may store the channel when the channel is not changed for a predetermined period of time, and the video display apparatus **3** itself may detect the commercial end timing and switch the channel to a corresponding channel.

Twelfth Embodiment

Next, the twelfth embodiment of the present invention will be described below. A configuration, an effect, and the like in the present embodiment are similar to those in the seventh embodiment unless otherwise noted. Thus, a difference between the present embodiment and the seventh embodiment will be mainly described below.

FIG. **22** is a flowchart illustrating a missing prevention process of the terminal apparatus **1**.

When a missing prevention mode of the terminal apparatus **1** is ON in step S**2200**, the process proceeds to step S**2201**, and when the missing prevention mode is OFF, the process ends.

Since steps S**2201** to S**2202** are similar to steps S**1601** to S**1602** illustrated in FIG. **16**, description thereof is omitted.

Next, in step S**2212**, the process is changed depending on whether the channel has a commercial. When the channel has a commercial, the process proceeds to step S**2203**, and when the channel has no commercial, the process does not proceed to step S**2203** and the process from step S**2200** is repeated. For example, whether or not the channel has a commercial can be determined by storing a list of channels having no commercial in the memory unit **25** in advance and comparing the list of channels with the channel stored in step S**2202**.

Since steps S**2203** to S**2205** are similar to steps S**1603** to S**1605** illustrated in FIG. **16**, description thereof is omitted.

Through steps S**2201** to S**2205** and step S**2212**, the terminal apparatus **1** detects the commercial switching in the channel having a commercial after an elapse of a predetermined period of time without the channel change by the user, and determines that a commercial start timing has come (step S**2206**).

Since steps S**2201** to S**2205** are similar to steps S**1601** to S**1605** illustrated in FIG. **16**, description thereof is omitted. Through steps S**2201** to S**2205**, the terminal apparatus **1** detects the commercial switching after an elapse of a predetermined period of time without the channel change by the user, and determines that a commercial start timing has come (step S**2206**).

Since steps S**2207** to S**2209** are similar to steps S**1607** to S**1609** illustrated in FIG. **16**, description thereof is omitted.

Through steps S**2207** to S**2209**, the terminal apparatus **1** detects the commercial switching after the start of a commercial, and determines that a commercial end timing has come (step S**2210**).

Next, in step S**2211**, the terminal apparatus **1** transmits a selection command of the channel stored in the memory unit **25** to the video display apparatus **3**, and repeats the process from step S**2200**.

By the foregoing configuration, in the twelfth embodiment of the present invention, a similar effect to that in the seventh embodiment can be obtained.

Furthermore, since the terminal apparatus **1** does not perform the missing prevention process for the channel having no commercial, the missing prevention process is not erroneously performed when the channel is switched to the channel having no commercial. Since there is a scene change where an audio is silent even on the channel having no commercial, there is the possibility that the terminal apparatus **1** determines that the commercial switching has occurred, but it is possible to prevent this.

Instead of the terminal apparatus **1**, the video display apparatus **3** may store the channel when the channel is not changed for a predetermined period of time, and the video display apparatus **3** itself may detect the commercial end timing and switch the channel to a corresponding channel.

Also, instead of the configuration in which the terminal apparatus **1** or the video display apparatus **3** switches the channel in response to the commercial end timing, the user may be notified of the end of the commercial by a video or an audio, and the user himself/herself may operate the terminal apparatus **1** to switch the channel.

Thirteenth Embodiment

Next, the thirteenth embodiment of the present invention will be described below. A configuration, an effect, and the like in the present embodiment are similar to those in the seventh embodiment unless otherwise noted. Thus, a difference between the present embodiment and the seventh embodiment will be mainly described below.

FIG. **24** is a flowchart illustrating an operation of the terminal apparatus **1** when the terminal apparatus **1** remotely controls the video display apparatus **3**.

Since steps S**2401** to S**2409** are similar to steps S**1501** to S**1509** illustrated in FIG. **15**, description thereof is omitted.

In step S**2410**, the terminal apparatus **1** confirms whether a user has pressed a channel selection button of a remote control function. When the user has pressed a channel selection button such as a "1" button or a "2" button displayed on the terminal apparatus **1**, the process proceeds to step S**2411**. Since step S**2411** is similar to step S**1511** illustrated in FIG. **15**, description thereof is omitted.

Next, in step S**2414**, the process is changed depending on whether the terminal apparatus **1** has received a status indicating that there is no channel selection authority. Only when the status has been received, the process proceeds to

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step S2415, and a video on a corresponding channel is displayed on the display unit 22 in the terminal apparatus 1. Then, the process from step S2403 is repeated. The status indicating that there is no channel selection authority is sent from the video display apparatus 3 when there is no channel selection authority.

When the user has not pressed the channel selection button of a remote control function displayed on the terminal apparatus 1 in step S2410, the process proceeds to step S2412. Since steps S2412 to S2413 are similar to steps S1512 to S1513 illustrated in FIG. 15, description thereof is omitted.

Thus, when there is no channel selection authority of the video display apparatus 3, the video on the corresponding channel is displayed on the terminal apparatus 1.

FIG. 25 is a flowchart illustrating an operation of the video display apparatus 3.

In step S2501, the video display apparatus 3 waits for receiving of a power supply command. When the power supply command has been received, the video display apparatus 3 is powered on (step S2502), and stores, in the memory unit 35, information indicating which of terminal apparatuses 1 has transmitted the power supply command, namely, an identification code which has been transmitted together with the power supply command (step S2509). Here, it is assumed that the terminal apparatus 1*a* has transmitted the power supply command.

An IP (Internet Protocol) address, an ID (Identification) individually assigned to the terminal apparatus 1, a telephone number and the like are applicable to the identification code. Generally, since it is assumed that one user possesses one terminal apparatus 1, a user ID given to each user by a manufacturer of the terminal apparatus 1 may be applied. In this case, the user ID is previously stored in the terminal apparatus 1 based on an operation by the user or the like.

Since steps S2503 to S2504 are similar to steps S1703 to S1704 illustrated in FIG. 17, description thereof is omitted.

Next, in step S2505, the video display apparatus 3 confirms whether a channel selection command has been received. When the channel selection command has been received, the video display apparatus 3 confirms whether the channel selection command is a setting command from a specific terminal apparatus 1, namely, the terminal apparatus 1 that has issued an instruction to turn on power (step S2510). When the channel selection command is the setting command from the terminal apparatus 1 that has issued the instruction to turn on power, the video display apparatus 3 executes the channel selection command as instructed (step S2506), and repeats the process from step S2503.

When the channel selection command is not the setting command from the terminal apparatus 1 that has issued the instruction to turn on power in step S2510, the video display apparatus 3 confirms whether a channel being displayed is during a commercial (step S2511). When the channel is during the commercial, the video display apparatus 3 executes the command as instructed (step S2506), and repeats the process from step S2503. When the channel is not during the commercial, the video display apparatus 3 sends status information indicating that there is no channel selection authority to the corresponding terminal apparatus 1 (step S2512), and then repeats the process from step S2503. Whether the channel is during the commercial may be transmitted from the terminal apparatus 1 in addition to being determined by the video display apparatus 3.

Since steps S2507 to S2508 are similar to steps S1707 to S1708 illustrated in FIG. 17, description thereof is omitted.

Thus, selection of the channel of the video display apparatus 3 can be performed only when it is instructed from the terminal apparatus 1*a* that has powered on the video display apparatus 3 during a television program, and can be performed also when it is instructed from the terminal apparatus 1*b* in addition to the terminal apparatus 1*a* during a commercial. Also, an operation other than the selection of the channel can be performed from both of the terminal apparatus 1*a* and the terminal apparatus 1*b*.

By the foregoing configuration, in the thirteenth embodiment of the present invention, a similar effect to that in the seventh embodiment can be obtained.

Furthermore, the selection of the channel of the video display apparatus 3 can be performed only when it is instructed from the terminal apparatus 1*a* that has powered on the video display apparatus 3 during a television program, and a video is displayed on the terminal apparatus 1*b* when it is instructed from the terminal apparatus 1*b*. In addition, during the commercial, the channel selection can be performed also when it is instructed from the terminal apparatus 1*b* in addition to the terminal apparatus 1*a*.

Fourteenth Embodiment

FIG. 26 is a flowchart illustrating an operation of the terminal apparatus 1 when the terminal apparatus 1 remotely controls the video display apparatus 3.

Since steps S2601 to S2605 are similar to steps S1501 to S1505 illustrated in FIG. 15, description thereof is omitted.

In step S2606, the terminal apparatus 1 confirms whether a user has pressed a "missing prevention" mode button. When the user has pressed the "missing prevention" mode button displayed on the terminal apparatus 1, the terminal apparatus 1 turns on a missing prevention mode, and repeats the process from step S2603.

When the user has not pressed the "missing prevention" mode button displayed on the terminal apparatus 1, the process proceeds to step S2610. Since steps S2610 to S2613 are similar to steps S1510 to S1513 illustrated in FIG. 15, description thereof is omitted.

FIG. 27 is a flowchart illustrating a missing prevention process of the terminal apparatus 1.

When the missing prevention mode of the terminal apparatus 1 is ON in step S2700, the process proceeds to step S2701, and when the missing prevention mode is OFF, the process ends.

In step S2701, the terminal apparatus 1 stores a channel previously set by the user.

Since steps S2707 to S2710 are similar to steps S1507 to S1510 illustrated in FIG. 15, description thereof is omitted. Through steps S2707 to S2709, the terminal apparatus 1 detects commercial switching after the start of a commercial, and determines that a commercial end timing has come (step S2710).

Next, in step S2711, the terminal apparatus 1 transmits a selection command of the channel stored in the memory unit 25 to the video display apparatus 3, and turns off the missing prevention mode in step S2712. When the channel selection button of a remote control function has not been pressed in step S2708, the selection command of the channel stored in the memory unit 25 does not have to be transmitted to the video display apparatus 3.

By the foregoing configuration, in the fourteenth embodiment of the present invention, the terminal apparatus 1 stores the channel which is being viewed when the user has pressed the "missing prevention" mode button, and transmits the selection command of the channel to the video display apparatus 3 in response to the timing of the end of the commercial.

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If the user has pressed the "channel" button after pressing the "missing prevention" mode button during the commercial, the channel returns to the channel prior to the switching at the end of the commercial even when the user switches the channel during the commercial. Thus, it is possible to prevent the television program on the channel which has been being viewed by the user from being missed.

Furthermore, when the "missing prevention" mode button is pressed during the commercial, a missing prevention mode is entered, and the missing prevention mode is canceled when the commercial ends. Therefore, the power consumption of the terminal apparatus **1** can be suppressed.

Instead of the terminal apparatus **1**, the video display apparatus **3** may store the channel, and the video display apparatus **3** itself may detect the commercial end timing and switch the channel.

Also, instead of the configuration in which the terminal apparatus **1** or the video display apparatus **3** switches the channel in response to the commercial end timing, the user may be notified of the end of the commercial by a video or an audio, and the user himself/herself may operate the terminal apparatus **1** to switch the channel.

Note that the embodiments above have been described in detail so as to make the present invention easily understood, and the present invention is not limited to the embodiment having all of the described constituent elements. Also, a part of the configuration of one embodiment may be replaced with the configuration of another embodiment, and the configuration of one embodiment may be added to the configuration of another embodiment. Furthermore, another configuration may be added to a part of the configuration of each embodiment, and a part of the configuration of each embodiment may be eliminated or replaced with another configuration.

Some or all of the above-mentioned configurations, functions, processing units, and processing means may be implemented by hardware by designing them with integrated circuits or the like. Also, the above-mentioned configurations and functions may be implemented by software by interpreting and executing programs for implementing the respective functions by processors. Information such as a program, a table, a file, and the like for implementing each of the functions can be placed in a recording device such as a memory, a hard disk, or an SSD (Solid State Drive) or a recording medium such as an IC card or an SD card.

Control lines and information lines, which are considered to be necessary in description, are illustrated, and all control lines and information lines in products are not necessarily illustrated. In practice, it is right to think that almost all configurations are connected to one another.

REFERENCE SIGNS LIST

1 . . . TERMINAL APPARATUS, **2** . . . REMOTE CONTROLLER, **3** . . . VIDEO DISPLAY APPARATUS, **5** . . . BROADCAST STATION, **6** . . . WIRELESS ROUTER, **7** . . . NETWORK, **20** . . . CONTROL UNIT, **21** . . . TELEVISION SIGNAL RECEIVING UNIT, **22** . . . DISPLAY UNIT, **23** . . . AUDIO OUTPUT UNIT, **24** . . . OPERATION UNIT, **25** . . . MEMORY UNIT, **26** . . . LAN COMMUNICATION UNIT, **30** . . . CONTROL UNIT, **31** . . . TELEVISION SIGNAL RECEIVING UNIT, **32** . . . DISPLAY UNIT, **33** . . . AUDIO OUTPUT UNIT, **34** . . . INFRARED COMMUNICATION UNIT, **35** . . . MEMORY UNIT, **36** . . . LAN COMMUNICATION UNIT

The invention claimed is:

1. A video display apparatus comprising:

a display unit that displays a video content from a broadcast station or from a video content delivery source;

a direct communication unit that executes bi-directional communication directly with a first wireless terminal device without going via a router;

a network communication unit that executes bi-directional communication via a router with a second wireless terminal device that is different from the first wireless terminal;

an infrared receiver unit that receives infrared rays from a remote controller; and

a controller that controls the display unit, the direct communication unit, the network communication unit, and the infrared receiver;

wherein, during display on the display unit of a first video content selected with the first wireless terminal device , if a first command for changing a video content on the display unit from the first video content to a second video content is transmitted from the second wireless terminal device to the network communication unit via the router, the display unit terminates displaying the first video content and starts to display the second video content and the direct communication unit sends first information for informing termination of the displaying of the first video content directly to the first wireless terminal device without going via a router, and

wherein, during display on the display unit of the second video content selected with the second wireless terminal device, if a second command for changing a video content on the display unit from the second video content to another video content is transmitted from the remote controller to the infrared receiver unit by infrared rays, the display unit terminates displaying the second video content and starts to display another video content and the network communication unit sends second information for informing termination of the displaying of the second video content via the router to the second wireless terminal.

2. A method for changing a content on the video display apparatus comprising:

displaying step to display a video content from a broadcast station or from a video content delivery source, on a display unit of the video display apparatus;

direct communication step to execute bi-directional communication directly with a first wireless terminal device without going via a router;

network communication step to execute bi-directional communication via a router with a second wireless terminal device that is different from the first wireless terminal device; and

infrared ray receiving step to receive infrared rays from a remote controller;

wherein, during display on the display unit of a first video content selected with the first wireless terminal device, if a first command for changing a video content on the display unit from the first video content to a second video content is transmitted from the second wireless terminal device to the video display apparatus via the router, the video display apparatus terminates displaying the first video content and starts to display the second video content and the video display apparatus sends first infoiiiiation for informing termination of the displaying of the first video content directly to the first wireless terminal device without going via a router, and

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wherein, during display on the display unit of the second video content selected with the second wireless terminal device, if a second command for changing a video content on the display unit from the second video content to another video content is transmitted from the remote controller to the video display apparatus by infrared rays, the display unit terminates displaying the second video content and starts to display another video content and the video display apparatus sends second information for informing termination of the displaying of the second video content via the router to the second wireless terminal.

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