(19) Europäisches Patentamt
European Patent Office
Office européen des brevets

(11) EP 2 309 665 A2

(12) EUROPEAN PATENT APPLICATION

(43) Date of publication:
13.04.2011 Bulletin 2011/15

(51) Int Cl.:
H04H 60/27 *(2008.01)*

(21) Application number: **10168876.0**

(22) Date of filing: **08.07.2010**

(84) Designated Contracting States:
AL AT BE BG CH CY CZ DE DK EE ES FI FR GB GR HR HU IE IS IT LI LT LU LV MC MK MT NL NO PL PT RO SE SI SK SM TR
Designated Extension States:
BA ME RS

(30) Priority: **18.09.2009 JP 2009218112**

(71) Applicant: **Kabushiki Kaisha Toshiba**
Tokyo 105-8001 (JP)

(72) Inventor: **Nakano, Hiroyuki**
Minato-ku
Tokyo 105-8001 (JP)

(74) Representative: **HOFFMANN EITLE**
Patent- und Rechtsanwälte
Arabellastraße 4
81925 München (DE)

(54) Broadcast reception and recording apparatus

(57) According to one embodiment, a broadcast reception apparatus includes receivers (19, 21, 23, 25, 27, 29, 31, or 33) and controller (42). The receivers (19, 21, 23, 25, 27, 29, 31, or 33) are configured to receive broadcast signals from channels. The controller (42) is configured to control recording of one or more programs of one or more target channels each being a target of recording at a recording time zone, based on selection of one or more the target channels and setting of the recording time zone, a number of the target channels being equal to or less than a number of the receivers (19, 21, 23, 25, 27, 29, 31, or 33), and one or more the channels being preset to one or more the receivers (19, 21, 23, 25, 27, 29, 31, or 33).

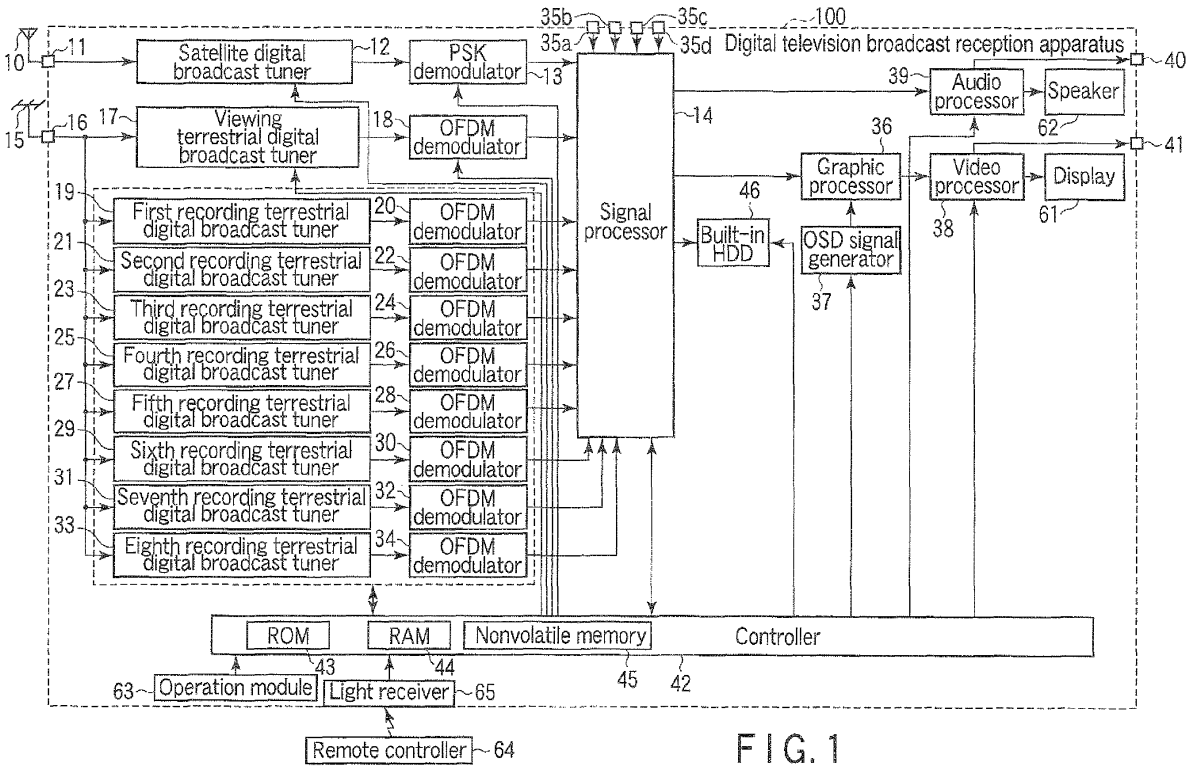

FIG. 1

EP 2 309 665 A2

Description

[0001] Embodiments described herein relate generally to a recording control technique in a broadcast reception apparatus having a plurality of tuners.

[0002] As is well known, in recent years, digitization of television broadcast has been promoted. For example, in Japan, terrestrial digital broadcast, as well as satellite digital broadcast such as BS (broadcasting satellite) digital broadcast and 110° CS (communication satellite) digital broadcast, has been started.

[0003] As regards digital television broadcast reception apparatuses, models with a plurality of digital broadcast tuners have come on to the market. Such a digital television broadcast reception apparatus has a high-level function of, for example, displaying a selected program while recording another program. If the number of digital broadcast tuners, which are mounted in the digital television broadcast reception apparatus, increases, the number of programs which can be recorded in the same time zone also increases. Jpn. Pat. Appln. KOKAI Publication No. 2007-36453 discloses the structure of a recording/reproducing apparatus which includes a plurality of tuners and switches channels of broadcast signals, which are tuned by the plural tuners, in accordance with the frequency of channel tuning.

[0004] A general architecture that implements the various feature of the embodiments will now be described with reference to the drawings. The drawings and the associated descriptions are provided to illustrate the embodiments and not to limit the scope of the invention.

FIG. 1 is an exemplary block diagram which schematically shows the structure of a digital television broadcast reception apparatus according to an embodiment;

FIG. 2 is an exemplary external appearance of a remote controller which is used for the digital television broadcast reception apparatus according to the embodiment;

FIG. 3 is an exemplary flowchart illustrating channel setting according to the embodiment;

FIG. 4 shows a channel setting screen in the channel setting according to the embodiment;

FIG. 5 is an exemplary channel setting screen in the channel setting according to the embodiment;

FIG. 6 is an exemplary channel change confirmation screen in the channel setting according to the embodiment;

FIG. 7 is an exemplary flowchart illustrating multi-channel simultaneous auto-recording setting according to the embodiment;

FIG. 8 is an exemplary change confirmation screen of the multi-channel simultaneous auto-recording setting according to the embodiment;

FIG. 9 is an exemplary setting screen of the multi-channel simultaneous auto-recording setting according to the embodiment;

FIG. 10 is an exemplary channel selection screen of the multi-channel simultaneous auto-recording setting according to the embodiment;

FIG. 11 is an exemplary time zone setting screen of the multi-channel simultaneous auto-recording setting according to the embodiment; and

FIG. 12 is an exemplary detailed setting screen of the recording time zone of the multi-channel simultaneous auto-recording setting according to the embodiment.

[0005] Various embodiments will be described hereinafter with reference to the accompanying drawings.

[0006] In general, according to one embodiment, a broadcast reception apparatus includes receivers and controller. The receivers are configured to receive broadcast signals from channels. The controller is configured to control recording of one or more programs of one or more target channels each being a target of recording at a recording time zone, based on selection of one or more the target channels and setting of the recording time zone, a number of the target channels being equal to or less than a number of the receivers, and one or more the channels being preset to one or more the receivers.

[0007] An embodiment will now be described with reference to the accompanying drawings. FIG. 1 is a block diagram which schematically shows the structure of a digital television broadcast reception apparatus 100 according to the embodiment. Specifically, a satellite digital television broadcast signal, which has been received by an antenna 10 for BS/CS digital broadcast reception, is supplied to a satellite digital broadcast tuner 12 via an input terminal 11. The satellite digital broadcast tuner 12 tunes a broadcast signal of a desired channel.

[0008] The broadcast signal, which is tuned by the satellite digital broadcast tuner 12, is supplied to a PSK (phase shift keying) demodulator 13, and demodulated to a digital video signal and audio signal. Then, the digital video signal and audio signal are output to a signal processor 14.

[0009] A terrestrial digital television broadcast signal, which has been received by an antenna 15 for terrestrial broadcast reception, is supplied to a viewing terrestrial digital broadcast tuner 17 for viewing via an input terminal 16. The viewing terrestrial digital broadcast tuner 17 switches and tunes a broadcast signal of the user's desired channel. The broadcast signal, which is tuned by the viewing terrestrial digital broadcast tuner 17, is supplied to an OFDM (orthogonal frequency division multiplexing) demodulator 18, and demodulated to a digital video signal and audio signal. Then, the digital video signal and audio signal are output to the signal processor 14.

[0010] A broadcast signal, which is tuned by a first terrestrial recording digital broadcast tuner 19 for recording, is supplied to an OFDM demodulator 20 and demodulated to a digital video signal and audio signal, and then the digital video signal and audio signal are output to the signal processor 14.

[0011] The same applies to a pair of a second recording terrestrial digital broadcast tuner 21 for recording and an OFDM demodulator 22; a pair of a third recording terrestrial digital broadcast tuner 23 for recording and an OFDM demodulator 24; a pair of a fourth recording terrestrial digital broadcast tuner 25 for recording and an OFDM demodulator 26; a pair of a fifth recording terrestrial digital broadcast tuner 27 for recording and an OFDM demodulator 28; a pair of a sixth recording terrestrial digital broadcast tuner 29 for recording and an OFDM demodulator 30; a pair of a seventh recording terrestrial digital broadcast tuner 31 for recording and an OFDM demodulator 32; and a pair of an eighth recording terrestrial digital broadcast tuner 33 for recording and an OFDM demodulator 34.

[0012] In the embodiment, a description is given of the case in which the digital television broadcast reception apparatus 100 includes eight recording terrestrial digital broadcast tuners. Alternatively, the digital television broadcast reception apparatus 100 may be configured to include seventh or less, or nine or more, recording terrestrial digital broadcast tuners.

[0013] The signal processor 14 selectively applies a predetermined digital signal process to the digital video signals an audio signals which are supplied from the PSK demodulator 13, OFDM demodulator 18, OFDM demodulator 20, OFDM demodulator 22, OFDM demodulator 24, OFDM demodulator 26, OFDM demodulator 28, OFDM demodulator 30, OFDM demodulator 32, and OFDM demodulator 34, and outputs the processed signals to a graphic processor 36 and an audio processor 39.

[0014] A plurality (four in the example shown) of input terminals 35a, 35b, 35c and 35d are connected to the signal processor 14. The input terminals 35a to 35d enable analog video signals and audio signals to be input from the outside of the digital television broadcast reception apparatus 100.

[0015] The signal processor 14 selectively digitizes analog video signals and audio signals, which are supplied from the input terminals 35a to 35d, performs a predetermined digital signal process on the digitized video signal and audio signal, and then outputs the resultant processed signals to the graphic processor 36 and audio processor 39.

[0016] The graphic processor 36 has a function of superimposing an OSD (on-screen display) signal, which is generated by an OSD signal generator 37, on a digital video signal which is supplied from the signal processor 14, and outputting the resultant signal. The graphic processor 36 can selectively output one of the output video signal of the signal processor 14 and the output OSD signal of the OSD signal generator 37, and can output both output signals in such a combination that both output signals constitute the halves of a screen.

[0017] The digital video signal, which is output from the graphic processor 36, is supplied to a video processor 38. The video signal, which has been processed by the video processor 38, is supplied to a display 61 and also supplied to an output terminal 41. The display 61 displays video based on the video signal. If an external device is connected to the output terminal 41, the video signal that is delivered to the output terminal 41 is input to the external device.

[0018] The audio processor 39 converts the input digital audio signal to an analog audio signal of a format which can be reproduced by a speaker 62. The analog audio signal is output to the speaker 62 and is reproduced, and is output to the outside via an output terminal 40.

[0019] All the operations of the digital television broadcast reception apparatus 100, including the above-described various receiving operations, are comprehensively controlled by a controller 42. The controller 42 includes a CPU (central processing unit), etc., receives operation information from an operation module 63 or operation information that is sent from a remote controller 64 and received via a light receiver 65, and controls the respective units so that the operation content of the operation information may be reflected. The remote controller 64, as shown in FIG. 2, includes a cursor key (cross key) 64a, a decision key 64b, a select key 64c, and a return key 64d.

[0020] The controller 42 mainly makes use of a ROM (read-only memory) 43 which stores a control program that is executed by the CPU, a RAM (random access memory) 44 which provides a working area for the CPU, and a nonvolatile memory 45 which stores various setting information and control information.

[0021] A built-in HDD (hard disk drive) 46 is connected to the signal processor 14. By multi-channel simultaneous auto-recording (to be described later), the built-in HDD 46 simultaneously records video signals and audio signals of programs of broadcast signals which are tuned by the first recording terrestrial digital broadcast tuner 19 to the eighth recording terrestrial digital broadcast tuner 33. In the embodiment, a description is given of the case in which the digital television broadcast reception apparatus 100 includes one built-in HDD.

[0022] Alternatively, the digital television broadcast reception apparatus 100 may be configured to include two or more built-in HDDs.

[0023] In the embodiment, in the case where the user has selected a desired channel for viewing by using the select key 64c of the remote controller 64, the viewing terrestrial digital broadcast tuner 17 effects switching to the corresponding channel and tunes the broadcast signal. The display 61 displays video of the program on the basis of the broadcast signal.

[0024] Each of the first recording terrestrial digital broadcast tuner 19 to the eighth recording terrestrial digital broadcast tuner 33 is set to always tune the broadcast signal of the service ID (channel) corresponding to the channel that is designated by the user with use of the remote controller 64. The service ID identifies a service. Usually, a service agrees with a channel that is tuned by the user. In the case where a plurality of channels are in

the transponder in satellite broadcast or in the physical channel in cable broadcast or terrestrial broadcast, the service ID indicates one channel. When a day of a week and a time which are set by the user have come, the controller 42 activates, in every week, those of the first recording terrestrial digital broadcast tuner 19 to the eighth recording terrestrial digital broadcast tuner 33, in which channels are set, and records video signals and audio signals of programs of plural channels in the built-in HDD 46. This operation is called "multi-channel simultaneous auto-recording".

[0025] Next, a description is given of the channel setting of broadcast signals which are tuned by the first recording terrestrial digital broadcast tuner 19 to the eighth recording terrestrial digital broadcast tuner 33. FIG. 3 is a flow chart illustrating the channel setting. To start with, if the user requests display of a channel setting screen by using the remote controller 64, the controller 42 causes the display 61 to display the channel setting screen shown in FIG. 4 (Block 101).

[0026] FIG. 4 shows the channel setting screen which displays the channels and broadcast stations which are currently set in the first recording terrestrial digital broadcast tuner 19 to the eighth recording terrestrial digital broadcast tuner 33. At a time of initial setting, none of channels and broadcast stations is displayed on the setting screen.

[0027] The user selects, on the channel setting screen shown in FIG. 4, "Yes" in the case of performing a channel change and "No" in the case of not performing a channel change, by using the cursor key 64b of the remote controller 64, and decides the selection by the decision key 64a.

[0028] On the basis of the selection by the user, the controller 42 determines whether the channel change has been selected (Block 102). In the case where the channel change is not selected (NO in Block 102), the controller 42 finishes the channel setting by keeping the broadcast signals, which are tuned by the first recording terrestrial digital broadcast tuner 19 to the eighth recording terrestrial digital broadcast tuner 33, as the currently set broadcast signals of the channels.

[0029] In the case where the channel change is selected (YES in Block 102), the controller 42 causes the display 61 to display a channel setting screen shown in FIG. 5 (Block 103). FIG. 5 shows the channel setting screen which displays a list of broadcast stations and channels which are currently selectable in the region where the digital television broadcast reception apparatus 100 is used.

[0030] The controller 42 acquires the information of the broadcast stations and channels corresponding to selectable broadcast signals in the following manner. At the time of the initial setting of the digital television broadcast reception apparatus 100, the controller 42 detects, with use of the viewing terrestrial digital broadcast tuner 17, the service IDs corresponding to the selectable broadcast signals in the region where the digital television broadcast reception apparatus 100 is used. The controller 42 stores in the nonvolatile memory 45 the information of the service IDs corresponding to the selectable broadcast signals. Based on this information, the controller 42 causes the display 61 to display the channel setting screen shown in FIG. 5. The controller 42 may use, in place of the viewing terrestrial digital broadcast tuner 17, any one of the first recording terrestrial digital broadcast tuner 19 to the eighth recording terrestrial digital broadcast tuner 33.

[0031] Using the cursor key 64b of the remote controller 64, the user moves the focus of the channel field in which the channel and broadcast station are displayed. Next, the user designates, by the decision key 64a, the channel corresponding to the broadcast signal which is tuned by any one of the first recording terrestrial digital broadcast tuner 19 to the eighth recording terrestrial digital broadcast tuner 33. The controller 42 determines whether the user has designated more than a predetermined number of channels (Block 104). In the embodiment, the user can designate at most eight channels corresponding to the number of the first recording terrestrial digital broadcast tuner 19 to the eighth recording terrestrial digital broadcast tuner 33.

[0032] If the number of designated channels is greater than a predetermined number of channels (eight in this example) (YES in Block 104), the controller 42 causes the display 61 to display a message indicating that more than a predetermined number of channels cannot be designated. After the passing of a predetermined time, the controller 42 returns to Block 103 and causes the display 61 to display the channel setting screen shown in FIG. 5.

[0033] In the case where the number of designated channels is not greater than the predetermined number of channels (eight in this example) (NO in Block 104), if the controller 42 detects the pressing of the return key 64 of the remote controller 64 by the user, the controller 42 determines whether there is a change in the channel designated by the user (Block 105).

[0034] If there is no channel change (i.e. if the channels designated in FIG. 4 are identical to the channels designated in FIG. 5) (NO in Block 105), the controller 42 finishes the channel setting by keeping the broadcast signals, which are tuned by the first recording terrestrial digital broadcast tuner 19 to the eighth recording terrestrial digital broadcast tuner 33, as the currently set broadcast signals of the channels.

[0035] If there is a channel change (i.e. if any one of the channels designated in FIG. 4 is different from the channels designated in FIG. 5) (YES in Block 105), the controller 42 determines whether a program of the channel, which has been changed from a selected state to a non-selected state, is recorded in the built-in HDD 46 (Block 106).

[0036] In the case where a program of the channel, which has been changed from the selected state to the non-selected state, is recorded in the built-in HDD 46 (YES in Block 106), the controller 42 causes the display

61 to display a channel change confirmation screen shown in FIG. 6 (Block 107). The user selects, on the channel change confirmation screen shown in FIG. 6, "Yes" in the case of permitting the channel change and "No" in the case of not permitting the channel change, by the cursor key 64b of the remote controller 64, and decides the selection by the decision key 64a.

[0037] In the case where the controller 42 has determined that the channel change is not permitted, on the basis of the selection by the user (NO in Block 107), the controller 42 finishes the channel setting by keeping the broadcast signals, which are tuned by the first recording terrestrial digital broadcast tuner 19 to the eighth recording terrestrial digital broadcast tuner 33, as the broadcast signals of the currently set service IDs.

[0038] In the case where a program of the channel, which has been changed from the selected state to the non-selected state, is not recorded in the built-in HDD 46 (NO in Block 106) or in the case where the controller 42 has determined that the channel change is permitted, on the basis of the selection by the user (YES in Block 107), the controller 42 determines whether the multi-channel simultaneous auto-recording setting is in a "record" state or not (Block 108).

[0039] In the case where the controller 42 has determined in Block 107 that the channel change is permitted (YES in Block 107), the video signal and audio signal of the simultaneous recording program of the channel, which has been changed from the selected state to the non-selected state, may be deleted from the built-in HDD 46.

[0040] In this case, the "record" state is the state in which the channels corresponding to the broadcast signals, which are tuned by the first recording terrestrial digital broadcast tuner 19 to the eighth recording terrestrial digital broadcast tuner 33, are allocated and fixed, and the recording channels and recording time zones, which are actually used in the multi-channel simultaneous auto-recording, are set.

[0041] The "not record" state is the state in which the channels corresponding to the broadcast signals, which are tuned by the first recording terrestrial digital broadcast tuner 19 to the eighth recording terrestrial digital broadcast tuner 33, are allocated and fixed, but the recording channels and recording time zones, which are actually used in the multi-channel simultaneous auto-recording, are not set.

[0042] In the case where the "record" state is set (YES in Block 108), the controller 42 executes such a change as to tune the broadcast signals of the newly set channels for the first recording terrestrial digital broadcast tuner 19 to the eighth recording terrestrial digital broadcast tuner 33. Further, the controller 42 changes the multi-channel simultaneous auto-recording setting to the "not record" state (Block 109). The controller 42 finishes the channel setting. In the case where the program is being recorded by the multi-channel simultaneous auto-recording, the controller 42 stops the recording.

[0043] The reason why the controller 42 changes in Block 109 the multi-channel simultaneous auto-recording setting from the "record" state to the "not record" state is that since the channels have been changed, it is necessary to newly set the recording channels and recording time zones which are actually used in the multi-channel simultaneous auto-recording.

[0044] In the case where the "record" state is not set (i.e. the "not record" state is set) (NO in Block 108), the controller 42 executes such a change as to tune the broadcast signals of the newly set channels for the first recording terrestrial digital broadcast tuner 19 to the eighth recording terrestrial digital broadcast tuner 33 (Block 110). The controller 42 finishes the channel setting.

[0045] Next, the multi-channel simultaneous auto-recording setting is described. FIG. 7 is a flow chart illustrating the multi-channel simultaneous auto-recording setting. To start with, if the user requests display of a multi-channel simultaneous auto-recording setting screen by using the remote controller 64, the controller 42 determines whether the multi-channel simultaneous auto-recording is in the "record" state or not (Block 201).

[0046] If the "record" state is set (YES in Block 201), the controller 42 causes the display 61 to display a screen shown in FIG. 8 for confirming the setting change of the multi-channel simultaneous auto-recording from the "record" state to the "not record" state (Block 202). In the case where the multi-channel simultaneous auto-recording setting is in the "not record" state, the controller 42 can set the recording channels and recording time zones in accordance with the user's request.

[0047] The user selects, on the confirmation screen shown in FIG. 8, "Yes" in the case of permitting the setting change from the "record" state to the "not record" state and "No" in the case of not permitting the setting change, by the cursor key 64b of the remote controller 64, and decides the selection by the decision key 64a.

[0048] In the case of performing the setting change from the "record" state to the "not record" state (YES in Block 202), the controller 42 returns to Block 201 and confirms the "record" state. In the case of not performing the setting change from the "record" state to the "not record" state (NO in Block 202), the controller 42 finishes the multi-channel simultaneous auto-recording setting.

[0049] In the case where the "record" state is not set (i.e. the "not record" state is set) (NO in Block 201), the controller 42 causes the display 61 to display a multi-channel simultaneous auto-recording setting screen shown in FIG. 9 (Block 203).

[0050] FIG. 9 shows the multi-channel simultaneous auto-recording setting screen which displays a list of the channels and broadcast stations which are set to be tuned by the first terrestrial digital broadcast tuner 19 to the eighth recording terrestrial digital broadcast tuner 33 by the user according to the flow chart of FIG. 3.

[0051] If the user selects "channel setting" on the recording setting screen shown in FIG. 9 by using the re-

mote controller 64, the controller 42 causes the display 61 to display a channel select screen shown in FIG. 10 (Block 204). The user can select nine desired recording channels at maximum by using the remote controller 64. If the user finishes the selection of recording channels and selects "setting completion" by using the remote controller 64, the controller 42 causes the display 61 to display once again the recording setting screen shown in FIG. 9. The controller 42 stores in the nonvolatile memory 45 the information of recording channels which have been selected from among the channels set for the first recording terrestrial digital broadcast tuner 19 to the eighth recording terrestrial digital broadcast tuner 33.

[0052] If the user selects "time zone setting" on the setting screen shown in FIG. 9 by using the remote controller 64, the controller 42 causes the display 61 to display a time zone setting screen shown in FIG. 11 (Block 205). The user can set a plurality of recording time zones. If the user selects a recording time zone registration field by using the remote controller 64, the controller 42 causes the display 61 to display a detailed setting screen of recording time zones, which is shown in FIG. 12. The user can designate and set the day of the week of recording and a time zone of a certain unit in the day. If the user finishes the setting of the time zone and selects "setting completion" by using the remote controller 64, the controller 42 causes the display 61 to display once again the recording setting screen shown in FIG. 9.

[0053] The controller 42 stores in the nonvolatile memory 45 the information of the day of the week and time zone when the program of the selected recording channel is to be recorded.

[0054] If the user selects the setting of the "record" state or "not record" state on the recording setting screen shown in FIG. 9 by using the remote controller 64, the controller 42 sets the state of multi-channel simultaneous auto-recording according to the selection (Block 206). The controller 42 finishes the multi-channel simultaneous auto-recording setting.

[0055] In the case where the "record" state is set in the multi-channel simultaneous auto-recording, when the day of the week and time which are preset by the user have come, the controller 42 activates, in every week, those of the first recording terrestrial digital broadcast tuner 19 to the eighth recording terrestrial digital broadcast tuner 33, which correspond to the selected recording channels, and records video signals and audio signals of programs of plural channels in the built-in HDD 46.

[0056] Although the controller 42 sets the day of the week and the time zone in Block 204, only the time zone may be set. In this case, the controller 42 starts multi-channel simultaneous auto-recording every day at the same time zone.

[0057] In the case of starting multi-channel simultaneous auto-recording of programs of plural channels, the controller 42 slightly shifts the recording start times of the plural channels in a stepwise manner. If the recording start times are shifted, the operational load on the digital television broadcast reception apparatus 100 can be reduced, and therefore the stability of the recording operation can be maintained.

[0058] The controller 42 formats the built-in HDD 46 at the time of initial setting of the digital television broadcast reception apparatus 100. The controller 42 divides the recording area of the built-in HDD 46 in accordance with the number of service IDs corresponding to selectable broadcast signals. For example, the controller 42 equally divides the capacity of the built-in HDD 46 by the number of service IDs. Specifically, the controller 42 designates the recording areas of the built-in HDD 46, which have equal capacities, in association with the respective service IDs. Accordingly, the controller 42 records video signals and audio signals of programs of the respective channels by the multi-channel simultaneous auto-recording in the respective recording areas of the built-in HDD 46 which are designated for the service IDs.

[0059] In the case where the controller 42 determines that the free space of the recording area of the built-in HDD 46, which is designated for the service ID of a specified channel, is insufficient at present for recording the program of the specified channel by executing multi-channel simultaneous auto-recording, the controller 42 continues the program recording operation in the following manner. The controller 42 deletes or overwrites the earliest ones of the video signals and audio signals which are recorded in the recording area that is designated for the service ID of the specified channel, and continues the recording of the program that is being currently recorded. Therefore, even if the free space of the recording area of the built-in HDD 46 has become deficient, the multi-channel simultaneous auto-recording is not interrupted.

[0060] According to the embodiment, terrestrial digital broadcast programs of a plurality of channels can be recorded at the same time in the same time zone. For example, the user performs 8-channel recording setting in connection with terrestrial digital broadcast of the same time zone, thereby being able to view afterwards the same program of the last week or the same program of the week before last with respect to a plurality of channels. Thus, the user can reduce the possibility of missing the program

[0061] In the embodiment, the controller 42 records the video signal and audio signal in the built-in HDD 46. However, the same applies to external HDDs which are connected to various terminals such as an HDMI terminal, a USB terminal and an i.Link terminal.

[0062] The embodiment has been described as being applicable to the digital television broadcast reception apparatus 100 shown in FIG. 1. However, the embodiment is also applicable to a set-top box which is configured by excluding at least the display 61 and speaker 62 from the structure shown in FIG. 1.

Claims

1. A broadcast reception apparatus **characterized by** comprising:

   Receivers (19, 21, 23, 25, 27, 29, 31, or 33) configured to receive broadcast signals from channels; and
   a controller (42) configured to control recording of one or more programs of one or more target channels each being a target of recording at a recording time zone, based on selection of one or more the target channels and setting of the recording time zone, a number of the target channels being equal to or less than a number of the receivers (19, 21, 23, 25, 27, 29, 31, or 33), and one or more the channels being preset to one or more the receivers (19, 21, 23, 25, 27, 29, 31,or 33).

2. The apparatus of claim 1, **characterized in that** the controller (42) is configured to allocate to be selected, one or more the target channels to one or more the receivers (19, 21, 23, 25, 27, 29, 31, or 33), based on the selection of the target channels.

3. The apparatus of claim 2, **characterized by** further comprising another receiver (17) configured to receive a broadcast signal by selecting one of the channels to be selected, so as to output video for viewing, wherein the controller (42) is configured to detect one or more the channels to be selected by using one of the receivers (19, 21, 23, 25, 27, 29, 31, or 33) and the another receiver (17) at a time of initial setting.

4. The apparatus of claim 3, **characterized in that** the controller (42) is configured to output display information of a screen for setting the recording time zone.

5. The apparatus of claim 3, **characterized in that** the controller (42) is configured to output display information of a screen for setting one or more the target channels, one or more candidates of selection of one or more the target channels being one or more the channels to be selected.

6. The apparatus of claim 3, **characterized in that** the apparatus is configured to be coupled with a recording device (46) comprising a recording area, the recording area being divided by a number of one or more the channels to be selected, and the controller (42) is configured to designate one or more divided areas of the recording area for one or more the channels to be selected.

7. The apparatus of claim 1, **characterized in that** the controller (42) is configured to step up or step down one or more recording start times when the programs of the target channels are to be recorded in a same time zone.

8. The apparatus of claim 6, **characterized in that** the controller (42) is configured to successively delete earliest ones of programs of a specified channel when a free space of the recording area for the specified channel is deficient or insufficient.

9. A recording method **characterized by** comprising:

   allocating one or more channels of one or more broadcast signals to be received, to one or more receivers (19, 21, 23, 25, 27, 29, 31, or 33), based on selection of one or more target channels, each being a target of recording, from one or more channels to be selected, a number of one or more the channels to be selected being equal to or less than a number of the receivers (19, 21, 23, 25, 27, 29, 31, or 33);
   receiving one or more the broadcast signals of one or more the target channels which are allocated to the receivers (19, 21, 23, 25, 27, 29, 31, or 33); and
   controlling recording of one or more programs of one or more the target channels at a recording time zone, based on selection of one or more the target channels and setting of the recording time zone.

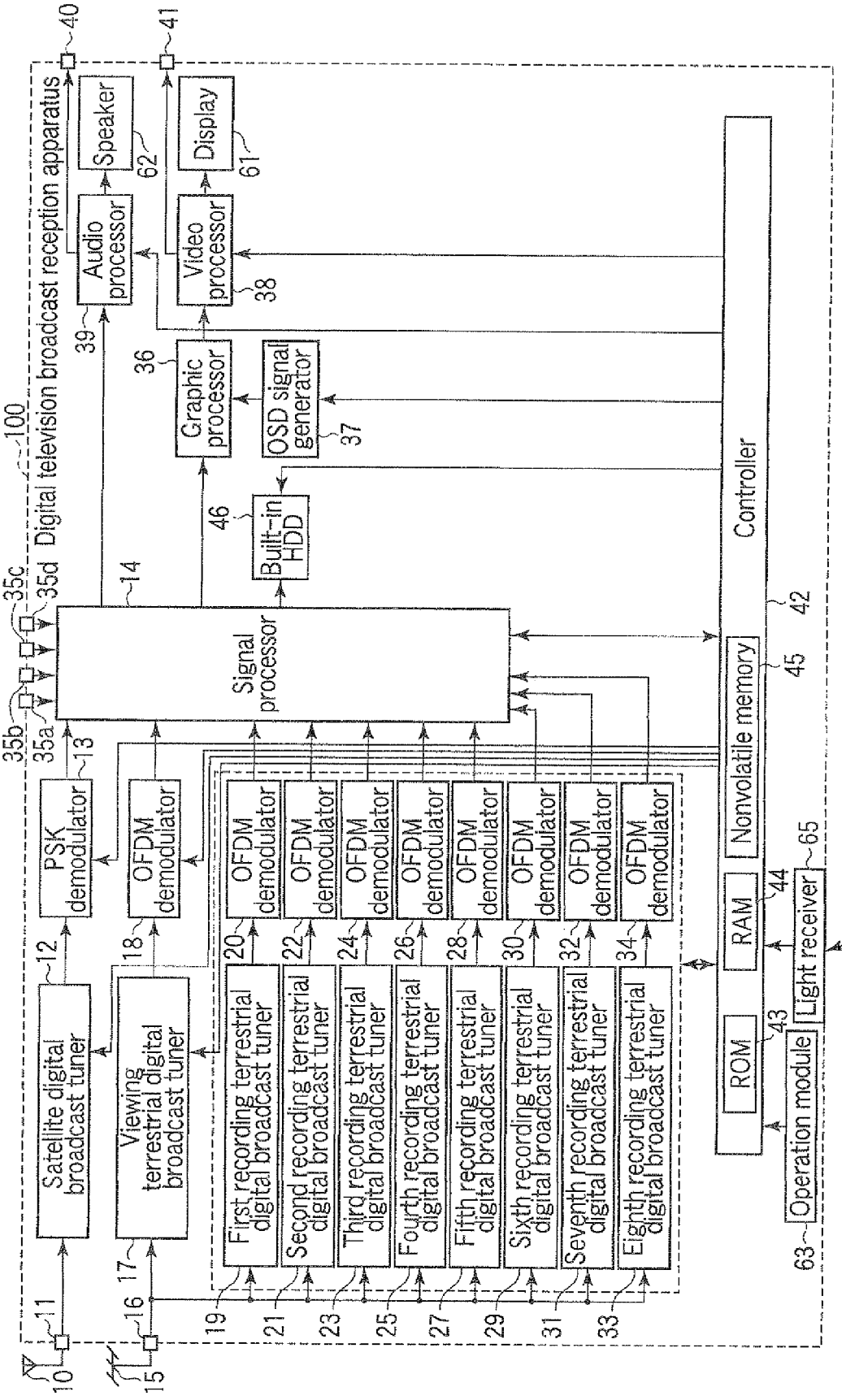
Digital television broadcast reception apparatus
100
Satellite digital broadcast tuner
Viewing terrestrial digital broadcast tuner
PSK demodulator
OFDM demodulator
First recording terrestrial digital broadcast tuner
Second recording terrestrial digital broadcast tuner
Third recording terrestrial digital broadcast tuner
Fourth recording terrestrial digital broadcast tuner
Fifth recording terrestrial digital broadcast tuner
Sixth recording terrestrial digital broadcast tuner
Seventh recording terrestrial digital broadcast tuner
Eighth recording terrestrial digital broadcast tuner
Signal processor
Built-in HDD
Graphic processor
OSD signal generator
Audio processor
Video processor
Speaker
Display
Controller
Nonvolatile memory
RAM
ROM
Operation module
Light receiver
Remote controller

FIG. 1

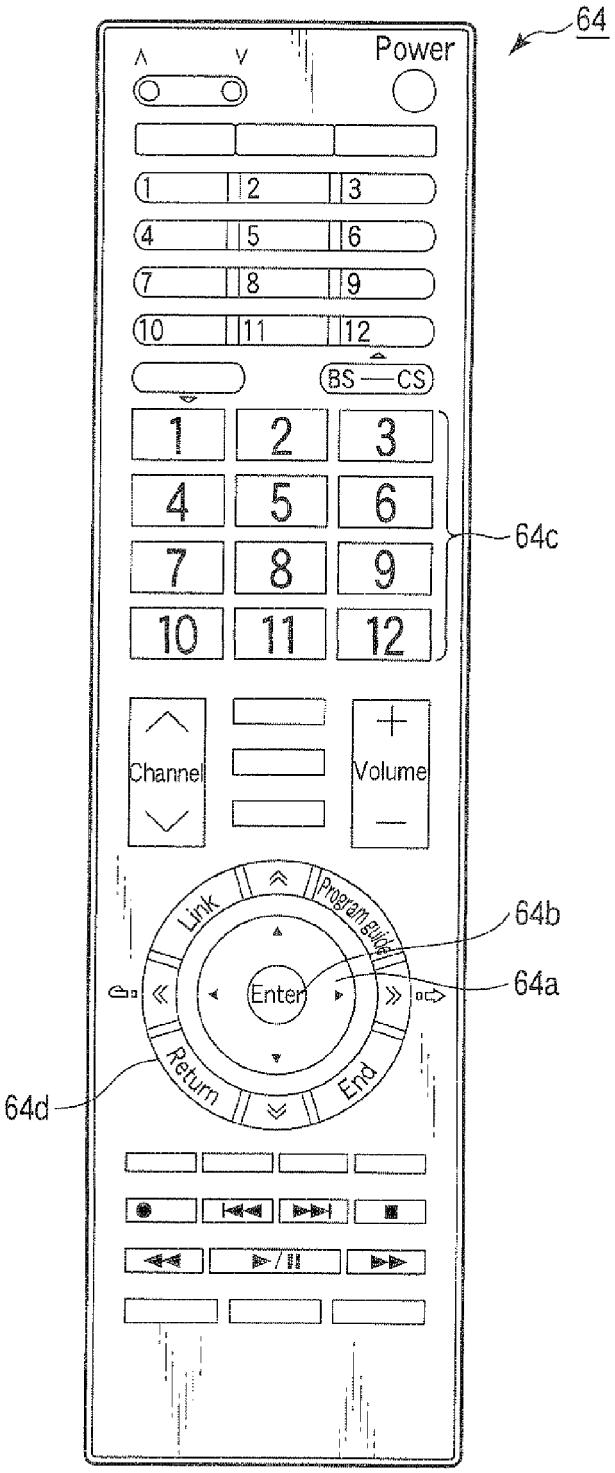
64
Power
1
2
3
4
5
6
7
8
9
10
11
12
BS
CS
64c
Channel
Volume
Link
Program guide
64b
Enter
64a
Return
End
64d

FIG. 2

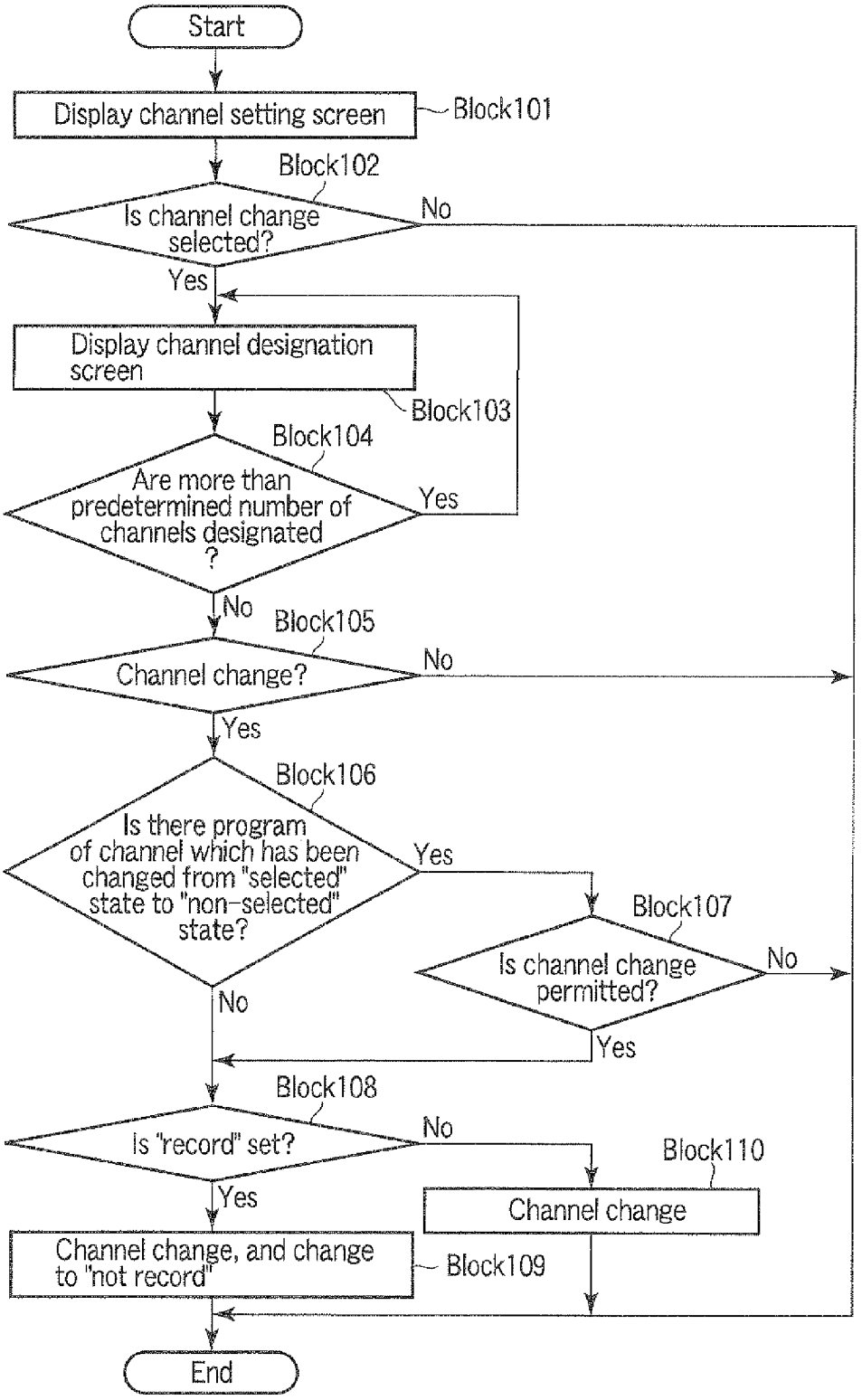
Start
Display channel setting screen
Block101
Block102
Is channel change selected?
No
Yes
Display channel designation screen
Block103
Block104
Are more than predetermined number of channels designated ?
Yes
No
Block105
Channel change?
No
Yes
Block106
Is there program of channel which has been changed from "selected" state to "non-selected" state?
Yes
Block107
Is channel change permitted?
No
Yes
No
Block108
Is "record" set?
No
Block110
Yes
Channel change
Channel change, and change to "not record"
Block109
End

FIG. 3

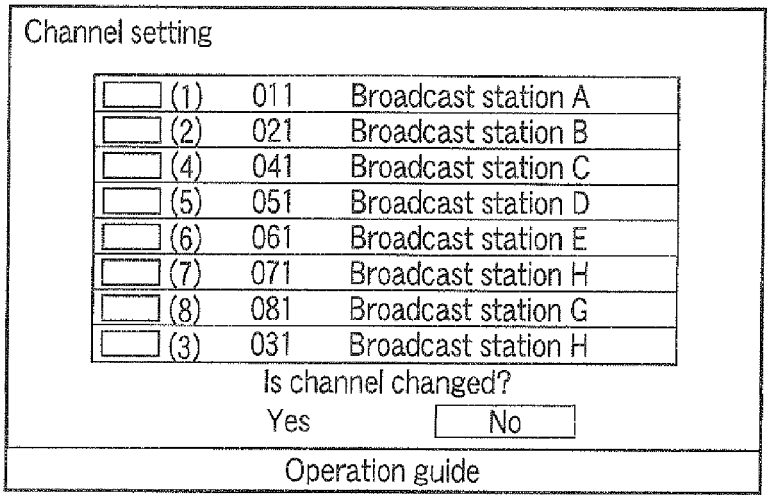

FIG. 4

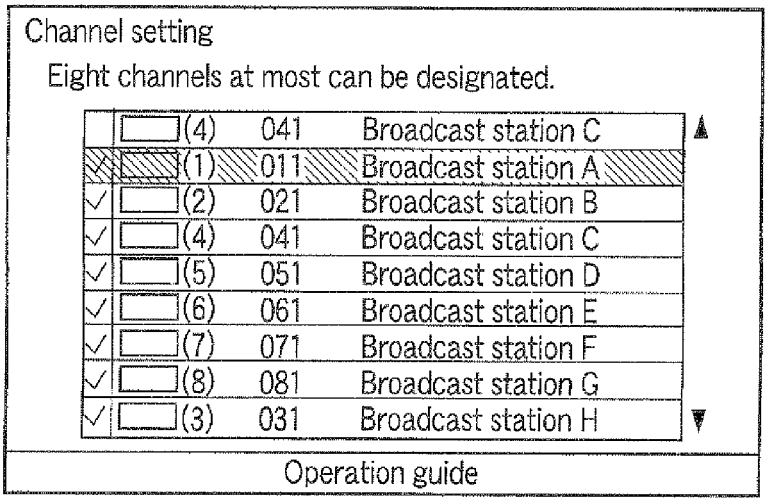

FIG. 5

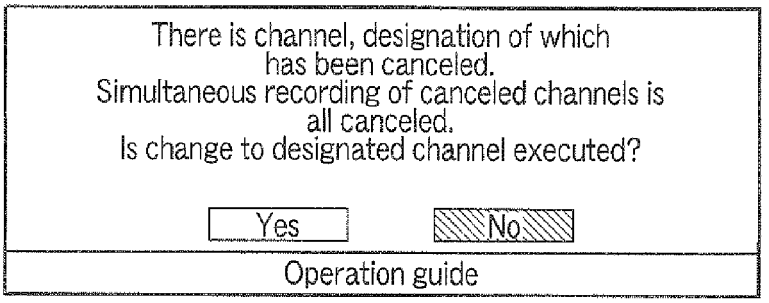

FIG. 6

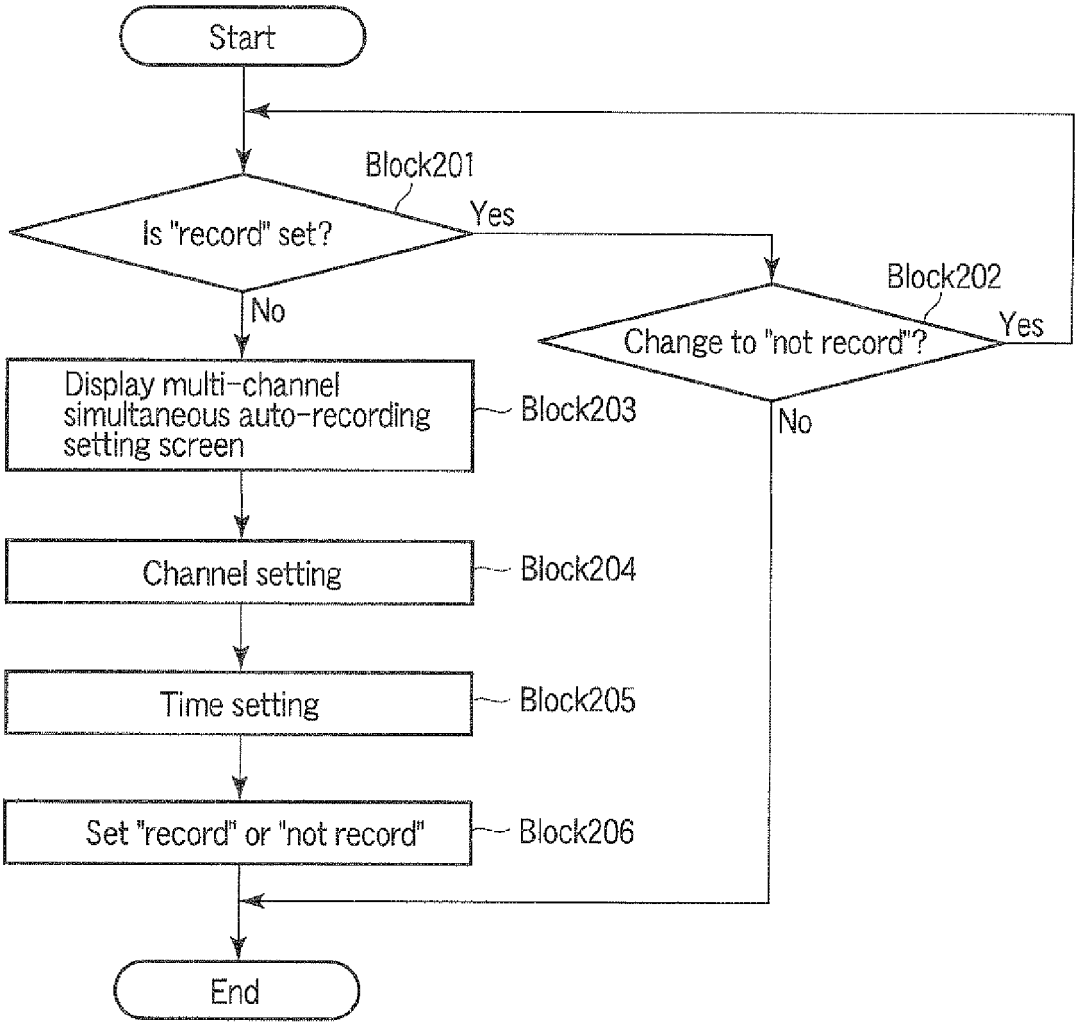
Start
Block201
Is "record" set?
Yes
No
Block202
Change to "not record"?
Yes
No
Display multi-channel simultaneous auto-recording setting screen
Block203
Channel setting
Block204
Time setting
Block205
Set "record" or "not record"
Block206
End

FIG. 7

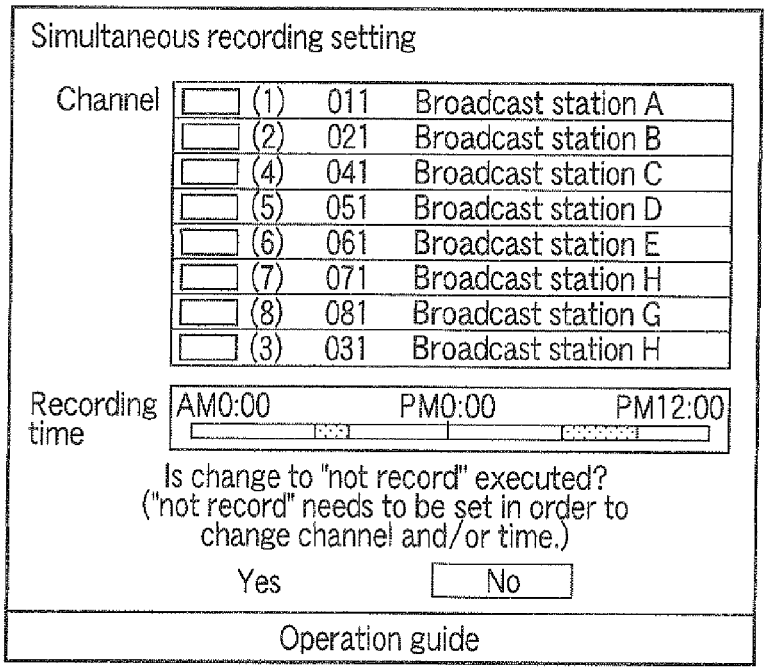
Simultaneous recording setting
Channel
(1) 011 Broadcast station A
(2) 021 Broadcast station B
(4) 041 Broadcast station C
(5) 051 Broadcast station D
(6) 061 Broadcast station E
(7) 071 Broadcast station H
(8) 081 Broadcast station G
(3) 031 Broadcast station H
Recording time
AM0:00
PM0:00
PM12:00
Is change to "not record" executed?
("not record" needs to be set in order to change channel and/or time.)
Yes
No
Operation guide

FIG. 8

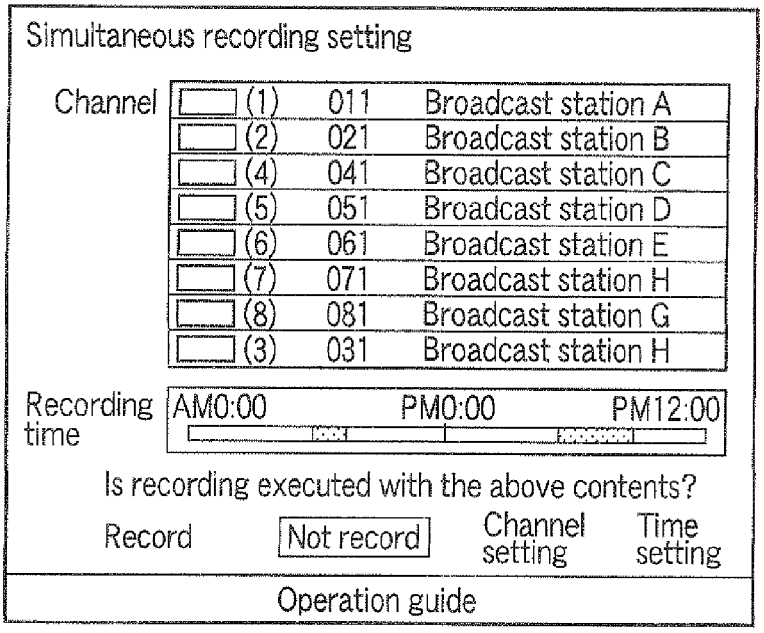
Simultaneous recording setting
Channel
(1) 011 Broadcast station A
(2) 021 Broadcast station B
(4) 041 Broadcast station C
(5) 051 Broadcast station D
(6) 061 Broadcast station E
(7) 071 Broadcast station H
(8) 081 Broadcast station G
(3) 031 Broadcast station H
Recording time
AM0:00
PM0:00
PM12:00
Is recording executed with the above contents?
Record
Not record
Channel setting
Time setting
Operation guide

FIG. 9

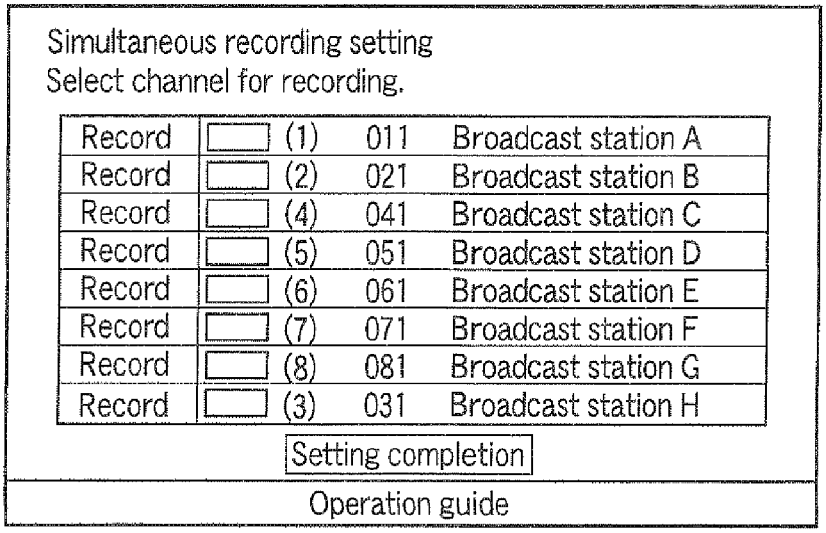
Simultaneous recording setting
Select channel for recording.
Record (1) 011 Broadcast station A
Record (2) 021 Broadcast station B
Record (4) 041 Broadcast station C
Record (5) 051 Broadcast station D
Record (6) 061 Broadcast station E
Record (7) 071 Broadcast station F
Record (8) 081 Broadcast station G
Record (3) 031 Broadcast station H
Setting completion
Operation guide

FIG. 10

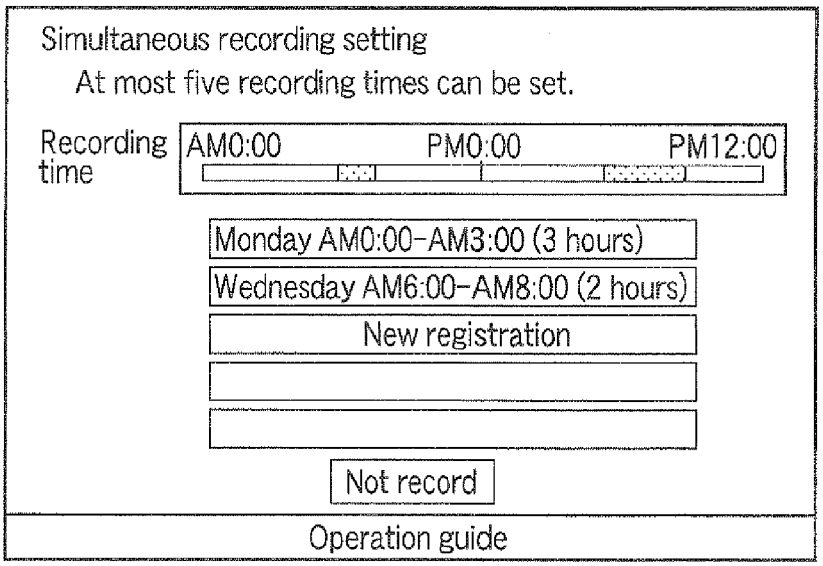
Simultaneous recording setting
At most five recording times can be set.
Recording time
AM0:00
PM0:00
PM12:00
Monday AM0:00-AM3:00 (3 hours)
Wednesday AM6:00-AM8:00 (2 hours)
New registration
Not record
Operation guide

FIG. 11

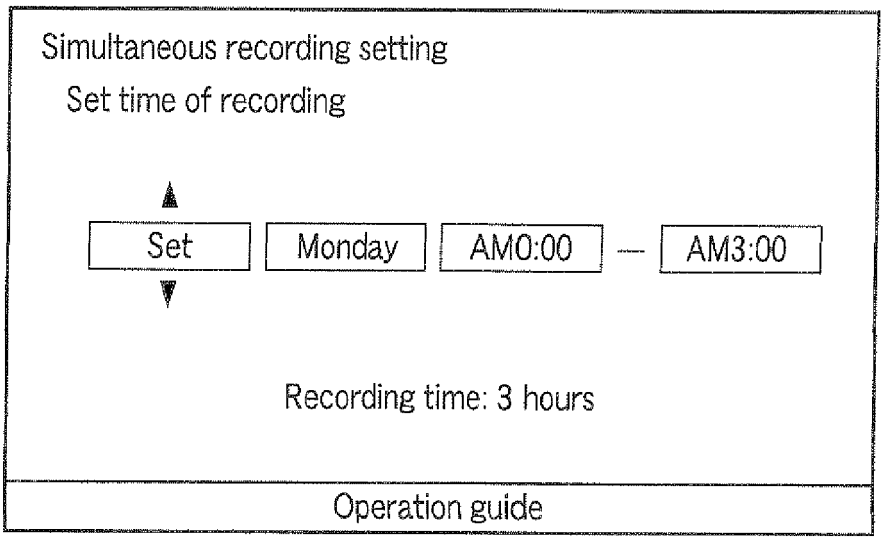
Simultaneous recording setting
Set time of recording
Set
Monday
AM0:00
AM3:00
Recording time: 3 hours
Operation guide

FIG. 12

REFERENCES CITED IN THE DESCRIPTION

This list of references cited by the applicant is for the reader's convenience only. It does not form part of the European patent document. Even though great care has been taken in compiling the references, errors or omissions cannot be excluded and the EPO disclaims all liability in this regard.

Patent documents cited in the description

- JP 2007036453 A **[0003]**