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(54) **BROADCAST RECEIVING APPARATUS AND OUTPUT CONTROL METHOD**

RUNDFUNKEMPFANGSVORRICHTUNG UND AUSGABESTEUERUNGSVERFAHREN

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Description

[0001] The present invention relates to a broadcast receiving apparatus and an output control method, and in particular to a broadcast receiving apparatus and an output control method configured to selectively switch and output broadcast by a first standard and broadcast by a second standard delayed from the broadcast by the first standard.

[0002] Conventionally, broadcast receiving apparatuses are designed to have a configuration to receive digital broadcast and analog broadcast, and to selectively switch and output the digital broadcast and the analog broadcast.

[0003] For example, the following Patent Literature 1 discloses a technique regarding a receiver configured to switch and output DAB (Digital Audio Broadcasting) broadcast and FM-RDS (Radio Data System) broadcast. When traffic information starts in the FM-RDS broadcast while listening to the DAB broadcast, this technique will switch voice output to the traffic information automatically. In particular, the technique of the following Patent Literature 1 is configured, even if a receiving condition of RDS data from an FM receiving circuit deteriorates during voice output of the traffic information, to listen to the original DAB broadcast continuously, by switching the voice output to the DAB broadcast automatically after a predetermined period of time,

[0004] In a broadcast receiving apparatus configured to selectively switch and output digital broadcast and analog broadcast, it is known that a time difference occurs between the digital broadcast and the analog broadcast received by the broadcast receiving apparatus, that is, reception of the digital broadcast is delayed from reception of the analog broadcast because the digital broadcast needs processing of digitization at a broadcasting station. Therefore, techniques designed to solve such a time difference are conventionally disclosed.

[0005] For example, the following Patent Literature 2 discloses a technique, when a digital broadcast tuner unit fails to receive digital voice broadcast normally, for delaying and outputting voice data received from analog voice broadcast to synchronize this voice data with voice data received from the digital voice broadcast. In particular, the technique of the following Patent Literature 2 outputs voice data received from the analog voice broadcast without a delay, on detection that emergency broadcast starts from the analog voice broadcast. This is intended to output the received emergency broadcast as promptly as possible.

[0006] In addition, the following Patent Literature 3 discloses, for eliminating a time difference between a digital broadcast playback voice signal and an analog broadcast playback voice signal, a technique for delaying the analog broadcast playback voice signal, in accordance with a delay time difference between both signals.

[0007] The following Patent Literature 4 discloses a technique, when an interrupt service from RDS broadcast is accepted during selected output of DAB broadcast, to put speaker output of the interrupt service on hold for a predetermined period, and when an interrupt service from DAB is accepted during the hold time, to output the interrupt service from DAB to a speaker.

[0008] JP 2001 156661 A discloses a broadcast receiving apparatus with a DAB receiver and a FM receiver which checks for announcements from both the DAB receiver and the FM receiver.

Citation List

Patent Literature

[0009]

PTL 1: Unexamined Japanese Patent Publication No. 2007-282147
PTL 2: Unexamined Japanese Patent Publication No. 2012-085207
PTL 3: Unexamined Japanese Patent Publication No. H10-247855
PTL 4: Japanese Patent 3529976

[0010] Here, a TA flag (announcement flag) indicating broadcast start of traffic information may be transmitted from each of the DAB broadcast and the FM broadcast to the broadcast receiving apparatus. The conventional broadcast receiving apparatus is configured, on detection of the TA flag from either broadcast, to switch an output mode of output voice to an announcement mode in preparation for broadcast start of the traffic information. In the announcement mode, for example, volume of the output voice is increased. In addition, a predetermined display screen is displayed on a display to notify that the traffic information is being broadcasted.

[0011] However, the TA flag of the DAB broadcast is typically transmitted a predetermined time (for example, five seconds) before the broadcast of the traffic information actually starts. Since the DAB broadcast has higher quality than the FM broadcast, it is preferable that a user continues listening to the DAB broadcast as long as possible. However, the DAB broadcast is broadcasted with a delay from the FM broadcast. For this reason, if both the DAB broadcast and the FM broadcast transmit the TA flag with timing with which the traffic information starts, the broadcast receiving apparatus will receive the TA flag of the FM broadcast first, and will switch to output of the FM broadcast. Therefore, the TA flag of the DAB broadcast is transmitted earlier than the TA flag of the FM broadcast so that the broadcast receiving apparatus may receive the TA flag of the DAB broadcast first.

[0012] The conventional broadcast receiving apparatus is configured, on detection of the TA flag of the DAB broadcast according to this earlier transmission while outputting the DAB broadcast, to switch the output mode of the DAB broadcast to the announcement mode for outputting the traffic information immediately. However,

if the output mode of the DAB broadcast is immediately switched to the announcement mode by detection of the TA flag of the DAB broadcast in this way, a problem arises that volume of the output voice is increased or the predetermined display screen is displayed on the display although the broadcast of the traffic information has not started.

[0013] FIG. 11 is a diagram illustrating an example of switching timing to the announcement mode by the conventional broadcast receiving apparatus. This example describes an example in which, in both the FM broadcast and the DAB broadcast, after data of normal voice broadcast is broadcasted like "-2", "-1", "0", "1", "2", "3", and "4", data of the traffic information is broadcasted like "T1", "T2", "T3", and "T4". FIG. 11 schematically illustrates timing with one frame of data defined as broadcast data of a predetermined time (for example, one second).

[0014] As illustrated in FIG. 11, although the DAB broadcast and the FM broadcast have identical content, the DAB broadcast is transmitted from a broadcasting station with a delay from the FM broadcast. In addition, as illustrated by a dotted line arrow of FIG. 11, in the FM broadcast, the TA flag is transmitted simultaneously with broadcast start timing of the traffic information. On the other hand, as illustrated by a solid line arrow of FIG. 11, in the DAB broadcast, the TA flag is transmitted a predetermined time (five pieces of data in the example of FIG. 11) before the broadcast start timing of the traffic information.

[0015] As illustrated in FIG. 11, the conventional broadcast receiving apparatus is configured to perform switching to the announcement mode immediately with timing of detection of the TA flag of the DAB broadcast. For this reason, data of normal voice broadcast will be output in the announcement mode from timing of detection of the TA flag until timing of actual broadcast start of the traffic information (five pieces of data in the example of FIG. 11).

[0016] Thus, when the DAB broadcast is output, the conventional broadcast receiving apparatus switches to the announcement mode with timing earlier than timing of actual broadcast start of the traffic information. Therefore, a problem arises that, although normal voice broadcast is still being output, volume of the output voice suddenly becomes large, or a display screen is suddenly displayed for notifying that the traffic information is being broadcasted, providing an uncomfortable feeling to a user.

[0017] An object of the present invention is to enable reduction of an uncomfortable feeling provided to the user at a time of switching to the announcement mode.

[0018] The invention relates to a broadcast receiving apparatus according to claim 1 and to an output control method according to claim 7. A broadcast receiving apparatus according to an aspect of the present invention includes: a first receiving unit that receives broadcast by a first standard; a second receiving unit that receives broadcast by a second standard delayed from the broadcast by the first standard; and an output control unit that selectively switches and outputs the broadcast by the first standard received by the first receiving unit, and the broadcast by the second standard received by the second receiving unit. When an announcement flag of the broadcast by the second standard is detected during output of the broadcast by the second standard, the broadcast receiving apparatus switches an output mode of the broadcast by the second standard to an announcement mode for outputting an announcement by using timing with which the announcement flag of the broadcast by the first standard is further detected as a trigger.

[0019] The present invention configured as described above does not switch the output mode of the broadcast by the second standard to the announcement mode even after the announcement flag of the broadcast by the second standard is detected until at least the announcement flag of the broadcast by the first standard is detected. The present invention may switch the output mode to the announcement mode with timing as close as possible to timing with which broadcast of the announcement actually starts. That is, a period may be minimized during which normal broadcast of the broadcast by the second standard will be broadcasted in the announcement mode. Therefore, the present invention allows reduction in an uncomfortable feeling provided to a user at a time of switching to the announcement mode.

Brief Description of Drawings

[0020]

FIG. 1 is a block diagram illustrating an example of a functional configuration of a broadcast receiving apparatus according to a first exemplary embodiment of the present invention;

FIG. 2 is a flowchart illustrating an example of processing performed by the broadcast receiving apparatus according to the first exemplary embodiment of the present invention;

FIG. 3 is a diagram illustrating an example of switching timing to an announcement mode by the broadcast receiving apparatus according to the first exemplary embodiment of the present invention;

FIG. 4 is a block diagram illustrating an example of the functional configuration of the broadcast receiving apparatus according to a second exemplary embodiment of the present invention;

FIG. 5 is a flowchart illustrating an example of processing performed by the broadcast receiving apparatus according to the second exemplary embodiment of the present invention;

FIG. 6 is a diagram illustrating an example of switching timing to the announcement mode by the broadcast receiving apparatus according to the second exemplary embodiment of the present invention;

FIG. 7 is a block diagram illustrating an example of the functional configuration of the broadcast receiving apparatus according to a third exemplary em-

bodiment of the present invention;

FIG. 8 is a diagram illustrating an example of switching timing to the announcement mode by the broadcast receiving apparatus according to the third exemplary embodiment of the present invention;

FIG. 9 is a diagram illustrating a variation of switching timing to the announcement mode by the broadcast receiving apparatus according to the third exemplary embodiment of the present invention;

FIGS. 10A and 10B are diagrams each illustrating an example of switching timing to the announcement mode by the broadcast receiving apparatus according to a fourth exemplary embodiment of the present invention; and

FIG. 11 is a diagram illustrating an example of switching timing to the announcement mode by a conventional broadcast receiving apparatus.

[0021] Hereinafter, exemplary embodiments of the present invention will be described with reference to the drawings. FIG. 1 is a block diagram illustrating an example of a functional configuration of a broadcast receiving apparatus 10 according to a first exemplary embodiment of the present invention. The broadcast receiving apparatus 10 illustrated in FIG. 1 is an apparatus capable of receiving FM broadcast (an example of broadcast by a first standard) and DAB broadcast (an example of broadcast by a second standard), switching selectively voice of the received FM broadcast and voice of the DAB broadcast, and outputting the voice to a speaker 12.

[0022] As illustrated in FIG. 1, the broadcast receiving apparatus 10 includes a first receiving unit 101, an FM demodulation unit 102, a second receiving unit 103, a DAB demodulation unit 104, a buffer unit 105, an output control unit 106, a flag detection unit 107, and a switching processing unit 108.

[0023] Each of the functional blocks 101 to 108 may be implemented by any of hardware, DSP (Digital Signal Processor), and software. For example, when each of the functional blocks is implemented by software, each of the functional blocks 101 to 108 actually includes components of a computer, such as a CPU, RAM, and ROM, and is implemented by a program stored in a recording media running, such as a RAM, ROM, hard disk, and semiconductor memory.

[0024] The first receiving unit 101 receives the FM broadcast. The FM demodulation unit 102 demodulates an analog voice signal of the FM broadcast received by the first receiving unit 101. The buffer unit 105 delays the analog voice signal of the FM broadcast (FM broadcast after demodulation by the FM demodulation unit 102) received by the first receiving unit 101 by a certain period of time.

[0025] The second receiving unit 103 receives the DAB broadcast. The DAB demodulation unit 104 demodulates a digital voice signal of the DAB broadcast received by the second receiving unit 103. The DAB broadcast received by the second receiving unit 103 has content identical to content of the FM broadcast received by the first receiving unit 101. However, the DAB broadcast received by the second receiving unit 103 is received with a delay from the FM broadcast received by the first receiving unit 101.

[0026] The output control unit 106 selectively switches and outputs the analog voice signal of the FM broadcast (FM broadcast after demodulation by the FM demodulation unit 102) received by the first receiving unit 101, and the digital voice signal of the DAB broadcast (DAB broadcast after demodulation by the DAB demodulation unit 104) received by the second receiving unit 103. For example, when strength of the received signal of the DAB broadcast is higher than a predetermined threshold, the output control unit 106 switches to the DAB broadcast and outputs the signal. On the other hand, when strength of the received signal of the DAB broadcast is less than the predetermined threshold, the output control unit 106 switches to the FM broadcast and outputs the signal. That is, the output control unit 106 is configured to output with priority the DAB broadcast that has higher quality than the FM broadcast.

[0027] With regard to the FM broadcast, after demodulation of the analog voice signal by the FM demodulation unit 102, the output control unit 106 outputs the analog voice signal with timing delayed by the buffer unit 105 by the certain period of time. On the other hand, with regard to the DAB broadcast, after demodulation of the digital voice signal by the DAB demodulation unit 104, the output control unit 106 outputs the digital voice signal immediately. This allows the output control unit 106 to synchronize output timing of the FM broadcast with output timing of the DAB broadcast.

[0028] The flag detection unit 107 detects a TA flag (example of an announcement flag) that indicates broadcast start of traffic information (example of an announcement) from each of the FM broadcast received by the first receiving unit 101 and the DAB broadcast received by the second receiving unit 103.

[0029] In response to detection of the TA flag by the flag detection unit 107, the switching processing unit 108 switches an output mode of the broadcast (FM broadcast or DAB broadcast) that is output from the output control unit 106 to an announcement mode.

[0030] In particular, according to the present exemplary embodiment, when the flag detection unit 107 detects the TA flag from the DAB broadcast while the output control unit 106 is outputting the DAB broadcast, the switching processing unit 108 switches the output mode of the DAB broadcast to the announcement mode with timing with which the flag detection unit 107 further detects the TA flag from the FM broadcast.

[0031] When the output mode of the DAB broadcast is switched to the announcement mode, the output control unit 106 increases volume of the output voice of the DAB broadcast. Also, the output control unit 106 displays a predetermined display screen on a display 14 for notifying that the traffic information is being broadcasted. This

allows a user to listen to the traffic information at higher volume, and to know that the traffic information is being broadcasted with the predetermined display screen displayed on the display 14.

[One example of processing by the broadcast receiving apparatus 10]

[0032] FIG. 2 is a flowchart illustrating an example of processing performed by the broadcast receiving apparatus 10 according to the first exemplary embodiment of the present invention. The processing illustrated in FIG. 2 is executed repeatedly, for example, while the output control unit 106 outputs the DAB broadcast.

[0033] First, the switching processing unit 108 determines whether the flag detection unit 107 has detected the TA flag from the DAB broadcast (step S202). When the switching processing unit 108 determines here that the TA flag has not been detected from the DAB broadcast (step S202: No), the switching processing unit 108 executes the determination processing of step S202 again.

[0034] On the other hand, when the switching processing unit 108 determines that the TA flag has been detected from the DAB broadcast (step S202: Yes), the switching processing unit 108 determines whether the flag detection unit 107 has detected the TA flag from the FM broadcast (step S204). When the switching processing unit 108 determines here that the TA flag has not been detected from the FM broadcast (step S204: No), the switching processing unit 108 executes the determination processing of step S204 again.

[0035] On the other hand, when the switching processing unit 108 determines that the TA flag has been detected from the FM broadcast (step S204: Yes), the switching processing unit 108 switches the output mode of the DAB broadcast by the output control unit 106 to the announcement mode (step S206). Then, the broadcast receiving apparatus 10 finishes a series of processing steps illustrated in FIG. 2.

[One example of switching timing to the announcement mode]

[0036] FIG. 3 is a diagram illustrating an example of switching timing to the announcement mode by the broadcast receiving apparatus 10 according to the first exemplary embodiment of the present invention. This example describes an example in which, in both the FM broadcast and the DAB broadcast, after data of normal voice broadcast is broadcasted like "-2", "-1", "0", "1", "2", "3", and "4", data of the traffic information is broadcasted like "T1", "T2", "T3", and "T4". FIG. 3 schematically illustrates timing with one frame of data defined as broadcast data of a predetermined time (for example, one second).

[0037] As illustrated in FIG. 3, although the DAB broadcast and the FM broadcast have identical content, the DAB broadcast is transmitted from a broadcasting station with a delay from the FM broadcast. In addition, as illustrated by a dotted line arrow of FIG. 3, in the FM broadcast, the TA flag is transmitted simultaneously with broadcast start timing of the traffic information. On the other hand, as illustrated by a solid line arrow of FIG. 3, in the DAB broadcast, the TA flag is transmitted a predetermined time (five pieces of data in the example of FIG. 3) before the broadcast start timing of the traffic information.

[0038] As illustrated in FIG. 3, the broadcast receiving apparatus 10 according to the first exemplary embodiment is configured not to perform switching to the announcement mode with timing of detection of the TA flag of the DAB broadcast, but to perform switching to the announcement mode with timing of further detection of the TA flag of the FM broadcast. In the example illustrated in FIG. 3, the TA flag is detected from the FM broadcast two pieces of data after timing of detection of the TA flag from the DAB broadcast, and switching to the announcement mode is performed with this timing of detection of the TA flag of the FM broadcast.

[0039] This configuration allows the broadcast receiving apparatus 10 according to the first exemplary embodiment to switch to the announcement mode with timing closer by two pieces of data to timing with which broadcast of the traffic information actually starts, as compared with a conventional broadcast receiving apparatus (refer to FIG. 11). That is, a period during which normal broadcast of the DAB broadcast is broadcasted in the announcement mode may be shortened by two pieces of data. This allows the broadcast receiving apparatus 10 according to the first exemplary embodiment to reduce an uncomfortable feeling provided to a user at a time of switching to the announcement mode.

[0040] Next, a second exemplary embodiment of the present invention will be described with reference to FIGS. 4 to 6. FIG. 4 is a block diagram illustrating an example of a functional configuration of a broadcast receiving apparatus 10' according to the second exemplary embodiment of the present invention. The broadcast receiving apparatus 10' illustrated in FIG. 4 differs from a broadcast receiving apparatus 10 according to the first exemplary embodiment in that the broadcast receiving apparatus 10' further includes a delay time calculation unit 109, and that the broadcast receiving apparatus 10' includes a switching processing unit 108' instead of a switching processing unit 108 (refer to FIG. 1).

[0041] The delay time calculation unit 109 calculates delay time of DAB broadcast from FM broadcast. For example, the delay time calculation unit 109 calculates, as the delay time of the DAB broadcast from the FM broadcast, a time difference between timing with which a certain analog voice signal of the FM broadcast is output from an FM demodulation unit 102 and is stored in a buffer unit 105, and timing with which a digital voice signal of the DAB broadcast with identical content is output from a DAB demodulation unit 104.

[0042] When a flag detection unit 107 detects a TA flag

from the DAB broadcast while an output control unit 106 is outputting the DAB broadcast, the switching processing unit 108' switches an output mode of the DAB broadcast to an announcement mode with timing with which the delay time calculated by the delay time calculation unit 109 has elapsed after the flag detection unit 107 further detects the TA flag from the FM broadcast.

[One example of processing by the broadcast receiving apparatus 10']

[0043] FIG. 5 is a flowchart illustrating an example of processing performed by the broadcast receiving apparatus 10' according to the second exemplary embodiment of the present invention. The processing illustrated in FIG. 5 is executed repeatedly, for example, while the output control unit 106 outputs the DAB broadcast.

[0044] First, the delay time calculation unit 109 calculates the delay time of the DAB broadcast from the FM broadcast (step S502). Next, the switching processing unit 108' determines whether the flag detection unit 107 has detected the TA flag from the DAB broadcast (step S504). When the switching processing unit 108' determines here that the TA flag has not been detected from the DAB broadcast (step S504: No), the switching processing unit 108' executes the determination processing of step S504 again.

[0045] On the other hand, when the switching processing unit 108' determines that the TA flag has been detected from the DAB broadcast (step S504: Yes), the switching processing unit 108' determines whether the flag detection unit 107 has detected the TA flag from the FM broadcast (step S506). When the switching processing unit 108' determines here that the TA flag has not been detected from the FM broadcast (step S506: No), the switching processing unit 108' executes the determination processing of step S506 again.

[0046] On the other hand, when the switching processing unit 108' determines that the TA flag has been detected from the FM broadcast (step S506: Yes), the switching processing unit 108' determines whether the delay time calculated in step S502 has elapsed from timing with which the TA flag has been detected from the FM broadcast in step S506 (step S508). When the switching processing unit 108' determines here that the delay time has not elapsed (step S508: No), the switching processing unit 108' executes the determination processing of step S508 again.

[0047] On the other hand, when the switching processing unit 108' determines that the delay time has elapsed (step S508: Yes), the switching processing unit 108' switches the output mode of the DAB broadcast by the output control unit 106 to the announcement mode (step S510). Then, the broadcast receiving apparatus 10' finishes a series of processing steps illustrated in FIG. 5.

[One example of switching timing to the announcement mode]

[0048] FIG. 6 is a diagram illustrating an example of switching timing to the announcement mode by the broadcast receiving apparatus 10' according to the second exemplary embodiment of the present invention. In FIG. 6, content of data transmitted from the DAB broadcast and the FM broadcast, and timing with which the TA flag is transmitted from the DAB broadcast and the FM broadcast are similar to the content and timing of the first exemplary embodiment (FIG. 3), and thus description will be omitted.

[0049] As illustrated in FIG. 6, the broadcast receiving apparatus 10' according to the second exemplary embodiment is configured not to perform switching to the announcement mode with timing of detection of the TA flag of the DAB broadcast, but to perform switching to the announcement mode with timing with which delay time d calculated by the delay time calculation unit 109 has elapsed from timing with which the TA flag of the FM broadcast is further detected. In the example illustrated in FIG. 6, the TA flag is detected from the FM broadcast two pieces of data after timing of detection of the TA flag from the DAB broadcast, and switching to the announcement mode is performed with timing with which the delay time d (three pieces of data in the example of FIG. 6) has further elapsed.

[0050] This configuration allows the broadcast receiving apparatus 10' according to the second exemplary embodiment to switch to the announcement mode with timing with which broadcast of traffic information actually starts. That is, a period during which normal broadcast of the DAB broadcast is broadcasted in the announcement mode may be set to zero. This allows the broadcast receiving apparatus 10' according to the second exemplary embodiment to resolve an uncomfortable feeling provided to a user at a time of switching to the announcement mode.

[0051] Next, a third exemplary embodiment of the present invention will be described with reference to FIGS. 7 to 9. FIG. 7 is a block diagram illustrating an example of a functional configuration of a broadcast receiving apparatus 20 according to the third exemplary embodiment of the present invention. The broadcast receiving apparatus 20 illustrated in FIG. 7 is an apparatus capable of receiving DAB broadcast (an example of broadcast by a first standard) and IP (Internet Protocol) broadcast (an example of broadcast by a second standard), switching selectively voice of the received DAB broadcast and voice of the IP broadcast, and outputting the voice to a speaker 12.

[0052] As illustrated in FIG. 7, the broadcast receiving apparatus 20 includes a first receiving unit 201, a DAB demodulation unit 202, a second receiving unit 203, an IP demodulation unit 204, a buffer unit 205, an output control unit 206, a flag detection unit 207, a switching processing unit 208, and a delay time calculation unit 209.

[0053] The functional blocks 201 to 209 described above have functions similar to functions of functional blocks having names identical to names of the functional blocks 101 to 107, 108', and 109 illustrated in the second exemplary embodiment (FIG. 4), respectively, and thus detailed functional description will be omitted. However, a term described as "FM broadcast" in the second exemplary embodiment will be interpreted as "DAB broadcast" in the third exemplary embodiment. In addition, a term described as "DAB broadcast" in the second exemplary embodiment will be interpreted as "IP broadcast" in the third exemplary embodiment.

[One example of switching timing to an announcement mode]

[0054] FIG. 8 is a diagram illustrating an example of switching timing to the announcement mode by the broadcast receiving apparatus 20 according to the third exemplary embodiment of the present invention. This example describes an example in which, in both the DAB broadcast and the IP broadcast, after data of normal voice broadcast is broadcasted like "-2", "-1", "0", "1", "2", "3", and "4", data of traffic information is broadcasted like "T1", "T2", "T3", and "T4". FIG. 8 schematically illustrates timing with one frame of data defined as broadcast data of a predetermined time (for example, one second).

[0055] As illustrated in FIG. 8, although the DAB broadcast and the IP broadcast have identical content, the IP broadcast is transmitted from a broadcasting station with a delay from the DAB broadcast. In addition, as illustrated by a dotted line arrow of FIG. 8, in the DAB broadcast, a TA flag is transmitted a predetermined time (five pieces of data in the example of FIG. 8) before the broadcast start timing of the traffic information. On the other hand, as illustrated by a solid line arrow of FIG. 8, in the IP broadcast, the TA flag is transmitted a predetermined time (10 pieces of data in the example of FIG. 8) before the broadcast start timing of the traffic information.

[0056] As illustrated in FIG. 8, the broadcast receiving apparatus 20 according to the third exemplary embodiment is configured not to perform switching to the announcement mode with timing of detection of the TA flag of the IP broadcast, but to perform switching to the announcement mode with timing with which delay time d' calculated by the delay time calculation unit 209 has elapsed from timing with which the TA flag of the DAB broadcast is further detected. In the example illustrated in FIG. 8, the TA flag is detected from the DAB broadcast two pieces of data after timing of detection of the TA flag from the IP broadcast, and switching to the announcement mode is performed with timing with which delay time d' (three pieces of data in the example of FIG. 8) has further elapsed.

[0057] This configuration allows the broadcast receiving apparatus 20 according to the third exemplary embodiment to switch to the announcement mode with timing closer by five pieces of data to timing with which broadcast of the traffic information actually starts, as compared with the configuration that performs switching to the announcement mode with timing of detection of the TA flag from the IP broadcast. That is, a period during which normal broadcast of the IP broadcast is broadcasted in the announcement mode may be shortened by five pieces of data. This allows the broadcast receiving apparatus 20 according to the third exemplary embodiment to reduce an uncomfortable feeling provided to a user at a time of switching to the announcement mode.

[Variation of switching timing to the announcement mode]

[0058] FIG. 9 is a diagram illustrating a variation of switching timing to the announcement mode by the broadcast receiving apparatus 20 according to the third exemplary embodiment of the present invention. In this variation, the broadcast receiving apparatus 20 does not include the delay time calculation unit 209 (refer to FIG. 7). In FIG. 9, content of data transmitted from the DAB broadcast and the IP broadcast, and timing with which the TA flag is transmitted from the DAB broadcast and the IP broadcast are similar to the content and timing of the example of FIG. 8, and thus description will be omitted.

[0059] As illustrated in FIG. 9, the broadcast receiving apparatus 20 according to the variation of the third exemplary embodiment is configured not to perform switching to the announcement mode with timing of detection of the TA flag of the IP broadcast, but to perform switching to the announcement mode with timing of further detection of the TA flag of the DAB broadcast. In the example illustrated in FIG. 9, the TA flag is detected from the DAB broadcast two pieces of data after timing of detection of the TA flag from the IP broadcast, and switching to the announcement mode is performed with this timing of detection of the TA flag from the DAB broadcast.

[0060] This configuration allows the broadcast receiving apparatus 20 according to the variation of the third exemplary embodiment to switch to the announcement mode with timing closer by two pieces of data to timing with which broadcast of the traffic information actually starts, as compared with the configuration that performs switching to the announcement mode with timing of detection of the TA flag from the IP broadcast. That is, a period during which normal broadcast of the IP broadcast is broadcasted in the announcement mode may be shortened by two pieces of data. This allows the broadcast receiving apparatus 20 according to the variation of the third exemplary embodiment to reduce an uncomfortable feeling provided to a user at a time of switching to the announcement mode.

[0061] Next, a fourth exemplary embodiment of the present invention will be described with reference to FIGS. 10A and 10B. The fourth exemplary embodiment differs from the first and the second exemplary embodiments in that FM broadcast is defined as broadcast by a first standard, and IP broadcast is defined as broadcast

by a second standard. The fourth exemplary embodiment is similar to the first and the second exemplary embodiments in others. That is, the fourth exemplary embodiment will be described through interpretation of a term described as "DAB broadcast" in the first and the second exemplary embodiments as "IP broadcast".

[Variation of switching timing to an announcement mode]

[0062] FIGS. 10A and 10B are diagrams each illustrating an example of switching timing to the announcement mode by a broadcast receiving apparatus according to the fourth exemplary embodiment of the present invention.

[0063] In the example illustrated in FIG. 10A, the broadcast receiving apparatus according to the fourth exemplary embodiment is configured not to perform switching to the announcement mode with timing of detection of a TA flag of the IP broadcast, but to perform switching to the announcement mode with timing of further detection of the TA flag of the FM broadcast. In the example illustrated in FIG. 10A, the TA flag is detected from the FM broadcast four pieces of data after timing of detection of the TA flag from the IP broadcast, and switching to the announcement mode is performed with this timing of detection of the TA flag of the FM broadcast.

[0064] In the example illustrated in FIG. 10B, on the other hand, the broadcast receiving apparatus according to the fourth exemplary embodiment is configured not to perform switching to the announcement mode with timing of detection of the TA flag of the IP broadcast, but to perform switching to the announcement mode with timing with which delay time d" calculated by the delay time calculation unit 109 (refer to FIG. 4) has elapsed from timing with which the TA flag of the FM broadcast is further detected. In the example illustrated in FIG. 10B, the TA flag is detected from the FM broadcast four pieces of data after timing of detection of the TA flag from the IP broadcast, and switching to the announcement mode is performed with timing with which the delay time d" (six pieces of data in the example of FIG. 10B) has further elapsed.

[0065] Thus, the broadcast receiving apparatus according to the fourth exemplary embodiment is configured, while the IP broadcast is output, to switch to the announcement mode with timing as close as possible to timing with which broadcast of traffic information actually starts. That is, a period during which normal broadcast of the IP broadcast is broadcasted in the announcement mode may be minimized. This allows the broadcast receiving apparatus according to the fourth exemplary embodiment to minimize an uncomfortable feeling provided to a user at a time of switching to the announcement mode.

[0066] According to the above-described second to fourth exemplary embodiments, delay time of the broadcast by the second standard (DAB broadcast in the second exemplary embodiment, IP broadcast in the third and fourth exemplary embodiments) from the broadcast by the first standard (FM broadcast in the second and fourth exemplary embodiments, DAB broadcast in the third exemplary embodiment) is calculated, and switching to the announcement mode is performed with timing with which the calculated delay time has elapsed from timing of detection of the TA flag of the broadcast by the first standard. However, the present invention is not limited to these examples. For example, if the delay time is determined in advance, switching to the announcement mode may be performed with timing with which a predetermined time (corresponding to the delay time) has elapsed from timing of detection of the TA flag of the broadcast by the first standard. In addition, for example, if a period from reception of the TA flag until the broadcast start of the traffic information is determined in advance in the broadcast by the second standard, switching to the announcement mode may be performed with timing with which the period has elapsed from timing of detection of the TA flag of the broadcast by the second standard.

[0067] Although the traffic information is used as an example of the announcement in each of the exemplary embodiments described above, the present invention is not limited to these examples. Also, combination of the broadcast by the first standard and the broadcast by the second standard is not limited to combination described in each of the exemplary embodiments described above. Any combination may be used if at least the broadcast by the second standard is delayed from the broadcast by the first standard, and if an announcement flag of the broadcast by the second standard is broadcasted before the announcement flag of the broadcast by the first standard.

[0068] In a further example not forming part of the present invention, if the flag detection unit 107 has already detected the TA flag from the broadcast by the first standard (FM broadcast in the first, second, and fourth exemplary embodiments, DAB broadcast in the third exemplary embodiment) during a preceding predetermined time from timing with which the flag detection unit 107 (or the flag detection unit 207) detects the TA flag from the broadcast by the second standard (DAB broadcast in the first and second exemplary embodiments, IP broadcast in the third and fourth exemplary embodiments), the switching processing unit 108 (or the switching processing units 108', 208) may switch the output mode of the broadcast by the second standard to the announcement mode with timing with which the flag detection unit 107 detects the TA flag from the broadcast by the second standard. This allows the switching processing unit 108 to switch the output mode of the broadcast by the second standard to the announcement mode at the moment when the broadcast of the traffic information of the broadcast by the second standard starts, even if at least some broadcasting stations transmit the TA flag of the broadcast by the first standard first, and later transmit the TA flag of the broadcast by the second standard when the broadcast of the traffic infor-

mation of the broadcast by the second standard starts.

[0069] Furthermore, each of the exemplary embodiments described above merely illustrates an example of embodiment for implementing the present invention, and the technical scope of the present invention is to be interpreted as in the claims.

Reference Signs List

[0070]

10, 10', 20	broadcast receiving apparatus
12	speaker
14	display
101	first receiving unit
102	FM demodulation unit
103	second receiving unit
104	DAB demodulation unit
105	buffer unit
106	output control unit
107	flag detection unit
108,108'	switching processing unit
109	delay time calculation unit
201	first receiving unit
202	DAB demodulation unit
203	second receiving unit
204	IP demodulation unit
205	buffer unit
206	output control unit
207	flag detection unit
208	switching processing unit
209	delay time calculation unit

Claims

1. A broadcast receiving apparatus comprising:

a first receiving unit (101) configured to receive a broadcast signal according to a first standard;
a second receiving unit (103) configured to receive a broadcast signal according to a second standard, the broadcast signal according to the second standard having identical content to the broadcast signal according to the first standard and being received with a delay with respect to the broadcast signal according to the first standard such that a time difference occurs between them;
an output control unit (106) configured to selectively switch and output the broadcast signal according to the first standard received by the first receiving unit (101), and the broadcast signal according to the second standard received by the second receiving unit (103);
a flag detection unit (107) configured to detect a first announcement flag indicating broadcast start of an announcement from the broadcast signal according to the first standard and a second announcement flag indicating broadcast start of said announcement from the broadcast signal according to the second standard, wherein the second announcement flag is transmitted a predetermined time before the broadcast of the announcement actually starts and the second announcement flag is transmitted earlier than the first announcement flag so that the broadcast receiving apparatus receives the second announcement flag first; and
a switching processing unit (108) configured to switch, when the flag detection unit (107) detects the second announcement flag while the output control unit (106) outputs the broadcast signal according to the second standard, an output mode of output voice of the broadcast signal according to the second standard to an announcement mode for outputting the announcement;
characterized in that the switching processing unit is configured to switch by using timing with which the flag detection unit (107) further detects the first announcement flag as a trigger for switching the output mode of the broadcast signal according to the second standard to the announcement mode for outputting the announcement, wherein the switching processing unit (108) is configured to not switch the output mode of the broadcast signal according to the second standard to the announcement mode even after the second announcement flag is detected until at least the first announcement flag is detected.

2. The broadcast receiving apparatus according to claim 1, **characterized in**
that the broadcast receiving apparatus further comprises a delay time calculation unit (109) configured to calculate delay time of the broadcast signal according to the second standard from the broadcast signal according to the first standard, and
that, when the flag detection unit (107) detects the second announcement flag while the output control unit (106) outputs the broadcast signal according to the second standard, the switching processing unit (108) is configured to switch the output mode of the broadcast signal according to the second standard to the announcement mode with timing with which the delay time calculated by the delay time calculation unit (109) has elapsed from timing with which the flag detection unit (107) further detects the first announcement flag.

3. The broadcast receiving apparatus according to any one of claims 1 to 2, **characterized in that** the broadcast signal according to the first standard is a FM broadcast signal, and that the broadcast signal according to the second standard is a DAB broadcast signal.

4. The broadcast receiving apparatus according to any one of claims 1 to 2, **characterized in that** the broadcast signal according to the first standard is a DAB broadcast signal, and that the broadcast signal according to the second standard is an IP broadcast signal.

5. The broadcast receiving apparatus according to any one of claims 1 to 2, **characterized in that** the broadcast signal according to the first standard is a FM broadcast signal, and that the broadcast signal according to the second standard is an IP broadcast signal.

6. The broadcast receiving apparatus according to any one of claims 1 or 3 to 5, **characterized in that**, when the flag detection unit (107) detects the second announcement flag while the output control unit (106) outputs the broadcast signal according to the second standard, the switching processing unit (108) is configured to switch the output mode of the broadcast signal according to the second standard to the announcement mode for outputting the announcement with timing with which a predetermined time has elapsed after the flag detection unit (107) further detects the first announcement flag.

7. An output control method by a broadcast receiving apparatus, wherein the broadcast receiving apparatus comprises an output control unit (106) that selectively switches and outputs a broadcast signal according to a first standard and a broadcast signal according to a second standard, the broadcast signal according to the second standard having identical content to the broadcast signal according to the first standard and being received with a delay with respect to the broadcast signal according to the first standard such that a time difference occurs between them, the output control method comprising :

a first flag detection process in which a flag detection unit (107) of the broadcast receiving apparatus detects a second announcement flag that indicates broadcast start of an announcement from the broadcast signal according to the second standard;
a second flag detection process in which the flag detection unit (107) of the broadcast receiving apparatus detects a first announcement flag that indicates broadcast start of the same announcement from the broadcast signal according to the first standard, wherein the second announcement flag is transmitted a predetermined time before the broadcast of the announcement actually starts and the second announcement flag is transmitted earlier than the first announcement flag so that the broadcast receiving apparatus receives the second announcement flag first; and
a switching processing process in which, when the second announcement flag is detected in the first flag detection process while the output control unit (106) outputs the broadcast signal according to the second standard, a switching processing unit (108) of the broadcast receiving apparatus switches an output mode of output voice of the broadcast signal according to the second standard to an announcement mode for outputting the announcement **characterised in that** the output mode is switched by using timing with which the first announcement flag is further detected in the second flag detection process as a trigger for switching the output mode of the broadcast signal according to the second standard to the announcement mode for outputting the announcement, wherein the switching processing unit (108) does not switch the output mode of the broadcast signal according to the second standard to the announcement mode even after the second announcement flag is detected until at least the first announcement flag is detected.

Patentansprüche

1. Rundfunkempfangsvorrichtung, umfassend:

eine erste Empfangseinheit (101), die dazu ausgelegt ist, ein Rundfunksignal gemäß einem ersten Standard zu empfangen;
eine zweite Empfangseinheit (103), die dazu ausgelegt ist, ein Rundfunksignal gemäß einem zweiten Standard zu empfangen, wobei das Rundfunksignal gemäß dem zweiten Standard identischen Inhalt wie das Rundfunksignal gemäß dem ersten Standard hat und mit einer Verzögerung in Bezug auf das Rundfunksignal gemäß dem ersten Standard empfangen wird, so dass eine Zeitdifferenz zwischen ihnen entsteht;
eine Ausgabesteuereinheit (106), die dazu ausgelegt ist, das Rundfunksignal gemäß dem ersten Standard, das von der ersten Empfangseinheit (101) empfangen wird, und das Rundfunksignal gemäß dem zweiten Standard, das von der zweiten Empfangseinheit (103) empfangen wird, selektiv zu schalten und auszugeben;
eine Flag-Erfassungseinheit (107), die dazu ausgelegt ist, ein erstes Meldungs-Flag, das den Übertragungsbeginn einer Meldung angibt, aus dem Rundfunksignal gemäß dem ersten Standard und ein zweites Meldungs-Flag, das den Übertragungsbeginn der Meldung angibt, aus dem Rundfunksignal gemäß dem zweiten Standard zu erfassen, wobei das zweite Meldungs-Flag eine vorgegebene Zeit gesendet

wird, bevor die Übertragung der Meldung tatsächlich beginnt und das zweite Meldungs-Flag früher als das erste Meldungs-Flag gesendet wird, so dass die Rundfunkempfangsvorrichtung das zweite Meldungs-Flag zuerst empfängt; und

eine Schaltverarbeitungseinheit (108), die dazu ausgelegt ist, wenn die Flag-Erfassungseinheit (107) das zweite Meldungs-Flag erfasst, während die Ausgabesteuereinheit (106) das Rundfunksignal gemäß dem zweiten Standard ausgibt, einen Ausgabemodus einer Ausgabestimme des Rundfunksignals gemäß dem zweiten Standard auf einen Meldungsmodus zur Ausgabe der Meldung umzuschalten;

dadurch gekennzeichnet, dass die Schaltverarbeitungseinheit dazu ausgelegt ist, unter Verwendung einer Zeit, mit der die Flag-Erfassungseinheit (107) ferner das erste Meldungs-Flag erfasst, als einen Auslöser zum Umschalten des Ausgabemodus des Rundfunksignals gemäß dem zweiten Standard auf den Meldungsmodus zum Ausgeben der Meldung umzuschalten, wobei die Schaltverarbeitungseinheit (108) dazu ausgelegt ist, den Ausgabemodus des Rundfunksignals gemäß dem zweiten Standard selbst nachdem das zweite Meldungs-Flag erfasst wurde, nicht auf den Meldungsmodus umzuschalten, bis mindestens das erste Meldungs-Flag erfasst wird.

2. Rundfunkempfangsvorrichtung nach Anspruch 1,
dadurch gekennzeichnet,
dass die Rundfunkempfangsvorrichtung ferner eine Verzögerungszeitberechnungseinheit (109) umfasst, die dazu ausgelegt ist, die Verzögerungszeit des Rundfunksignals gemäß dem zweiten Standard aus dem Rundfunksignal gemäß dem ersten Standard zu berechnen, und
dass die Schaltverarbeitungseinheit (108) dazu ausgelegt ist, wenn die Flag-Erfassungseinheit (107) das zweite Meldungs-Flag erfasst, während die Ausgabesteuereinheit (106) das Rundfunksignal gemäß dem zweiten Standard ausgibt, den Ausgabemodus des Rundfunksignals gemäß dem zweiten Standard auf den Meldungsmodus mit einer Zeit umzuschalten, mit der die von der Verzögerungszeitberechnungseinheit (109) berechnete Verzögerungszeit abgelaufen ist, ab der Zeit, mit der die Flag-Erfassungseinheit (107) ferner das erste Meldungs-Flag erfasst.

3. Rundfunkempfangsvorrichtung nach einem der Ansprüche 1 bis 2,
dadurch gekennzeichnet, dass das Rundfunksignal gemäß dem ersten Standard ein FM-Rundfunksignal ist und das Rundfunksignal gemäß dem zweiten Standard ein DAB-Rundfunksignal ist.

4. Rundfunkempfangsvorrichtung nach einem der Ansprüche 1 bis 2,
dadurch gekennzeichnet, dass das Rundfunksignal gemäß dem ersten Standard ein DAB-Rundfunksignal ist und das Rundfunksignal gemäß dem zweiten Standard ein IP-Rundfunksignal ist.

5. Rundfunkempfangsvorrichtung nach einem der Ansprüche 1 bis 2,
dadurch gekennzeichnet, dass das Rundfunksignal gemäß dem ersten Standard ein FM-Rundfunksignal ist und das Rundfunksignal gemäß dem zweiten Standard ein IP-Rundfunksignal ist.

6. Rundfunkempfangsvorrichtung nach einem der Ansprüche 1 oder 3 bis 5,
dadurch gekennzeichnet, dass die Schaltverarbeitungseinheit (108) dazu ausgelegt ist, wenn die Flag-Erfassungseinheit (107) das zweite Meldungs-Flag erfasst, während die Ausgabesteuereinheit (106) das Rundfunksignal gemäß dem zweiten Standard ausgibt, den Ausgabemodus des Rundfunksignals gemäß dem zweiten Standard auf den Meldungsmodus zum Ausgeben der Meldung mit einer Zeit umzuschalten, mit der eine vorgegebene Zeit abgelaufen ist, nachdem die Flag-Erfassungseinheit (107) ferner das erste Meldungs-Flag erfasst.

7. Ausgabesteuerverfahren durch eine Rundfunkempfangsvorrichtung, wobei die Rundfunkempfangsvorrichtung eine Ausgabesteuereinheit (106) umfasst, die ein Rundfunksignal gemäß einem ersten Standard und ein Rundfunksignal gemäß einem zweiten Standard selektiv schaltet und ausgibt, wobei das Rundfunksignal gemäß dem zweiten Standard identischen Inhalt wie das Rundfunksignal gemäß dem ersten Standard hat und mit einer Verzögerung in Bezug auf das Rundfunksignal gemäß dem ersten Standard empfangen wird, so dass eine Zeitdifferenz zwischen ihnen entsteht,
wobei das Ausgabesteuerverfahren umfasst:

einen ersten Flag-Erfassungsprozess, bei dem eine Flag-Erfassungseinheit (107) der Rundfunkempfangsvorrichtung ein zweites Meldungs-Flag, das den Übertragungsbeginn einer Meldung angibt, aus dem Rundfunksignal gemäß dem zweiten Standard erfasst;

einen zweiten Flag-Erfassungsprozess, bei dem die Flag-Erfassungseinheit (107) der Rundfunkempfangsvorrichtung ein erstes Meldungs-Flag, das den Übertragungsbeginn der gleichen Meldung angibt, aus dem Rundfunksignal gemäß dem ersten Standard erfasst,

wobei das zweite Meldungs-Flag eine vorgegebene Zeit gesendet wird, bevor die Übertragung der Meldung tatsächlich beginnt, und das zweite Meldungs-Flag früher als das erste Meldungs-

Flag gesendet wird, so dass die Rundfunkempfangsvorrichtung das zweite Meldungs-Flag zuerst empfängt; und

einen Schaltverarbeitungsprozess, bei dem, wenn das zweite Meldungs-Flag in dem ersten Flag-Erfassungsprozess erfasst wird, während die Ausgabesteuereinheit (106) das Rundfunksignal gemäß dem zweiten Standard ausgibt, eine Schaltverarbeitungseinheit (108) der Rundfunkempfangsvorrichtung einen Ausgabemodus der Ausgabestimme des Rundfunksignals gemäß dem zweiten Standard auf einen Meldungsmodus zur Ausgabe der Meldung umschaltet,

dadurch gekennzeichnet, dass der Ausgabemodus unter Verwendung einer Zeit, mit der das erste Meldungs-Flag ferner in dem zweiten Flag-Erfassungsprozess erfasst wird, als ein Auslöser zum Umschalten des Ausgabemodus des Rundfunksignals gemäß dem zweiten Standard auf den Meldungsmodus zur Ausgabe der Meldung umgeschaltet wird, wobei die Schaltverarbeitungseinheit (108) den Ausgabemodus des Rundfunksignals gemäß dem zweiten Standard selbst nachdem das zweite Meldungs-Flag erfasst wurde, nicht auf den Meldungsmodus umschaltet, bis mindestens das erste Meldungs-Flag erfasst wird.

Revendications

1. Appareil de réception de radiodiffusion comprenant :

une première unité de réception (101) configurée pour recevoir un signal de radiodiffusion conforme à une première norme ;

une deuxième unité de réception (103) configurée pour recevoir un signal de radiodiffusion conforme à une deuxième norme, le signal de radiodiffusion conforme à la deuxième norme possédant une teneur identique à celle du signal de radiodiffusion conforme à la première norme et étant reçu avec un retard par rapport au signal de radiodiffusion conforme à la première norme, d'une manière telle que l'on obtient une différence de temps entre les deux ;

une unité de commande de sortie (106) configurée pour soumettre à une commutation et émettre de manière sélective le signal de radiodiffusion conforme à la première norme reçue par la première unité de réception (101) et le signal de radiodiffusion conforme à la deuxième norme reçu par la deuxième unité de réception (103) ;

une unité de détection d'indicateur (107) configurée pour détecter un premier indicateur de communication indiquant le début d'une communication par radiodiffusion à partir du signal de radiodiffusion conforme à la première norme et un deuxième indicateur de communication indiquant le début de ladite communication par radiodiffusion à partir du signal de radiodiffusion conforme à la deuxième norme ; dans lequel le deuxième indicateur de communication est émis à un moment prédéterminé avant le démarrage proprement dit de la radiodiffusion de la communication et le deuxième indicateur de communication est émis plus tôt que le premier indicateur de communication, d'une manière telle que l'appareil de réception de radiodiffusion reçoit le deuxième indicateur de communication en premier lieu ; et

une unité de traitement de commutation (108) configurée pour faire passer par commutation, lorsque l'unité de détection d'indicateur (107) détecte le deuxième indicateur de communication, tandis que l'unité de commande de sortie (106) émet le signal de radiodiffusion conforme à la deuxième norme, un mode de sortie de voix de sortie du signal de radiodiffusion conforme à la deuxième norme à un mode de communication pour la sortie de la communication ;

caractérisé en ce que l'unité de traitement de commutation est configurée pour faire passer par commutation, en utilisant le moment auquel l'unité de détection d'indicateur (107) détecte en outre le premier indicateur de communication comme déclencheur pour la commutation du mode de sortie du signal de radiodiffusion conforme à la deuxième norme au mode de communication pour la sortie de la communication ; dans lequel l'unité de traitement de commutation (108) est configurée pour ne pas faire passer par commutation le mode de sortie du signal de radiodiffusion conforme à la deuxième norme au mode de communication, même après la détection du deuxième indicateur de communication, avant la détection d'au moins le premier indicateur de communication.

2. Appareil de réception de radiodiffusion selon la revendication 1, **caractérisé en ce que** l'appareil de réception de radiodiffusion comprend en outre une unité de calcul (109) du temps de retard configurée pour calculer le temps de retard du signal de radiodiffusion conforme à la deuxième norme à partir du signal de radiodiffusion conforme à la première norme ; et **en ce que**, lorsque l'unité de détection d'indicateur (107) détecte le deuxième indicateur de communication, tandis que l'unité de commande de sortie (106) émet le signal de radiodiffusion conforme à la deuxième norme, l'unité de traitement de commutation (108) est configurée pour faire passer le mode de sortie du signal de radiodiffusion conforme à la deuxième norme par commutation au mode

de communication au moment où le temps de retard calculé par l'unité de calcul (109) du temps de retard s'est écoulé à partir du moment où l'unité de détection d'indicateur (107) détecte en outre le premier indicateur de communication.

3. Appareil de réception de radiodiffusion selon l'une quelconque des revendications 1 à 2, **caractérisé en ce que** le signal de radiodiffusion conforme à la première norme est un signal de radiodiffusion de type FM, et **en ce que** le signal de radiodiffusion conforme à la deuxième norme est un signal de radiodiffusion de type DAB.

4. Appareil de réception de radiodiffusion selon l'une quelconque des revendications 1 à 2, **caractérisé en ce que** le signal de radiodiffusion conforme à la première norme est un signal de radiodiffusion de type DAB et **en ce que** le signal de radiodiffusion conforme à la deuxième norme est un signal de radiodiffusion de type IP.

5. Appareil de réception de radiodiffusion selon l'une quelconque des revendications 1 à 2, **caractérisé en ce que** le signal de radiodiffusion conforme à la première norme est un signal de radiodiffusion de type FM et **en ce que** le signal de radiodiffusion conforme à la deuxième norme est un signal de radiodiffusion de type IP.

6. Appareil de réception de radiodiffusion selon l'une quelconque des revendications 1 ou 3 à 5, **caractérisé en ce que**, lorsque l'unité de détection d'indicateur (107) détecte le deuxième indicateur de communication, tandis que l'unité de commande de sortie (106) émet le signal de radiodiffusion conforme à la deuxième norme, l'unité de traitement de commutation (108) est configurée pour faire passer le mode de sortie du signal de radiodiffusion conforme à la deuxième norme par commutation au mode de communication pour la sortie de la communication au moment où un laps de temps prédéterminé s'est écoulé après que l'unité de détection d'indicateur (107) détecte en outre le premier indicateur de communication.

7. Procédé de commande de sortie via un appareil de réception de radiodiffusion, dans lequel l'appareil de réception de radiodiffusion comprend une unité de commande de sortie (106) qui procède de manière sélective à une commutation et à une émission d'un signal de radiodiffusion conforme à une première norme et d'un signal de radiodiffusion conforme à une deuxième norme, le signal de radiodiffusion conforme à la deuxième norme possédant une teneur identique à celle du signal de radiodiffusion conforme à la première norme et étant reçu avec un retard par rapport au signal de radiodiffusion conforme à la première norme, d'une manière telle que l'on obtient une différence de temps entre les deux, le procédé de commande de sortie comprenant :

un premier processus de détection d'indicateur dans lequel une unité de détection d'indicateur (107) de l'appareil de réception de radiodiffusion détecte un deuxième indicateur de communication qui indique le début d'une communication par radiodiffusion à partir du signal de radiodiffusion conforme à la deuxième norme ;
un deuxième processus de détection d'indicateur dans lequel l'unité de détection d'indicateur (107) de l'appareil de réception de radiodiffusion détecte un premier indicateur de communication qui indique le début, par radiodiffusion, de la même communication à partir du signal de radiodiffusion conforme à la première norme ; dans lequel le deuxième indicateur de communication est émis à un moment prédéterminé avant le démarrage effectif de la radiodiffusion de la communication, et le deuxième indicateur de communication est émis plus tôt que le premier indicateur de communication, d'une manière telle que l'appareil de réception de radiodiffusion reçoit le deuxième indicateur de communication en premier lieu ; et
un processus de traitement de commutation dans lequel, lorsque le deuxième indicateur de communication est détecté dans le premier processus de détection d'indicateur, tandis que l'unité de commande de sortie (106) émet le signal de radiodiffusion conforme à la deuxième norme, une unité de traitement de commutation (108) de l'appareil de réception de radiodiffusion fait passer un mode de sortie de voix de sortie du signal de radiodiffusion conforme à la deuxième norme par commutation à un mode de communication pour la sortie de la communication, **caractérisé en ce que** le mode de sortie est soumis à une commutation en utilisant le moment auquel le premier indicateur de communication est en outre détecté dans le deuxième processus de détection d'indicateur, à titre de déclencheur pour la commutation du mode de sortie du signal de radiodiffusion conforme à la deuxième norme au mode de communication pour la sortie de la communication ; dans lequel l'unité de traitement de commutation (108) ne fait pas passer le mode de sortie du signal de radiodiffusion conforme à la deuxième norme par commutation au mode de communication, même après la détection du deuxième indicateur de communication, avant la détection d'au moins le premier indicateur de communication.

FIG. 1

EXAMPLE OF FUNCTIONAL CONFIGURATION OF BROADCAST RECEIVING APPARATUS ACCORDING TO FIRST EXEMPLARY EMBODIMENT OF PRESENT INVENTION

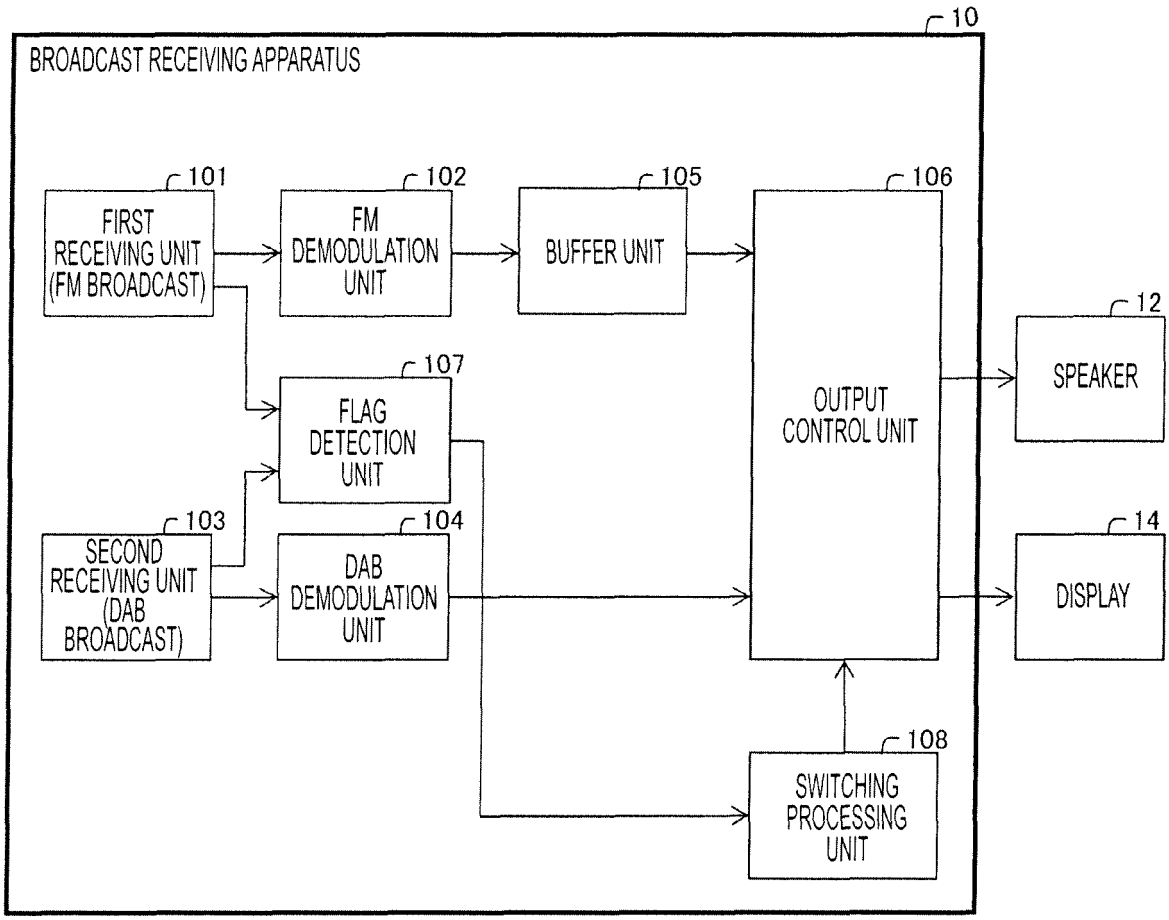


FIG. 2

ONE EXAMPLE OF PROCESSING PERFORMED BY BROADCAST RECEIVING APPARATUS ACCORDING TO FIRST EXEMPLARY EMBODIMENT OF PRESENT INVENTION

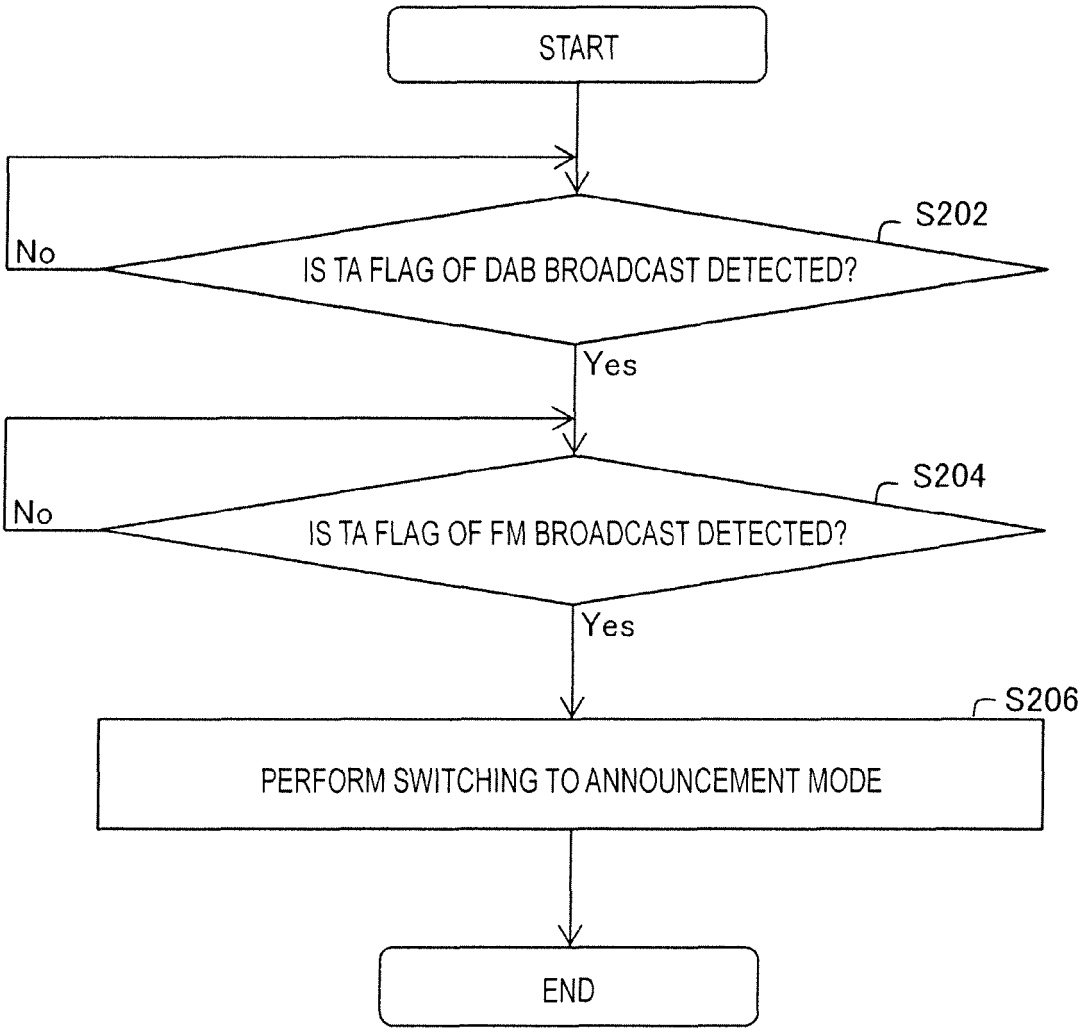


FIG. 3

ONE EXAMPLE OF SWITCHING TIMING TO ANNOUNCEMENT MODE BY BROADCAST RECEIVING APPARATUS ACCORDING TO FIRST EXEMPLARY EMBODIMENT OF PRESENT INVENTION

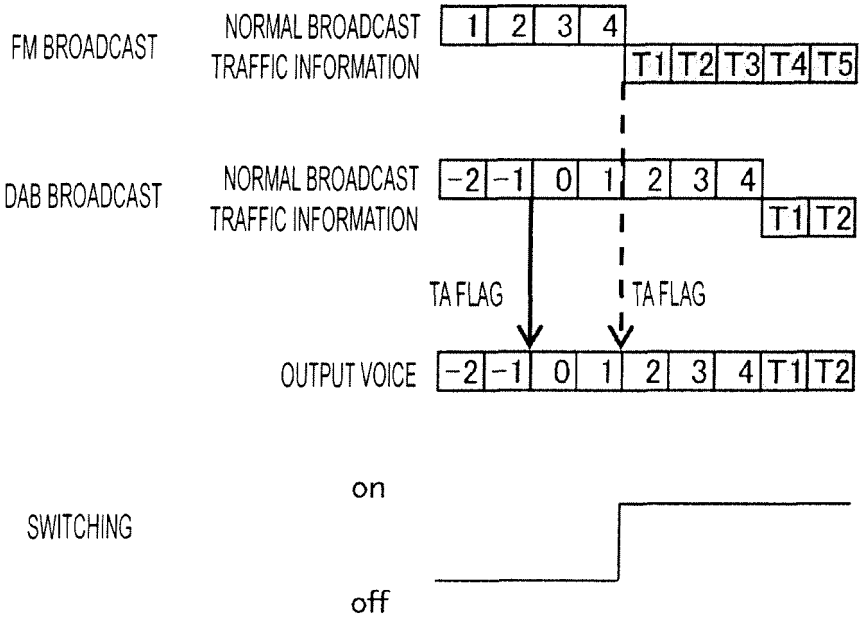


FIG. 4

EXAMPLE OF FUNCTIONAL CONFIGURATION OF BROADCAST RECEIVING APPARATUS ACCORDING TO SECOND EXEMPLARY EMBODIMENT OF PRESENT INVENTION

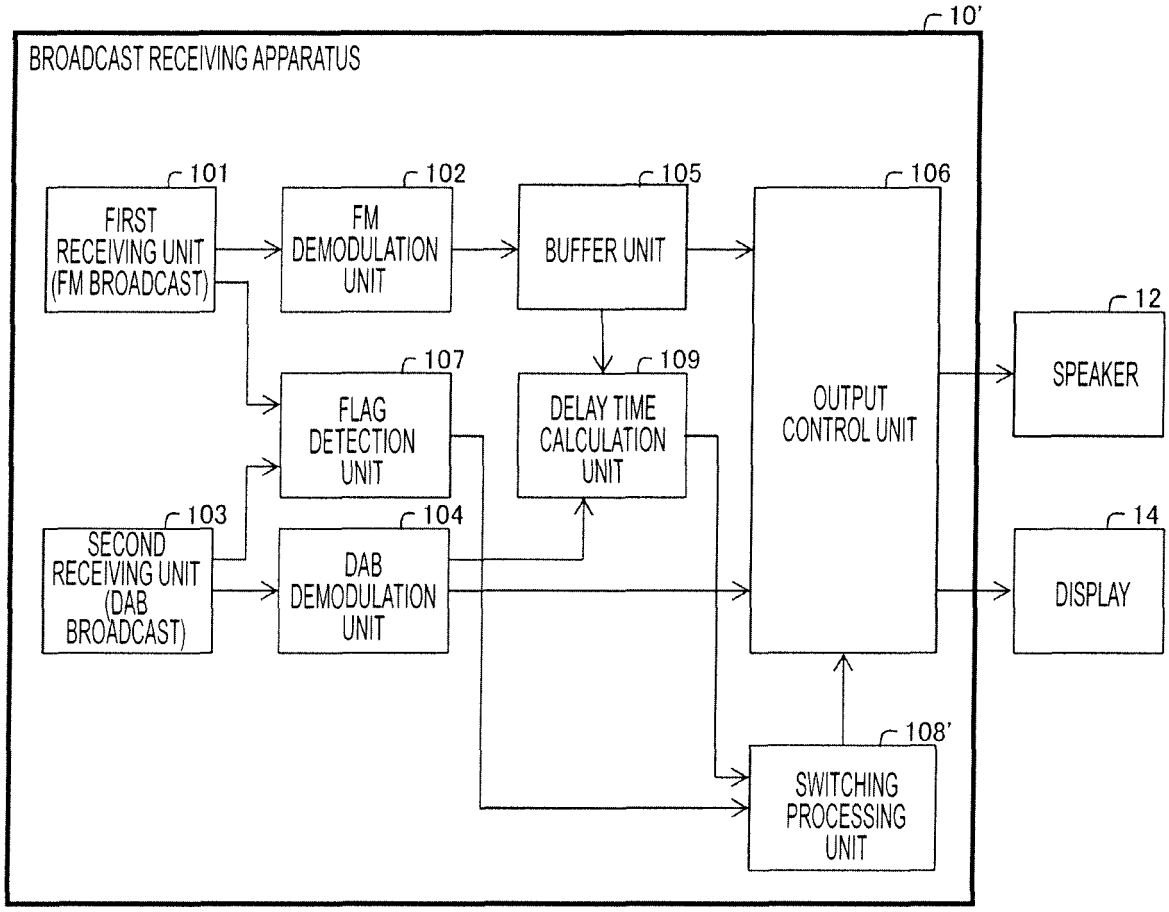


FIG. 5

ONE EXAMPLE OF PROCESSING PERFORMED
BY BROADCAST RECEIVING APPARATUS ACCORDING TO
SECOND EXEMPLARY EMBODIMENT OF PRESENT INVENTION

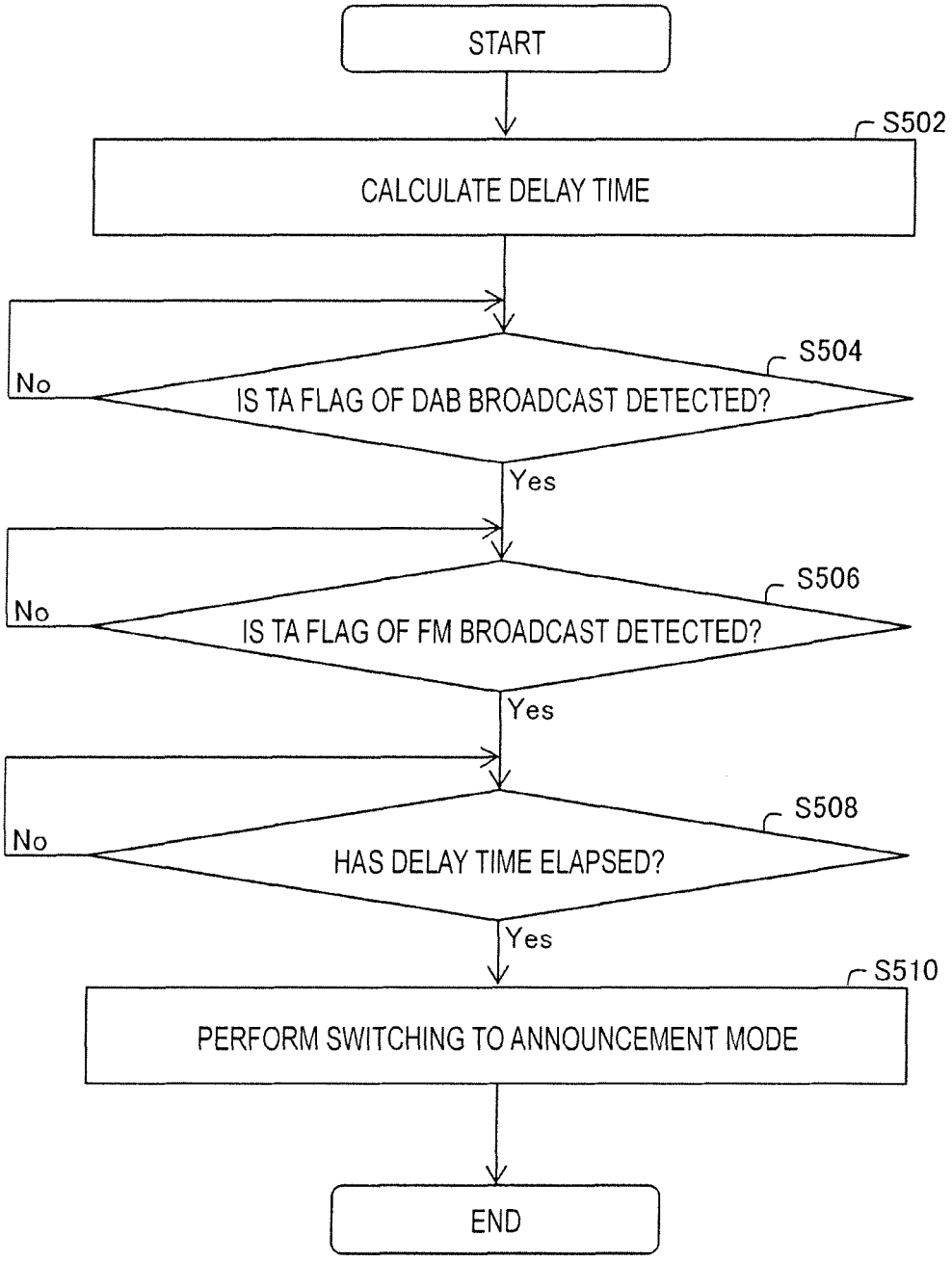


FIG. 6

ONE EXAMPLE OF SWITCHING TIMING TO ANNOUNCEMENT MODE BY BROADCAST RECEIVING APPARATUS ACCORDING TO SECOND EXEMPLARY EMBODIMENT OF PRESENT INVENTION

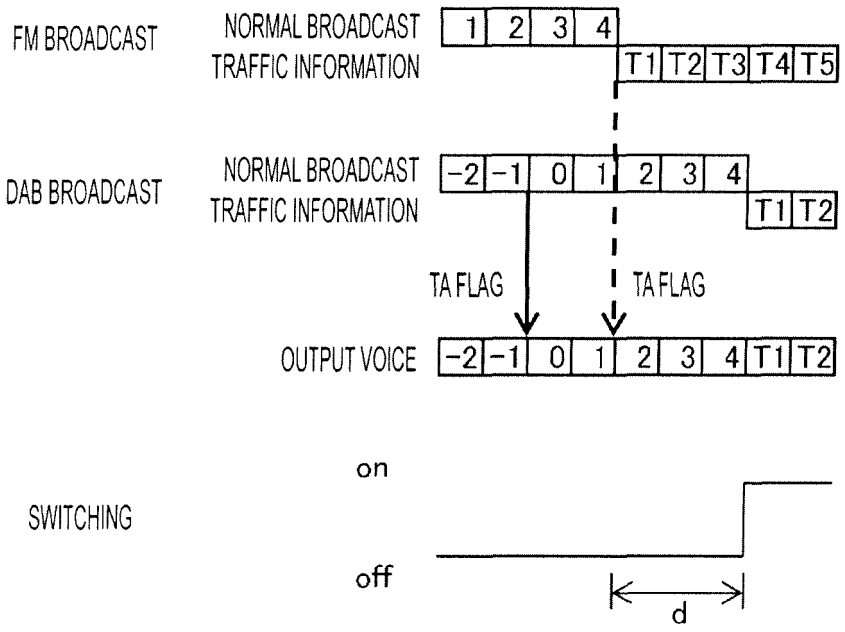


FIG. 7

EXAMPLE OF FUNCTIONAL CONFIGURATION OF BROADCAST RECEIVING APPARATUS ACCORDING TO THIRD EXEMPLARY EMBODIMENT OF PRESENT INVENTION

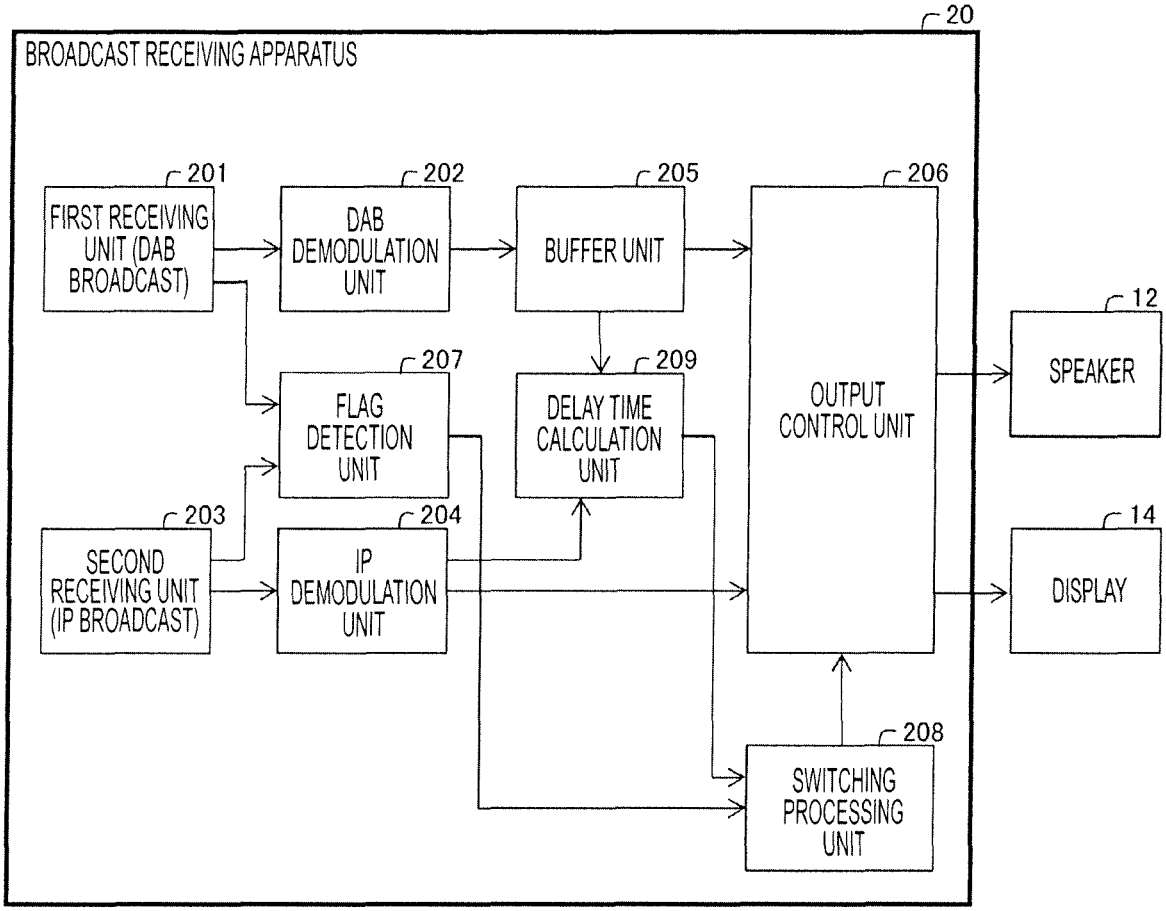


FIG. 8

ONE EXAMPLE OF SWITCHING TIMING TO ANNOUNCEMENT MODE BY BROADCAST RECEIVING APPARATUS ACCORDING TO THIRD EXEMPLARY EMBODIMENT OF PRESENT INVENTION

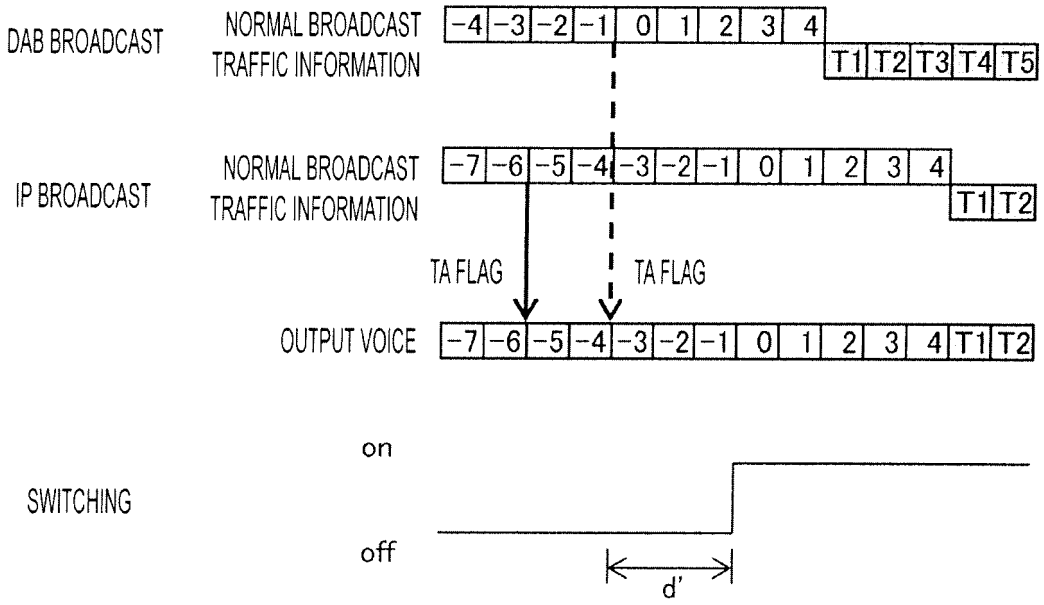


FIG. 9

VARIATION OF SWITCHING TIMING TO ANNOUNCEMENT MODE BY BROADCAST RECEIVING APPARATUS ACCORDING TO THIRD EXEMPLARY EMBODIMENT OF PRESENT INVENTION

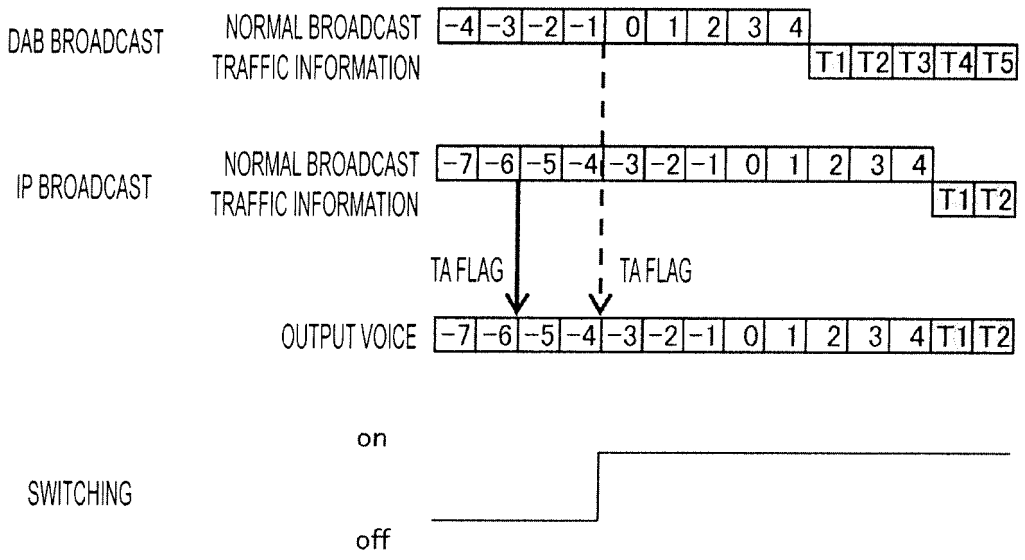


FIG. 10A

ONE EXAMPLE OF SWITCHING TIMING TO ANNOUNCEMENT MODE BY BROADCAST RECEIVING APPARATUS ACCORDING TO FOURTH EXEMPLARY EMBODIMENT OF PRESENT INVENTION

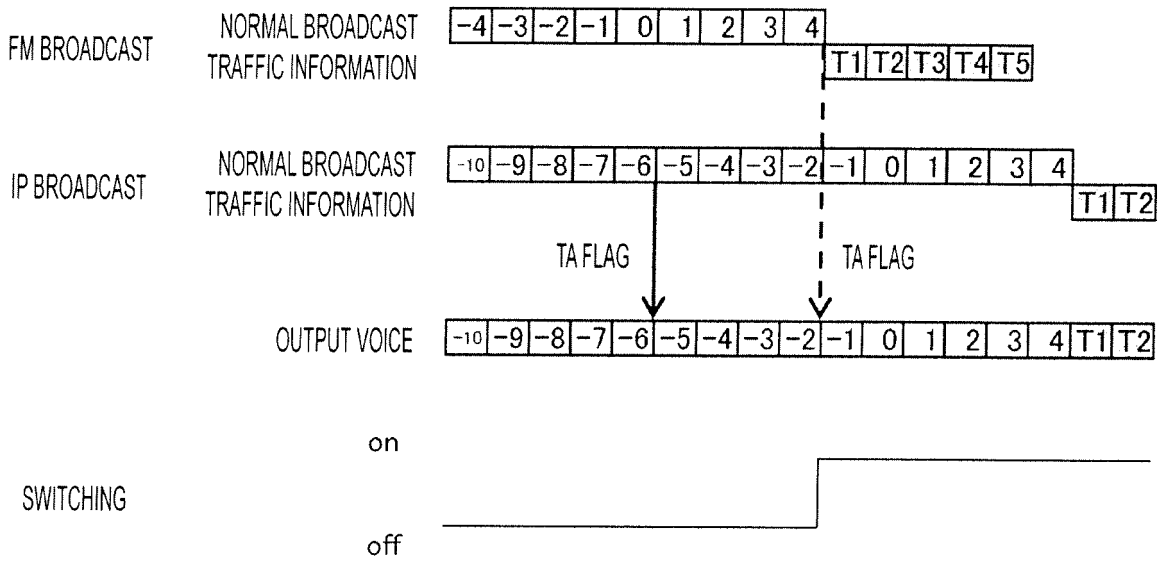


FIG. 10B

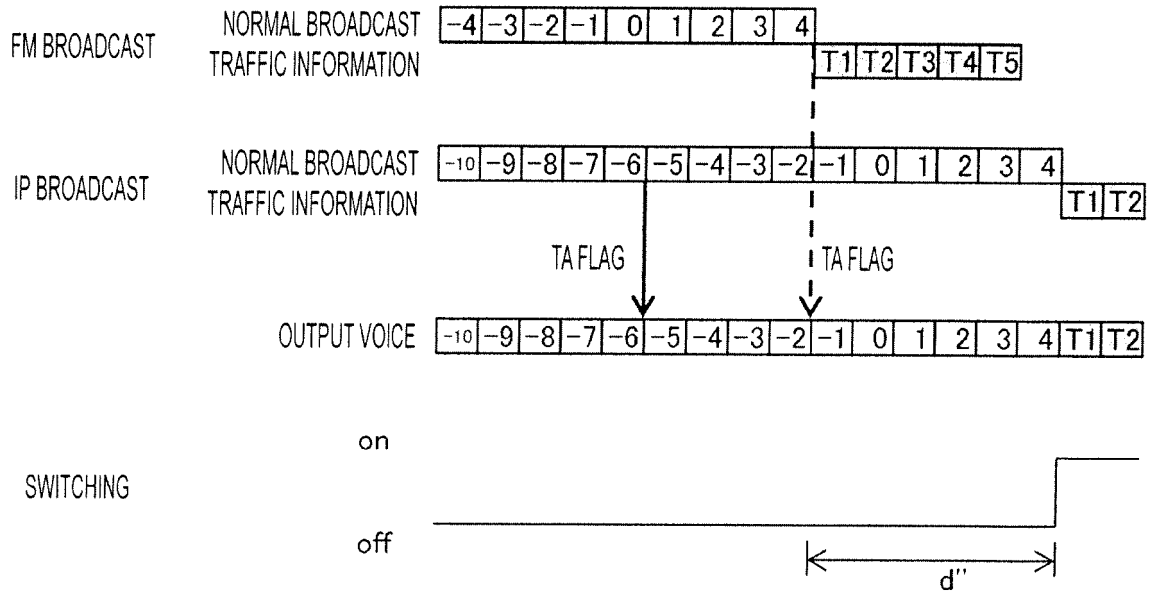
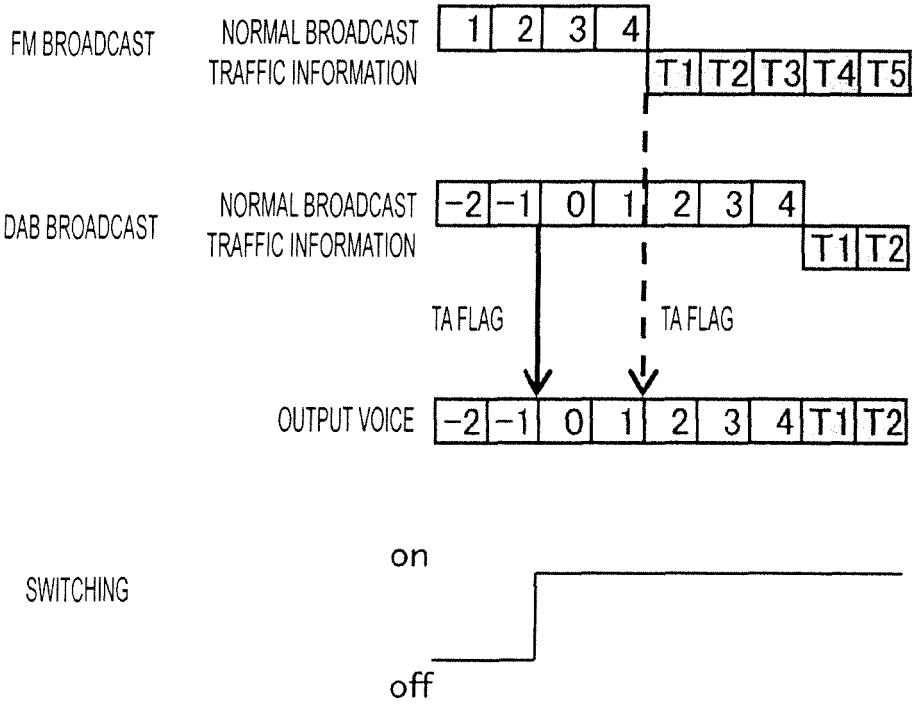


FIG. 11

ONE EXAMPLE OF SWITCHING TIMING TO ANNOUNCEMENT MODE BY CONVENTIONAL BROADCAST RECEIVING APPARATUS



REFERENCES CITED IN THE DESCRIPTION

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