(12) **EUROPEAN PATENT APPLICATION**

(54) **Broadcast receiver**

(57)   Unlike a conventional broadcast receiver, a broadcast receiver (10) according to the present invention is capable of quickly seeking and receiving a broadcast program even when all of EId, SId, and LSN codes are not obtained. The broadcast receiver (10) includes a DAB decoder (13) for decoding a received signal into DAB data including an EId code, an SId code, and an LSN code, and a controller (21) for producing and storing a network management database (30) and a linkage management database (40) in accordance with the encoded DAB data and also for, if degradation occurs in a receiving condition of a current broadcast program being received, commanding a DAB front end (12) to seek and receive a broadcast program having the same content as that of the current broadcast program in accordance with the EId code, a set of the EId code and the SId code, or a set of the EId code, the SId code and the LSN code, depending upon the status of the obtained DAB data.

FIG. 1

10

11
DAB FRONT END   12
DAB DECODER   13
AUDIO DECODER   14
D/A   15
16
SP   17
BER DETECTOR   18
DISPLAY   19
OPERATION CONTROL UNIT   20
CONTROLLER   21

EP 1 133 089 A2
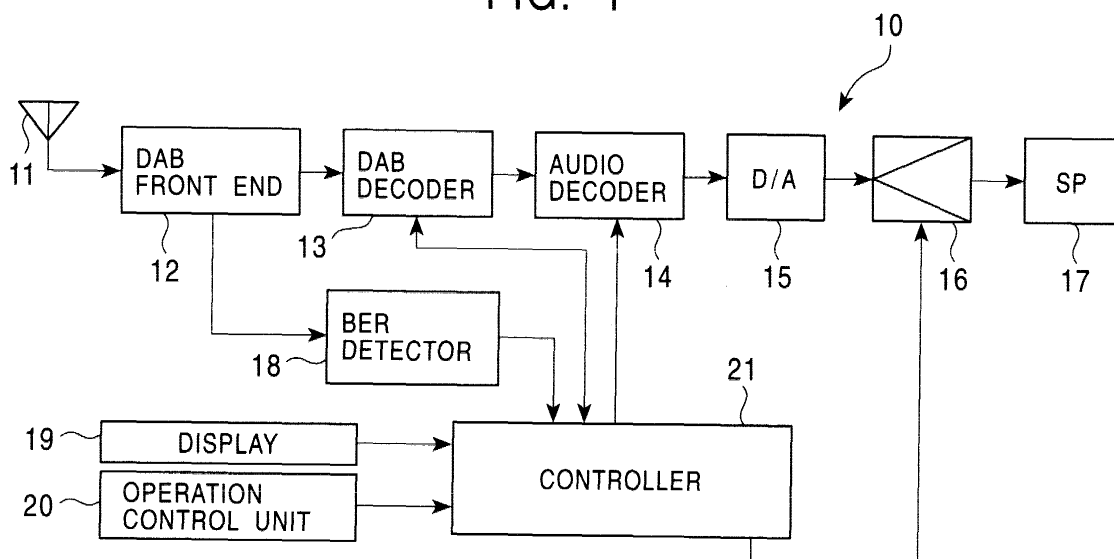
Description

BACKGROUND OF THE INVENTION

1. Field of the Invention

[0001] The present invention relates to a broadcast receiver such as a DAB (digital audio broadcasting) receiver having a capability of seeking and receiving a broadcast program having the same content as that of a broadcast program currently being received.

2. Description of the Related Art

[0002] In a conventional broadcasting technique, one program is broadcasted at one broadcasting frequency. In contrast, in the DAB broadcasting, unlike the conventional broadcasting, a plurality of programs are broadcasted at one broadcasting frequency (hereinafter referred to as an ensemble).

[0003] Therefore, a DAB receiver designed to receive DAB broadcast programs has a capability of receiving an ensemble and selecting a desired broadcast program from a plurality of broadcast programs in the received ensemble.

[0004] In a specific DAB receiving area, DAB data being broadcasted includes an EId (Ensemble Identifier) code identifying an ensemble, an SId (Service Identifier) code identifying a broadcast program, an LSN (Linkage Set Number) code identifying an identical broadcast program, and an area code indicating the area.

[0005] The EId code is information indicating a linkage relationship among ensembles.

[0006] The SId code is information used not only to identify a broadcast program but also to link a plurality of EId codes.

[0007] The LSN code is information which identifies broadcast programs having an identical content among a plurality of broadcast programs and which indicates linkage among different SId codes.

[0008] When a DAB receiver receives DAB data, the DAB receiver can detect broadcasting frequencies at which an identical program is broadcasted in a receiving area, in accordance with the received SId code, EId code, and the LSN code.

[0009] That is, when the DAB receiver receives EId codes and SId codes such as those shown in Fig. 5, the DAB receiver produces a network management database 30 for managing a plurality of broadcast programs in each ensemble and also broadcasting frequencies of each broadcast program.

[0010] For example, when the network management database 30 includes broadcasting frequencies (239.200, 223.936, and so on) linked by an ensemble (EId = A001) in association with corresponding broadcast programs (SId = C221, C225, C229), it is possible to determine that programs (SId = C221, C225, C229) are broadcasted at frequencies (239.200, 223.936, and so on) contained in the ensemble EId = A001.

[0011] Furthermore, the DAB receiver produces a linkage management database 40 for managing broadcast programs having the same content in accordance with received LSN codes such as those shown in Fig. 6.

[0012] For example, when the linkage management database 40 includes an LSN code (LSN = 2) identifying broadcast programs having the same content in association with broadcasting frequencies (SId = C221, C222) at which broadcast programs having the same content are broadcasted, it is possible to determine that the programs of C221 and C222 with the same LSN code (LSN = 2) have the same content although the SId codes, C221 and C222, are different.

[0013] In the DAB receiver in which the network management database 30 and the linkage management database 40 are produced, if degradation in a receiving condition of, for example, SId = C221 occurs as a car is running, an LSN code corresponding to SId = C221 is retrieved from the linkage management database 40, and in this specific example, the LSN code of interest is determined as 2.

[0014] The DAB receiver then retrieves an SId code corresponding to LSN = 2. Thus, in this specific example, the DAB receiver detects that the same content as that of C221 is broadcasted at C222.

[0015] Thus, the DAB receiver determines that C222 should be sought, and detects a broadcasting frequency of 225.648 corresponding to SId = C222 by searching the network management database 30. The DAT receiver starts to seek the detected broadcasting frequency to receive the broadcast program having the same content.

[0016] Thus, even if degradation occurs in the receiving condition of a DAB program currently being received, the DAB receiver is capable of continuously receiving a broadcast program having the same content as that of the broadcast program currently being received by retrieving an SId code corresponding to the broadcast program having the same content as that currently being received using an LSN code and seeking the broadcasting frequency corresponding to the SId code.

[0017] In the conventional DAB receiver described above, the network management database 30 shown in Fig. 5 and the linkage management database 40 shown in Fig. 6 are produced in accordance with received three kinds of information, SId code, EId code, and LSN code, and a broadcast program having the same content as that of a broadcast program currently being received is sought in accordance with information stored in the databases 30 and 40. However, if some of three kinds of information is not obtained, a broadcast program having the same content is sought simply by scanning all broadcasting frequencies without using obtained information. This can cause a problem that no program is received for a long period of time until a broadcast program having the same content is captured.

[0018] In view of the above problem, it is an object of the present invention to provide a broadcast receiver capable of quickly seeking a broadcast program having the same content by using obtained information even if some of three kinds of information is not obtained.

SUMMARY OF THE INVENTION

[0019] According to an aspect of the present invention, in order to achieve the above object, there is provided a broadcast receiver having a capability of seeking and receiving a broadcast program having the same content as that of a broadcast program currently being received, the broadcast receiver comprising: information storage means for extracting first information, which associates a plurality of broadcasting frequencies with each other, from a received signal and storing the extracted first information; retrieval means for, if degradation occurs in a receiving condition of a broadcast program currently being received, retrieving another broadcasting frequency associated with a current broadcasting frequency in accordance with the first information; and seeking means for seeking the broadcasting frequency retrieved by the retrieval means so as to receive a broadcast program having the same content as that of the broadcast program currently being received.

[0020] Thus, in this broadcast receiver according to the present invention, if degradation in the receiving condition of a broadcast program currently being received occurs, another frequency associated with a current broadcasting frequency is retrieved on the basis of the first information which associates a plurality of broadcasting frequencies, and the retrieved broadcasting frequency is sought to receive a broadcast program having the same content as that of the broadcast program currently being received. Thus, in this broadcast receiver, when an LSN code or an SId code is not obtained, if first information (EId code) is obtained, it is possible to quickly seek a broadcast program having the same content by making full use of the obtained first and second information, without scanning all broadcasting frequencies.

[0021] According to another aspect of the present invention, there is provided a broadcast receiver having a capability of seeking and receiving a broadcast program having the same content as that of a broadcast program currently being received, the broadcast receiver comprising: information storage means for extracting, from a received signal, first information which associates a plurality of broadcasting frequencies with each other and second information identifying respective broadcast programs and storing the extracted first and second information; retrieval means for, if degradation occurs in a receiving condition of a broadcast program currently being received, retrieving another broadcasting frequency at which the same content as that of the broadcast program currently being received is broadcasted, in accordance with the first and second informa-

tion; and seeking means for seeking the broadcasting frequency retrieved by the retrieval means so as to receive a broadcast program having the same content as that of the broadcast program currently being received.

[0022] In this broadcast receiver according to the present invention, if degradation occurs in the receiving condition of a broadcasting program currently being received, another broadcasting frequency, at which a program having the same content as that currently being received is broadcasted, is retrieved in accordance with the first information which associates a plurality of broadcasting frequencies and the second information identifying the broadcast program, and the retrieved broadcasting frequency is sought to receive a broadcast program having the same content as that of the broadcast program currently being received. Thus, in this broadcast receiver, when an LSN code is not obtained, if first information (EId code) and second information (SId code) are obtained, it is possible to identify a broadcast program having the same content using obtained first information (ID code) and it is possible to more quickly seek a broadcast program having the same content by making full use of the obtained first and second information.

[0023] According to still another aspect of the present invention, there is provided a broadcast receiver having a capability of seeking and receiving a broadcast program having the same content as that of a broadcast program currently being received, the broadcast receiver comprising: information storage means for extracting, from a received signal, first information which associates a plurality of broadcasting frequencies with each other, second information identifying respective broadcast programs and third information which associates the second information with each other, and storing the extracted first, second and third information; first retrieval means for, if degradation occurs in a receiving condition of a broadcast program currently being received, retrieving another broadcasting frequency associated with a current broadcasting frequency in accordance with the first information; second retrieval means for, if degradation occurs in the receiving condition of the broadcast program currently being received, retrieving another broadcasting frequency which is associated with the current broadcasting frequency and at which the same content as that of the broadcast program currently being received is broadcasted, in accordance with the first and second information; third retrieval means for, if degradation occurs in the receiving condition of the broadcast program currently being received, retrieving another broadcasting frequency which is associated with the current broadcasting frequency and at which a broadcast program associated with the broadcast program currently being received is broadcasted, in accordance with the first, second and third information; selection means for selecting one of the first, second, and third retrieval means, in accordance with storage status of the first, second, and third information stored in the

information storage means; and seeking means for seeking the broadcasting frequency retrieved by retrieval means selected by the selection means so as to receive a broadcast program having the same content as that of the broadcast program currently being received.

[0024]   Thus, in this broadcast receiver according to the present invention, proper retrieval means is selected, depending upon the information storage status, from the first retrieval means for retrieving a broadcast frequency on the basis of the first information, the second retrieval means for retrieving a broadcast frequency on the basis of the first and second information, and the third retrieval means for retrieving a broadcast frequency on the basis of the first, second and third information. Thus, in this broadcast receiver, it is possible to quickly seek a broadcast program having the same content by making full use of the obtained information depending upon the status of obtained information, without scanning all broadcasting frequencies.

[0025]   In this broadcast receiver, when degradation occurs in a receiving condition of a broadcast program currently being received, if no information other than the second information is stored in the information storage means, seeking is performed by scanning all broadcasting frequencies in accordance with the second information.

[0026]   In this case, because seeking is performed by scanning all broadcasting frequencies in accordance with the second information when no information other than the second information is stored in the information storage means, it is possible to seek and receive a broadcast program having the same content even in the case where only the second information is stored in the information storage means.

BRIEF DESCRIPTION OF THE DRAWING

[0027]

Fig. 1 is a block diagram illustrating an internal structure of a DAB receiver according to an embodiment of the present invention;
Fig. 2 is a table showing a content of a network management database in the DAB receiver according to the embodiment of the present invention;
Fig. 3 is a table showing a content of a linkage management database in the DAB receiver according to the embodiment of the present invention;
Fig. 4 is a flow chart illustrating a process performed by the DAB receiver to seek and receive a broadcast program having the same content;
Fig. 5 is a table showing a content of a network management database in a conventional DAB receiver; and
Fig. 6 is a table showing a content of a linkage management database in a conventional receiver.

DESCRIPTION OF THE PREFERRED EMBODIMENTS

[0028]   The present invention is described in further detail below with reference to preferred embodiments in conjunction with the accompanying drawings. Fig. 1 is a block diagram illustrating an internal structure of a DAB receiver according to an embodiment of the present invention.

[0029]   As shown in Fig. 1, the DAB receiver 10 includes a receiving antenna 11 for receiving a DAB program; a DAB front end 12 for converting a receiving frequency of the DAB program into an intermediate frequency and amplifying it; a DAB decoder 13 for extracting DAB data from the output of the DAB front end 12, an audio decoder 14 for extracting an audio signal from the output of the DAB front end 12, a D/A converter 15 for converting the audio signal into analog form, an amplifier 16 for amplifying the audio signal converted into analog form, a speaker 17 for outputting a sound in accordance with the audio signal amplified by the amplifier 16, a BER detector 18 for detecting a BER in accordance with the output of the DAB front end 12, a display 19 for displaying various kinds of information, an operation control unit 20 for inputting various commands, and a controller 21 responsible for controlling the entire DAB receiver 10.

[0030]   As described earlier, when the DAB receiver 10 receives an ensemble, the DAB receiver 10 selects a desired broadcast program from a plurality of broadcast programs contained in the received ensemble.

[0031]   The controller 21 produces a network management database 30 such as that shown in Fig. 2 (Fig. 5) in accordance with an SId code and an EId code included in the DAB data extracted by the DAB decoder 13, and also produces a linkage management database 40 in accordance with an LSN code and an SId code included in the DAB data extracted by the DAB decoder 13. The controller 21 stores the resultant network management database 30 and the linkage management database 40.

[0032]   If the BER detector 18 detects a BER greater than a predetermined level for a broadcast program currently being received, the controller 21 determines that degradation occurs in the receiving condition of the broadcast program currently being received, and the controller 21 seeks a broadcast program having the same content as that of the broadcast program currently being received in accordance with information stored in the network management database 30 and the linkage management database 40.

[0033]   Examples of the network management database 30 and the linkage management database 40 produced by the controller 21 are described below.

[0034]   In the case where the DAB receiver 10 has successfully acquired an SId code, an EId code, and an LSN code, the network management database 30 and the linkage management database 40 can be stored as

shown in Figs. 5 and 6 as descried earlier with reference to the conventional technique.

[0035] However, in the case where an LSN code was not obtained although an SId code and an EId code were obtained, the controller 21 produces the network management database 30 such as that shown in Fig. 2 in accordance with the SId code and the EId code but the controller 21 does not produce the linkage management database 40 such as that shown in Fig. 6.

[0036] When only an EId code was obtained but neither an SId code nor an LSI code was obtained, the controller 21 produces a network management database 30A including no SId code data such as that shown in Fig. 3, and the controller 21 does not produce the linkage management database 40.

[0037] Note that the information storage means descried in the appended claims includes the DAB decoder 13 for extracting DAB data and the controller 21 for storing the network management database 30 and the linkage management database 40 produced in accordance with an SId code, an EId code, and an LSN code extracted by the DAB decoder 13. The retrieval means, the first retrieval means, the second retrieval means, the third retrieval means, and the selection means are realized by the controller 21. The seeking means is formed of the DAB front end 12 and the controller 21 which controls the front end 21.

[0038] The operation of the DAB receiver 10 having the above-described structure is described below. Fig. 4 is a flow chart illustrating an operation performed by the DAB receiver 10 to seek a broadcast program having the same content according to the present embodiment.

[0039] This operation is performed, when degradation in the receiving condition of a broadcast program currently being received is detected, to quickly seek and receive a broadcast program having the same content as that of the broadcast program currently being received.

[0040] In Fig. 4, if the controller 21 detects degradation in the receiving condition of a broadcast program currently being received (hereinafter, such a program will be referred to as a last SId) (step S11), the controller 21 searches the linkage management database 40 for an LSN code corresponding to the last SId in order to receive a broadcast program having the same content as that of the last SId (step S12). The controller 21 then determines whether an LSN code has been successfully retrieved from the linkage management database 40 (step S13).

[0041] If an LSN code has been successfully acquired from the linkage management database 40, the controller 21 searches the network management database 30 for an SId code of a broadcast program which has the same content as that of the last SId and which is contained in another ensemble included in the acquired LSN code (step S14), and the controller 21 determines (in step S15) whether an SId code having the same con-

tent and included in another ensemble has been successfully retrieved from the network management database 30.

[0042] In the case where an SId code in another ensemble has been successfully acquired from the network management database 30, the controller 21 retrieves a broadcasting frequency corresponding to the acquired SId code (step S16), and the controller 21 determines (in step S17) whether a broadcasting frequency has been successfully acquired from the network management database 30.

[0043] In the case where it is determined in step S17 that a broadcasting frequency has been successfully acquired, the DAB receiver 10 acquires DAB data including all of an EId code, an SId code and an LSN code, and the network management database 30 and the linkage management database 40 are produced, for example, as shown in Figs. 5 and 6, and thus the broadcasting frequency is acquired from the network management database 30 and the linkage management database 40.

[0044] In the case where it is determined in step S17 that a broadcasting frequency has been successfully acquired, the controller 21 seeks the acquired broadcasting frequency (step S18) and determines (in step S19) whether a broadcast program having the same content as that of the last SId has been captured as a result of the seeking process.

[0045] If a broadcast program having the same content has been captured, the controller 21 performs setting so as to receive the captured broadcast program (step S20), and thus the operation is completed.

[0046] In the case where it is determined in step S13 that an LSN code corresponding to the last SId code is not found in the linkage management database 40, an SId code associated with a broadcast program having the same content as that of the last SId but included in another ensemble other than the current ensemble is retrieved from the network management database 30 in accordance with the last SId (step S21), and it is determined (in step S22) whether an SId code in another ensemble has been successfully retrieved from the network management database 30 (step S22).

[0047] If an SId code in another ensemble has been retrieved, a broadcasting frequency corresponding to the obtained SId code is then retrieved (step S23), and it is determined (in step S24) whether a broadcasting frequency has been successfully retrieved from the network management database 30.

[0048] In the case where it is determined in step S24 that a broadcasting frequency has been successfully retrieved, the DAB receiver 10 acquires DAB data including only an EId code and an SId code. In this case, the linkage management database 40 is not produced, and only the network management database 30 is produced and stored, for example, such as shown in Fig. 2 (Fig. 5), and thus the broadcasting frequency is acquired from the network management database 30.

[0049] If it is determined in step S24 that a broadcast-

ing frequency has been successfully retrieved, the process goes to step S18 to seek the obtained broadcasting frequency.

[0050] In the case where it is determined in step S22 that an SId code in another ensemble is not found, another broadcasting frequency is retrieved from the network management database 30A in accordance with the last SId and the last EId (step S25).

[0051] In this case, the DAB receiver 10 obtains DAB data including only an EId code, and only the network management database 30A such as that shown in Fig. 3 is produced and stored without producing the linkage management database 40, and the broadcasting frequency is obtained only on the basis of the network management database 30A.

[0052] It is determined (in step S26) whether a broadcasting frequency has been successfully retrieved from the network management database 30A as a result of the retrieval process in step S25.

[0053] In the case where a broadcasting frequency has been successfully retrieved, the process goes to step S18 to seek the obtained broadcasting frequency.

[0054] In the case where it is determined that a broadcasting frequency is not found, seeking by means of scanning all broadcasting frequencies is started (step S27) and the process goes to step S19.

[0055] In the case where it is determined in step S15 that an SId code in another ensemble is not found in the network management database 30, or in the case where it is determined in step S17 that a broadcasting frequency corresponding to the SId code is not found in the network management database 30, the process goes to step S21 to search the network management database 30 in accordance with the last SId to retrieve an SId code included in another ensemble and having the same content as that of the last SId.

[0056] In the case where it is determined in step S24 that a broadcasting frequency corresponding to the SId code is not found in the network management database 30, the process goes to step S25 to search the network management database 30 in accordance with the last SId and the last EId to retrieve a broadcasting frequency in another ensemble.

[0057] In the case where it is determined in step S19 that a broadcast program having the same content as that of the last SId was not captured, the process returns to step S12.

[0058] According to the present embodiment, as described above, even when only an EId code is obtained and neither an LSN code nor an SId code is obtained, the obtained EId is fully used such that a plurality of broadcasting frequencies contained in an ensemble other than that containing a broadcast program which has encountered degradation in the receiving condition are retrieved and a broadcast program having the same content is quickly sought and received on the basis of the retrieved broadcast frequencies without scanning all broadcasting frequencies.

[0059] Furthermore, according to the present embodiment, even when an LSN code is not obtained, if an SId code and an EId code are obtained, the obtained EId code and the SId code are fully used such that a broadcasting frequency associated with a broadcast program having the same content of that of a current broadcast program which has encountered degradation in the receiving condition is retrieved from a plurality of broadcasting frequencies contained in an ensemble other than an ensemble containing the current broadcast program, and the broadcast program having the same content is quickly sought and received on the basis of the retrieved broadcast frequency without scanning all broadcasting frequencies.

[0060] Furthermore, according to the present embodiment, not only in the case where any of SId, EId, and LSN codes is not obtained, but also in the case where only an SId code and an EId are obtained and in the case where only an EId code are obtained, the obtained code(s) is/are fully used depending upon the obtained code(s) so as to quickly seek and receive a broadcast program having the same content without scanning all frequencies.

[0061] As can be understood from the above description, the present invention provides great advantages. That is, in the broadcast receiver according to the present invention, even when an LSN code and an SId code are not obtained, if first information (EId code) is obtained, the obtained first information is fully used such that a plurality of broadcasting frequencies contained in an ensemble other than that containing a broadcast program which has encountered degradation in the receiving condition are retrieved and a broadcast program having the same content is quickly sought and received on the basis of the retrieved broadcast frequencies without scanning all broadcasting frequencies.

[0062] Furthermore, in the broadcast receiver according to present invention, even when an LSN code is not obtained, if an EId code and an SId code are obtained, the obtained EId code and the SId code are fully used such that a broadcasting frequency associated with a broadcast program having the same content of that of a current broadcast program which has encountered degradation in the receiving condition is retrieved from a plurality of broadcasting frequencies contained in an ensemble other than an ensemble containing the current broadcast program, and the broadcast program having the same content is quickly sought and received on the basis of the retrieved broadcast frequency without scanning all broadcasting frequencies.

[0063] Furthermore, in the broadcast receiver according to the present invention, an obtained code(s) is/are fully used depending upon which code of EId, SId, and LSN codes is obtained, so as to quickly seek and receive a broadcast program having the same content without scanning all frequencies.

[0064] In the broadcast receiver according to the present invention, when any one of EId, SId, and LSN

codes is not obtained, seeking is performed by scanning all broadcasting frequencies so as to seek and receive a broadcast program having the same content.

Claims

1. A broadcast receiver (10) having a capability of seeking and receiving a broadcast program having the same content as that of a broadcast program currently being received, said broadcast receiver (10) comprising:

   information storage means (13, 21) for extracting first information, which associates a plurality of broadcasting frequencies with each other, from a received signal and storing said extracted first information;
   retrieval means (21) for, if degradation occurs in a receiving condition of a broadcast program currently being received, retrieving another broadcasting frequency associated with a current broadcasting frequency in accordance with said first information; and
   seeking means (12) for seeking the broadcasting frequency retrieved by said retrieval means (21) so as to receive a broadcast program having the same content as that of the broadcast program currently being received.

2. A broadcast receiver (10) having a capability of seeking and receiving a broadcast program having the same content as that of a broadcast program currently being received, said broadcast receiver (10) comprising:

   information storage means (13, 21) for extracting, from a received signal, first information which associates a plurality of broadcasting frequencies with each other and second information identifying respective broadcast programs and storing said extracted first and second information;
   retrieval means (21) for, if degradation occurs in a receiving condition of a broadcast program currently being received, retrieving another broadcasting frequency at which the same content as that of the broadcast program currently being received is broadcasted, in accordance with said first and second information; and
   seeking means (12) for seeking the broadcasting frequency retrieved by said retrieval means (21) so as to receive a broadcast program having the same content as that of the broadcast program currently being received.

3. A broadcast receiver (10) having a capability of seeking and receiving a broadcast program having

the same content as that of a broadcast program currently being received, said broadcast receiver (10) comprising:

   information storage means (13, 21) for extracting, from a received signal, first information which associates a plurality of broadcasting frequencies with each other, second information identifying respective broadcast programs and third information which associates said second information with each other, and storing said extracted first, second and third information;
   first retrieval means (21) for, if degradation occurs in a receiving condition of a broadcast program currently being received, retrieving another broadcasting frequency associated with a current broadcasting frequency in accordance with said first information;
   second retrieval means (21) for, if degradation occurs in the receiving condition of the broadcast program currently being received, retrieving another broadcasting frequency which is associated with the current broadcasting frequency and at which the same content as that of the broadcast program currently being received is broadcasted, in accordance with said first and second information;
   third retrieval means (21) for, if degradation occurs in the receiving condition of the broadcast program currently being received, retrieving another broadcasting frequency which is associated with the current broadcasting frequency and at which a broadcast program associated with the broadcast program currently being received is broadcasted, in accordance with said first, second and third information;
   selection means for selecting one of said first, second, and third retrieval means, in accordance with storage status of said first, second, and third information stored in said information storage means (13, 21); and
   seeking means (12) for seeking the broadcasting frequency retrieved by retrieval means (21) selected by said selection means so as to receive a broadcast program having the same content as that of the broadcast program currently being received.

4. A broadcasting receiver according to Claim 3, wherein when degradation occurs in a receiving condition of a broadcast program currently being received, if no information other than said second information is stored in said information storage means (13, 21), seeking is performed by scanning all broadcasting frequencies in accordance with said second information.
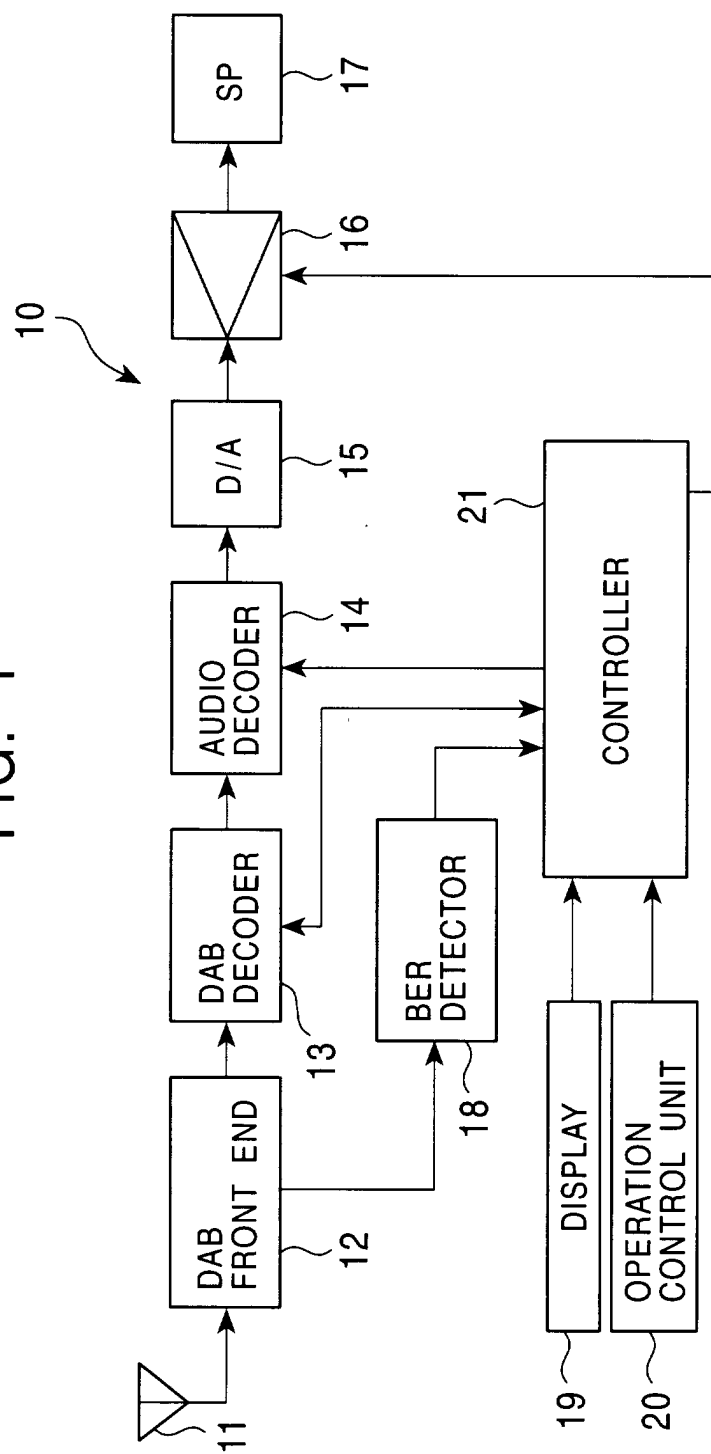
FIG. 1

FIG. 2

30

	Eid	Sid			BROADCASTING FREQUENCY			
		Sid.1	Sid.2	Sid.3	Freq.1	Freq.2	···	Freq.n
1	A001	C221	C225	C229	239.200	223.936		
2	A002	C222	C227		225.648	1466.656		
⋮								
63								

FIG. 3

30A

	Eid	Sid			BROADCASTING FREQUENCY			
		Sid.1	Sid.2	Sid.3	Freq.1	Freq.2	···	Freq.n
1	—	—	—	—	—	—		
2	A002	—	—	—	225.648	1466.656		
⋮								
63								

FIG. 4
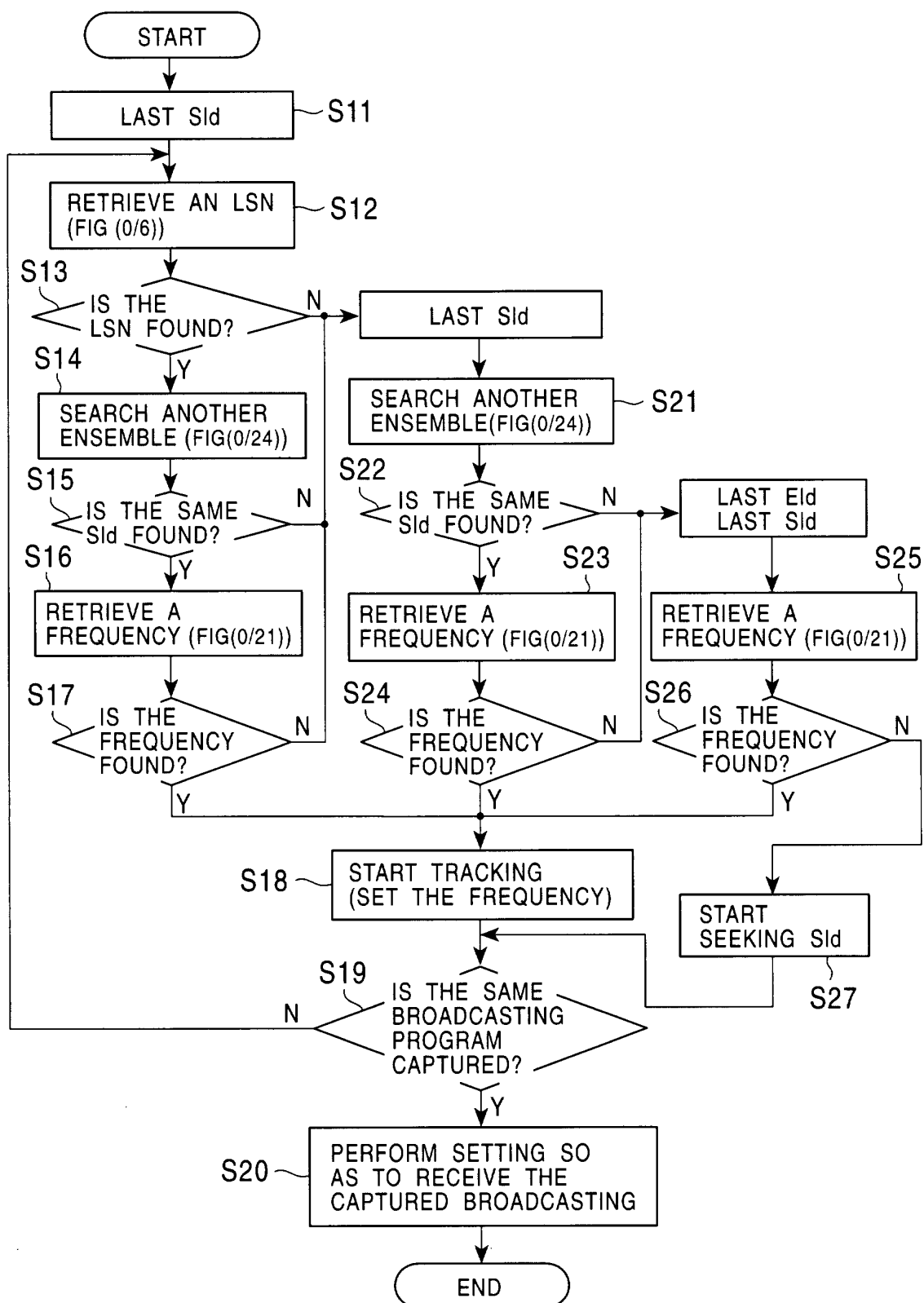
FIG. 5

30

	Eld	Sld			BROADCASTING FREQUENCY			
		Sld.1	Sld.2	Sld.3	Freq.1	Freq.2	···	Freq.n
1	A001	C221	C225	C229	239.200	223.936		
2	A002	C222	C227		225.648	1466.656		
⋮								
63								

FIG. 6

40

	LSN	Sld			
		Sld.1	Sld.2	······	Sld.15
1	1	C220			
2	2	C221	C222		
⋮					
63					