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(54) **Broadcast receiver**

Rundfunkempfänger

Récepteur de radiodiffusion

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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 and disclosed in JP-A-11 234227 (Alpine), 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] The above problem is solved by a method and receiver as set out in the claims.

BRIEF DESCRIPTION OF THE DRAWING

[0020]

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

[0021] 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.

[0022] 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.

[0023] 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.

[0024] 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.

[0025] 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.

[0026] Examples of the network management database 30 and the linkage management database 40 produced by the controller 21 are described below.

[0027] 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.

[0028] 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.

[0029] 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.

[0030] 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.

[0031] 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.

[0032] 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.

[0033] 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).

[0034] 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 content and included in another ensemble has been successfully retrieved from the network management database 30.

[0035] 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.

[0036] 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.

[0037] 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.

[0038] 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.

[0039] 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).

[0040] 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.

[0041] 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.

[0042] If it is determined in step S24 that a broadcasting frequency has been successfully retrieved, the process goes to step S18 to seek the obtained broadcasting frequency.

[0043] 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).

[0044] 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.

[0045] 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.

[0046] In the case where a broadcasting frequency has been successfully retrieved, the process goes to step S18 to seek the obtained broadcasting frequency.

[0047] 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.

[0048] 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.

[0049] 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.

[0050] 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.

[0051] 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.

[0052] 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.

[0053] 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.

[0054] 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.

[0055] 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.

[0056] 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.

[0057] 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 method for seeking and receiving a broadcast program having the same content as that of a broadcast program which is currently received by a digital audio broadcast (DAB) receiver (10), comprising the steps:

extracting step for extracting DAB data being ensemble identifier code (EId), service identifier code (SId) and linkage set number code (LSN) from a received DAB signal;

storing step for storing said extracted ensemble identifier codes (EId) and service identifier codes (SId) to a network management database (30; 30A), in which service identifier codes (SId) are associated to an ensemble identifier code (EId) identifying a ensemble in which said broadcasting programs identified by said service identifier codes (SId) are contained and are associated to broadcasting frequencies which are linked by said ensemble identifier code (EId), and said extracted service identifier codes (SId) and said linkage set number codes (LSN) to a linkage management database (40), in which service identifier codes (SId) identifying programs having an identical content are linked by said linkage set number code (LSN);

searching step for searching, in case of degradation in receiving condition of said broadcast program currently received and being identified by a last service identifier code (last SId), another ensemble other than said ensemble identified by said last ensemble identifier code (last EId) in said network management database (30) which includes a service identifier code (SId) taken from said linkage management database (40) and identifying a program having identical content to said program currently received and if such an ensemble is found, obtaining another broadcasting frequency from said frequencies linked by said another ensemble identifier code from said network management database (30); and

seeking and receiving step for, if another broadcasting frequency is obtained, seeking and receiving said obtained broadcasting frequency,

wherein in said searching step, in case that it is determined that a linkage set number code (LSN) corresponding to said last service identifier code (last SId) is not found or there is no linkage management database (40), another ensemble other than said ensemble identified by said last ensemble identifier code (last EId) is searched in said network management database (30) which includes said last service identifier code (last SId).

2. A method according to claim 1, wherein in said searching step, in case that it is further determined that another ensemble other than said ensemble identified by said last ensemble identifier code (last EId) is not found in said network management database (30) which includes said last service identifier code (last SId) or said network management data base (30A) only contains ensemble identifier codes (EId) linking broadcasting frequencies, another broadcasting frequency is obtained from said frequencies linked by said last ensemble identifier code (last EId) from said network management database (30A).

3. A method according to one of the claims 1 to 2, wherein if another broadcasting frequency is not found in said network management database (30, 30A), scanning all broadcasting frequencies to seek and receive a broadcast program having same content.

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

information storage means (13, 21) for extracting, from a received signal, information being ensemble identifier codes (EId) associating a plurality of broadcasting frequencies with each other, service identifier codes (SId) identifying respective broadcast programs and linkage set numbers (LSN) associating said service identifier codes (SId) with each other, and for storing said extracted ensemble identifier codes (EId), service identifier codes (SId) and broadcasting frequencies arranged as a network management database (30; 30A) and said extracted service identifier codes (SId) and linkage set numbers (LSN) arranged as a linkage management database (40);

first retrieval means (21) for, if degradation occurs in a receiving condition of a broadcast program currently being received in an ensemble identified by a last ensemble identifier code (last EId), retrieving from said information storage means another broadcasting frequency from said frequencies linked by said last ensemble identifier code (last EId) from said network management database (30A);

second retrieval means (21) for, if degradation occurs in receiving condition of said broadcast program currently being received in an ensemble identified by said last ensemble identifier code (last EId) and being identified by a last service identifier code (last SId), retrieving from said information storage means another broadcasting frequency from frequencies linked by another ensemble identifier code from said network management database by searching said another ensemble identifier code other than said last ensemble identifier code (last EId) in said network management database (30) which includes said last service identifier code (last SId);

third retrieval means (21) for, if degradation occurs in receiving condition of said broadcast program currently being received in an ensemble identified by said last ensemble identifier code (last EId) and being identified by said last service identifier code (last SId), retrieving from said information storage means another broadcasting frequency linked by another ensemble identifier code from said network management database by searching another ensemble other than said ensemble identified by said last ensemble identifier code (last EId) in said network management database (30) which includes a service identifier code (SId) taken from said linkage management database (40) and identifying a program having identical content to said program currently received;

selection means for selecting said first retrieval means (21) if only said ensemble identifiers (EId) are obtained and stored in said information storage means (13, 21), said second retrieval

means (21) if only said ensemble identifiers (EId) and service identifier codes (SId) are obtained and stored in said information storage means (13, 21), and said third retrieval means if any of said ensemble identifiers (EId), service identifiers (SId) and linkage set numbers (LSN) are obtained; and
seeking means (12) for seeking said broadcasting frequency retrieved by said respective retrieval means (21) selected by said selection means so as to receive a broadcast program having same content as that of said broadcast program currently being received.

5. A DAB broadcasting receiver according to claim 4, wherein when degradation occurs in a receiving condition of a broadcast program currently being received, if no information other than said service identifier codes (SId) are stored in said information storage means (13, 21), seeking is performed by scanning all broadcasting frequencies in accordance with said service identifier code (SId).

Patentansprüche

1. Verfahren zum Suchen und Empfangen eines Rundfunkprogramms mit dem gleichen Inhalt wie dem eines Rundfunkprogrammes, das im Moment durch einen digitalen Audio-Rundfunk (DAB)-Empfänger (10) empfangen wird, wobei es die Schritte umfasst:

Extraktionsschritt zum Extrahieren von DAB-Daten, die ein Ensemble-Kennungscode (EId), Dienst-Kennungscode (SId) und einen Verbundsatznummerncode (LSN) aus einem empfangenen DAB-Signal sind;
Speicherschritt zum Speichern der extrahierten Ensemble-Kennungscodes (EId) und Dienst-Kennungscodes (SId) in einer Netzwerkverwaltungsdatenbank (30; 30A), in der Dienst-Kennungscodes (SId) einem Ensemble-Kennungscode (EId) zugeordnet sind, der ein Ensemble kennzeichnet, in dem die Rundfunkprogramme, die durch die Dienst-Kennungscodes (SId) **gekennzeichnet** sind, enthalten sind, und Rundfunkfrequenzen zugeordnet sind, die durch den Ensemble-Kennungscode (EId) verbunden sind, und der extrahierten Dienst-Kennungscodes (SId) und der Verbundsatznummerncodes (LSN) in einer Verbundverwaltungsdatenbank (40), in der Dienst-Kennungscodes (SId), die Programme mit einem identischen Inhalt identifizieren, durch den Verbundsatznummerncode (LSN) verbunden sind;
Suchschritt zum Suchen, im Fall einer Verschlechterung der Empfangsbedingung des Rundfunkprogramms, das im Moment empfangen wird und durch einen letzten Dienst-Kennungscode (letzter SId) **gekennzeichnet** ist, eines anderen Ensembles als dem Ensemble, das durch den letzten Ensemble-Kennungscode (letzter EId) in der Netzwerkverwaltungsdatenbank (30), das einen Dienst-Kennungscode (SId) enthält, der aus der Verbundverwaltungsdatenbank (40) genommen wurde, und ein Programm mit identischem Inhalt zu dem Programm, das im Moment empfangen wird, kennzeichnet und, wenn ein derartiges Ensemble gefunden wird, Erhalten einer anderen Rundfunkfrequenz von den Frequenzen, die durch den anderen Ensemble-Kennungscode verbunden sind, aus der Netzwerkverwaltungsdatenbank (30); und
Such- und Empfangsschritt zum, wenn eine andere Rundfunkfrequenz erhalten wird, Suchen und Empfangen der erhaltenen Rundfunkfrequenz,

wobei in dem Suchschritt, in dem Fall, dass festgestellt wird, dass ein Verbundsatznummerncode (LSN), der dem letzten Service-Kennungscode (letzter SId) entspricht, nicht gefunden wurde oder es keine Verbundverwaltungsdatenbank (40) gibt, ein anderes Ensemble als das Ensemble, das durch den letzten Ensemble-Kennungscode (letzter EId) **gekennzeichnet** wird, in der Netzwerkverwaltungsdatenbank (30) gesucht wird, welches den letzten Dienst-Kennungscode (letzter SId) enthält.

2. Verfahren nach Anspruch 1, wobei in dem Suchschritt, im Fall, dass weiter festgestellt wird, dass ein anderes Ensemble als das Ensemble, das durch den letzten Ensemble-Kennungscode (letzter EId) **gekennzeichnet** wird, in der Netzwerkverwaltungsdatenbank (30), die den letzten Dienst-Kennungscode (letzter SId) enthält, nicht gefunden wurde oder die Netzwerkverwaltungsdatenbank (30A) nur Ensemble-Kennungscodes (EId) enthält, die Rundfunkfrequenzen verbinden, aus der Netzwerkverwaltungsdatenbank (30A) eine andere Rundfunkfrequenz von den Frequenzen erhalten wird, die durch den letzten Ensemble-Kennungscode (letzter EId) verbunden sind.

3. Verfahren nach einem der Ansprüche 1 bis 2, wobei, wenn eine anderen Rundfunkfrequenz in der Netzwerkverwaltungsdatenbank (30, 30A) nicht gefunden wird, alle Rundfunkfrequenzen gescannt werden, um ein Rundfunkprogramm zu suchen und zu empfangen, das den gleichen Inhalt hat.

4. Digitaler Audio-Rundfunk (DAB)-Empfänger (10), der in der Lage ist, ein Rundfunkprogramm mit dem gleichen Inhalt wie dem eines Rundfunkprogramms, das im Moment empfangen wird, zu suchen und zu

empfangen, wobei der DAB-Empfänger (10) umfasst:

Informationsspeichermittel (13, 21) zum Extrahieren von Informationen aus einem empfangenen Signal, die sind Ensemble-Kennungscodes (EId), die eine Vielzahl von Rundfunkfrequenzen einander zuordnen, Dienst-Kennungscodes (SId), die jeweilige Rundfunkprogramme kennzeichnen, und Verbundsatznummern (LSN), die die Dienst-Kennungscodes (SId) einander zuordnen und zum Speichern der extrahierten Ensemble-Kennungscodes (EId), Dienst-Kennungscodes (SId) und Rundfunkfrequenzen, angeordnet als eine Netzwerkverwaltungsdatenbank (30; 30A) und der extrahierten Dienst-Kennungscodes (SId) und Verbundsatznummern (LSN), angeordnet als eine Verbundverwaltungsdatenbank (40);
erste Abfragemittel (21) zum, wenn eine Verschlechterung in einer Empfangsbedingung eines Rundfunkprogramms, das im Moment in einem Ensemble empfangen wird, das durch einen letzten Ensemble-Kennungscode (letzter EId) **gekennzeichnet** wird, auftritt, Abfragen aus den Informationsspeichermitteln einer anderen Rundfunkfrequenz von den Frequenzen, die durch den letzten Ensemble-Kennungscode (letzter EId) verbunden sind, aus der Netzwerkverwaltungsdatenbank (30A);
zweite Abfragemittel (21) zum, wenn eine Verschlechterung in einer Empfangsbedingung des Rundfunkprogramms, das im Moment in einem Ensemble empfangen wird, das durch den letzten Ensemble-Kennungscodes (letzter EId) **gekennzeichnet** wird, und durch einen letzten Dienst-Kennungscode (letzter SId) **gekennzeichnet** wird, auftritt, Abfragen aus den Informationsspeichermitteln einer anderen Rundfunkfrequenz von Frequenzen, die durch einen anderen Ensemble-Kennungscode verbunden sind, aus der Netzwerkverwaltungsdatenbank durch Suchen des anderen Ensemble-Kennungscodes, der ein anderer der letzte Ensemble-Kennungscode (letzter EId) ist, in der Netzwerkverwaltungsdatenbank (30), die den letzten Dienst-Kennungscode (letzter SId) enthält;
dritte Abfragemittel (21) zum, wenn eine Verschlechterung in einer Empfangsbedingung des Rundfunkprogramms, das im Moment in einem Ensemble empfangen wird, das durch den letzten Ensemble-Kennungscode (letzter EId) **gekennzeichnet** ist, und durch den letzten Dienst-Kennungscode (letzter SId) **gekennzeichnet** ist, Abfragen aus den Informationsspeichermitteln einer anderen Rundfunkfrequenz, die durch einen anderen Ensemble-Kennungscode verbunden ist, aus der Netzwerkverwaltungsdatenbank durch Suchen eines anderen Ensemble, das ein anderes ist als das Ensemble, das durch den letzten Ensemble-Kennungscode (letzter EId) **gekennzeichnet** ist, in der Netzwerkverwaltungsdatenbank (30), das einen Dienst-Kennungscode (SId) enthält, der von der Verbundverwaltungsdatenbank (40) entnommen ist und ein Programm identifiziert, das einen identischen Inhalt zu dem Programm, das im Moment empfangen wird, aufweist;
Auswahlmittel zum Auswählen des ersten Abfragemittels (21), wenn nur die Ensemble-Kennungen (EId) erhalten und in den Informationsspeichermitteln (13, 21) gespeichert wurden, der zweiten Abfrage-mittel (21), wenn nur die Ensemble-Kennungen (EId) und Dienst-Kennungscodes (SId) erhalten wurden und in den Informationsspeichermitteln (13, 21) gespeichert wurden, und der dritten Abfragemittel, wenn jede der Ensemble-Kennungen (EId), Dienst-Kennungen (SId) und Verbundsatznummern (LSN) erhalten wurden; und
Suchmittel (12) zum Suchen der Rundfunkfrequenz, die von dem jeweiligen Abfragemittel (21), die durch die Auswahlmittel ausgewählt wurden, abgefragt wurde, um so ein Rundfunkprogramm zu empfangen, das den gleichen Inhalt hat wie der des Rundfunkprogramms, das im Moment empfangen wird.

5. DAB-Rundfunkempfänger nach Anspruch 4, wobei, wenn eine Verschlechterung in einer Empfangsbedingung eines Rundfunkprogramms, das im Moment empfangen wird, auftritt, wenn keine anderen Informationen als die Dienst-Kennungscodes (SId) in den Informationsspeichermitteln (13, 21) gespeichert sind, Suchen durch Scannen aller Rundfunkfrequenzen in Übereinstimmung mit dem Dienst-Kennungscode (SId) durchgeführt wird.

Revendications

1. Un procédé pour rechercher et recevoir un programme radiodiffusé possédant le même sujet ou contenu que celui d'un programme radiodiffusé qui est couramment reçu par un récepteur (10) de radiodiffusion numérique (DAB), comprenant les étapes suivantes :

étape d'extraction consistant à extraire des données de radiodiffusion numérique, qui comprennent un code d'identification d'ensemble (EId), un code d'identification de service (SId) et un code numéraire d'ensemble de liaison (LSN), à partir d'un signal de radiodiffusion numérique reçu ;
étape d'enregistrement consistant à enregistrer

lesdits codes d'identification d'ensemble (EId) et codes d'identification de service (SId) extraits dans une base de données pour administration de réseau (30 ; 30A), dans laquelle les codes d'identification de service (SId) sont associés avec un code d'identification d'ensemble (EId) identifiant un ensemble dans lequel lesdits programmes radiodiffusés identifiés par lesdits codes d'identification de service (SId) sont contenus et associés avec des fréquences de radiodiffusion, qui sont liées par ledit codes d'identification d'ensemble (EId), et lesdits codes d'identification de service (SId) et lesdits codes numéraires d'ensemble de liaison (LSN) dans une base de données pour administration de liens (40), dans laquelle les codes d'identification de service (SId) identifiant des programmes possédant un sujet identique sont liés par ledit code numéraire d'ensemble de liaison (LSN) ;
étape de recherche consistant à rechercher, en cas de dégradation des conditions de réception dudit programme radiodiffusé couramment reçu et étant identifié par un dernier code d'identification de service (dernier SId), un autre ensemble qui diffère dudit ensemble identifié par ledit dernier code d'identification d'ensemble (dernier EId) dans ladite base de données pour administration de réseau (30), qui comprend un code d'identification de service (SId) extrait de ladite base de données pour administration de liens (40) et identifiant un programme possédant un sujet identique audit programme couramment reçu et, en cas de découverte d'un tel ensemble, obtenir une autre fréquence de radiodiffusion parmi lesdites fréquences liées par ledit autre code d'identification d'ensemble (EId) de ladite base de données pour administration de réseau (30) ; et
étape de recherche et de syntonisation ou de réception pour, si une autre fréquence de radiodiffusion est obtenue, rechercher et syntoniser ou recevoir ladite fréquence de radiodiffusion obtenue,
dans lequel, au cours de ladite étape de recherche et dans le cas où il est déterminé qu'un code numéraire d'ensemble de liaison (LSN) correspondant audit dernier code d'identification de service (dernier SId) n'est pas trouvé ou qu'il n'y a pas de base de données pour administration de liens (40), un autre ensemble qui diffère dudit ensemble identifié par ledit dernier code d'identification d'ensemble (dernier EId) est recherché dans ladite base de données pour administration de réseau (30), qui inclut ledit dernier code d'identification de service (dernier SId).

2. Un procédé selon la revendication 1 dans lequel, au cours de ladite étape de recherche et dans le cas où il est en outre déterminé qu'un autre ensemble qui diffère dudit ensemble identifié par ledit dernier code d'identification d'ensemble (dernier EId) n'est pas trouvé dans ladite base de données pour administration de réseau (30), qui inclut ledit dernier code d'identification de service (dernier SId), ou que ladite base de données pour administration de réseau (30A) ne contient que des codes d'identification d'ensemble (EId) liant des fréquences de radiodiffusion, une autre fréquence de radiodiffusion est obtenue parmi lesdites fréquences liées par ledit dernier code d'identification d'ensemble (dernier EId) de ladite base de données pour administration de réseau (30A).

3. Un procédé selon l'une des revendications 1 à 2, comprenant l'étape de balayer toutes les fréquences de radiodiffusion pour rechercher et syntoniser ou recevoir un programme radiodiffusé possédant le même sujet, si une autre fréquence de radiodiffusion n'est pas trouvée dans ladite base de données pour administration de réseau (30, 30A).

4. Un récepteur (10) de radiodiffusion numérique (DAB) possédant la capacité de rechercher et syntoniser ou recevoir un programme radiodiffusé possédant le même sujet ou contenu que celui d'un programme radiodiffusé étant couramment reçu, ledit récepteur (10) comprenant :

des moyens d'enregistrement de données (13, 21) pour extraire, à partir d'un signal reçu, des données comprenant des codes d'identification d'ensemble (EId) qui associent une pluralité de fréquences de radiodiffusion les unes avec les autres, des codes d'identification de service (SId) qui identifient des programmes radiodiffusés respectifs et des nombres d'ensemble de liaison (LSN) qui associent lesdits codes d'identification de service (SId) les uns avec les autres, et pour enregistrer lesdits codes d'identification d'ensemble (EId), codes d'identification de service (SId) et fréquences de radiodiffusion extraits, configurés comme une base de base de données pour administration de réseau (30 ; 30A), et lesdits codes d'identification de service (SId) et nombres d'ensemble de liaison (LSN) configurés comme une base de données pour administration de liens (40) ;
des premiers moyens d'extraction (21) pour extraire, à partir desdits moyens d'enregistrement de données, en cas de dégradation d'une condition de réception d'un programme radiodiffusé étant couramment reçu dans un ensemble identifié par un dernier code d'identification d'ensemble (dernier EId), une autre fréquence de radiodiffusion parmi lesdites fréquences liées par ledit dernier code d'identification d'ensemble (dernier EId) de ladite base de données pour

administration de réseau (30A),
des deuxièmes moyens d'extraction (21) pour extraire, à partir desdits moyens d'enregistrement de données, en cas de dégradation d'une condition de réception dudit programme radiodiffusé qui est couramment reçu dans un ensemble identifié par ledit dernier code d'identification d'ensemble (dernier EId) et identifié par un dernier code d'identification de service (dernier SId), une autre fréquence de radiodiffusion parmi des fréquences liées par un autre code d'identification d'ensemble de ladite base de données pour administration de réseau, en recherchant ledit autre code d'identification d'ensemble autre que ledit dernier code d'identification d'ensemble (dernier EId) dans ladite base de données pour administration de réseau (30), qui contient ledit dernier code d'identification de service (dernier SId) ;
des troisièmes moyens d'extraction (21) pour extraire, à partir desdits moyens d'enregistrement de données, en cas de dégradation d'une condition de réception dudit programme radiodiffusé qui est couramment reçu dans un ensemble identifié par un dernier code d'identification d'ensemble (dernier EId) et identifié par ledit dernier code d'identification de service (dernier SId), une autre fréquence de radiodiffusion liée par un autre code d'identification d'ensemble de ladite base de données pour administration de réseau, en recherchant un autre ensemble différent dudit ensemble identifié par ledit dernier code d'identification d'ensemble (dernier EId) dans ladite base de données pour administration de réseau (30), qui contient un code d'identification de service (SId) extrait de la base de données pour administration de liens (40), et identifier un programme possédant un sujet identique à celui du programme couramment reçu ou réceptionné ;
des moyens de sélection pour sélectionner lesdits premiers moyens d'extraction (21) si uniquement lesdits codes d'identification d'ensemble (EId) sont obtenus et enregistrés dans lesdits moyens d'enregistrement de données (13, 21), lesdits deuxièmes moyens d'extraction (21) si uniquement lesdits codes d'identification d'ensemble (EId) et lesdits codes d'identification de service (SId) sont obtenus et enregistrés dans lesdits moyens d'enregistrement de données (13, 21), et lesdits troisièmes moyens d'extraction (21) si les uns quelconques parmi lesdits codes d'identification d'ensemble (EId), codes d'identification de service (SId) et nombres d'ensemble de liaison (LSN) sont obtenus ; et
des moyens de recherche (12) pour rechercher ladite fréquence de radiodiffusion extraite avec lesdits moyens d'extraction respectifs (21) sélectionnés par lesdits moyens de sélection, de manière à recevoir un programme radiodiffusé possédant le même sujet ou contenu que celui du programme radiodiffusé qui est couramment reçu.

5. Un récepteur de radiodiffusion numérique selon la revendication 4 dans lequel, lorsque la dégradation d'une condition de réception d'un programme radiodiffusé couramment reçu survient et si aucune autre information que lesdits codes d'identification de service (SId) n'est enregistrée dans lesdits moyens d'enregistrement de données (13, 21), la recherche est accomplie par le balayage de toutes les fréquences de radiodiffusion selon ledit code d'identification de service (SId).

FIG. 1

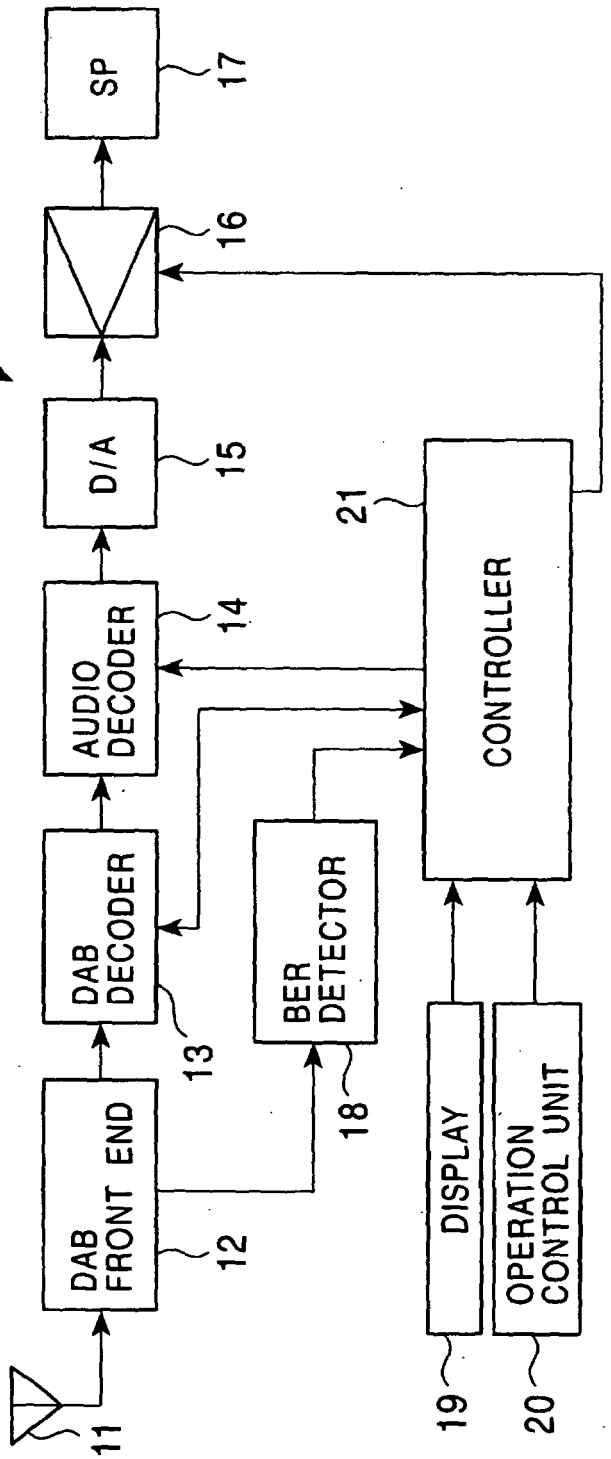
10
11
DAB FRONT END
12
DAB DECODER
13
AUDIO DECODER
14
D/A
15
16
SP
17
BER DETECTOR
18
DISPLAY
19
OPERATION CONTROL UNIT
20
CONTROLLER
21

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

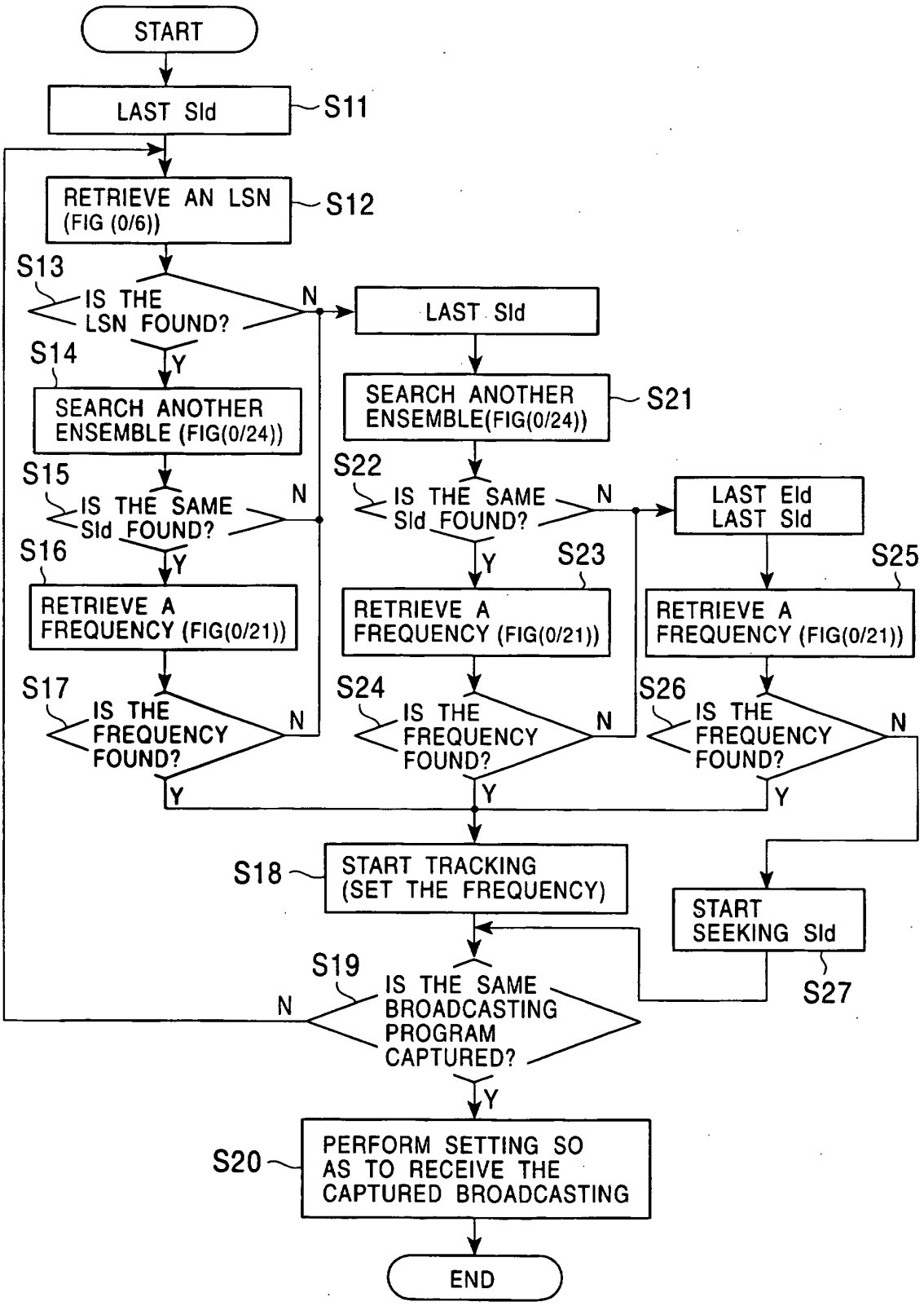
START
LAST SId
S11
RETRIEVE AN LSN (FIG (0/6))
S12
S13
IS THE LSN FOUND?
N
Y
S14
SEARCH ANOTHER ENSEMBLE (FIG(0/24))
S15
IS THE SAME SId FOUND?
N
Y
S16
RETRIEVE A FREQUENCY (FIG(0/21))
S17
IS THE FREQUENCY FOUND?
N
Y
LAST SId
SEARCH ANOTHER ENSEMBLE(FIG(0/24))
S21
S22
IS THE SAME SId FOUND?
N
Y
S23
RETRIEVE A FREQUENCY (FIG(0/21))
S24
IS THE FREQUENCY FOUND?
N
Y
LAST EId LAST SId
S25
RETRIEVE A FREQUENCY (FIG(0/21))
S26
IS THE FREQUENCY FOUND?
N
Y
S18
START TRACKING (SET THE FREQUENCY)
START SEEKING SId
S27
S19
IS THE SAME BROADCASTING PROGRAM CAPTURED?
N
Y
S20
PERFORM SETTING SO AS TO RECEIVE THE CAPTURED BROADCASTING
END

FIG. 5

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. 6

40

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