

gap d from Rhine of a car correctly.

[Translation done.]

TECHNICAL FIELD

[Field of the invention] This invention lays a road marker on a road, and relates to the lane deviation warning device which detects the gap from the road marker of a car and warns of deviation from a lane by detecting this road marker.

[Translation done.]

PRIOR ART

[Description of the Prior Art] The unattended operation system which adopts the distance between two cars with the lane location of a car, mileage, a rate, acceleration, and the other car etc. as information, it warns a driver, or generates the command of the brakes operation of a car, accelerator actuation, steering actuation, etc., and tells a driving device based on this information by the communication link with a road and a car or the communication link with a car and a car is known.

[0003] In such an unattended operation system, it is important to recognize correctly which part (the center, the left, or rightist inclinations of a lane) of a lane the mileage (relative mileage from a predetermined reference point) of a car and a car are running which lane of a road, or it has not separated from the lane or is running, whether it is running straightly along the lane, or it is crossing aslant.

[0004] Although the technique of judging a transit location by photoing and carrying out the image recognition of the condition of a road through a mounted camera was proposed in the former (for example, refer to JP,7-77431,A), since a camera and an image processing system were needed and a judgment algorithm became complicated, equipment which can recognize a transit location more simply was desired. Then, the system which detects the mileage of a car and the variation rate of the longitudinal direction of a car body is proposed by embedding a magnetic nail along the direction of

a road on a path road surface, and detecting this magnetic nail with the magnetometric sensor formed in the car body (September 13, 1994 U.S. Pat. No. 5,347,456 and May 14, 1992 PCT international public presentation WO 92/08176 refer to number).

[0005] Furthermore, a magnetic tape is stuck on a road and the system which detects the location of a car using the field produced from a magnetic tape is also proposed. These magnetic nails, a magnetic tape, etc. presuppose that the facility formed in the road is named a "road marker" generically, in order to detect the transit location of a car. The car carrying an unattended operation system can know the transit location of a car by detecting a road marker as mentioned above.

[Translation done.]

EFFECT OF THE INVENTION

[Effect of the invention] According to the lane deviation warning device of this invention, it can ask for the gap d from Rhine of a car as mentioned above by projecting the location of the car called for by autonomous navigation on Rhine where a road marker stands in a line. Based on this gap d , deviation of a lane can be judged exactly and it can warn of it.

[0041] Especially, if it is invention according to claim 2, the location of the car called for by autonomous navigation can be correctly amended based on a road marker's coordinate data train memorized by road marker map memory, and it can ask for the gap d from Rhine of a car correctly.

[Translation done.]

TECHNICAL PROBLEM

[Problem(s) to be Solved by the invention] By the way, in order to recognize correctly which part of a lane it has not separated from the lane or is running, whether it is running straightly along the lane, or it is crossing aslant, it is necessary to recognize

the gap from the road marker of a car. The approach considered most ordinarily is the approach of computing the gap from a road marker by whether which sensing element has detected the road marker by arranging in the pars basilaris ossis occipitalis of the bumper of a car etc. two or more sensing elements which detect a road marker.

[0007] For example, a sensing element is attached in right and left and the middle of the pars basilaris ossis occipitalis of a bumper, when the sensing element has detected the road marker right in the middle, it supposes that it is running the center of a lane, when the left sensing element has detected the road marker, it supposes that it is running the rightist inclinations of a lane, and when the right sensing element has detected the road marker, suppose that it is running the left of a lane. However, by the aforementioned detection approach, when it deviates from a lane exceeding the anchoring die length of a sensing element, the gap from a road marker is not clear anymore. And the anchoring die length of a sensing element is limited to the width of face of a car body.

[0008] On the other hand, the autonomous navigation which computes the estimated position of a car based on the mileage detecting signal of a car and the transit direction detecting signal is known. Then, this invention aims at realizing the lane deviation warning device which can judge deviation of a lane exactly and can warn of it by using autonomous navigation together while it memorizes a road marker's coordinate data train.

[Translation done.]

MEANS

[Means for Solving the Problem] The lane deviation warning device of this invention by projecting a car location presumption means to presume the location of a car with autonomous navigation, the road marker map memory which memorized a road marker's coordinate data train, and the location of a car on Rhine where a road marker stands in a line It asks for the gap d from Rhine of a car, and is a threshold d_0 about this gap d . By comparing, it has a deviation detection means to detect lane deviation, and a deviation warning means (claim 1).

[0010] According to this configuration, it can ask for the gap d from Rhine of a car by projecting the location of the car called for by autonomous navigation on Rhine where

a road marker stands in a line. This gap is a threshold d_0 . If it is above, it can detect and warn of lane deviation. The lane deviation warning device of this invention to said element according to claim 1 In addition, a marker appearance means to detect a road marker, Matching with the road marker detected by the marker appearance means and the road marker memorized by coordinate data memory is carried out. Based on the location of the car presumed by the car location presumption means, a road marker's estimated position detected by said marker appearance means is computed. This road marker's estimated position, By comparing a road marker's coordinate data memorized by coordinate data memory, it has further a location amendment means to amend the location of the car presumed by autonomous navigation (claim 2).

[0011] According to this configuration, the location of the car called for by autonomous navigation can be correctly amended based on a road marker's coordinate data train memorized by road marker map memory. Therefore, it can ask for the gap d from Rhine of a car correctly. Said threshold d_0 (a) according to claim 3 -- (d) It can set up based on the criteria of either or these combination (claim 3).

[0012] (a) -- (d) The reason for adopting criteria is as follows.

(a) : since it will be easy to deviate from a lane if the width of face of a car is wide, it is a threshold d_0 . It is made small.

(b) : since it will be easy to deviate from a lane if lane width is narrow, it is a threshold d_0 . It is made small.

(c) : since it means that the speed from which the yaw angle ϕ separates from Rhine when large is quick and is transit top risk if warning is not taken out a little early, set up a threshold small. When small, since the cut of a handle is also easy, the yaw angle ϕ thinks that warning may become slow, and sets up a threshold more greatly.

(d) : since there is danger of a collision if warning is not taken out a little early when the distance from the white line which specifies a lane to a guard rail or a side attachment wall is short, it is a threshold d_0 . It is made more smallish. When this distance is comparatively long, it is a threshold d_0 . It enlarges slightly.

[0013]

[Embodiment of the Invention] Hereafter, the gestalt of operation of this invention is explained to a detail, referring to an accompanying drawing. Drawing 1 is drawing which looked at the road which embedded the magnetic nail in the middle of a lane as a road marker from the low altitude. A magnetic nail consists of a nail of the diameter of 3cm, and an about [die-length 10cm] ferromagnetic.

[0014] N pole and the south pole make a period the predetermined pitch L (for example, 1-2m), and a magnetic nail is arranged according to a predetermined code

(for example, 1 N pole and -1 the south pole then -1, 1, -1, 1, ...). In addition, a polarity means the polarity of the field suitable for earth surface. Drawing 2 is the block diagram showing the mounted equipment containing a lane deviation warning device. The location presumption section 14 in which mounted equipment computes an estimated position with autonomous navigation based on the mileage detecting signal and the transit direction detecting signal to which it is outputted from the mileage detecting element 11, the transit direction detecting element 12, and both the detecting elements 11 and 12, The field detecting element 13 and waveform-shaping section 13a for detecting the field of the magnetic nail embedded by the road, The road marker map memory 15 which stored the code Sagitta label data stream constituted by the magnetic nail, The code of a magnetic nail is detected, the coordinate data memorized by this and the road marker map memory 15 is compared, and it has the location amendment section 16 which amends the estimated position detected in the location presumption section 14, the deviation detecting element 19, and the deviation warning section 20.

[0015] These locations presumption section 14, the road marker map memory 15, and the location amendment section 16 constitute the location detecting element 18. If it furthermore explains to a detail, for example, a wheel speed sensor is usable as said mileage detecting element 11. This wheel speed sensor has the magnetometric sensor which detects rotation of a wheel, obtains the number of rotations of a wheel by counting the wave number of the output sine wave signal from a magnetometric sensor with a counter, and detects the mileage of per detection period Δt (a periodic number is expressed with n .) by carrying out the multiplication of the predetermined constant which shows the periphery of a wheel with a multiplier to the count data outputted from a counter. In addition, the thing of conventionally well-known configurations, such as a speed sensor of a configuration of detecting mileage, is also usable by detecting and integrating with the travel speed of a car based on a doppler shift etc. in addition to it.

[0016] The gyroscope which outputs the angle-of-rotation data per unit time amount to said transit direction detecting element 12 is usable. As an example of this gyroscope, an oscillating gyroscope, an optical fiber gyroscope, and a differential mold wheel speed sensor are raised. Moreover, the earth magnetism sensor which detects the horizontal component of earth magnetism can also be used, and it is also possible to adopt the combination of an earth magnetism sensor and said gyroscope.

[0017] As it is prepared in the pars basilaris ossis occipitalis of a bumper and shown in drawing 3, said field detecting element 13 arranges two or more magnetic resistance

elements 1 in on the permanent magnet 3 of the shape of long and slender rubber, and makes them the circuitry which takes out output voltage from each. A magnetic resistance element 1 is a component from which electric resistance changes by adding a field, and semiconductor materials, such as InSb, GaAs, and InAs, are used well. Although the component which formed the InSb thin film with the vacuum deposition method on the substrate is used with the gestalt of this operation (for example, the "magnetic-resistance-element TMS-D series" by TOYOKOMU Toyo Communication Equipment Co., Ltd. is usable), the magnetic resistance element of a bulk (single crystal) mold may be used in addition to this.

[0018] If one magnetic resistance element of the field detecting elements 13 detects the field of the magnetic nail embedded along the road, the code of a magnetic nail can be read by the change. Moreover, the relative distance (it is written as "Lm" below) of the longitudinal direction of the center line of a car and a magnetic tape is also detectable by getting to know whether which magnetic resistance element of the field detecting element 13 has detected.

[0019] The code and positional information from which the road marker map memory 15 is constituted by the magnetic nail are stored. Here, the storage structure of said road marker map memory 15 becomes as it is shown in Table 1.

[0020]

[Table 1]

路線名、区間名

地点番号	磁気 ネイル符号	相 对 座 標
0	S	(0, 0)
1	N	(x_1 , y_1)
2	S	(x_2 , y_2)
3	N	(x_3 , y_3)
⋮	⋮	⋮
⋮	⋮	⋮

[0021] The road marker map memory 15 corresponded for every route of a highway, and section, and the relative coordinate which made x directions distinction (it is called "the sign of a magnetic nail") of the pole of the number of a point and its point of the embedded magnetic nail and the east sense, and made the north sense the direction of y is memorized. For example, in the sign of the magnetic nail by which the

number of the point used as a starting point was embedded at 0 and its point, the relative coordinate of S and a point is (0, 0).

[0022] The location presumption section 14 is distance data ΔD_n outputted from the mileage detecting element 11. While incorporating Angular-velocity data ω_n outputted from the transit direction detecting element 12 It incorporates.

Angular-velocity ω_{n-1} [last] This angular-velocity ω_n Average $\omega_n \omega_{n-1} = (\omega_{n-1} + \omega_n) / 2$ are calculated, periodic Δt is applied to this, and it is bearing θ_{n-1} [last]. It is this bearing θ_n by adding. It asks.

[0023] $\theta_n = \omega_n \Delta t + \theta_{n-1}$ — bearing θ_{n-1} [further last] This bearing θ_n Average bearing θ_n It asks. $\theta_n = (\theta_n + \theta_{n-1}) / 2$ and this average bearing θ_n It is based. Said distance ΔD_n Direction component of east and west $\Delta x_n (= \Delta D_n \times \cos \theta_n)$, And direction component of north and south $\Delta y_n (= \Delta D_n \times \sin \theta_n)$ is detected, and they are said each component Δx_n and Δy_n to the last estimated position data (x_{n-1} and y_{n-1}). A current estimated position (x_n and y_n) is detected by adding.

[0024] $x_n = x_{n-1} + \Delta x_n$ $y_n = y_{n-1} + \Delta y_n$ — the car location at the time of in addition, this initial valve position (x_0 and y_0) detecting the magnetic nail used as a starting point, although the initial valve position (x_0 and y_0) of an estimated position needed to be decided — for example, (0 0), what is necessary is to set up and just to adopt it

[0025] The location amendment section 16 amends this estimated position (x_n and y_n) based on the relative coordinate in which it was stored by the road marker map memory 15 on the assumption that it has not deviated from the lane more than the anchoring die length of a magnetic resistance element. Explanation of this amendment approach pinpoints a course starting point first. Here, pinpointing of a course starting point is performed as follows. A car receives the information on the route name of the highway concerned, and a section name from means of communications, for example, a beacon, before going into a highway. As long as it carries navigation equipment, the information on a route name and a section name may be received from navigation equipment. Using this information, the memory location of the data constellation memorized by the road marker map memory 15 can be pinpointed.

[0026] The magnetic nail is embedded between the inlet port of a highway, and the outlet, if a car goes into a highway from the inlet port concerned, at first, a specific sign (for example, south pole) will appear, and both signs will appear according to a predetermined code after that. Let the point which detected this first specific sign for the first time be a starting point. Then, a relative coordinate can be known by reading

the code constituted by the magnetic nail.

[0027] moreover, a code -1, 1, and -- if it is simple things, such as 1, 1, and ..., since it turns out the point of what position it is, with reference to Table 1, a relative coordinate can be known only by counting the detected sign. The location amendment section 16 reads a relative coordinate (it is written as "" (xm and ym) below) with reference to the road marker map memory 15 based on the reading result of said code.

[0028] Next, it asks for the car estimated position at the time concerned (xs and ys). Generally the car estimated position (xs and ys) concerned Since it exists between the car estimated position (xn-1 and yn-1) which one of detection period Δt begins, and the last car estimated position (xn and yn) as shown in drawing 4 A car estimated position (xs and ys) is time-of-day T_{n-1} which detection period Δt begins. Time of day T_n of an end Time of day T_m when the sign was detected if it uses $x_s = x_{n-1} + (x_n - x_{n-1}) (T_m - T_{n-1}) / \Delta t$ It asks by $y_s = y_{n-1} + (y_n - y_{n-1}) (T_m - T_{n-1}) / \Delta t$.

[0029] And a car estimated position (xs and ys) and said relative distance Lm concerned It asks for the relation between the relative coordinate (x'm and y'm) presumed by being based, and the relative coordinate (xm and ym) memorized by the road marker map memory 15. Drawing 5 is drawing showing the physical relationship of a car estimated position (xs and ys) and an estimated position (x'm and y'm), and the transit direction of a car is θ . It is expressed. Direction θ A sign makes a counterclockwise rotation forward and is a relative distance Lm. A sign makes forward the time of detecting a magnetic tape or a guide wire on the left-hand side of a car. From the relation shown in this drawing, an estimated position (x'm and y'm) is Lm. θ It uses. $x'_m = x_s - L_m \sin \theta$ (1) $y'_m = y_s + L_m \cos \theta$ (2) It is expressed.

[0030] Here, it is the above (1). A formula and (2) The estimated position (x'm and y'm) shown by the formula is compared with the coordinate (xm and ym) of the magnetic nail read from the road marker map memory 15, and the difference is searched for. $\Delta x = x_m - x'_m$ $\Delta y = y_m - y'_m$ --- these differences Δx and Δy serve as the amount of amendments of a car estimated position (xn and yn) (hereafter, Subscript n is omitted and it is written as an estimated position (x y)). That is, a car estimated position (x y) can be amended as $x = x + \Delta x$ $y = y + \Delta y$. the amended estimated position (x y) --- GPS (Global Positioning System) etc. --- it compares and precision is very high.

[0031] The processing of the location amendment section 16 mentioned above was premised on having not deviated from the lane more than the anchoring die length of a magnetic resistance element. If it deviates from a lane exceeding the anchoring die

length of a magnetic resistance element, it will be the relative distance L_m of the longitudinal direction of the center line of a car, and a magnetic tape. Since it cannot be found, processing mentioned above cannot be performed. In this case, the estimated position (x_n and y_n) of the car outputted from the location presumption section 14 will be adopted as an estimated position (x y) of a car as it is.

[0032] Next, how to warn of deviation from a lane is explained. A car can make a judgment of this warning, even if it deviates from a lane exceeding the anchoring die length of a magnetic resistance element, and it has not deviated (although felt like saying that warning having not deviated is unnecessary, a warning threshold can be set as arbitration). First, the deviation detecting element 19 projects a car estimated position (x y) to the location on Rhine where the magnetic nail is located in a line.

[0033] Drawing 6 is drawing showing the coordinate (x_{m0} , y_{m0}) of the magnetic nail detected recently, the coordinate (x_{m1} , y_{m1}) of the magnetic nail corresponding to the following number, and an estimated position (x y). If the locations which should amend on Rhine will be written to be (x_b and y_b), (x_b and y_b) will be calculated by drawing a perpendicular from an estimated position (x y) to Rhine.

$$x_b = x_{m0} + (x_{m1} - x_{m0}) R \quad y_b = y_{m0} + (y_{m1} - y_{m0}) R \quad \text{--- here --- } R = \frac{(x_{m1} - x_{m0})(x - x_{m0}) + (y_{m1} - y_{m0})(y - y_{m0})}{(x_{m1} - x_{m0})^2 + (y_{m1} - y_{m0})^2}$$

It comes out and defines.

[0034] Distance $d_d = \text{SQRT}$ of the projection location (x_b and y_b) to this Rhine top, and a car estimated position (x y) $\{(x - x_b)^2 + (y - y_b)^2\}$

It becomes a gap from Rhine of *****. For the deviation detecting element 19, this gap d is a threshold d_0 . If it judges that it is large, warning will be taken out from the deviation warning section 20 with voice. Of course, it may replace with taking out warning with voice, and warning may be displayed on a display (not shown). Moreover, a command signal may be given to the actuator which performs brakes operation, accelerator actuation, steering actuation, etc. to taking out warning and coincidence.

[0035] Discharge of warning is considered as the time of there being steering actuation, when there is winker actuation. Moreover, it follows on winker actuation and steering actuation, and the gap d from Rhine is a threshold d_0 . When it exceeds, warning is bent from the start, and it is good even if like. In addition, said threshold d_0 For example, it can choose in consideration of the width of face of a car, and lane width. In this case, what is necessary is for lane width to correspond for every route of a highway, and section, and just to store it in the road marker map memory 15 as data that what is necessary is just to hold the width of face of a car as a value of a proper on the car concerned.

[0036] For example, it is a threshold d_0 at the time of the lane width of 3.5m, and width of face of 1.8m of a car. It is set as 0.85m. Threshold d_0 When setting up, as shown in drawing 7, the yaw angle ϕ with Rhine where the transit direction of a car and the magnetic nail are located in a line may be taken into consideration. Here, the yaw angle ϕ is computable based on time amount change of the gap d from a road marker. Since it means that the speed from which the yaw angle ϕ separates from Rhine when large is quick, a threshold is set up small. When small, since the cut of a handle is also easy, the yaw angle ϕ thinks that warning may become slow, and sets up a threshold more greatly.

[0037] While the car's performing straight-line maintenance transit generally, speaking concretely, when performing less than $\phi \times 1.5$ degrees of yaw angles and making a lane change, the yaw angle ϕ becomes 3 degrees – about 5 degrees. Therefore, when the yaw angle ϕ is less than 1.5 degrees, warning is given just before the white line which shows the boundary of a lane, when the yaw angle ϕ is 1.5 degrees or more less than 3 degrees, warning is given by 30cm inside of a white line, and when the yaw angle ϕ is 3 degrees or more, warning is given by 50cm inside of a white line.

[0038] Moreover, threshold d_0 It can also determine not only in consideration of the width of face of a car, and lane width but in consideration of the distance to a guard rail or a side attachment wall. In this case, the distance to a white line, a guard rail, or a side attachment wall is stored in the road marker map memory 15, and when this distance is comparatively short, it is a threshold d_0 . It is made more smallish, and when this distance is comparatively long, it is a threshold d_0 . It enlarges slightly.

[0039] Furthermore, a threshold is also changeable with the peculiarity of operation of a driver. There are those who run the left depending on a driver, and those who run rightist inclinations. In this case, the past contents of transit are learned and a threshold is changed on right-hand side and left-hand side. Moreover, with the engine performance of a car etc., since blurring on either side may be oversized, the past contents of transit are learned also in this case, and when blurring on either side is large, a threshold is set up more smallish.

[Translation done.]

DESCRIPTION OF DRAWINGS

[Brief Description of the Drawings]

[Drawing 1] It is drawing which looked at the road which embedded the magnetic nail in the middle of a lane from the low altitude as a road marker.

[Drawing 2] It is the block diagram showing the mounted equipment containing a lane deviation warning device.

[Drawing 3] It is drawing showing the circuitry which arranges two or more magnetic resistance elements in on the permanent magnet of the shape of long and slender rubber, and takes out output voltage from each.

[Drawing 4] It is drawing explaining the calculation approach of the car estimated position (x_s and y_s) between the car estimated position (x_{n-1} and y_{n-1}) which one of detection period Δt begins, and the car estimated position (x_n and y_n) of an end.

[Drawing 5] It is drawing explaining the physical relationship of a car estimated position (x_s and y_s) and the coordinate (x_m and y_m) of a magnetic nail.

[Drawing 6] It is drawing explaining how to project a car estimated position (x y) to the location on Rhine where the magnetic nail is located in a line.

[Drawing 7] When projecting a car estimated position (x y) to the location on Rhine where the magnetic nail is located in a line, it is drawing explaining how to project in consideration of the yaw angle ϕ .

[Description of Notations]

- 1 Magnetic Resistance Element
- 2 Resistance Element
- 3 Permanent Magnet
- 11 Mileage Detecting Element
- 12 The Transit Direction Detecting Element
- 13 Field Detecting Element
- 13a Waveform-shaping section
- 14 Location Presumption Section
- 15 Road Marker Map Memory
- 16 Location Amendment Section
- 17 Antenna
- 17a Reception recovery section
- 17b Loop-formation coil
- 17c Loop-formation coil
- 17d 90-degree phase shifter
- 17e Hybrid

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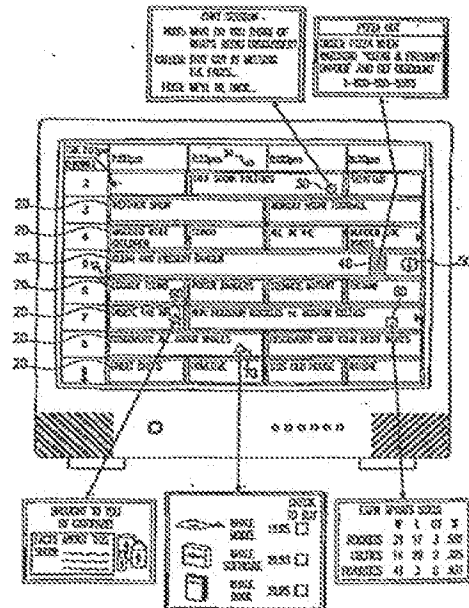
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(54) 【発明の名称】 マルチ・ソース情報の選択ガイドを表示のためのコンピュータ・システム

(57) 【要約】

【課題】 複数のビデオ・ソース等からプログラムの選択を効率よく選択できるようにする。

【解決手段】 モニタ画面に内容ガイドが表示され、該内容ガイドは、開始時間とチャンネルとを横縦軸としたグリッド状セル20として表示される。ユーザがテレビジョン番組等の所望のソースをアイコン30~90で選択すると、オンライン・サービスで対応するソース信号がダウンロードされ、ユーザに所望の情報を画面表示する。



【特許請求の範囲】

【請求項1】 マルチ・ソース情報の選択ガイドを表示するためのコンピュータ・システムにおいて、該システムは、

ガイド・セルを含むグリッドからなる視覚的表示を生じる手段と、

表示されたガイド・セルのアイコンの少なくとも一部に配置する手段と、

表示されたアイコンからユーザが選択できるようにする手段とを備えており、

アイコンに一義的な命令であって、かつセルに表示されたアイコン以外の他の情報に依存する実行可能な命令に、選択されたアイコンがリンクされ、更に、アイコンが表わす複数のあり得る実行可能な動作から該アイコンが分別することを特徴とするコンピュータ・システム。

【請求項2】 請求項1記載のコンピュータ・システムにおいて、該システムはさらに、アイコンを選択的にアニメーション動作するように見せる手段と、

アイコンを選択的に3次元状に見せる手段とを備えていることを特徴とするコンピュータ・システム。

【請求項3】 図形情報の表示のためのシステムにおいて、該システムは、

図形イメージを表示する図形表示手段と、

複数のビデオ・ソースからの信号を受取る少なくとも1つのビデオ信号受け取り手段と、

受取った複数のビデオ・ソースの信号から選択して、該ソースの信号を図形表示手段に表示する手段と、

音響を再生する音響再生手段と、

複数の音響ソースから選択して、該選択された音響ソースの信号を音響再生手段へ提供する手段と、

テキストを表示するテキスト表示手段と、

種々のテキスト・ソースから選択して、テキスト表示手段へ選択されたテキスト・ソースの信号を提供する手段と、

獲得された情報が、複数のビデオ・ソース、複数の音響ソースおよびテキスト・ソースの内容の少なくとも一部に関する情報を含むように、少なくとも1つの到来信号から、内容ガイド中に処理されるデジタル情報を獲得する獲得手段とを備えることを特徴とするシステム。

【請求項4】 請求項3記載のシステムにおいて、デジタル情報を獲得する獲得手段が、ビデオ信号受け取り手段に結合されており、獲得手段における獲得が、受取られたビデオ信号の垂直ブランキング・インターバル内に埋設された情報からで行われることを特徴とするシステム。

【請求項5】 請求項3記載のシステムにおいて、該システムはさらに、

グリッド状に表示されるプログラム素材にリンクされて、獲得手段により獲得されたデジタル信号にตอบสนองし

て、表示手段に表示される図形アイコンを生じる処理手段と、

図形的にリンクされたオブジェクトを格納する記憶手段とを備えることを特徴とするシステム。

【請求項6】 請求項5記載のシステムにおいて、該システムはさらに、処理手段に結合されてオンライン・サービスに接続するためのモデムを備えることを特徴とするシステム。

【請求項7】 請求項5記載のシステムにおいて、該システムはさらに、処理手段に結合されて、表示された図形的にリンクされたオブジェクトをユーザが選択してアクティブ状態にすることができるようにする選択手段を備えることを特徴とするシステム。

【請求項8】 請求項7記載のシステムにおいて、該システムはさらに、処理手段内部に含まれて、選択され格納された表示済みの図形的にリンクされたオブジェクトに関する格納情報に基づいて実行される一連のソフトウェア・コマンドを該処理手段に実行させるハイパー・リンク追従手段を備えることを特徴とするシステム。

【請求項9】 図形情報の表示のためのコンピュータ・システムにおいて、

図形イメージを表示する図形表示手段と、

複数のビデオ・プログラム・ソースの信号を受取る少なくとも1つの手段と、

受取った複数のビデオ・プログラム・ソースの信号から選択して、図形表示手段にビデオ・ソースの信号を表示する手段と、

音響を再生する音響再生手段と、

複数の音響ソースから選択して、音響再生手段へ選択された音響ソースの信号を提供する手段と、

テキストを表示するテキスト表示手段と、

種々のテキスト・ソースから選択して、選択されたテキスト・ソースに基づくテキストの表示をテキスト表示手段へ提供する手段と、

獲得された情報が複数のビデオ・プログラム・ソース、

複数の音響ソースおよびテキスト・ソースの内容の少なくとも一部に関する情報を含むように、少なくとも1つの到来信号から、内容ガイド内へ処理されるべきデジタル情報を獲得する獲得手段と、を備えるコンピュータ・システム。

【請求項10】 請求項9記載のシステムにおいて、該システムはさらに、

獲得手段により獲得されたデジタル信号にตอบสนองして、表示手段に表示される図形的にリンクされたオブジェクトを生じる処理手段と、

図形的にリンクされたオブジェクトを格納する記憶手段とを備えることを特徴とするシステム。

【請求項11】 請求項1記載のシステムにおいて、アイコンの選択と同時に、物品の注文のための自動接続を行う手段を更に備えるシステム。

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【請求項12】 請求項1記載のシステムにおいて、アイコンの選択と同時に、サービスの注文のための自動接続を行う手段を更に備えるシステム。

【請求項13】 マルチ・ソースに関する内容の表示のためのシステムにおいて、該システムは、

中央処理装置と、

中央処理装置に結合された表示回路と、

中央処理装置と表示回路とに結合されたハイパーテキスト・リンク・エンジンとを備え、外部資源に対するリンクを提供するため、マルチ・ソースおよびアイコンの少なくとも二つの内容に関するグリッド配置のリスト表示で表示するようにハイパーテキスト・リンク・エンジンが、表示回路へコマンドを与えるように構成されていることを特徴とするシステム。

【発明の詳細な説明】

【0001】

【発明の属する技術分野】 本発明は、電子的娯楽（エンターテインメント）に関する情報を提供する新規なシステムおよび方法に関し、特に、娯楽に関連するサービスを提供する情報プログラムの内容ガイドに関する。

【0002】

【従来の技術及び本発明の特徴】 テレビジョン・ショーなどに関する情報を提供するための、種々のテキスト基準のシステムが、今日利用可能である。しかし、これらの装置および印刷された印刷物は、それらの範囲がある程度限定されている。地方の新聞に見出される情報を取り上げるVCR+（登録商標）等のシステムは、VCRの自動プログラミングをすることができるようにするため、新聞に印刷される操作コードをVCRへ入力することが必要となる、コード基準のシステムを提供する。しかし、このシステムは、現時点では、ユーザとの間の柔軟性のある対話的リンクを実現するものではない。本発明は、テキスト基準の予め印刷された情報のシステムについて、それに勝る著しい改善を提供し、更に、付加的な関連サービスおよび情報をユーザに提供できる機構を提供する。ケーブル・システムにおいて見られるような他のコンピュータおよび電子的手段に基づくシステムは、対話性の欠如、および対話的リンクの提供あるいは容易な方法で更新することができる情報の提供能力の欠如等の、色々な他の問題から免れない。

【0003】 本発明によって提供されるコンピュータ基準のシステムは、例えば、多数の電子信号ソースおよび個人により使用されるソースから、色々な種類の情報を表示するための表示機構を取出して、統合化し、提供するパーソナル・コンピュータを提供する。このようなコンピュータ・システムは、主として、距離をおいて見ることが可能な大型スクリーン・モニタを組み込むように設計されるが、本発明は、その用途に限定されるものではなく、実際には、あらゆるサイズのモニタに関して使用することができる。本発明のコンピュータ・システム

は、複数のソースからの色々な種類の電子信号をコンピュータ・システムの中央処理装置によって取得することができる、集積されたハードウェアと機能性とを有している。該システムは、再生されかつユーザに対して表示される情報を、解釈し処理する。これらの情報の信号は、アナログ信号あるいはデジタル信号から取得される。信号ソースの幾つかの例は、空中への標準的なアナログ・テレビジョン送信、ケーブル・アナログ・テレビジョン送信、デジタル・ケーブル・テレビジョン送信、およびデジタルあるいはアナログのいずれかの直接放送衛星である。

【0004】 更に別のデジタル情報は、例えばアナログ・テレビジョン信号の一部として、垂直ブランキング・インターバル（VBI）の一部として、あるいは、画像部分に含まれるビデオおよびオーディオ波形の他の部分において、搬送することができる。デジタル・データはまた、中央プロセッサによって、ケーブル・モデム、衛星デジタル・ビデオ送信により、あるいは「統合サービス・デジタル・ネットワーク（ISDN）無線送信を含む標準的な電話回線、AM/FMラジオ放送、CD、ROM、CDI、磁気フロッピなどのデジタル媒体により、得られる。更に別の情報は、ビデオ・カセット・レコーダ、オーディオCDプレーヤーなどにおいて使用される予め記録されたアイテムから取得することができる。このような情報は、次に、本来のアナログ・フォーマットからデータ・フォーマットに変換されるか、あるいは格納されたデジタル・フォーマットまたは送信用デジタル・フォーマットからデータ・フォーマットに変換され、コンピュータがこのデータ・フォーマットの情報を使用することができる。

【0005】 このような情報を平均的なユーザが使用可能な状態に提示することは、本発明の重要な特徴および利点の1つである。特に、本発明のコンピュータ・システムは、多数の電子信号から情報を取得し、そして、ユーザに対して、該情報の理解が容易でありかつ使用に適するフォーマットで提示できる、統一メカニズム（統一機構）を提供する。例えば、放送テレビジョン信号の場合は、これらの信号は受信された後、動きのあるデジタル図形表示、すなわち動画へ変換され、処理された信号は次に、システム・モニタで表示することができる。このとき、付随するオーディオ信号は、受信されてデジタル・サンプルへ変換される。次いでデジタル・ディスプレイを介して、システムに設けられたアナログ・コンピュータへ再生される。当然ながら、信号を視覚的あるいは音響的に提供するために用いられる本発明の信号取得方法および装置、並びにその処理方法は、受信される信号ソースの種類と信号が受信される方法に応じて、変化することになる。

【0006】 デジタル信号ソースの場合は、信号を解釈して表示するため用いられる処理方法は、明らかに、デ

デジタル情報の種類に依存する。したがって、情報がどのようにデータ・ストリーム内に含まれ、あるいはデータが受取られるコンテキストにどのように存在するかを考慮しなければならない。信号をコンピュータ・システムに到達させるメカニズムは、先に述べたように変化するためであり、従って、本発明を信号の特定の受信方法に関するものに限定するべきではない。

【0007】オーディオ信号を受取って表示し、あるいはこれを再生することが可能であるどのような複雑なコンピュータ・システムにおいても、エンターテインメントおよび適度な信号の豊富で多岐にわたるソースが存在する。しかし、個々のユーザにとって、存在するプログラムおよび内容の種類からなる広範囲に渡る選択から、容易かつ手早く選択することは極めて難しい。従来の試みにおいては、選択が一旦行われると、複雑なコマンドを入れることなく、他の番号/内容ソースに変更すること、あるいは該ソースを調べることは、困難であるかあるいは時間がかかる。異なる手段で送られる内容を探して見つける場合(例えば、テレビジョン放送信号からモデム・データ信号に切替える場合等)、どの素材がユーザにとって興味がありかつ利用できるかを決定するためには、多くの情報ソース即ち「内容ガイド」を調べる

ことが必要となる。

【0008】従来例のシステムにおいて生じる別の問題は、容易性、すなわち、操作(アクション)をある信号タイプについてユーザにプロンプト指示でき、かつ該操作を別の信号タイプを用いて実行できるようにするための容易性である。この場合の一例は、物品を購入する注文を入れるための電話番号、あるいはワールド・ウェブ・アドレス(世界共通アドレス)等のテレビジョン上の宣伝である。これは、テレビジョン・プログラムの一部分として表示される。従来の操作方法は、ユーザが、電話番号を書き留めて受話器を取り上げ、電話番号をダイヤルし、特定の商品注文し、そして、クレジット・カード情報あるいは請求書情報をオペレータへ提供している。ワールド・ウェブ・アドレスがテレビジョン・ショーで提供されると、ユーザは、該アドレスの幾つかの表示を得た後、該アドレスの正確なシンタックスを知り、そのアドレスを写し取り、それをウェブ・ブラウザに入力して、このウェブ・ページと通信することができる。

【0009】

【発明の概要】本発明の利点の1つは、関連する特徴が提供される統合された内容ガイド(ICG)にある。この内容ガイドは、複数の信号タイプおよびプログラミングに含まれると共に全体にわたって興味がある内容を探して見つけるための統合された方法を提供し、かつ、このような情報の提供および該情報の信号と共に送られる宣伝情報の提供のための統合された方法を提供する。本発明の更に別の利点は、リンクと、見たり聞いたりするプログラムのコンテキストに保持される関連する情報

と、の少なくとも一方を、内容ガイドの一部として使用することができるようにするためのメカニズムである。

【0010】

【発明の実施の形態】図1に示されているように、ケーブル・テレビジョンに例として示される従来の表示ガイドは、開始時間10と現在時間とに基づいて、現在及び未来のショーをリスト表示する。これらガイドの一部は、ユーザが手動スクロールすることが可能であることから、(極めて制限された)対話的手法であると言える。しかし、これらの内容ガイドの形式は、本質的に非常に制限されていることから、ユーザに対して完全に柔軟な手段を提供するものではない。更にまた、情報は、一般に、有意な方法で格納されず、またリンク、すなわち結合関係が提供されることもない。

【0011】

本発明における統合された内容ガイド(統合内容ガイド)は、汎用コンピュータで動作可能なソフトウェア・アプリケーションであり、例えば、テレビジョン、デジタル・サテライト・サービスなどのような多数のサービス、ならびにオンライン・サービス、インターネット・サービス、検索可能なデータベースあるいは他のプログラミング、および情報内容に富んだソースのような他の多様なソースについての内容の利用可能性についての情報を含んでいる。内容ガイドにおける各エントリは、サービスについての情報を個々に含み、あるいは関連するサービス提供についての情報を組み合わせることもできる。本発明の内容ガイドは、これらサービスについての記述的情報を含むデータベースを利用している。この内容は、表示される。更に、データベースは、広告グラフィックスまたは特別な關心事のメッセージのような追加の情報、ならびにコンピュータ・システムに特定の動作を実行させるためにアクセスされる埋め込まれた(エンベジド)コマンドを含むこともできる。追加の情報、グラフィックスあるいは埋め込まれたコマンドの利用可能性を示すための、図形的アイコンその他の手段もまた、ユーザに対して提供される。

【0012】

受取られた信号から、情報が抽出されて中央プロセッサへ提供される。ソフトウェアは、この抽出データを読取ってデータベースを形成し、そして、この情報をユーザが追従することができるように図形的な方法で提供する。このような表示と、該表示及び記憶されたデータベース間の対話とを提供することにより、本発明は、コンピュータの制御に使用できる、単一の貫性のある情報に富む制御フロント・エンドを、有効に統合して提供する。このような制御にあり、ユーザが、コンピュータ・システムに提供される種々の信号タイプおよび種々のサービスを介して、情報について種々の他の操作を選択または実行できるようにする。グリッド・セル内の情報は、図5に示されるチャット・セッション1000のようなオンライン・サービス「プログラム」に対するリンクである。また、面白そうなオンライン・グ

ームの選択、あるいは雑誌「タイム（登録商標）」等について入手可能なような検索可能なデータベースへの「リンク」も、作成することができる。

【0013】本発明においては、データベースは、例えば、コンピュータ・システムの磁気ハード・ディスク・ドライブまたは他の形式のデジタル・メモリ記憶装置に、局部的に格納される。データベースは、しばしば更新されて、更新された内容の情報、更新された広告、その他の情報を含むことになる。このような更新は本発明の重要な利点の1つであり、例えば、広告主が販売促進情報などを更新できると共に、プログラム時間、長さ、内容などの変更を含むプログラム情報を更新することができる。データベースのデジタル内容は、コンピュータが備える複数のデジタル・データ取得システムの中の任意のシステムを用いて、取得されかつハード・ディスク・ドライブに格納される。例えば、このような情報は、放送テレビジョン信号の垂直ブランキング・インターバル内で搬送されるか、あるいはこのインターバルから取得されることが可能である。コンピュータから1つのオンライン・サービスに対してダイヤルするモデムを用いて、この情報を更に別に配送することもでき、あるいは、アクティブ状態に保持されるISDN回線を通じて提供することもでき、ケーブル・モデムを介して提供することもでき、または固定されたワイド・エリア・ネットワークから、あるいは専用無線チャンネルなどにより提供することもできる。

【0014】種々の表示モードをユーザが選択することが可能である。これら表示モードはそれぞれ、図2、図3および図4に示されるように、情報の表示の配列を変更する。モード表示の各々は、表示における図形的に別の領域を特徴付けるものと考えられる。特定のプログラムあるいは関心のある1つのアイテムと関連するこれらの領域は、例えば、図2に示される。これらの領域はそれぞれ、セル20と呼ばれる領域である。1つのセルを、例えば、個々のテレビジョン・プログラムと関連させることができ、また1つのセルがプログラムのタイトルを含むようにすることもできる。デフォルト・モードにおいては、セルは、図2に示されるように、チャンネルに従って（即ち、垂直位置に）、かつプログラムの時間スパン（水平位置）に従って、図形的に配列される。これは、一般に、「グリッド・ガイド」と呼ばれ、図1に示されたグリッド・ガイドに類似している。典型的な構成においては、テレビジョン・チャンネル番号（または、個々の局を識別する他のメカニズム）は、表示の左側に最上部から最下部へリスト表示され、日時は、表示の左側から右側へ等しい間隔で表示される。プログラムのリスト表示を含む各セルは、表示上で適切なチャンネルの開始時間と持続時間の座標となるように、表示される。

【0015】特定のセルを選択あるいは高輝度表示する

ために、配線または無線の遠隔制御装置である、矢印キー、マウスあるいは他の形式のポインティング機構のようなナビゲーション装置を使用してもよい。テレビジョンを選択されたチャンネルに同調させるために、ユーザが遠隔制御装置のボタンを押す等の別の動作をするようにしてもよい。表示を時間的に前に進めあるいは遅らせ、あるいは利用可能なチャンネルを上下させるために、遠隔制御装置にポインタ制御手段を用いてもよい。ある場合には、ボタンを押すと、プログラム・ガイドに含まれる別の情報が現れるようにしてもよい。情報をダウンロードする方法は種々の変更が考えられ、幾つかの従来の方法を採用してもよい。これらの方法は、VBIからの情報の抽出、インターネットからのパルク・ダウンロード、あるいはローカル・コンピュータによりダウンロードされ格納された他の公知の方法を含むことができる。

【0016】統合化された内容ガイドおよび格納された関連しているデータベースは、ユーザ用の付加的な図形表示およびナビゲーションのフロント・エンドを提供し、種々の内容ソースを統合化して、内容の提示のため使用されるコンピュータ・システムにエンベデッド制御を提供する。本発明の統合化された内容ガイドは、汎用パーソナル・コンピュータ・システムにおいて展開されるファクトを活用するという点において、独特である。コンピュータの機能性をテレビジョンの内容の複雑と共に組み合わせることにより、幾つかの付加的な機能的アイテムを可能にしている。

【0017】特に、図2に示されるように、エンベデッド・アイコン30、31、40、50、60、70、71、80は、例えば、ハード・ディスクに局部的に格納されるか、あるいは、ウェブ・サーバからまたは他のソースから個々にダウンロードされる広告グラフィックスに対するリンクを提供することができる。コンピュータ・システムのハード・ディスクに局部的に格納される付加的なビデオまたは音響もまた、あるリンクを高輝度表示することによって、ユーザにより表示あるいは再生することができる。リンクを選択した後のこのような情報の表示は、従来の方法で行うことができる。スクリーン上の個々のアイコンを選択することによっても、自動ダイヤル・アウトを提供し、かつオンライン・サービスまたはファイル・サーバから情報に対する要求を出すこともできる。このダイヤル・アウトは、同様に、選択がビデオ・スクリーン上で行われた後、周知の方法で行うことができる。これは、（例えば、エンベデッド・ブラウザか、あるいは自動的に発される個々のブラウザ・アプリケーションを用いる）表示を含み、また、従来のウェブ・ブラウザ様式あるいは他の種類のサーチ・エンジンを用いて更なる動作を生じるアクティブ・リンクを有するハイパーテキスト・マークアップ行ページ（html）に従従する。

【0018】図3に示されるような異なる種類のリンクの連列は、ユーザに対する操作のプロンプトを提供する内容プロバイダによって配置されるアイコンである。例えば、政治的なトーク番組は、個々の視聴者からの投票結果を有することができるようにすることができ、これは、特定の質問に対するオートダイヤル・インの投票(応答)を、ユーザにプロンプト指示することにより提供される。パーソナル・コンピュータに配置されかつ従来の大容量記憶装置に格納された補助ソフトウェアを、プログラム内容における個々のアイテムに結び付けることもできる。例えば、ゲーム番組のプレイ・アロング・バージョン(play-along versions)をプログラム・ガイド内容と共に送ることもでき、その結果、同じゲームをテレビジョン番組で表演中に、ユーザが家庭で参加してゲームすることができる。

【0019】更に、予めプログラムされたクレジット・カード情報がシステムに提供されるならば、プログラムのデスト・バージョン、あるいは実際にソフトウェアの完全バージョンのような、アイテムの引き渡しを生じるように、選択を行うことができる。これら要求の全ては、周知の手段によって行われる。しかし、本発明による方法におけるこのような情報の内容ガイドにおける表示は、エンターテインメントのプログラミング情報のコンテキストにおいて提示される。本発明の統合化データベース構成によって行われる。本発明の新規な特徴の1つは、広告および(または)販売促進の機会を設ける手段を提供することができることであり、これは、このような機会が、ユーザの「瞬間的な関心(moment of interest)」で容易にアクセスできるからである。瞬間的な関心は、ユーザが内容ガイドのリスト表示に引き付けられる時に生じる。例えば、野球ファンを野球ゲームのリスト表示に引き付ける宣伝を表示すれば、リスト表示により生じる「瞬間的な関心」を増大させることができる。「瞬間的な関心」は、テレビジョンのフレームワーク内のエンターテインメント・プログラミング情報を他のアイテム間に含む本発明のガイドを用いる環境において生じる。

【0020】種々の表示モード

図2、図3、図4および図5に示されるセルは各々、あるソースから得られる特定の内容についてのある種類の情報を含んでいる。セルの均一な外観を提供することにより、個々の内容およびサービスをアクセスするために必要となる計算ステップのシーケンスは、あるセルに集められて表示され、あるいは、あるセル内に置かれたアイコンによって表示される。ユーザの観点からは、オン・スクリーン・カーソルまたはポインティング・デバイス特定のアイコン上に置いてからボタンを押すような動作が、必要な動作の全てであるように見える。動作のこのような開始は、リスト表示される内容またはサービスをアクセスする、均等かつ一貫した方法を提供する。

このような開始はまた、従来のダブル・クリック法を用いることもでき、あるいは音声でアクティブ状態となるコマンドなどでもよい。しかしながら、実行されるべきある動作を選択する上記した均等な構成は、本発明の重要な特徴である。

【0021】個々のアイコンまたは1つのセル内の内容を選択すると、種々の動作が行われる。これらの動作は、一般に周知である。しかし、これら動作を内容ガイド中のアイコンへ結び付けることは、本発明において新規である。特に、あるセル内のあるアイコンを選択することにより、あるテレビジョン・プログラムを選択することができ、チューナ装置をあるチャンネルに強制的に同調させることができると共に、個々のソースまたは経路により提供されるビデオおよびオーディオの両チャンネルを選択するために、コンピュータにおける一連の開始コマンドを実行することができる。図2に示される

「CHAT SESSION(チャット・セッション)」として示されるアイコン30が選択されると、個々の対話的なテキスト・ベースのチャット・タイプまたはオーディオ・チャット構成を、ユーザに提供することができる。このアイコンを選択することで、オンライン・サービスのソフトウェア・アプリケーションを開始し、予め格納されたユーザ・ネームをユーザ・ネームのフィールドへ与え、ダイヤル動作を開始してオンライン・サービスへ接続し、実行されるべき接続を提供し、オンライン・サービスへログオンし、データベースから適切なコマンド・シーケンスを取出すことにより自動事項におけるあるチャット・セッションへログオンして実行し、そして、情報が内容ガイドに提供されるこの予めプログラムされたコマンド・シーケンスに置換することによりチャット・セッションへ統合する。

【0022】図2に示される商品の宣伝または提供を見る場合は、例えば、アイコン40を選択することにより、国内チェーンまたはローカル・チェーンからビザに注文を入れることができる。次いで、コンピュータにより行われる自動化されたイベント・シーケンスが、データベースから適切な電話番号を取出し、特定の番号をダイヤルし、ビザ・レストランとユーザとが音声で連絡される状況にし、あるいは、その代わりに、ユーザが所望のビザの種類を自動的に選択できるようにする。別の機会即ちアイコンを同様にスクリーン上に提供することもでき、これは、瞬時に更新することができる。これらのアイコンは、機会に基づく動作をコンピュータに行わせるために用いられる、目に見える制御手段である。これらの機会は、エンターテインメント・プログラミング・コンテキストおよびユーザの関心事によって決められる。この事例としては、スポーツの点数等のアイテムであり、これにより、データベース・ディレクトリに埋め込まれたすなわち配置された一連のコマンドをコンピュータが実行できるようにし、そして、最新の点数を得るた

めに装置のコンピュータ・モデム回線から電話呼出を行うようにする。スポーツ関連の番組または商品を選択すると共に、単なる点数ではなく誰が得点したかのような更に詳細な付加的なスポーツ情報を検索するために、更に他のコンテキスト・ベースの関連アイコンを用いることができる。さらに詳細な情報になると、選択されるアイコン80は他の解説に関するリンクを提供する、このような詳細な情報は、例えば、リーグ中のチームの状況、特定の選手の成績、あるいは他の統計値のような事項である。更に他のアイコンを組み合わせ、これらアイコンに対して3次元的な様相即ち構成を持つこともできる。

【0023】多量ソースの統合化

本発明の内容ガイドは、多数のソースに対する1つのエントリ・ポイントを提供する。例えば、セルのリスト表示は、個々のテレビジョン・チャンネル内容に限定されることなく、他のサービス提供物と構成することもできる。一例として上げれば、ユーザは、デジタル衛星放送、ケーブル・アクセス、および従来の無線放送提供物のいずれかを使用することができる。更に、例えば、American On-Line (登録商標; AOL) またはCompuServe (登録商標; CIS) [アイコン90] により提供することが可能であるオンライン・チャット・サービスのような、コンピュータに基づくテキスト・システムおよびデータベース・システムが提供される。このような提供は、従来の放送チャンネルまたはデジタル衛星チャンネルのいずれかで視聴できる映画のプログラム・リスト表示に続いて行われる。プログラムに関するUsenetグループもまた、あるセルに結び付けることができる。また、サーチ可能なデータベースも同様に、図5における「タイム(登録商標)」なる雑誌アーカイブ1010等と同じスクリーンに置くことができる。

【0024】チャット・セッション・セルをクリックすると、指定されたチャット・セッションをアクティブ状態にするのに必要である埋め込まれたコマンドを、コンピュータに実行させ、該チャット・セッションを、図3に示されるような映画セルまたは他のテレビジョン・プログラム・セルに直接結び付けることができる。高解度表示され選択された時、図3に示されるようなビデオ・ウィンドウ100が高解度表示され選択されると、該ウィンドウは、コンピュータのテレビジョン部分を当該チャンネルに同調させることになる。これにより、ユーザが、テレビジョン番組に結び付けられるチャット・セッションに、簡単な機構を結合させることができる。これはまた、ユーザがチャット・セッションを選択できる簡

素化された機構を提供する。チャット・セッションが例えばある映画に結び付けられる構成を提供することにより、ユーザのアクセスを均一で容易なものにする。更に、多数ソースのこのような統合化の一部として、ある広告主がそのプログラムの一部として、例えば、情報を再タイプする必要なしにユーザにより選択される世界共通のウェブ・ページ等に自動的につながる情報を提供する。

【0025】本発明の一部であるコンピュータ化されたデータベースを持つことにより、ユーザに関してその使用パターンを知る情報を格納することが可能である。使用パターンを格納するログ・ファイルは、容易に保守される。この情報は、個々のユーザが使用するありそうな設定および嗜好されるチャンネルおよびプログラムを決めるのにコンピュータによって関連付けられるデータベースを形成するため、ログ・ファイルから情報を検索することにより、コンピュータによって使用することができる。一例をあげれば、あるユーザが4時つづけてある特定のチャンネルの10時のニュースを観るならば、コンピュータがこの事実を認識して、このユーザに対して10時のニュースの直前あるいはちょうど10時のニュースの時間にスイッチを入れてこのチャンネルに同調するオプションを提供することができる。システムに付加的なコマンドを発することにより、個々のセルの表示の再構成及び再分類を実現することができる。図4により構成される方法で表示を提供するように、コマンドの従来のフィルク・タイプも同様に実現することができる。

【図面の簡単な説明】

【図1】従来例のシステムに使用される表示形式を図形的に表した図である。

【図2】本発明により提供される表示形式の一例を示す図である。

【図3】図2においてあるリンクが追従される時に生じる表示例を示す図である。

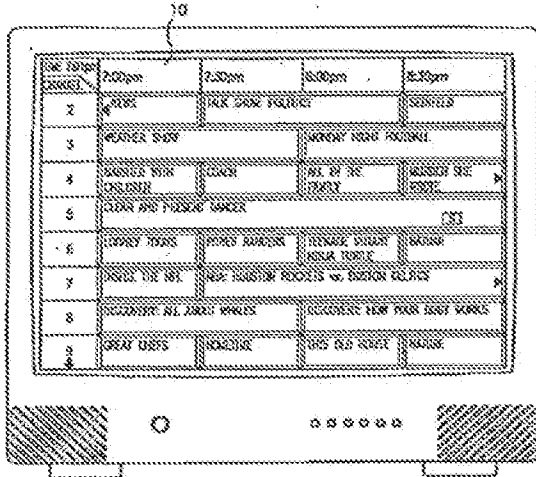
【図4】興味がある表示に基いて再配置が可能であるメカニズムを説明するための表示例の図である。

【図5】可能なテレビジョン内容アイテムおよび非テレビジョン内容アイテムを示す、本発明による表示例の図である。

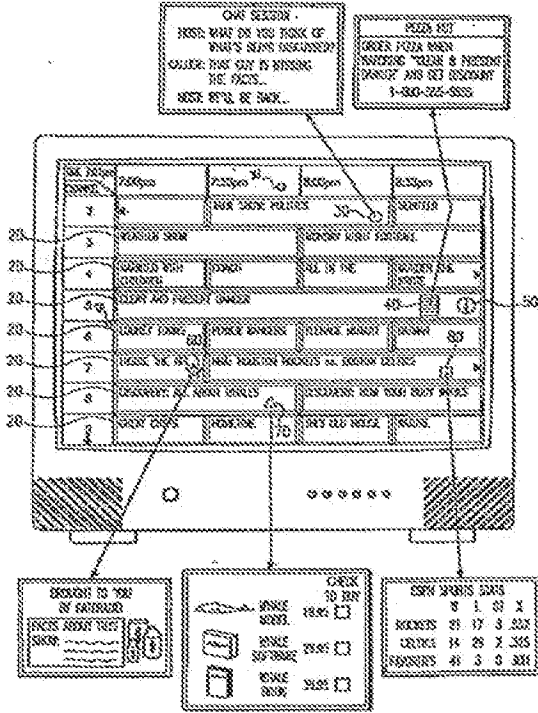
【符号の説明】

- 10 開始時間
- 20 セル
- 30, 31, 40, 50, 60, 70, 71, 80 アイコン
- 100 1000 チャット・セッション
- 1010 雑誌アーカイブ

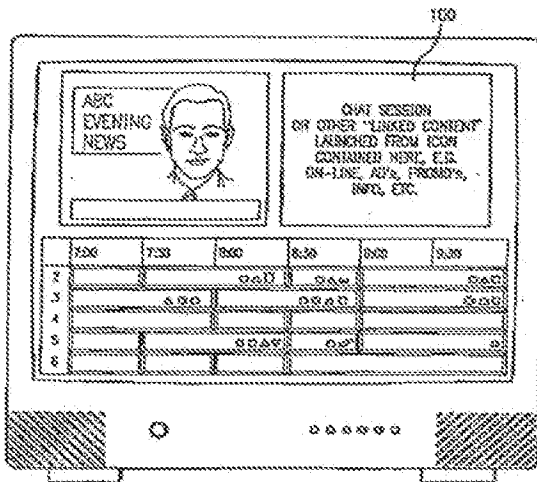
【図1】



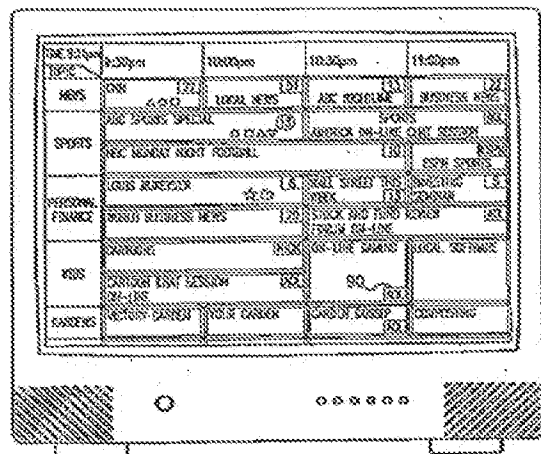
【図2】



【図3】



【図4】



【図5】

Sunday	7:00 PM	7:30 PM	8:00 PM
ABC	Football: Packers vs Cowboys		
Disney	Gummy Bears: Toy Story		
ESPN	Special: Chat with Jay Leno	Games	
HBO	Toes From The Hand		
TIME	1999's Top Stories		

フロントページの続き

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【手続補正等】

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【手続補正1】

【補正対象書類名】明細書

【補正対象項目名】特許請求の範囲

【補正方法】変更

【補正の内容】

【特許請求の範囲】

【請求項1】

コンテンツ選択ガイドを表示のための方法において、該方法は、

複数のコンテンツ・ソースからユーザのコンピュータ・システム上に、これらコンテンツ・ソースと関連する記述情報からなるコンテンツ選択情報であって、ユーザのコンピュータ・システム上に表示するためにコンテンツ・ソースからコンテンツを選択するためのコンテンツ選択情報を取得するステップと、

コンテンツ選択情報を統合して、選択可能なコンテンツの可視表示を生成するステップと、

該可視表示内に複数の選択可能なガイド・セルを画成するステップであって、各ガイド・セルは、複数のコンテンツ・ソースの1つから得られるコンテンツを指示しており、かつ、ガイド・セルが選択されたときに、該ガイド・セルが対応するコンテンツを表示するように構成されている、ステップと、

コンテンツの表示以外のアクションを、複数のガイド・セル中の1つのガイド・セルの選択可能部分に関連づけるステップであって、アクションは、タイプを有し、かつ、当該ガイド・セルに関連している、ステップと、

関連づけられたアクションのタイプを指示するステップと、

複数のガイド・セル中の当該ガイド・セルの選択可能部分がユーザによって選択されたときに、関連づけられたアクションを実行するステップとからなることを特徴とする方法。

【請求項2】

請求項1記載の方法において、タイプを指示するステップは、複数のガイド・セル中の当該ガイド・セルの選択可能部分にアイコンを埋め込むステップを含んでいることを特徴とする方法。

【請求項3】

請求項1記載の方法において、該方法はさらに、ユーザ入力に基づいて、可視表示を再配膳するステップを含んでいることを特徴とする方法。

【請求項4】

請求項3記載の方法において、再配膳するステップは、予め記憶された複数のスキーム

の1つを選択するステップを含んでいることを特徴とする方法。

【請求項5】

請求項1記載の方法において、関連づけられたアクションを実行するステップは、ユーザのコンピュータ・システム上でアプリケーションを実行するステップを含んでいることを特徴とする方法。

【請求項6】

請求項1記載の方法において、可視表示を生成するステップは、複数のコンテンツ・ソースの任意のものによって提供された変更に対応して、可視表示を更新するステップを含んでいることを特徴とする方法。

【請求項7】

複数のコンテンツ・ソースの選択ガイドを表示するためのコンピュータ・システムであって、プロセッサと、プロセッサに接続された表示装置と、プロセッサに接続され、かつソフトウェアを格納している記憶媒体とからなるコンピュータ・システムにおいて、ソフトウェアは、

複数のコンテンツ・ソースから、これらコンテンツ・ソースと関連する記述情報からなるコンテンツ選択情報であって、ユーザのコンピュータ・システム上に表示するためにコンテンツ・ソースからコンテンツを選択するためのコンテンツ選択情報を取得するステップと、

コンテンツ選択情報を統合して、選択可能な複数のガイド・セルからなる可視表示を生成するステップと、

複数のガイド・セル中の1つのガイド・セルに、実行可能な機能と関連づけられたアイコンを埋め込むステップと、

予め格納された複数のスキームの1つにより、ユーザ入力に基づいて複数のガイド・セルを再配置するステップと

を実行するよう構成されていることを特徴とするコンピュータ・システム。

【請求項8】

請求項7記載のコンピュータ・システムにおいて、アイコンと関連づけられた実行可能な機能は、広告を表示する機能であることを特徴とするコンピュータ・システム。

【請求項9】

請求項7記載のコンピュータ・システムにおいて、該システムはさらに、可視表示用のデータを記憶したデータベースを備え、ソフトウェアはさらに、

該データベースに記憶された可視表示用のデータを分析して、パターン・データを生成するステップと、

生成されたパターン・データに応じて、可視表示を自動的に構築するステップと
を実行するよう構成されていることを特徴とするコンピュータ・システム。

【請求項10】

請求項7記載のコンピュータ・システムにおいて、アイコンと関連づけられた実行可能な機能は、該アイコンに関連づけられたウェブ・サイトへのリンクであることを特徴とするコンピュータ・システム。

PATENT ABSTRACTS OF JAPAN

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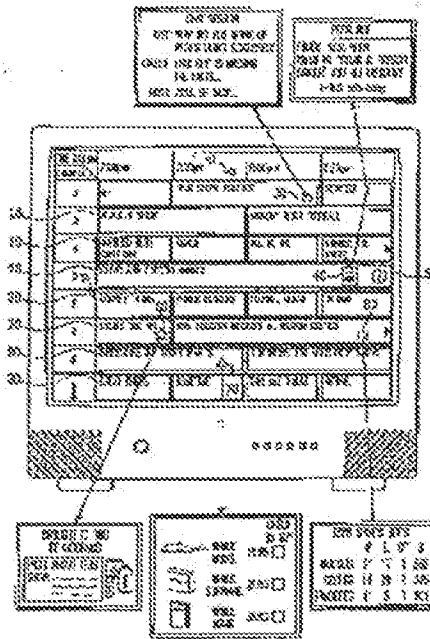
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(54) COMPUTER SYSTEM FOR DISPLAYING SELECTION GUIDE FOR MULTI SOURCE INFORMATION

(57)Abstract:

PROBLEM TO BE SOLVED: To efficiently make a program selection from plural video sources, etc.

SOLUTION: A content guide is shown on a monitor screen and the content guide is shown as grid-shaped cells 20 which consist of horizontal axes of start times and vertical axes of channels. When a user selects a desired source of television programs, etc., with icons 30 to 80, a source signal that is corresponded to by online service is downloaded and the desired information is shown on the screen to the user.



JAPANESE [JP,10-143349,A]

CLAIMS DETAILED DESCRIPTION TECHNICAL FIELD DESCRIPTION OF DRAWINGS
DRAWINGS CORRECTION OR AMENDMENT

[Translation done.]

CLAIMS

[Claim (s)]

[Claim 1] In the computer system for a display of the selection guide of the multi-source information this system The means which produces the visual display which consists of a grid containing a guide cel, and a means to arrange to a part of icon [at least] of the displayed guide cel, it has the means a user enables it to choose from the displayed icon. To the instruction depending on other information other than the icon which is the instruction most important to an icon, and was displayed on the cel which can be executed Computer system which the selected icon is linked and is further characterized by this icon discriminating from the actuation which may have the plurality which an icon expresses, and which can be performed.

[Claim 2] it is the computer system characterized by having the means shown so that this system may carry out animation actuation of the icon selectively further in computer system according to claim 1, and a means to show an icon in the shape of a three dimension selectively.

[Claim 3] In the system for presenting of graphic form information this system A graphic-display means to display a graphic form image, and at least one video signal reception means to receive the signal from two or more video sources, A means to choose from the signal of two or more received video sources, and to display the signal of this source on a graphic-display means, A sound reproduction means to reproduce sound, and a means to choose from two or more sound sources, and to offer the signal of the this chosen sound source to a sound reproduction means, It chooses from a text display means to display a text, and the various text sources. So that a means to offer the signal of the text source chosen to the text display means, and the acquired information may include the information about a part of content [at least] of two or more video sources, two or more sound sources, and the text source The system characterized by having an acquisition means to acquire the digital information processed during a content guide from at least one arrival signal.

[Claim 4] The system characterized by combining with the video signal reception means an acquisition means to acquire digital information, in the system according to claim 3, and performing acquisition in an acquisition means from the information laid underground in the vertical blanking interval of the received video signal.

[Claim 5] it is the system characterized by being linked to the program raw material

with which this system is further displayed in the shape of a grid in a system according to claim 3, answering the digital signal acquired by the acquisition means, and having the processing means which produces the graphic form icon displayed on a display means, and a storage means to store the object linked graphically.

[Claim 6] It is the system characterized by having a modem for this system being further combined with a processing means in a system according to claim 5, and connecting with an on-line service.

[Claim 7] This system is a system characterized by having the selection means a user chooses the object which was further combined with the processing means in the system according to claim 5, and was displayed, and which was linked graphically, and it enables it to make into an active state.

[Claim 8] It is the system characterized by having a hyperlink flattery means to make this processing means execute a series of software commands executed based on the storing information about the object [finishing /the display which this system was further contained inside the processing means in the system according to claim 7, and was chosen and stored] linked graphically.

[Claim 9] A graphic-display means to display a graphic form image in the computer system for presenting of graphic form information, At least one means to receive the signal of two or more video program sources, A means to choose from the signal of two or more received video program sources, and to display the signal of the video source on a graphic-display means, A sound reproduction means to reproduce sound, and a means to offer the signal of the sound source which chose from two or more sound sources, and was chosen to the sound reproduction means, It chooses from a text display means to display a text, and the various text sources. A means to offer the display of a text based on the selected text source to a text display means, So that the acquired information may include the information about a part of content [at least] of two or more video program sources, two or more sound sources, and the text source Computer system equipped with an acquisition means to acquire the digital information which should be processed into a content guide from at least one arrival signal.

[Claim 10] It is the system characterized by answering the digital signal from which this system was further gained by the acquisition means in the system according to claim 9, and having the processing means which produces the object which is displayed on a display means, and which was linked graphically, and a storage means to store the object linked graphically.

[Claim 11] The system further equipped with a means to perform selection of an icon,

and automatic connection for an order [coincidence] of an article, in a system according to claim 1.

[Claim 12] The system further equipped with a means to perform selection of an icon, and automatic connection for the order [coincidence] of service, in a system according to claim 1.

[Claim 13] In the system for the display of the content about the multi-source this system in order to have the hypertext link engine combined with the central processing unit, the display circuit combined with the central processing unit, and a central processing unit and a display circuit and to offer the link to external resources, The system by which a hypertext link engine is characterized by being constituted so that a command may be given to a display circuit so that it may display by the list display of the grid arrangement about the multi-source and at least two contents of the icon.

[Translation done.]

DETAILED DESCRIPTION

[Detailed Description of the Invention]

[0001]

[Field of the Invention] This invention relates to the content guide of the information program which offers the service relevant to amusement especially about the new system and new approach of offering the information about electronic amusement (entertainment).

[0002]

[A Prior art and the description of this invention] The system of various text criteria for offering the information about television show etc. is available today. However, as for these periodicals equipment [periodicals] and printed, those range is limited to some extent. Systems, such as VCR+ (trademark) which takes up the information found out by the local newspaper, offer the system of the code criteria for which it is necessary to input into VCR the operation code printed by the newspaper, in order to enable it to carry out automatic programming of VCR. However, at present, this system does not realize the supple interactive link between users. This invention offers the device in which the remarkable improvement which excels it is offered and a user can be provided with still more nearly additional related service and information

about the informational system by which text criteria were printed beforehand. The system based on other computers and electronic means which are seen in a cable system does not escape other various problems, such as lack of the offer capacity of the information which can be updated by offer or the easy approach of lack of dialogism and an interactive link.

[0003] The system of the computer criteria offered by this invention offers the personal computer which takes out the display device for displaying the information on various classes from the source used by many the electronic signal sources and individuals, integrates, and is offered. Although such computer system is designed so that the large-sized screen monitor which can set and see distance may mainly be incorporated, this invention is not limited to the application and can be actually used about the monitor of all sizes. The computer system of this invention has the hardware and functionality which can acquire the electronic signal of various classes from two or more sources with the central processing unit of computer system and which were accumulated. This system interprets and processes the information which is reproduced and is displayed to a user. The signal of such information is acquired from an analog signal or a digital signal. Some examples of the signal source are the direct broadcast satellites of either standard analog television transmission in the air, cable analog television transmission, digital cable television transmission and digital ones or an analog.

[0004] Furthermore, another digital information can be conveyed as for example, a part of analog television signal in the video contained in the image part as a part of vertical blanking interval (VBI), and other parts of an audio wave. Digital data is obtained by the central processor again by the cable modem, satellite digital video transmission, or digital media, such as the standard telephone line including "integrated service digital network (ISDN) wireless transmission, an AM/FM radio broadcasting, CD, ROM and CDI, and a magnetic floppy. Furthermore, another information is acquirable from the item which is used in a video cartridge recorder, an audio CD player, etc. and which was recorded beforehand. Such information is changed into a data format from the digital format which was changed into the data format from the original analog format, or was stored next, or the digital format for transmission, and a computer can use the information on this data format.

[0005] It is one of the important description of this invention, and the advantages that an average user shows an usable condition such information. Especially the computer system of this invention acquires information from many electronic signals, and offers the unification mechanism (unification device) which can be shown in the format which

an understanding of this information is easy and is suitable for an activity to a user. For example, in the case of a broadcast television signal, it is changed into the digital graphic display which has a motion after these signals are received, i.e., an animation, and the processed signal can be displayed with a system monitor next. At this time, it is received and the accompanying audio signal is changed into a digital sample. Subsequently, it is reproduced through a digital display to the analog converter prepared in the system. Though natural, the art will change to the acquisition of signal approach of this invention and equipment which are used in order to offer a signal visually or acoustically, and a list according to the approach by which the class and signal of the signal source received are received.

[0006] The art used in order to interpret and display a signal in the case of the digital signal source is dependent on the class of digital information clearly. Therefore, it must take into consideration how it exists in the context from which information is included in a data stream how, or data are received. The mechanism which makes a signal reach computer system should not change, as stated previously, and it should not limit this invention to the thing concerning [therefore] the specific reception approach of a signal.

[0007] In any complicated computer system which an audio signal is received and displayed or can reproduce this, the various sources by the abundance of entertainment and a satisfactory signal exist. However, it is very difficult for each user to choose from the alternative which consists of a class of the existing program and content and across which it goes broadly easily and quickly. In the conventional attempt, without putting in a complicated command, once selection is performed, it is difficult to change into other signal / content sources, or to investigate this source, or it requires time amount. In order to determine a raw material which raw material is interested and can use for a user when finding it in search of the content sent with a different means (for example, when switching to a modem data signal from a television broadcasting signal etc.), it is necessary to investigate, many the information sources, i.e., a "content guide."

[0008] Another problem produced in the system of the conventional example is the ease for being able to carry out the prompt directions of ease (action), i.e., the actuation, about a certain signal type at a user, and performing this actuation using another signal type. An example in this case is publicity on television, such as the telephone number for putting in the order which purchases an article, or the world web address (cosmopolitan address). This is displayed as a part of television program. A user writes down the telephone number, takes up an earphone, dials the telephone

number, and orders specific goods, and the conventional operating instructions offer credit card information or bill information to the operator. If the world web address is offered in television show, after a user gets some displays of this address, he can know the exact syntax of this address, that address can be inputted into counterpart picking, and he can input it into a web browser, and can communicate with this web page.

[0009]

[Summary of the invention] One of the advantages of this invention is in the content guide (ICG) with which the related description is offered and which is integrated. This content guide offers an approach to have been unified for offer of the publicity information which offers an approach to have been unified for finding it in search of the content which is interested over the whole while being contained in two or more signal types and programming, and is sent with offer of such information, and the signal of this information. Still more nearly another advantage of this invention is a mechanism for using at least one side of a link, the related information held at the context of the program seen or heard, and ** as some content guides.

[0010]

[Embodiment of the invention] The conventional display guide shown in cable television as an example displays the show of the present and the future in a list based on start time 10 and current time as shown in drawing 1. It can be said that it is the interactive (restricted extremely) technique since it is possible for a user to do manual scrolling as for some of these guides. However, since the format of these content guides is restricted dramatically intrinsically, it does not offer a completely flexible means to a user. Furthermore, generally information is not stored by the significant approach, and a link, i.e., joint relation, is not offered again.

[0011] The content guide (integrated content guide) in this invention integrated is the software application which can operate by the general purpose computer, for example, includes the information about the availability of the database or other programming in which service of a large number, such as television and digital satellite service, and an on-line service, the Internet service, and retrieval are possible, and the content about other various sources like the source which was rich in the content of information. Each entry in a content guide can include the information about service separately, or can also combine the information about related service provision. The content guide of this invention uses the database including the descriptive information about these services. This content is displayed. Furthermore, a database can also contain the embedded command (en BEDDED) which is accessed in order to make advertising

graphics or the information on an addition like the message of special concerns, and computer system perform specific actuation. The means of a graphical icon and others to show the information on additional, graphics, or the embedded availability of a command is also offered to a user.

[0012] From the received signal, information is extracted and it is provided to a central processor. Software is offered by the graphical approach so that this extract data may be read, and a database may be formed and a user can follow this information. By offering such a display, and this display and the dialogue between the memorized databases, this invention unifies effectively the control front end which can be used for control of a computer and which is rich in information with single coordination, and offers it. It gets down to such control, and a user minds the various signal type and the various services with which computer system is provided, and can choose or perform other various actuation now about information. The information in a grid cell is a link to an on-line service "a program" like the chat session 1000 shown in drawing 5. Moreover, the "link" to the database which is available about selection of the online game which seems to be interesting, or a journal "a time (trademark)" and which can be searched can be created.

[0013] In this invention, a database is locally stored in the digital memory storage of the magnetic hard disk drive of computer system, or other formats. A database will often be updated and will include the information on the information on the updated content, the updated advertisement, and others. Such updating is one of the important advantages of this invention, for example, it can update program information including modification of program time, the length, the content, etc. while an advertiser can update sales promotion information etc. Using the system of the arbitration of two or more digital data acquisition systems with which a computer is equipped, the digital content of the database is acquired and is stored in a hard disk drive. For example, it is conveyed within the vertical blanking interval of a broadcast television signal, or such information can be acquired from this interval. It can also provide by the Wide Area Network which could also provide through the ISDN circuit which can also deliver this information still more nearly independently or is held at an active state using the modem dialed from a computer to one on-line service, and could also provide through the cable modem, or was fixed to an exclusive radio channel etc.

[0014] A user is able to choose various display modes. These display modes change the informational array of a display, respectively, as shown in drawing 2, drawing 3, and drawing 4. Each of a mode display is considered that another field is characterized graphically in a display. These fields relevant to one item with a specific

program or an interest are shown in drawing 2. These fields are fields called a cel 20, respectively. One cel can be related with each television program, and one cel can contain the title of a program. In default mode, a cel is graphically arranged according to the time amount span (horizontal position) of a program according to a channel, as shown in drawing 2 (to namely, vertical position). Generally, this is called a "grid guide" and is similar to the grid guide shown in drawing 1. In a typical configuration, a television channel number (or other mechanisms which identify each station) is shown in the left-hand side of a display a list table from the topmost part at the bottom, and time is expressed on right-hand side as equal spacing from the left-hand side of a display. Each cel including the list display of a program is displayed so that it may be on a display and may become the start time of a suitable channel, and the coordinate of the persistence time.

[0015] Navigation equipment like the arrow key and mouse which are remote control of wiring or wireless about a specific cel selection or in order to carry out a daylight display, or the pointing device of other formats may be used. In order to make it align with the channel which had television chosen, it may be made to carry out another actuation of a user pushing the carbon button of remote control. In order to advance a display in front in time, to delay it or to make an available channel go up and down, a pointer control means may be used for remote control. If a carbon button is pushed, you may make it another information included in a program guide appear in a certain case. The approach of downloading information can consider various modification, and may adopt some conventional approaches. These approaches can include other well-known approaches which downloaded by the extract of the information from VBI, the bulk download from the Internet, or local computer, and were stored.

[0016] The integrated related database which was stored [which were stored and was content-guided] offers the front end of the additional graphic display for users, and navigation, integrates the various content sources and provides with en BEDDED0 control the computer system used for presentation of the content. The content guide with which this invention was integrated is peculiar in the point of utilizing FAKUTO developed in a general-purpose personal computer system. By combining the functionality of a computer with viewing and listening of the content of television, some additional functional items are made possible.

[0017] As especially shown in drawing 2, the en BEDDED0 icons 30, 31, 40, 50, 60, 70, 71, and 80 are locally stored in a hard disk, or can offer the link to the advertising graphics separately downloaded from other sources from a web server. The additional video or the sound locally stored in the hard disk of computer system can also be

displayed or reproduced by the user by carrying out the daylight display of a certain link. Presenting of such information after choosing a link can be performed by the conventional approach. Also by choosing each icon on a screen, auto-dial out can be offered and the demand to information can also be advanced from an on-line service or a file server. Similarly, this dial out can be performed by the well-known approach, after selection is performed on a video screen. This follows the hypertext markup language (html) which has the active link which produces the further actuation using the search engine of the conventional web browser format or other classes, including a display (for example, an embedded browser or each browser application emitted automatically is used).

[0018] Flattery of the link of a different class as shown in drawing 3 is an icon arranged by the content provider who offers the prompt of actuation to a user. For example, a political talk program can make it possible to have a vote result from each viewer, and this is offered by carrying out the prompt directions of the vote (response) of auto-dialing into a specific question at a user. The auxiliary software which has been arranged at the personal computer and stored in the conventional large capacity storage can also be connected to each item in the content of a program. For example, the play ARONGU version (play-along versions) of a game show can also be sent with the content of a program guide, consequently a user can participate and play the game of the same game during demonstration in a television program at home.

[0019] Furthermore, if a system is provided with the credit card information programmed beforehand, it can choose so that the test version of a program or a turnover of an item actually like the perfect version of software may be produced. These the demands of all are performed by the well-known means. However, the display in the content guide of such information in the approach by this invention is performed by the integration database configuration of this invention shown in the context of the programming information on entertainment. one of the new descriptions of this invention is being able to offer a means preparing the opportunity of an advertisement and (or) sales promotion, and this is because such an opportunity can access easily by a user's "a momentary interest (moment of interest)." A momentary interest is produced when drawn by the user to the list display of a content guide. For example, if the publicity which attracts a baseball fan to the list display of a baseball game is displayed, "the momentary interest" produced by list display can be increased. "A momentary interest" is produced in the environment using the guide of this invention which includes the entertainment programming information within the framework of television among other items.

[0020] The cel shown in various display-mode drawing 2, drawing 3, drawing 4, and drawing 5 includes respectively the kind of a certain kind about the specific content acquired from a certain source of information. By offering an appearance with a uniform cel, the sequence of the count step which is needed in order to access each content and service is displayed by the icon which was collected and displayed on a certain cel, or was placed into a certain cel. From a user's viewpoint, actuation which pushes a carbon button after placing on-screen cursor or a pointing device on a specific icon seems to be all the required actuation. such initiation of operation accesses the content or service shown a list table — equal and the consistent approach are offered. The command which can also use the conventional double-clicking method or will be in an active state with voice again may be used for such initiation. However, the above-mentioned equal configuration which chooses a certain actuation which should be performed is the important description of this invention.

[0021] Selection of each icon or the content in one cel performs various actuation. Generally these actuation is common knowledge. However, it is new in this invention to tie up these actuation to the icon under content guide. While being able to choose a certain television program and being able to align tuner equipment with a certain channel compulsorily by choosing a certain icon in a certain cel especially, in order to choose the video offered according to each source or path, and both the channels of an audio, a series of initiation commands in a computer can be executed. A user can be provided with each interactive chat type or interactive audio chat configuration of the text base if the icon 30 shown as "CHAT SESSION (chat session)" shown in drawing 2 is chosen. The software application of an on-line service is started by choosing this icon. The user name stored beforehand is given to the field of a user name. Start dial actuation, connect with an on-line service, and the connection which should be made is offered. Log on to an on-line service, and by taking out suitable command sequence from a database, log on to a certain chat session in an automatic matter, and it performs. it joins together to a chat session by permuting by this command sequence by which a content guide is provided with information and that was programmed beforehand.

[0022] When seeing the publicity or offer of goods shown in drawing 2, an order can be put into pizza from a domestic chain or a local chain by choosing an icon 40. Subsequently, the automated event sequence which is performed by computer makes it the situation that dial drawing and a specific number and a pizza restaurant and a user are connected with voice in the telephone number suitable from a database, or a

user enables it to instead choose automatically [the class of desired pizza]. It can also offer on a screen similarly, another opportunity, i.e., icon, and this can be updated in an instant. These icons are control means which are used in order to make the actuation based on an opportunity perform to a computer and which are a foregone conclusion. These opportunities are determined by the concerns of an entertainment programming context and a user. It is items, such as mark of a sport, and thereby, a computer enables it to execute a series of commands which it was embedded to the database directory, i.e., have been arranged, and in order to obtain the newest mark, it is made to perform telephone call appearance from the computer modem circuit of equipment as this case. While choosing sport-related record or goods, in order to retrieve still more detailed additional sport information as if mere not mark but who scored, the related icon of the context base of further others can be used. When it becomes still more detailed information, such detailed information that the icon 80 chosen provides with the link about other descriptions is a matter like the situation of the team for example, in a league, a specific player's results, or other statistics. Furthermore, an aim can be doubled for other icons and it can also have to these icons, three dimension modality, i.e., configuration.

[0023] The content guide of integration this invention of the multiplex source offers one entry point to much sources. For example, the list display of a cel is not limited to each content of a television channel, and can also be mixed with other service provision objects. If it raises as an example, a user can use either digital satellite transmission, cable access and the conventional radio broadcasting offer object. Furthermore, American The text system and database system based on a computer like the online chat service which can be provided by On-Line (trademark; AOL) or CompuServe (trademark; CIS) [an icon 90] are offered. Such offer is performed following the program-listing display of the film to which it can view and listen by either the conventional broadcast channel or the digital satellite channel. The Usenet group about a program can also connect to a certain cel. moreover, "a time (trademark)" --- it can put on the same screen as journal archive 1010 grade. [in / similarly /in the database which can be searched /drawing 5]

[0024] if a chat session cel is clicked, a computer can be made to be able to execute the embedded command required to make the specified chat session into an active state, and this chat session can be directly connected to a film cel or other television program cels as shown in drawing 3 . When a daylight display is carried out and it is chosen, and the daylight display of the video window 100 as shown in drawing 3 is carried out and it is chosen, this window makes the television part of a computer align

with the channel concerned. Thereby, a user can combine an easy device with the chat session connected to a television program. This offers the simplified device in which a user can choose a chat session again. By offering the configuration in which a chat session is connected, for example to a certain film, a user's access is made uniform and easy. Furthermore, a certain advertiser provides the web page of the cosmopolitan chosen without the need of re-typing information by the user, as a part of the program etc. with the information connected automatically as a part of such integration of the a large number source.

[0025] By having the computerized database which is a part of this invention, it is possible to store the information which gets to know the activity pattern about a user. The log file which stores an activity pattern is maintained easily. Since this information forms the database related with deciding setting out which each user uses, and which is likely to exist, channel, and program by which a preference is carried out by computer, it can be used by computer by retrieving information from a log file. If an example is given and a certain user will look at the news at 10.00 of the channel of 4 **** attachment ***** specification, a computer can recognize this data and can offer just before the news at 10.00, or the option which puts a switch into the time amount of the news at 10.00 exactly, and aligns with this channel to this user. By emitting an additional command to a system, reconstruction and reclassification of a display of each cel are realizable. The conventional filter type of a command is realizable similarly so that a display may be offered by the approach constituted by drawing 4.

[Translation done.]

TECHNICAL FIELD

[Field of the invention] This invention relates to the content guide of the information program which offers the service relevant to amusement especially about the new system and new approach of offering the information about electronic amusement (entertainment).

[0002]

[A Prior art and the description of this invention] The system of various text criteria for offering the information about television show etc. is available today. However, as

for these periodicals equipment [periodicals] and printed, those range is limited to some extent. Systems, such as VCR+ (trademark) which takes up the information found out by the local newspaper, offer the system of the code criteria for which it is necessary to input into VCR the operation code printed by the newspaper, in order to enable it to carry out automatic programming of VCR. However, at present, this system does not realize the supple interactive link between users. This invention offers the device in which the remarkable improvement which excels it is offered and a user can be provided with still more nearly additional related service and information about the informational system by which text criteria were printed beforehand. The system based on other computers and electronic means which are seen in a cable system does not escape other various problems, such as lack of the offer capacity of the information which can be updated by offer or the easy approach of lack of dialogism and an interactive link.

[0003] The system of the computer criteria offered by this invention offers the personal computer which takes out the display device for displaying the information on various classes from the source used by many the electronic signal sources and individuals, integrates, and is offered. Although such computer system is designed so that the large-sized screen monitor which can set and see distance may mainly be incorporated, this invention is not limited to the application and can be actually used about the monitor of all sizes. The computer system of this invention has the hardware and functionality which can acquire the electronic signal of various classes from two or more sources with the central processing unit of computer system and which were accumulated. This system interprets and processes the information which is reproduced and is displayed to a user. The signal of such information is acquired from an analog signal or a digital signal. Some examples of the signal source are the direct broadcast satellites of either standard analog television transmission in the air, cable analog television transmission, digital cable television transmission and digital ones or an analog.

[0004] Furthermore, another digital information can be conveyed as for example, a part of analog television signal in the video contained in the image part as a part of vertical blanking interval (VBI), and other parts of an audio wave. Digital data is obtained by the central processor again by the cable modem, satellite digital video transmission, or digital media, such as the standard telephone line including "integrated service digital network (ISDN) wireless transmission, an AM/FM radio broadcasting, CD, ROM and CDI, and a magnetic floppy. Furthermore, another information is acquirable from the item which is used in a video cartridge recorder, an

audio CD player, etc. and which was recorded beforehand. Such information is changed into a data format from the digital format which was changed into the data format from the original analog format, or was stored next, or the digital format for transmission, and a computer can use the information on this data format.

[0005] It is one of the important description of this invention, and the advantages that an average user shows an usable condition such information. Especially the computer system of this invention acquires information from many electronic signals, and offers the unification mechanism (unification device) which can be shown in the format which an understanding of this information is easy and is suitable for an activity to a user. For example, in the case of a broadcast television signal, it is changed into the digital graphic display which has a motion after these signals are received, i.e., an animation, and the processed signal can be displayed with a system monitor next. At this time, it is received and the accompanying audio signal is changed into a digital sample. Subsequently, it is reproduced through a digital display to the analog converter prepared in the system. Though natural, the art will change to the acquisition of signal approach of this invention and equipment which are used in order to offer a signal visually or acoustically, and a list according to the approach by which the class and signal of the signal source received are received.

[0006] The art used in order to interpret and display a signal in the case of the digital signal source is dependent on the class of digital information clearly. Therefore, it must take into consideration how it exists in the context from which information is included in a data stream how, or data are received. The mechanism which makes a signal reach computer system should not change, as stated previously, and it should not limit this invention to the thing concerning [therefore] the specific reception approach of a signal.

[0007] In any complicated computer system which an audio signal is received and displayed or can reproduce this, the various sources by the abundance of entertainment and a satisfactory signal exist. However, it is very difficult for each user to choose from the alternative which consists of a class of the existing program and content and across which it goes broadly easily and quickly. In the conventional attempt, without putting in a complicated command, once selection is performed, it is difficult to change into other signal /content sources, or to investigate this source, or it requires time amount. In order to determine a raw material which raw material is interested and can use for a user when finding it in search of the content sent with a different means (for example, when switching to a modem data signal from a television broadcasting signal etc.), it is necessary to investigate, many the information sources.

ie., a "content guide."

[0008] Another problem produced in the system of the conventional example is the ease for being able to carry out the prompt directions of ease (action), i.e., the actuation, about a certain signal type at a user, and performing this actuation using another signal type. An example in this case is publicity on television, such as the telephone number for putting in the order which purchases an article, or the world web address (cosmopolitan address). This is displayed as a part of television program. A user writes down the telephone number, takes up an earphone, dials the telephone number, and orders specific goods, and the conventional operating instructions offer credit card information or bill information to the operator. If the world web address is offered in television show, after a user gets some displays of this address, he can know the exact syntax of this address, that address can be inputted into counterpart picking, and he can input it into a web browser, and can communicate with this web page.

[0009]

[Summary of the Invention] One of the advantages of this invention is in the content guide (CG) with which the related description is offered and which is integrated. This content guide offers an approach to have been unified for offer of the publicity information which offers an approach to have been unified for finding it in search of the content which is interested over the whole while being contained in two or more signal types and programming, and is sent with offer of such information, and the signal of this information. Still more nearly another advantage of this invention is a mechanism for using at least one side of a link, the related information held at the context of the program seen or heard, and ** as some content guides.

[0010]

[Embodiment of the Invention] The conventional display guide shown in cable television as an example displays the show of the present and the future in a list based on start time 10 and current time as shown in drawing 1. It can be said that it is the interactive (restricted extremely) technique since it is possible for a user to do manual scrolling as for some of these guides. However, since the format of these content guides is restricted dramatically intrinsically, it does not offer a completely flexible means to a user. Furthermore, generally information is not stored by the significant approach, and a link, i.e., joint relation, is not offered again.

[0011] The content guide (integrated content guide) in this invention integrated is the software application which can operate by the general purpose computer, for example, includes the information about the availability of the database or other programming in

which service of a large number, such as television and digital satellite service, and an on-line service, the Internet service, and retrieval are possible, and the content about other various sources like the source which was rich in the content of information. Each entry in a content guide can include the information about service separately, or can also combine the information about related service provision. The content guide of this invention uses the database including the descriptive information about these services. This content is displayed. Furthermore, a database can also contain the embedded command (en BEDDED) which is accessed in order to make advertising graphics or the information on an addition like the message of special concerns, and computer system perform specific actuation. The means of a graphical icon and others to show the information on additional, graphics, or the embedded availability of a command is also offered to a user.

[0012] From the received signal, information is extracted and it is provided to a central processor. Software is offered by the graphical approach so that this extract data may be read, and a database may be formed and a user can follow this information. By offering such a display, and this display and the dialogue between the memorized databases, this invention unifies effectively the control front end which can be used for control of a computer and which is rich in information with single coordination, and offers it. It gets down to such control, and a user minds the various signal type and the various services with which computer system is provided, and can choose or perform other various actuation now about information. The information in a grid cell is a link to an on-line service "a program" like the chat session 1000 shown in drawing 5. Moreover, the "link" to the database which is available about selection of the online game which seems to be interesting, or a journal "a time (trademark)" and which can be searched can be created.

[0013] In this invention, a database is locally stored in the digital memory storage of the magnetic hard disk drive of computer system, or other formats. A database will often be updated and will include the information on the information on the updated content, the updated advertisement, and others. Such updating is one of the important advantages of this invention, for example, it can update program information including modification of program time, die length, the content, etc. while an advertiser can update sales promotion information etc. Using the system of the arbitration of two or more digital data acquisition systems with which a computer is equipped, the digital content of the database is acquired and is stored in a hard disk drive. For example, it is conveyed within the vertical blanking interval of a broadcast television signal, or such information can be acquired from this interval. It can also provide by the Wide

Area Network which could also provide through the ISDN circuit which can also deliver this information still more nearly independently or is held at an active state using the modem dialed from a computer to one on-line service, and could also provide through the cable modem, or was fixed to an exclusive radio channel etc.

[0014] A user is able to choose various display modes. These display modes change the informational array of a display, respectively, as shown in drawing 2, drawing 3, and drawing 4. Each of a mode display is considered that another field is characterized graphically in a display. These fields relevant to one item with a specific program or an interest are shown in drawing 2. These fields are fields called a cel 20, respectively. One cel can be related with each television program, and one cel can contain the title of a program. In default mode, a cel is graphically arranged according to the time amount span (horizontal position) of a program according to a channel, as shown in drawing 2 (to namely, vertical position). Generally, this is called a "grid guide" and is similar to the grid guide shown in drawing 1. In a typical configuration, a television channel number (or other mechanisms which identify each station) is shown in the left-hand side of a display a list table from the topmost part at the bottom, and time is expressed on right-hand side as equal spacing from the left-hand side of a display. Each cel including the list display of a program is displayed so that it may be on a display and may become the start time of a suitable channel, and the coordinate of the persistence time.

[0015] Navigation equipment like the arrow key and mouse which are remote control of wiring or wireless about a specific cel selection or in order to carry out a daylight display, or the pointing device of other formats may be used. In order to make it align with the channel which had television chosen, it may be made to carry out another actuation of a user pushing the carbon button of remote control. In order to advance a display in front in time, to delay it or to make an available channel go up and down, a pointer control means may be used for remote control. If a carbon button is pushed, you may make it another information included in a program guide appear in a certain case. The approach of downloading information can consider various modification, and may adopt some conventional approaches. These approaches can include other well-known approaches which downloaded by the extract of the information from VBI, the bulk download from the internet, or local computer, and were stored.

[0016] The integrated related database which was stored [which were stored and was content-guided] offers the front end of the additional graphic display for users, and navigation, integrates the various content sources and provides with an BEDDED control the computer system used for presentation of the content. The content guide

with which this invention was integrated is peculiar in the point of utilizing FAKUTO developed in a general-purpose personal computer system. By combining the functionality of a computer with viewing and listening of the content of television, some additional functional items are made possible.

[0017] As especially shown in drawing 2, the en BEDDED0 icons 30, 31, 40, 50, 60, 70, 71, and 80 are locally stored in a hard disk, or can offer the link to the advertising graphics separately downloaded from other sources from a web server. The additional video or the sound locally stored in the hard disk of computer system can also be displayed or reproduced by the user by carrying out the daylight display of a certain link. Presenting of such information after choosing a link can be performed by the conventional approach. Also by choosing each icon on a screen, auto-dial out can be offered and the demand to information can also be advanced from an on-line service or a file server. Similarly, this dial out can be performed by the well-known approach, after selection is performed on a video screen. This follows the hypertext markup language (html) which has the active link which produces the further actuation using the search engine of the conventional web browser format or other classes, including a display (for example, an en BEDDED0 browser or each browser application emitted automatically is used).

[0018] Flattery of the link of a different class as shown in drawing 3 is an icon arranged by the content provider who offers the prompt of actuation to a user. For example, a political talk program can make it possible to have a vote result from each viewer, and this is offered by carrying out the prompt directions of the vote (response) of auto-dialing Inn to a specific question at a user. The auxiliary software which has been arranged at the personal computer and stored in the conventional large capacity storage can also be connected to each item in the content of a program. For example, the play ARONGU version (play-along versions) of a game show can also be sent with the content of a program guide, consequently a user can participate and play the game of the same game during demonstration in a television program at home.

[0019] Furthermore, if a system is provided with the credit card information programmed beforehand, it can choose so that the test version of a program or a turnover of an item actually like the perfect version of software may be produced. These the demands of all are performed by the well-known means. However, the display in the content guide of such information in the approach by this invention is performed by the integration database configuration of this invention shown in the context of the programming information on entertainment. one of the new descriptions of this invention is being able to offer a means preparing the opportunity of an

advertisement and (or) sales promotion, and this is because such an opportunity can access easily by a user's "a momentary interest (moment of interest)." A momentary interest is produced when drawn by the user to the list display of a content guide. For example, if the publicity which attracts a baseball fan to the list display of a baseball game is displayed, "the momentary interest" produced by list display can be increased. "A momentary interest" is produced in the environment using the guide of this invention which includes the entertainment programming information within the framework of television among other items.

[0020] The cel shown in various display-mode drawing 2, drawing 3, drawing 4, and drawing 5 includes respectively the kind of a certain kind about the specific content acquired from a certain source of information. By offering an appearance with a uniform cel, the sequence of the count step which is needed in order to access each content and service is displayed by the icon which was collected and displayed on a certain cel, or was placed into a certain cel. From a user's viewpoint, actuation which pushes a carbon button after placing on-screen cursor or a pointing device on a specific icon seems to be all the required actuation. such initiation of operation accesses the content or service shown a list table --- equal and the consistent approach are offered. The command which can also use the conventional double-clicking method or will be in an active state with voice again may be used for such initiation. However, the above-mentioned equal configuration which chooses a certain actuation which should be performed is the important description of this invention.

[0021] Selection of each icon or the content in one cel performs various actuation. Generally these actuation is common knowledge. However, it is new in this invention to tie up these actuation to the icon under content guide. While being able to choose a certain television program and being able to align tuner equipment with a certain channel compulsorily by choosing a certain icon in a certain cel especially, in order to choose the video offered according to each source or path, and both the channels of an audio, a series of initiation commands in a computer can be executed. A user can be provided with each interactive chat type or interactive audio chat configuration of the text base if the icon 30 shown as "CHAT SESSION (chat session)" shown in drawing 2 is chosen. The software application of an on-line service is started by choosing this icon. The user name stored beforehand is given to the field of a user name. Start dial actuation, connect with an on-line service, and the connection which should be made is offered. Log on to an on-line service, and by taking out suitable command sequence from a database, log on to a certain chat session in an automatic

matter, and it performs. It joins together to a chat session by permuting by this command sequence by which a content guide is provided with information and that was programmed beforehand.

[0022] When seeing the publicity or offer of goods shown in drawing 2, an order can be put into pizza from a domestic chain or a local chain by choosing an icon 40. Subsequently, the automated event sequence which is performed by computer makes it the situation that dial drawing and a specific number and a pizza restaurant and a user are connected with voice in the telephone number suitable from a database, or a user enables it to instead choose automatically [the class of desired pizza]. It can also offer on a screen similarly, another opportunity, i.e., icon, and this can be updated in an instant. These icons are control means which are used in order to make the actuation based on an opportunity perform to a computer and which are a foregone conclusion. These opportunities are determined by the concerns of an entertainment programming context and a user. It is items, such as mark of a sport, and thereby, a computer enables it to execute a series of commands which it was embedded to the database directory, i.e., have been arranged, and in order to obtain the newest mark, it is made to perform telephone call appearance from the computer modem circuit of equipment as this case. While choosing sport-related record or goods, in order to retrieve still more detailed additional sport information as if mere not mark but who scored, the related icon of the context base of further others can be used. When it becomes still more detailed information, such detailed information that the icon 80 chosen provides with the link about other descriptions is a matter like the situation of the team for example, in a league, a specific player's results, or other statistics. Furthermore, an aim can be doubled for other icons and it can also have to these icons, three dimension modality, i.e., configuration.

[0023] The content guide of integration this invention of the multiplex source offers one entry point to much sources. For example, the list display of a cel is not limited to each content of a television channel, and can also be mixed with other service provision objects. If it raises as an example, a user can use either digital satellite transmission, cable access and the conventional radio broadcasting offer object. Furthermore, American The text system and database system based on a computer like the online chat service which can be provided by On-Line (trademark; AOL) or CompuServe (trademark; CIS) [an icon 90] are offered. Such offer is performed following the program-listing display of the film to which it can view and listen by either the conventional broadcast channel or the digital satellite channel. The Usenet group about a program can also connect to a certain cel. moreover, "a time

(trademark)" — it can put on the same screen as journal archive 1010 grade. [in / similarly / in the database which can be searched / drawing 5]

[0024] if a chat session cel is clicked, a computer can be made to be able to execute the embedded command required to make the specified chat session into an active state, and this chat session can be directly connected to a film cel or other television program cels as shown in drawing 3. When a daylight display is carried out and it is chosen, and the daylight display of the video window 100 as shown in drawing 3 is carried out and it is chosen, this window makes the television part of a computer align with the channel concerned. Thereby, a user can combine an easy device with the chat session connected to a television program. This offers the simplified device in which a user can choose a chat session again. By offering the configuration in which a chat session is connected, for example to a certain film, a user's access is made uniform and easy. Furthermore, a certain advertiser provides the web page of the cosmopolitan chosen without the need of re-typing information by the user, as a part of the program etc. with the information connected automatically as a part of such integration of the a large number source.

[0025] By having the computerized database which is a part of this invention, it is possible to store the information which gets to know the activity pattern about a user. The log file which stores an activity pattern is maintained easily. Since this information forms the database related with deciding setting out which each user uses, and which is likely to exist, channel, and program by which a preference is carried out by computer, it can be used by computer by retrieving information from a log file. If an example is given and a certain user will look at the news at 1000 of the channel of 4 **** attachment ***** specification, a computer can recognize this data and can offer just before the news at 1000, or the option which puts a switch into the time amount of the news at 1000 exactly, and aligns with this channel to this user. By emitting an additional command to a system, reconstruction and reclassification of a display of each cel are realizable. The conventional filter type of a command is realizable similarly so that a display may be offered by the approach constituted by drawing 4.

[Translation

done.]

DESCRIPTION OF DRAWINGS

[Brief Description of the Drawings]

[Drawing 1] It is drawing which expressed graphically the display format used for the system of the conventional example.

[Drawing 2] It is drawing showing an example of the display format offered by this invention.

[Drawing 3] It is drawing showing the example of a display produced when the link set to drawing 2 is followed.

[Drawing 4] It is drawing of the example of a display for explaining a rearrangeable mechanism based on an interested display.

[Drawing 5] It is drawing of the example of a display by this invention showing the possible content item of television, and the content item of non-television.

[Description of Notations]

10 Start Time

20 Cel

30, 31, 40, 50, 60, 70, 71, 80 Icon

100 1000 Chat Session

1010 Journal Archive

[Translation done.]

CORRECTION OR AMENDMENT

[Kind of official gazette] Printing of amendment by the convention of 2 of Article 17 of Patent Law

[Category partition] The 3rd partition of the 6th category

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[F1]

G06F 3/14 370 A

G09G 5/00 510 G

[Procedure amendment]

[Filing Date] August 11, Heisei 16 (2004. 8.11)

[Procedure amendment 1]

[Document to be Amended] Description

[Item(s) to be Amended] Claim

[Method of Amendment] Modification

[The content of amendment]

[Claim(s)]

[Claim 1]

A contents selection guide is set to the approach for a display, and it is this approach, The step which acquires the contents selection information for choosing contents from the contents source in order to be the contents selection information which consists of descriptive information relevant to these contents source and to display on a user's computer system on two or more contents sources to a user's computer system.

The step which unifies contents selection information and generates the visible display of selectable contents,

It is the step which is a step which forms two or more selectable guide cells in this visible display, and is constituted so that this guide cell may display contents, when each guide cell is directing the contents obtained from one of two or more of the contents sources and a guide cell is chosen,

It is the step which it is the step which relates actions other than the display of contents with the selectable part of one guide cell in two or more guide cells, and action has a type, and relates to the guide cell concerned,

The step which directs the type of associated action,

The step which performs associated action when the selectable part of the guide cell concerned in two or more guide cells is chosen by the user since — the approach characterized by becoming.

[Claim 2]

The step which directs a type in an approach according to claim 1 is an approach characterized by including the step which embeds an icon into the selectable part of

the guide cel concerned in two or more guide cels.

[Claim 3]

It is the approach characterized by including the step to which this approach rearranges a visible display further in an approach according to claim 1 based on a user input.

[Claim 4]

The step rearranged in an approach according to claim 3 is an approach characterized by including the step which chooses one of two or more of the schemes memorized beforehand.

[Claim 5]

The step which performs associated action in an approach according to claim 1 is an approach characterized by including the step which performs application on a user's computer system.

[Claim 6]

The step which generates a visible display in an approach according to claim 1 is an approach characterized by answering modification offered by the thing of the arbitration of two or more contents sources, and including the step which updates a visible display.

[Claim 7]

It sets to the computer system which consists of a storage which is the computer system for displaying the selection guide of two or more contents sources, and is connected with a processor and the display connected to the processor at a processor, and stores software, and is software,

The step which is the contents selection information which consists of descriptive information relevant to these contents source, and acquires the contents selection information for choosing contents from the contents source from two or more contents sources in order to display on a user's computer system,

The step which generates the visible display which unifies contents selection information and consists of two or more selectable guide cels,

The step which embeds the icon related with the function which can be performed in one guide cel in two or more guide cels,

The step which rearranges two or more guide cels based on a user input by one of two or more of the schemes stored beforehand

Computer system characterized by being constituted so that it may perform.

[Claim 8]

The function which was related with the icon in computer system according to claim 7

and which can be performed is computer system characterized by being the function which displays an advertisement.

[Claim 9]

This system is equipped with the database which memorized the data further for a visible display in computer system according to claim 7, and software is ,

The step which analyzes the data for a visible display memorized by this database, and generates pattern data,

The step which builds a visible display automatically according to the generated pattern data

Computer system characterized by being constituted so that it may perform.

[Claim 10]

The function which was related with the icon in computer system according to claim 7 and which can be performed is computer system characterized by being a link to the website related with this icon.

[Translation done.]

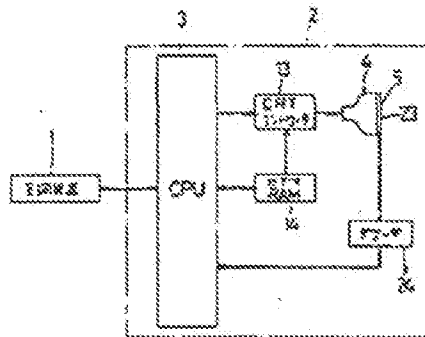
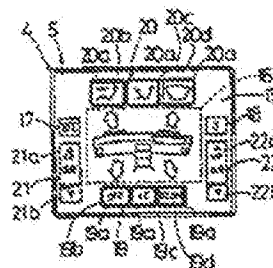
AIR CONDITION DISPLAY DEVICE FOR VEHICLE

Publication number: JP1018712
 Publication date: 1989-01-23
 Inventor: KAKIHARA MASAKI
 Applicant: MAZDA MOTOR
 Classification:
 - International: B60H1/00; B60H1/00; (IPC1-7): B60H1/00
 - European: B60H1/00Y10
 Application number: JP19870176387 19870715
 Priority number(s): JP19870176387 19870715

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Abstract of JP1018712

PURPOSE:To secure the installation space for an operation part of an air conditioner and to improve operability by simultaneously displaying the operating condition of the air conditioner and an operation key portion for operating and controlling the air conditioner on a display screen of an air condition display device. **CONSTITUTION:**A control device 2 for an air conditioner 1 loaded on a car includes a central processing unit 3 and a display device 4. An image processing data created by the central processing unit 3 is stored in a video RAM 14, and an image is displayed on a display screen 5 of the display device 4 according to the stored data by CRT controller 13. On the other hand, a display portion 15 for displaying the operating condition of the air conditioner 1 is provided at the central portion of the display screen 5, and operation key portions 19-22 of various kinds are displayed on the peripheral edge portion of the display screen 5. Further, the display screen 5 includes a touch sensor 23 for detecting the operation of the operation key portions 19-22 of various kinds. In this arrangement, the operating condition of the air conditioner 1 and the operating condition of every kind are respectively displayed on the display screen 5.



Data supplied from the esp@cenet database - Worldwide

Inventor: Kakihara
Applicant: Mazda Motors

Date of Application: July 15, 1987

CLAIMS OMITTED

3. Detailed Description of the Invention (Industrial Field of Application)

The present invention relates to an air conditioning display device for displaying the air blowing direction, temperature, and the like of an air conditioner mounted on a vehicle.

Prior Art

Conventionally air conditioner display devices of this type have been of the type disclosed, for example, in JP54-113137, disposing a display panel on which the structure [pattern] of air blown out from the air conditioner is prefigured; by displaying the actual air blow state from the air conditioner on this display panel, a determination can be made at a glance as to whether an air flow [lit, "wind"] is present, the direction of the airflow, and the like.

Problem the Invention is to Solve

Generally, however, there is a need to control various states of an air conditioner's operation including, for example, the turning on and off of the air conditioner itself, setting of the target vehicle interior temperature, adjustments upward or downward of the air flow by [changing] blower rpm, changing of air blowing direction, and the like; these are normally accomplished by the operation of operating levers or switches.

When the above conventional display panel is placed in the operating space [used] for these operating levers and switches, the operating portion is affected to the extent of the space [needed] for that display panel, resulting in the problem of reducing that space available for the operating levers and switches. However, it is desirable to dispose some type of display means in order to inform the driver of the air conditioner actuation state and increase the operability of the air conditioner.

The object of the present invention is to improve the operating portion for an air conditioning system and the display means for indicating the operating condition of the air conditioning system so that an adequate space may be secured for the operating portion and the operability of the operating portion may be improved at the same time.

H002277

Inventor: Kakihara
Applicant: Mazda Motors

Date of Application: July 15, 1987

Means to Solve Problem

To achieve such an object, the present invention provides a display device such as a CRT (cathode ray tube) as a display means for displaying the actuation state of an air conditioner, and displays on that display device not only the actuation state of the air conditioner, but also simultaneously the various operating key portions [which serve] as the operating portion thereof, so as to actuate and control the air conditioner by operating those operating key portions.

Specifically, the target of the present invention is an air conditioner display device for displaying actuation states such as the air blowing direction and temperature for an air conditioner mounted on a vehicle.

An operating portion for outputting an operating command signal to the air conditioner is displayed as an operating key portion on that display screen, and the air conditioner is actuation controlled by operating that operating key portion.

Moreover, the above key portion is displayed on the same display-screen as [that for] the display of the air conditioner actuation state.

Operation

In this configuration of the invention, operation of the operating key portion for actuation control of the air conditioner, which is displayed on the display screen of the display device, [results in] actuation control of the air conditioner in response to an operation of that operating key portion. The actuation state of the air conditioner when controlled by the operation of this operating key portion is immediately displayed on the same display device display screen.

In this connection, because the operating key portion for actuation control of the air conditioner is displayed simultaneously with the air conditioner actuation state, the display within the operating key portion display screen eliminates the need for an air conditioner control portion separate from the display device; space can therefore be secured for that operating portion.

The actuation state of the air conditioner is displayed on a display screen, and as the air conditioner is controlled so as to actuate in response to operation of the operating key, the resulting change in actuation state is displayed immediately, so that the actuation state of the air conditioner can be accurately grasped by the actuation state as displayed on the display screen, thereby improving air conditioner operability.

H002278

Inventor: Kakihara
Applicant: Mazda Motors

Date of Application: July 15, 1987

Embodiment

Below we explain an embodiment of the invention based on figures.

Fig. 3 depicts the overall structure of an embodiment of the invention. 1 is an air conditioner mounted on a vehicle; 2 is a control device for actuation control of the air conditioner 1 - this control device 2 has a CPU 3 and a display device 4 comprising a CRT, and the display device 4 is disposed on the top end portion of the console box 7, disposed contiguous to the center lower portion of the vehicle interior front end instrument panel 6, as shown in Fig. 2. In Fig. 2, 8 is a steering wheel, 9 is a driver's seat, 10 is a passenger seat, and 11 and 12 are respectively the left and right doors.

The above air conditioner 1 is connected to the above CPU 3 so as to be capable of sending and receiving signals. The display device 4 is also connected to the CPU 3 via a CRT controller 13 and a video RAM 14 so as to be capable of sending and receiving signals. Image processing data created by the CPU 3 is stored by the video RAM 14, and an image is displayed on the display device 4 display screen 5 by the CRT controller 13 based on that stored data.

As shown in Fig. 1, an actuation state display portion 15 for displaying the actuation state of the above air conditioner 1 is formed at approximately the center of the display device 4 display screen 5. This actuation state display portion 15 comprises a blower state display portion 16 for respectively displaying at the center portion of the display screen 5 an image of chest blower ports 6a, 6a, defroster blower ports 6b, 6b, foot blower ports (not shown) etc. as shown in Fig. 2, and displaying the air blowing state of each of those blower ports 6a, 6b, along with the air volume thereof, using arrows. The actuation state display portion 15 further comprises a blower temperature display portion 17 at the top end portion of the display screen 5 on the left side of the blower state display portion 16, for displaying the air blower temperature in concrete numerical form; and an air volume level display portion 18 for displaying in numerical form the level of air volume (for example the blower RPM) coming from the above blower ports 6a, 6b at the top edge of the display screen 5 on the right side of the blower state display portion 16.

At the same time, various operating key portions 19-22 for actuation control of the air conditioner 1 are displayed generally in the perimeter area of the display screen 5. Specifically, these operating key portions 19-22 include an actuation state switching operating key portion 19 for actuation switching of the air conditioner 1

H002279

Inventor: Kakihara
Applicant: Mazda Motors

Date of Application: July 15, 1987

which is displayed at the bottom edge portion of the display screen 5 below the blowing state display portion 16 in the above actuation state display portion 15; a mode switching operating key portion 20 for switching the actuation modes of the air conditioner 1, given as different combinations of the blower ports 6a, 6b and the temperature thereof displayed at the top edge of the display screen 5 above the blowing state display portion 16; a temperature control operating key portion 21 for increasing and decreasing the temperature of the air blown out from each of the blower ports 6a, 6b displayed on the bottom edge portion of the display screen 5 at the left side of the above blowing state display portion 16; and an air volume adjustment operating key portion 22 for increasing and decreasing the air volume level from each of the blower ports 6a, 6b, which is formed at the bottom edge portion of the display screen 5 at the right side of the blowing state display portion 16. The above actuation state switching operating key portion 19 comprises three switch operating keys, e.g. an OFF operating key 19b, an ON operating key 19c (the air conditioner operating key), and an economy mode operating key 19d, each surrounded by a framing portion 19a. The mode switching operating key portion 20, similarly, comprises three operating keys 20b-20d, for example ventilation, heat, and defrost, displayed as simplified graphic images, each surrounded by a framing portion 20a.

Moreover, the temperature control operating key portion 21 has an up key 21a and a down key 21b for increasing and decreasing the temperature level; and the air volume adjustment operating key portion 22 has an up key 22a and a down key 22b for increasing and decreasing the air volume level.

As shown in Fig. 3, a touch sensor 23 is attached in a tightly adhered state to the display screen 5 on the above display device 4. This touch sensor 23 has multiple line-shaped transparent electrodes (not shown), respectively parallel to the horizontal and vertical directions of the display screen 5 and disposed so as to mutually intersect. When a portion thereof is touched with a finger, the position of the contacted portion is detected by a matrix signal. The output signal from the above touch sensor 23 is then processed by the decoder 24 and input to the central processing unit 3. When the image operating key portions 19-22 displayed on the display device 4 display screen 5 are pushed (touch operated) from over the touch sensor 23, signals corresponding to those operating key portions 19-22 are detected by the touch sensor 23 and input to the central processing unit 3. The air conditioner 1 is actuated in response to the above operating key portions 19-22,

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and the actuation control state of that air conditioner 1 is displayed in the actuation state display portion 15 of the same display screen 5 of the display device 4.

To explain the air conditioner actuation state on the display screen 5 [more] concretely, when one of the operating portions 19b-19d of the above actuation state changing operating key portion 19 is selectively operated via the touch sensor 23, for example, the display state of the framing portion 19a [around] that selected operating portion 19b-19d is changed, for example, to a reverse display state different from that of the framing portion[s] 19a [around] other operating keys 19b-19d, so as to distinguish the operated state of that switch operating key portion 19, i.e. the operating state of the air conditioner 1.

By selective operation of one of the operating keys 20b-20d of the mode switch operating key portion 20, the display state of the framing portion 20a [around] the selected operating portion 20a-20b is similarly changed, for example, to a reverse display state different from that of the framing portion[s] 20a [around] other operating keys 20b-20d, so as to distinguish the operated state of that switch operating key portion 20, i.e. the operating mode of the air conditioner 1.

When the target set temperature of the air conditioner 1 is changed by operating the temperature adjustment operating key portion 21, that target set temperature is displayed by the blower temperature display portion 17, while at the same time the display color of the arrows in the blowing state display portion 16 is changed in response to the air blowing temperature determined by the above target setting temperature to, for example, a blue color in the low temperature state and to a red color in the hot air state, respectively.

Furthermore, when the target set temperature of the air conditioner 1 is changed by operation of the air volume adjustment portion 22, the selected target air volume is displayed as a number by the air volume level display section portion 18, while the size (length) of the blowing state display portion 16 arrow is increased when the air volume level is raised and decreased when the air volume level is lowered, in response to the above target set air volume.

Next, the operation of the above embodiment is explained. The operating key portions 19-22 for actuation control of the air conditioner 1 are displayed on the display device 4 display screen 5; when these operating key portions 19-22 are operated, their operation is detected by the touch sensor 23; through actuation of the central processing unit 3 by receiving a detection signal from the touch sensor 23, the air conditioner 1 is actuation controlled in response to the operating state of the

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above operating key portions 19-22, and the actuation state of the air conditioner 1 is displayed on the display device 4 display screen 5.

When, for example, any one of the operating keys 19b-19d of the above actuation state switching operating key portion 19 on the display screen 5 is selectively operated, the display state of the framing portion 19a around the selected operating key 19a-19d is changed with respect to the framing portions 19a of other operating keys 19b-19d, and the actuation state of that air conditioner 1 is displayed.

Similarly to the above, when any one of the operating keys 20b-20d of the mode switch operating key portion 20 is selectively operated, the display state of the framing portion 20a around the selected operating key 20a-20d is changed with respect to the framing portions 20a of other operating keys 20b-20d, and the actuation state of that air conditioner 1 is displayed.

The temperature adjustment operating key portion 21 is operated to change the target set temperature [delivered] by the air conditioner 1. By this operation, the above target temperature is displayed as a specific number on the display screen 5 by the blower temperature display portion 17, while the display color of the arrow in the blowing state display portion 16 on the display screen 5 is changed, for example, to a blue color in a lower temperature selection, and to a red color in a warmer temperature selection, in response to the air blow temperature determined by the above target set temperature.

When the target set air volume of the air conditioner 1 is changed, operating the air volume adjustment 22 on the display screen 5 causes a numerical display of that target air volume by the air volume level display section portion 18, while in response to the above target set air volume, the size of the blowing state display portion 16 arrow is increased when the air volume level is set higher and decreased when the air volume level is set lower.

Therefore in this embodiment the display screen 5 simultaneously displays, in addition to the actual air conditioner 1 actuation state, the operating key portions 19-22 for actuation control of the air conditioner 1 thereof, so that even when the above display device 4 is provided, there is no need to provide the display device 4 separately from the air conditioner 1 operating portion, thereby securing adequate space for the operating portion thereof.

Each of the actuation states of the air conditioner 1 is displayed on the display screen 5 and, since the air condition actuation state displayed on the above display

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Date of Application: July 15, 1987

screen 5 changes immediately in response to the change in the actuation control of the air conditioner 1 which results from the operation of the operating key portions 19-22, the actuation state of the air conditioner 1 can be accurately and quickly grasped by the actuation state [shown] on that display screen 5, thereby enabling an improvement in the operability of the air conditioner 1.

Furthermore, along with the operations to change the target set temperature and target set air volume which form the actuation states of the above air conditioner 1, those target set temperature and target set air volume are more concretely respectively displayed by the blower temperature display portion 17 and the blow volume level display section portion 18 on the display screen 5, while simultaneously the display color and size of the arrow in the blowing state display portion 16 on the same display screen 5 are changed, so that the actual actuation state of the air conditioner 1 can visually be easily grasped at a glance, and an even greater improvement in the operability of the air conditioner 1 can be achieved.

In the display device 4 display screen 5, the operating key portions 19-22 for air conditioner actuation control are distributed around the edge portion of the display screen 5, so that space can be left between the operating key portions 19-22, and this permits the operating key portions 19-22 to be accurately operated.

Note that while a CRT was used for the display device 4 in the above embodiment, a liquid crystal display device, for example, could of course also be used.

Effect of the Invention

As explained above, according to the present invention, simultaneous display of the actuation state of an air conditioner as well as the operating key portions for actuation control of that air conditioner permits space for setting the operation of the air conditioner on a display device display screen using a display within a display screen [as part of] the operating portion of the air conditioner; at the same time, operability thereof can be improved by displaying the actuation state of the air conditioner.

Brief Description of Figures

OMITTED HERE BELOW

H002283

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◎特許出願公開

◎公開特許公報(A) 昭64-18712

◎Int. Cl.
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庁内整理番号
T-7153-3L
Z-7153-3L

◎公開 昭和64年(1989)1月23日

審査請求 未請求 発明の数 1 (全6頁)

◎発明の名称 車両用空調表示装置

◎特 願 昭62-176367

◎出 願 昭62(1987)7月15日

◎発 明 者 柿 原 正 樹 広島県安芸郡府中町新地3番1号 マング株式会社内
◎出 願 人 マング株式会社 広島県安芸郡府中町新地3番1号
◎代 理 人 弁 理 士 前 田 弘

要 約

1. 発明の名称

車両用空調表示装置

2. 特許請求の範囲

(1) 車両に搭載された空調装置の風の吹出し方向や風速等の作動状態を表示する空調表示装置であって、上記空調装置に制御部を備え手動力する操作部が該空調装置に操作キー部として表示されている、その操作キー部の操作により空調装置が作動状態を、上記操作キー部は、空調装置の作動状態の表示と同一の表示範囲に表示されるように構成されていることを特徴とする車両用空調表示装置。

3. 発明の詳細な説明

(産業上の利用分野)

本発明は、車両に搭載された空調装置の風の吹出し方向や風速等の作動状態を表示する空調表示装置に関するものである。

(従来の技術)

従来より、この種の空調表示装置として、例えば

実開特許第1131117号公報に記載されるものでは、予め、空調装置からの風の吹出し状態を備いた表示板を設け、この表示板に対して空調装置からの実際の風の吹出し状態を表示することにより、風の有無やその方向等を一目して判別できるようにすることとされている。

(発明が解決しようとする課題)

よこすで、一般に、車両用空調装置においては、その作動状態を風の吹出し状態に換算する必要がある。例えば、空調装置自体のON/OFFの切換え、目標とする温度内の温度設定、ブローの回転速度による風速の増減調整、吹出し方向の切換え等があり、これらは運転者側マイコン操作スイッチ等の操作により行われる。

そして、これらの操作スイッチ等が操作者の視界スイッチに対して、上記従来の表示板を設けると、その表示板のスイッチの分だけ操作部を必要を設けて、その表示スイッチが小さくなるという欠点がある。そこで、従来の空調装置を運転者が目視をせず、空調装置の操作部

本発明の目的は、上記した従来の装置よりも、より簡単な構造で、より正確な測定を行うことにある。

本発明の目的は、上記した従来の装置よりも、より簡単な構造で、より正確な測定を行うことにある。

(図面を参照せよ)

この装置は、図1に示すように、測定対象物1を測定する。測定対象物1は、図1に示すように、測定対象物1を測定する。測定対象物1は、図1に示すように、測定対象物1を測定する。

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また、図1に示すように、測定対象物1は、測定対象物1を測定する。測定対象物1は、図1に示すように、測定対象物1を測定する。

(図面を参照せよ)

図1に示すように、測定対象物1は、測定対象物1を測定する。測定対象物1は、図1に示すように、測定対象物1を測定する。

本発明の目的は、上記した従来の装置よりも、より簡単な構造で、より正確な測定を行うことにある。

本発明の目的は、上記した従来の装置よりも、より簡単な構造で、より正確な測定を行うことにある。

(図面を参照せよ)

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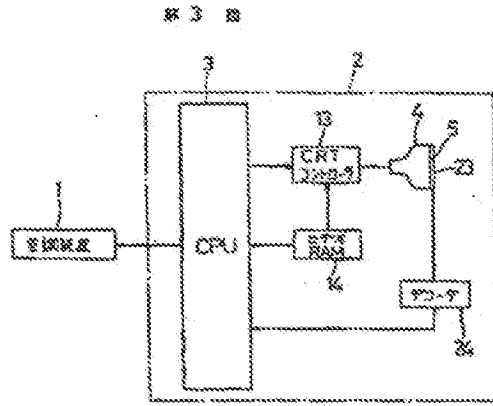
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VEHICLE SWITCH DEVICE

Patent number: JP5077679
Publication date: 1993-03-30
Inventor: SEKINE MANABU; NAGASHI SUBO
Applicant: NISSAN MOTOR
Classification:
- international: B60K35/00; B60K37/06; B60R16/02; H01R9/16
- european:
Application number: JP19910270258 19910921
Priority number(s): JP19910270258 19910921

[View EPADOC patent family](#)

Abstract of JP5077679

PURPOSE: To provide an easy and reliable access to an intended switch button and lever so that a driver can do without moving his or her eyes while an automobile is running. **CONSTITUTION:** A touch sensor and an operation detection means are provided for a button so that a layout of a button 52i which is being touched and surrounding buttons is displayed on a headup display device and the button 52i which is being touched is highlighted. When a button is operated, that button 52p is highlighted differently from the touch state.

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(12) 公開特許公報 (A)

(11) 特許出願公開番号

特開平5-77679

(48) 公開日 平成5年(1993)3月30日

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B 6 0 K 19/02		D 2105-3D		
B 6 0 K 35/09		A 7812-3D		
	37/05	7812-3D		
H 0 1 H 9/18		B 7828-5G		

審査請求 未請求 請求項の数 8 (全 14 頁)

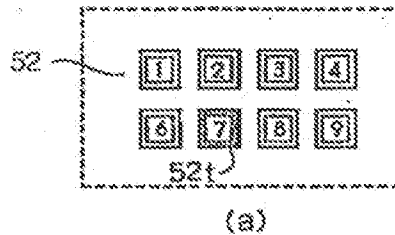
(21) 出願番号	特願平3-270253	(71) 出願人	900005097 日産自動車株式会社 神奈川県横浜市神奈川区宝町2番地
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		(73) 発明者	名越 末男 神奈川県横浜市神奈川区宝町2番地 日産自動車株式会社内
		(74) 代理人	弁護士 菊谷 公男 (外3名)

(54) 【発明の名称】 車両用スイッチ装置

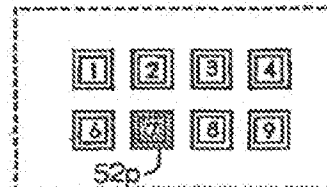
(57) 【要約】

【目的】 運転中ドライバーが視線を移動させなくとも意図するスイッチボタンやレバーに容易確実にアクセスできるようにする。

【構成】 ボタンにタッチセンサと操作検出手数を設けて、タッチ状態のボタン52とその周辺のボタンのレイアウト図をヘッドアップディスプレイ装置に表示させ、そのなかでタッチ状態のボタン52とを強調表示する。ボタンが操作されたときにはそのボタン52をタッチ状態時とは異なる強調表示にする。



(a)



(b)

【発明者の範囲】

【請求項1】 スイッチ操作部に設置されたタッチセンサと、このスイッチ操作部の周辺の配置情報を記憶しているメモリと、ヘッドアップディスプレイ装置と、ヘッドアップディスプレイ制御装置は前記タッチセンサからの信号に基づいて、前記スイッチ操作部がタッチ状態にあるときは当該スイッチ操作部の周辺の配置情報をメモリから引き出して、スイッチ操作部およびその周辺の配置情報をヘッドアップディスプレイ装置に送示させるとともに、該表示のなかで前記スイッチ操作部を周辺の配置情報と差別表示させるようにしたことを特徴とする車両用スイッチ装置。

【請求項2】 スイッチ操作部に設置されたタッチセンサと、このスイッチ操作部の操作検出手段と、スイッチ操作部の周辺の配置情報を記憶しているメモリと、ヘッドアップディスプレイ装置と、ヘッドアップディスプレイ制御装置は前記タッチセンサからの信号に基づいて、前記スイッチ操作部がタッチ状態にあるときは当該スイッチ操作部の周辺の配置情報をメモリから引き出して、スイッチ操作部およびその周辺の配置情報をヘッドアップディスプレイ装置に送示させるとともに、該表示のなかで前記スイッチ操作部を周辺の配置情報と差別表示させ、操作検出手段からの信号に基づいて、前記スイッチ操作部が操作状態にあるときは当該スイッチ操作部を前記タッチ状態のときと異なる差別表示させるようにしたことを特徴とする車両用スイッチ装置。

【請求項3】 複数のスイッチ操作部にそれぞれ設置されたタッチセンサと、制御回路と、スイッチ操作部の周辺の配置情報を記憶しているメモリと、ヘッドアップディスプレイ装置と、ヘッドアップディスプレイ制御装置は前記タッチセンサからの信号に基づいて、タッチ状態にあるスイッチ操作部を特定する情報をヘッドアップディスプレイ制御装置に送り、ヘッドアップディスプレイ制御装置は前記情報に基づいてタッチ状態にあるスイッチ操作部の周辺の配置情報をメモリから引き出して、前記タッチ状態にあるスイッチ操作部およびその周辺の配置情報をヘッドアップディスプレイ装置に送示させるとともに、該表示のなかで前記タッチ状態にあるスイッチ操作部を周辺の配置情報と差別表示させるようにしたことを特徴とする車両用スイッチ装置。

【請求項4】 前記スイッチ操作部が押圧又は押し込み側のボタンであることを特徴とする請求項1、2または3記載の車両用スイッチ装置。

【請求項5】 前記スイッチ操作部がスライド式レバーのノブであることを特徴とする請求項1、2または3記載の車両用スイッチ装置。

【請求項6】 前記スイッチ操作部が回転させて操作す

るノブであることを特徴とする請求項1、2または3記載の車両用スイッチ装置。

【請求項7】 スライド式レバーのノブに設置されたタッチセンサと、ノブの操作検出手段と、前記レバーの位置検出手段と、レバー周辺の配置情報を記憶しているメモリと、ヘッドアップディスプレイ装置と、ヘッドアップディスプレイ制御装置はタッチセンサおよび位置検出手段からの信号に基づいて、前記ノブがタッチ状態にあるときは当該レバー周辺の配置情報をメモリから引き出して、レバー周辺の配置情報をヘッドアップディスプレイ装置に送示させ、該表示のなかで前記ノブをレバー位置に対応する位置に周辺の配置と差別表示させ、操作検出手段からの信号に基づいて、前記ノブが操作状態にあるときは当該ノブを新たなレバー位置に対応する位置に前記タッチ状態のときと異なる差別表示させるようにしたことを特徴とする車両用スイッチ装置。

【請求項8】 回転式スイッチのノブに設置されたタッチセンサと、ノブの操作検出手段と、前記スイッチの回転角度検出手段と、ノブ周辺の配置情報を記憶しているメモリと、ヘッドアップディスプレイ装置と、ヘッドアップディスプレイ制御装置はタッチセンサおよび回転角度検出手段からの信号に基づいて、前記ノブがタッチ状態にあるときは当該ノブ周辺の配置情報をメモリから引き出して、ノブ周辺の配置情報をヘッドアップディスプレイ装置に送示させ、該表示のなかで前記ノブを周辺の配置情報と差別表示させ、操作検出手段からの信号に基づいて、前記ノブが操作状態にあるときは当該ノブの近傍にその回転方向を表示させるようにしたことを特徴とする車両用スイッチ装置。

【発明の詳細な説明】

【0001】

【産業上の利用分野】 この発明は、操作性を向上させた車両用スイッチ装置に関する。

【0002】

【従来の技術】 車両の運転席周りには図14に示すように携帯電話操作のための様々なスイッチが設置されている。例えばステアリングに設置されたハンズフリー自動着信専用スイッチ1は、図15のようにステアリングハンドルのスイッチパネル3にプッシュボタン3が設けられ、ボタン操作により電話番号の入力や発信着信の切り換えなどを行なうようになっている。そして操作される毎に、あるいはスイッチオンしているときにスイッチの近傍に設けられたランプ4が点灯する。このとき「ピー」などのトーン音を発するようにしたものもある。なお、これに類似する技術として、例えば特開昭59-33540号、特開昭59-227633号公報に記載されたものがある。

【0003】 また、インストルメントパネルに設置された

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車内エアコンコントロールスイッチ5の場合は、空調風の吹き出しモードの選択ボタン6のほか、温度設定用のレバー7その態も設けられ、ドライバーが好みの位置にスライドさせて設定できるようになっている。

【0004】

【発明が解決しようとする課題】しかし上記のような従来の車両用スイッチにおいては、それらのスイッチを操作する際、ドライバーは操作しようとしているスイッチを指で探し、あるいは手探りで確認しなければならなかった。これはその他のスイッチ、例えばステレオカセット用スイッチ10、テレビ・ナビゲーション用ディスプレイタッチスイッチ11、センターコンソール近傍に設けられた自動車乗用バンドセット12のダイヤルテンキースイッチ、ラジオ選局スイッチやボリュームスイッチあるいはドアに設置されたパワーウィンドウスイッチ14やドアロックスイッチ15などについても同様である。

【0005】このため、運転中にスイッチ操作を行う際には、スイッチの位置と種類を確認しようとするれば、視線を移動しなければならぬとか、極めてわずかな時間内での視野では見逃したボタンなどの混同を回避してしまおうという不具合があった。またトーン音を発するものも、正しいボタンを選択している場合には出力によらず操作入力を確認できるが、ボタンが正しく選択されていなければ意味がないことになる。

【0006】したがってこの発明は、運転中ドライバーが視線を移動させなくとも意図するスイッチボタンやレバーに容易にアクセスでき、さらには、アクセスしたそのボタンを正しく操作したことを確認することができる車両用スイッチ装置を提供することを目的とする。

【0007】

【課題を解決するための手段】このため各請求項に記載した発明は、図1に示すように、スイッチ操作部20に配置されたタッチセンサ25と、スイッチ操作部の配置情報を記憶しているメモリ30と、ヘッドアップディスプレイ装置45と、ヘッドアップディスプレイ制御装置40を備え、ヘッドアップディスプレイ制御装置40はタッチセンサ25からの信号に基づいて、前記スイッチ操作部20がタッチ状態にあるときは当該スイッチ操作部20の周辺の配置情報をメモリ30から引き出して、スイッチ操作部20およびその周辺の配置情報をヘッドアップディスプレイ装置45に表示させるとともに、該表示のなかで前記スイッチ操作部20を周辺の配置情報と差別表示させるようにしたことを基本構成とする。

【0008】さらには、操作検出手段を備えて、スイッチ操作部が操作状態にあるときはタッチ状態とは異なる差別表示をさせるようにし、あるいはまたスイッチ操作部が意図する場合には、タッチ状態にあるスイッチ操作部を周辺の他のスイッチ操作部から区別される差別表示をさせるようにした。

【0009】

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【作用】スイッチを指で操作する場合において、指で触れたボタンやノブなどスイッチ操作部20が、その周辺の他の操作部などのレイアウトとともに、ヘッドアップディスプレイ装置45で表示され、とくに触れられてタッチ状態にあるスイッチ操作部が差別表示されるから、ドライバーは運転中前方視界のまま、自分が意図するスイッチ操作部であるかどうかを確認して操作を行なうことができる。

【0010】さらに操作検出手段を備えて、タッチ状態とは区別して表示するようにした場合には、そのスイッチ操作部を意図して操作したことをドライバーは確認することができる。またスイッチ操作部が意図されていない場合には、差別表示されたスイッチ操作部が意図するものでない場合には、隣接する周辺のスイッチ操作部も表示されるから、求めるスイッチ操作部が今触れているものからどちらの方向にあるかを容易に知ることができる。

【0011】

【実施例】図2はステアリングに設けたハンズフリー自動車電話のスイッチにこの発明を適用した実施例を示す。ステアリングパッドには、スイッチ操作部としての「0」から「9」までのダイヤルに対応した各テンキーボタン52、通話の開始・終了を行うためのプッシュ式の発信受話ボタン54のほか、音量調節ボタン55やラジオ選局ボタン56などが配置されて、自動車電話用のスイッチパネル50を構成している。このスイッチパネル50からの指令によって無線機50が制御され、指示したアンテナを介して通話が行われる。

【0012】スイッチパネル50の各ボタン52〜56には、指が触れている状態を感知するタッチセンサ25が設けられる。例えば音量調節ボタン55表面に貼着してタッチセンサ25とする。あるいはこのほか図3に示すように、ばね定数の異なる2種のばね71、72を内蔵し、70で代表されるボタンの最少変位によって深さかばね71をたわませてボタン接続点73とオンする第1の接点74でタッチセンサ25を構成するようにしてもよい。なお図3において第2の接点75はさらにばね72をたわませてボタン70を押し込んだときオンして、該ボタン70がテンキーボタンであればその数を示すダイヤル信号を出力するようになっている。

【0013】この実施例においては、タッチセンサ25に加え、さらにボタンの押圧あるいは押し込みなどのプッシュ操作により選択されるあるいはオンしている状態を検出する操作検出手段80を備えている。操作検出手段80としてはボタンの変位を検出してよく、または圧力センサ、あるいは容積センサをタッチセンサ25と共用して両方レベルの相違を利用してよい。さらには図3の例では第2の接点75から出力されるダイヤル信号を共用することもできる。

【0014】タッチセンサ25と操作検出手段80の出

方は判別回路85に入力され、タッチ状態が操作状態かの判断およびボタンの検出がなされる。判別回路85からの信号はヘッドアップディスプレイ制御装置94に入力される。ヘッドアップディスプレイ制御装置94にはまたメモリ93が接続されており、このメモリ93にはヘッドアップディスプレイ装置45で表示するボタン形状やステアリングパッド部のボタンレイアウトの情報を記憶させてある。ヘッドアップディスプレイ装置45はヘッドアップディスプレイ制御装置94からの指令により、図4のドライバー側面の装置で示すフロントウィンドウの表示領域46に、車両前方の透過した風景に合わせてボタンレイアウトを表示する。

【0015】スイッチパネル50からは自動車電話機能のために信号線が無線機90へ接続されており、またこの信号線がトーン音発生装置52にも接続している。さらに音声合成装置87が判別回路85に接続し、音声合成装置87とトーン音発生装置52の出力がスピーカ64に入力している。

【0016】次に、以上の構成による一連の動作を図5および図6に示されるフローチャートに従い説明する。まずステップ100でボタンに指が触れているかどうかをチェックされる。すなわち、ドライバーが運転席側操作を行うため、指でテンキーボタン52をなぞり、何れかのボタン52に触れると、そのボタン52に設けられたタッチセンサ25からタッチ検出信号が出される。ステップ110で、判別回路85はタッチ状態にあるボタン52を判別し、そのボタンがタッチ状態にある旨の情報をヘッドアップディスプレイ制御装置94に送る。

【0017】ヘッドアップディスプレイ制御装置94では、ステップ115において、タッチ状態にあるボタンに対応して、配線情報としての該タッチ状態にあるボタン52とその周辺に配置されている他のボタンのレイアウトを示す配線データを、メモリ93から選択して読み出す。そしてステップ120で図7のように、前回のタッチ状態にあるボタン52とその周辺のボタンのレイアウト図をヘッドアップディスプレイ装置45に表示させる。ここで指が「7」番のボタンに触れているとすれば、図7の(a)のように表示に際して、タッチ状態にあるボタン52として該「7」番ボタンについては、差別表示としてボタンの縁部が浮き出て強調表示される。差別表示としては、他より太い輪郭線にすることができ、あるいは他と異なる色表示や反転表示にすることができ、

【0018】このとき判別回路85から音声合成装置87にも同じ情報が送られ、音声合成装置87では当該ボタン52を音で示す。ここでは「なな!」、を合成してスピーカ64から音声出力する。

【0019】ドライバーはヘッドアップディスプレイ装置45の表示、さらにスピーカ64の音から、指が触れているボタンを確認し、操作したいボタンに相違な

ければ続けてそのボタンをプッシュ操作する。

【0020】次にステップ130では、何れかのボタンが操作状態にあるかどうかをチェックされる。すなわち、ボタンのプッシュ操作がなされると、そのボタンに設けられた操作検出手段60から操作検出信号が出力される。

【0021】ボタンが操作状態にないときにはスタートに戻って上記が繰り返される。また、指が触れているボタンが意図するボタンではない場合には、ドライバーはヘッドアップディスプレイ装置45で表示されている周辺のレイアウトから、どちらの方向に意図するボタンがあるかが容易に判断できるので、指を移動させる。上述のフローは繰り返しているもので、指を移動させ他のボタンに触れるとそれに対応してヘッドアップディスプレイ装置45で表示される強調表示のボタンが変化する。

【0022】ボタンが操作され無線機90へ信号が流れると、同時にトーン音発生装置52が作動しスピーカ64から「ピー」音が出力される。

【0023】ステップ130でボタンの操作状態がチェックされ、操作されているときは、判別回路85はステップ140でその操作状態にあるボタン52pを特定し、そのボタンが操作状態にある旨の情報をヘッドアップディスプレイ制御装置94に送る。

【0024】ヘッドアップディスプレイ制御装置94では、ステップ145において、前記の操作状態にあるボタン52pとその周辺のボタンのレイアウト図をヘッドアップディスプレイ装置45に表示させる。この際図7の(b)に示すように、操作状態にあるボタン52p例えば「7」番ボタンについては、タッチ状態にあることを示す前記図7の(a)の強調表示と区別される。例えば当該ボタンだけ全面色表示するなど、別の強調表示を行なわせる。

【0025】そして操作されたボタン52pに対応する数字は、ダイヤルする電話番号としてステップ150で無線機90に送られる。この電話番号が繰り返されて、当該先の電話番号の全数字が登録される。ステップ160で電話番号の登録完了が確認されると、次にステップ170においてテンキーボタン52と同様に、通話の開始のための発信/受信ボタン54がタッチ状態にあるかどうかのチェックをタッチセンサ25を用いて行なう。

【0026】発信/受信ボタン54がタッチ状態にあることが判別回路85によって判別されると、ステップ175に進んで、ヘッドアップディスプレイ制御装置94は発信/受信ボタン54周りの関連データをメモリ93から読み出し、ステップ180でヘッドアップディスプレイ装置45に表示させる。続いてステップ190で、発信/受信ボタン54が操作状態にあるかどうかを操作検出手段60によってチェックされる。

【0027】ドライバーが該ボタンをプッシュ操作し、

操作状態にあることが判別回路 385 によって判別されると、ステップ 386 でヘッドアップディスプレイ制御装置 34 は、タッチ状態を示すのは別の態様による強調表示を行なうとともに、ステップ 210 で無動態 60 は先に登録された電話番号番号を呼び出して通話開始となる。またこれらのボタンについても、ファンキーボタン 62 と同様にトーン音や合成音声が併用される。

【0038】以上の構成により、ドライバーはステアリングパッドのスイッチパネル 80 に指を持って行けば、指の触れたボタン周辺の様子が目前のフロントウインドに提示されるから、視線を移動させることなく意図するボタンを探索することができ、しかもボタンをプッシュしたときには、それが操作されたことまでフロントウインドの表示で確認することができる。さらには音声合成の出力あるいはトーン音が加わって操作性が向上し、かつ操作の確実性がより高まる効果を得られる。

【0039】図 8 は車内のエアコントロールスイッチに適用した第 3 の実施例を示す。エアコントロールのスイッチパネル 300 には、空調風の吹き出しモードの選択ボタン 202 の他、スライド式のレバー 203、204 が設けられて、空調風の温度設定あるいは風量設定を行なうようにされ、レバー位置に対比して空調温度 305 の表示がなされるようになっている。

【0040】吹き出しモードの選択ボタン 202 については、前述実施例と同様に、指が触れているボタンとその周辺の他のボタンのレイアウトを表示するようにすればよい。ここではとくにスライド式レバーへの適用について説明すると、レバー 203、204 のノブ 205、206 には、タッチセンサ 25 と操作検出手段 80 が共同施例と同様に設けられている。さらにレバー操作部には、スライド経路 207、208 内のレバーの位置を検出する位置検出手段 215 が設けられている。この位置検出手段 215 としては、例えばレバー 203、204 に関連させて設けたポテンショメータとしてもよく、あるいは空調制御部 220 の制御に用いられる温度設定信号あるいは風量設定信号を流用することもできる。

【0041】タッチセンサ 25 と操作検出手段 80 の出力は判別回路 385 に入力され、タッチ状態か操作状態かの判断と、どのレバーであるかの特定がなされる。判別回路 285 からの信号と位置検出手段 215 の信号は、ヘッドアップディスプレイ制御装置 240 に入力される。一方、メモリ 330 にヘッドアップディスプレイ装置 45 で表示するノブ形状や、スライド経路 207、208 にそった温度目盛 308 あるいは温度表示マーク 210 など、副情報としてのスイッチパネル 300 のレイアウトを記憶させてある。

【0042】ヘッドアップディスプレイ制御装置 340 は、判別回路 385 からの信号に基づいて、レバーのノブに指が触れている場合には図 9 の (a) のようにスイッチパネル 200 のレイアウトをヘッドアップディス

プレイ装置 45 に表示させるとともに、位置検出手段 215 からの信号に基づいて、例えばノブ 205 がタッチ状態であれば該ノブを表示されたレイアウトの対応する位置に強調表示させる。

【0043】このヘッドアップディスプレイ装置 45 の表示によって、触れているノブを持つレバーを認識した後、ドライバーがそのレバーをスライドさせると、今度は図 9 の (b) に示すように操作状態にあるレバーのノブ 205 がタッチ状態の場合とは異なった強調表示で、移動した新たな位置に表示される。

【0044】このため、操作にしたがってノブの位置が変化しても、指の触れたノブが周辺のレイアウトと関連させてフロントウインドに表示されるから、ドライバーは自分がどのレバーのノブに触れているか確認できる。そしてレバーを操作すると、目盛を含むレイアウト図の中の対応する位置にそれが表示されるから、どの位置までスライドさせたかも視線を移すことなく知ることができる。

【0045】図 10 は車載ラジオカセット用のスイッチに適用した第 3 の実施例を示す。ラジオカセットのスイッチパネル 300 には、カセット操作用のプッシュ式ボタン 202 のほか、音量、音質、あるいは左右バランスの調整のため回転式のポリウムスイッチが設けられ、それぞれ音量調整ノブ 305、音質調整ノブ 306、左右バランス調整ノブ 307 がパネル面から突出して配設されている。

【0046】ここではとくに回転式を特徴とする調整ノブへの適用について説明すると、各調整ノブ 305、306、307 には前述各実施例と同様にタッチセンサ 25 が設けられている。さらにこれら調整ノブを備える各ポリウムスイッチには、その回転角度を検出する回転角度検出手段 315 が設けられている。この回転角度検出手段 315 としては、例えば調整ノブ 305、306、307 に関連させて設けたポテンショメータとしてもよく、あるいは調整に用いられる各ポリウムスイッチの出力を流用することもできる。

【0047】タッチセンサ 25 の出力は判別回路 385 に入力され、タッチ状態かどうかの判断と、どの調整ノブであるかの特定がなされる。判別回路 385 からの信号と回転角度検出手段 315 の信号はヘッドアップディスプレイ制御装置 240 に入力される。一方、メモリ 330 にヘッドアップディスプレイ装置 45 で表示する調整ノブの配置やノブ形状、ノブ周りのマークあるいは目盛など、副情報としてのスイッチパネルのレイアウトを記憶させてある。

【0048】ヘッドアップディスプレイ制御装置 340 は、判別回路 385 からの信号に基づいて、例えば音量調整ノブ 305 に指が触れている場合には、図 11 の (a) のようにタッチ状態にある音量調整ノブ 305 周辺のレイアウトをヘッドアップディスプレイ装置 45 に

表示させるとともに、音源調整ノブ306を強調表示させる。

【0039】このヘッドアップディスプレイ装置の表示によって、触れているノブを認識した後、ドライバーがその調整ノブを回転させると、今度は、図9の(b)に示すようにノブの回転量を指示する方向が矢印の内周マーク310を表示させ、そしてこの内周の長さをノブの回転角度に対応させる。

【0040】この実施例によれば、回転操作するものを手探りで操作するときに、操作しているノブの強調表示に加え、その操作方向が指示されるから操作を間違えることもない利点がある。

【0041】このほか車室内では電動パワーシート調整スイッチに適用することもでき、ボタン式の場合には第1の実施例に準じた構成で実現することができる。この場合のヘッドアップディスプレイ装置による表示例を第4の実施例として図13に示す。シートの前座位置調整ボタンと上下位置調整ボタンは、図9の(a)のようにシートクッションの側面400に配置され、上下位置調整ボタン401の上半部には上向きマーク402、下半部には下向きマーク403が設けられ、前後位置調整ボタン405の前半部には前向きマーク406、後半部には後向きマーク407が設けられて、それぞれ前半部をプッシュ操作することによってマークが指示方向にシートが調整されるようになってい

【0042】この各種ボタンにタッチセンサが設けられている。そして、例えば上下位置調整ボタン401に指が触れている場合には、図9の(b)のように、調整ボタン部のレイアウト図が表示されるとともに、そのなかで上下位置調整ボタン401が強調表示される。このヘッドアップディスプレイ装置の表示によって、触れているボタンを認識した後、ドライバーがその上下位置調整ボタン401の上半部をプッシュ操作すると、今度は図9の(c)に示すように、調整部の中で上向きマーク402が強調表示されて、上方向調整の操作状態にあることが示される。

【0043】この実施例によれば、調整部の下でドアに置換している状態による確認ができず、手探りで付なうしかなかったシートの調整スイッチの操作が、極めて容易に行なえるうえ、シートが移動する方向が目で確認できる利点がある。

【0044】さらに本発明は、例えばコンソール上に置かれ、使用時に手に取って操作されるリモートコントロールスイッチなどにも適用される。これもボタン式であるから第1の実施例に準じて構成され、各ボタンにタッチセンサおよび操作検出手段が設けられる。そしてヘッドアップディスプレイ装置への操作伝達は電波あるいは赤外線などによる。

【0045】この場合における表示例を第5の実施例として図13に示す。リモートコントロールスイッチ50

9には図9の(a)に示されるように多数のボタン503が配設され、その中から意図するボタンを探す。ここで指が「C」のボタンに触れているとすれば、車内のフロントウインドには、図9の(b)のように「C」のボタンとその周辺のボタン、とくに調整のボタン、がヘッドアップディスプレイ装置によって表示されるとともに、その際、「C」のボタンの輪郭が強調表示されてタッチ状態にあることが示される。そしてこのボタンが意図したものであってプッシュ操作されると、図9(c)のように「C」のボタンの輪郭内部が反転表示されるなどタッチ状態とは異なる強調表示に変わる。

【0046】一方、(b)の表示を見て操作者が意図するボタンは今触れているボタンより左にあると知って、指を左へずらし、「B」のボタンに指がいくと図9の(d)に示すように、この「B」のボタンを中心とするレイアウト図に変わり、「B」のボタンの周囲である「A」および「C」のボタンを含む周辺の配置が表示される。このとき「B」のボタンはタッチ状態を示す強調表示となる。

【0047】

【発明の効果】以上のとおり、本発明はスイッチ操作部にタッチセンサを設け、タッチセンサからの信号に基づいて、スイッチ操作部がタッチ状態にあるときはスイッチ操作部およびその周辺の配置情報をヘッドアップディスプレイ装置に表示させるとともに、その際タッチ状態のスイッチ操作部を周辺の配置情報と差別表示させるようにしたから、ドライバーは手探りで触れたスイッチ操作部が自分の意図するものであるかどうかを、視覚中前方視野のまま、確認することができる。またスイッチ操作部が多数配設されているなかで触れたものが意図するスイッチ操作部でなかったときにも、表示されている周辺の配置情報からその位置を容易に知り、求めるスイッチ操作部に簡単にアクセスすることができる。

【0048】さらに、操作検出手段を備えて、スイッチ操作部が操作されたときタッチ状態とは異なる強調表示をさせるようにしたときには、騒音の多い中で従来のトーン音による確認が困難な状況でも、ドライバーは確実にそのスイッチ操作部を操作したことを目で知り、しかも誤操作を容易に検出することなしに確認することができ、操作ミスがない。上述共通の効果に加え、第1の実施例では音源合成の出力トーン音がさらに付加されて、スイッチ操作部の探索および操作の確実性がより高まる効果がある。

【0049】第2の実施例によれば、スライド式レバースイッチでノブの位置が不定の場合でも、表示された周辺の目標などを含むレイアウトと関連させて、手探りで指の触れたノブがどのレバースイッチのノブであるか確認できる。そしてレバーを操作すると、表示の中のノブ位置も移動するから、どの位置までスライドさせたかを視覚で移すことなく知ることができる。

【0060】第3の実施例ではノブの回転量を示す一方が矢印の円弧マークを表示させ、そして円弧の長さをノブの回転角度に対応させるようにしたから、回転ノブを手廻りで操作するとき、その回転量を直観でき操作を間違えることもない。

【0061】第4の実施例によれば、ドライバーが零圧したとき直接視認することが必ず不可能な場所に設けたシートの際部スイッチの配置が極めて容易に行なえるうえ、シートの移動する方向まで前方視野の中で確認できる利点がある。

【0062】第5の実施例では、狭いパネルに多数のボタンが密集して配置され、運転中の視認的な視線の移動ではボタンの探検が困難なりリモートコントロールスイッチにおいて、指が触れているボタンの近傍のボタンまで容易に認識できる大きさで前方視野内に表示されるから、必要なボタンに迅速に指を持って行くことができ操作性が極めて向上する効果がある。

【0063】またこの実施例からも明らかなように、ドライバーの視覚による確認ができない場所であっても、指が傾く範囲であれば操作スイッチを設置することができることとなるので、車室内のスイッチ配置の設計自由度が増す利点を有する。

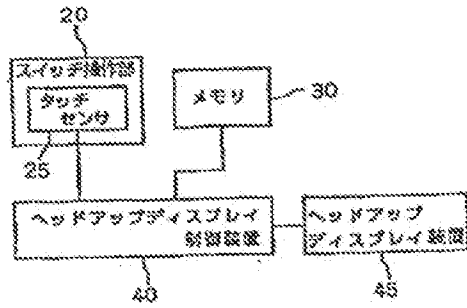
【図面の簡単な説明】

- 【図1】本発明の構成を示す図である。
- 【図2】本発明の第1の実施例を示す図である。
- 【図3】タッチセンサの構成例を示す図である。
- 【図4】ヘッドアップディスプレイ装置による表示部位を示す図である。
- 【図5】表示動作のフローを示す図である。
- 【図6】表示動作のフローを示す図である。
- 【図7】ヘッドアップディスプレイ装置による表示例を示す図である。
- 【図8】第2の実施例を示す図である。
- 【図9】第2の実施例におけるヘッドアップディスプレイ装置による表示例を示す図である。
- 【図10】第3の実施例を示す図である。
- 【図11】第3の実施例におけるヘッドアップディスプレイ装置による表示例を示す図である。
- 【図12】第4の実施例を示す図である。
- 【図13】第5の実施例を示す図である。
- 【図14】運転席周りのスイッチの配置状態を示す図である。
- 【図15】従来のスイッチパネル図の例を示す図である。

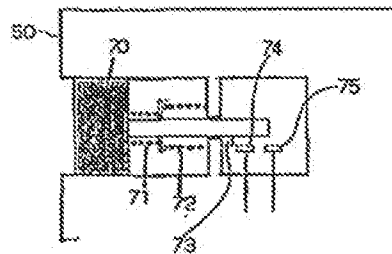
【符号の説明】

- 20 スイッチ操作部
- 25 タッチセンサ
- 30, 93, 330, 330 メモリ
- 40, 94, 240, 340 ヘッドアップディスプレイ制御装置
- 45 ヘッドアップディスプレイ装置
- 45 表示部位
- 50, 200, 300 スイッチパネル
- 52 テンキーボタン
- 54 前後進ボタン
- 56 音量調整ボタン
- 58 電源ボタン
- 59 無線機
- 62 トーン音源制御装置
- 64 スピーカー
- 70 ボタン
- 71, 72 ばね
- 73, 74, 75 接点
- 80 操作検出手段
- 85, 285, 385 特別回路
- 87 音声合成装置
- 90 選択ボタン
- 93, 94 レバー
- 96, 98 ノブ
- 207, 208 スライド経路
- 209 高度目盛
- 210 機体表示マーク
- 215 位置検出手段
- 230 空気調整部
- 305 音量調整ノブ
- 308 音質調整ノブ
- 307 左右バランス調整ノブ
- 310 円弧マーク
- 315 回転角度検出手段
- 401 上下位置調整ボタン
- 402 上向きマーク
- 403 下向きマーク
- 405 前後位置調整ボタン
- 406 前向きマーク
- 407 後向きマーク
- 500 リモートコントロールスイッチ
- 502 ボタン

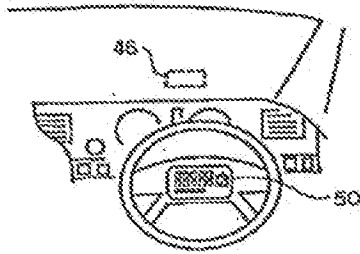
【図1】



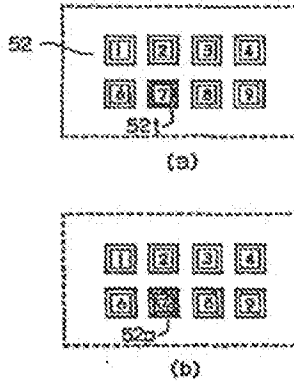
【図3】



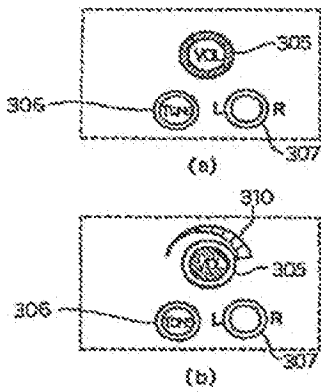
【図4】



【図7】



【図11】



【図14】

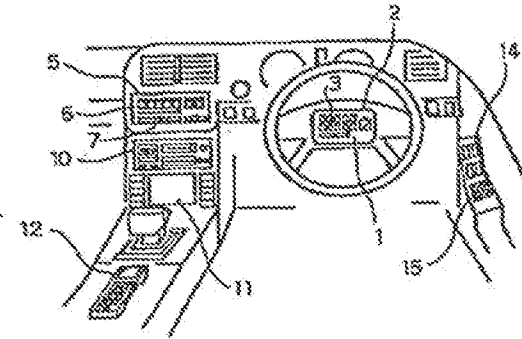
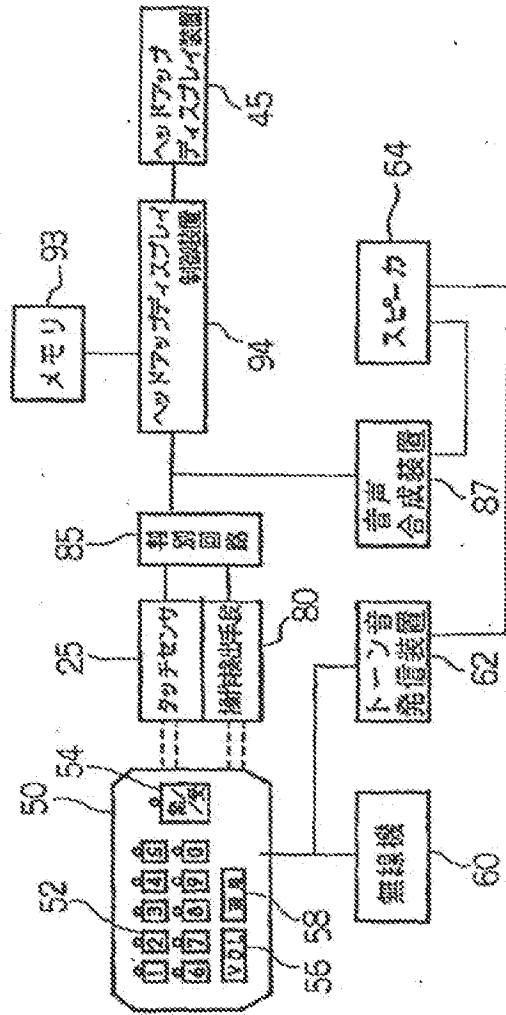
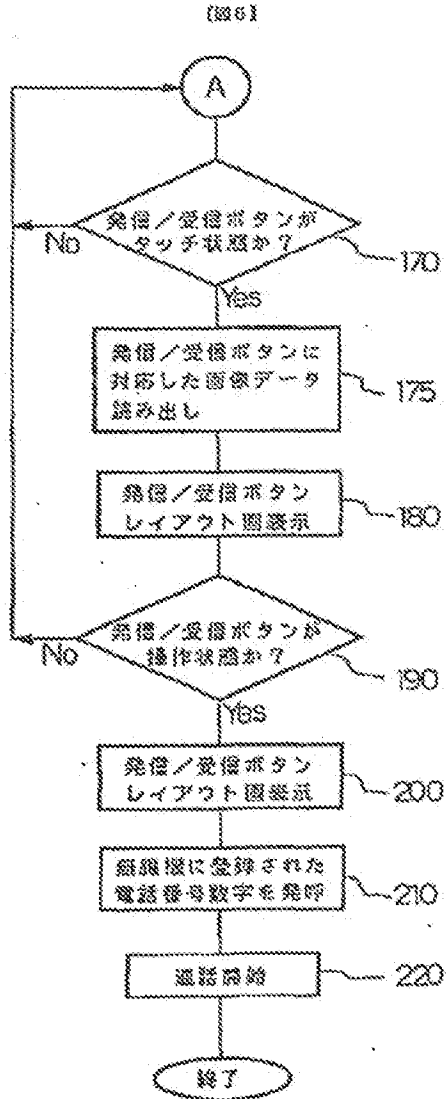
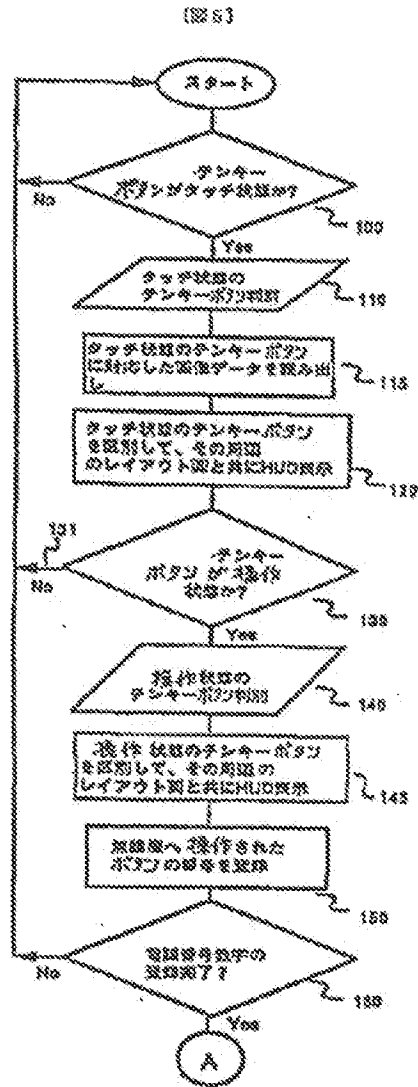
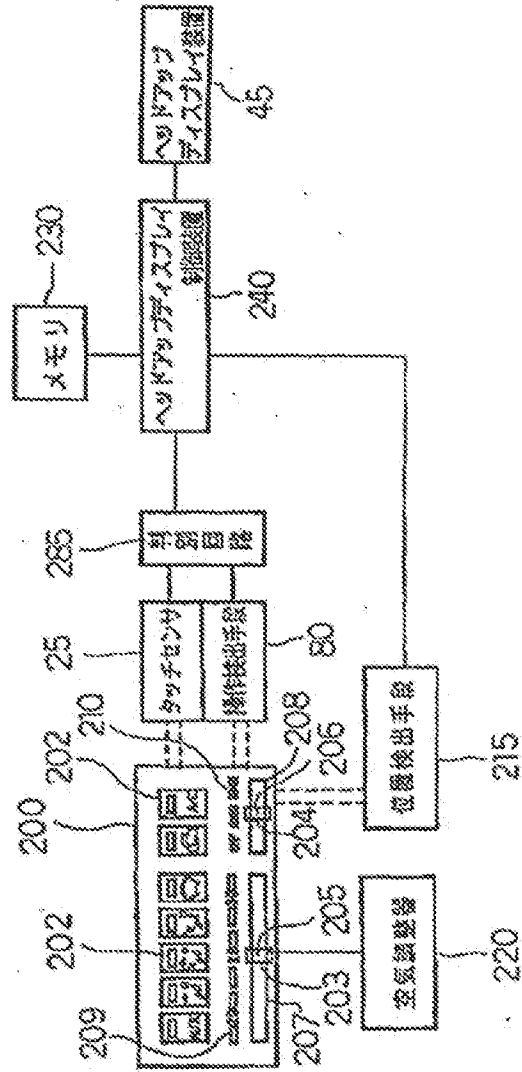


図3

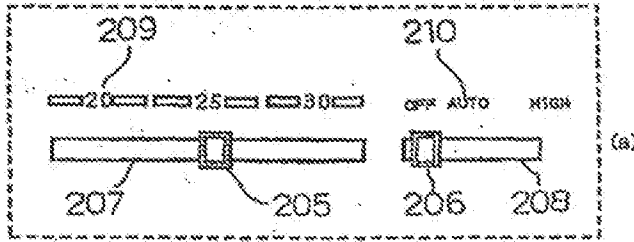




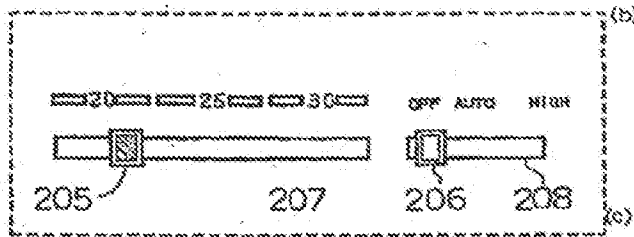
(図8)



【図1】

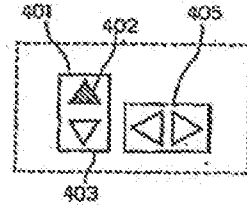
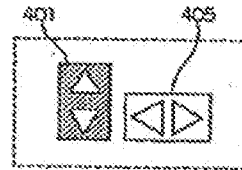
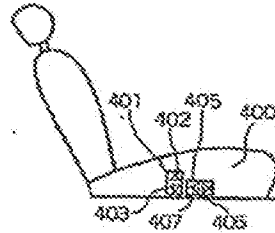


(a)



(b)

【図12】



【図16】

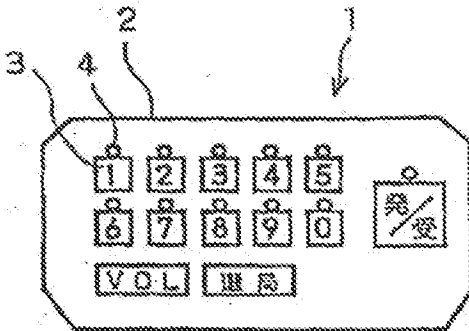
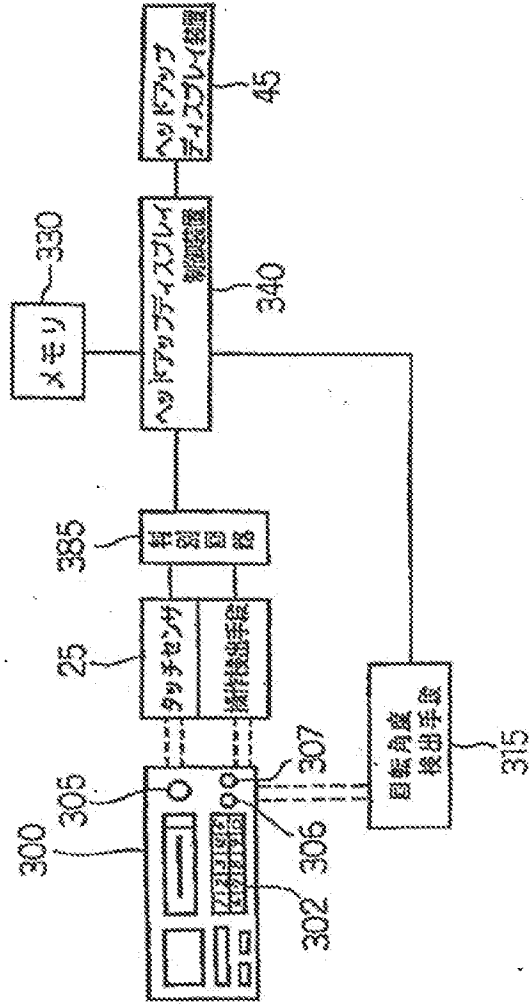
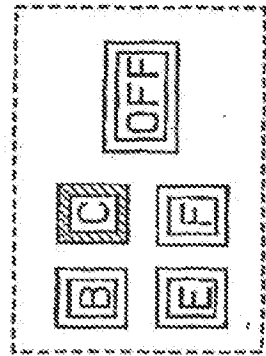


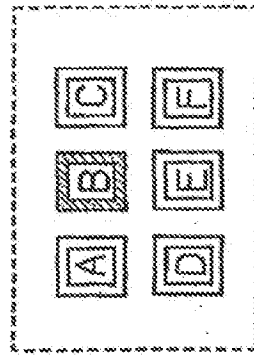
図10



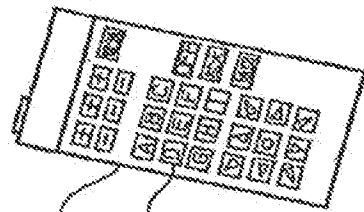
(图 1.3)



(b)



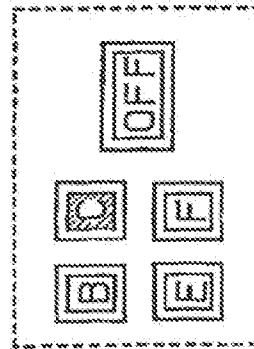
(c)



500

502

(a)



(c)

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B 60 K 35/00	D	7812-3D		
37/06	A	7812-3D		
H 01 H 9/16	B	7826-3G		

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		(74) Agent	Kimio Kikutani, Patent Attorney (3 others)

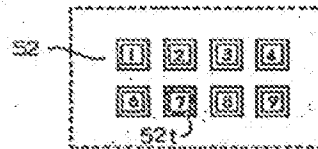
(54) Title of the Invention Vehicle Switch Device

(57) [Abstract]

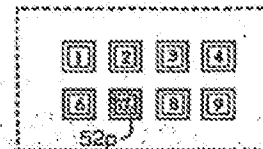
[Purpose] To provide an easy and reliable access to an intended switch button and level so that a driver can use it without moving his or her eyes while driving.

[Constitution] A touch sensor and an operation detection means are provided for a button so that a layout of a button 52i that is being touched and surrounding buttons are displayed on a head-up display device and the button 52i that is being touched is highlighted. When a button is operated, that button 52p is highlighted differently from the touch state.

[See source of the drawing]



(a)



(b)

[Specification]

[Scope of the Claims]

[Claim 1] A vehicle switch device comprising of a touch sensor installed in the switch operation unit, a memory storing configuration information around the switch operation unit, a head-up display device and a head-up display control device, characterized such that this head-up display control device reads based on the signals from the said touch sensor the switch operation unit and its surrounding configuration information from the memory if the said switch operation unit is in a touched state, in order to display the switch operation unit and its surrounding configuration information in the head-up display device, while the said switch operation unit in the display is distinguished from its surrounding configuration information.

[Claim 2] A vehicle switch device comprising of a touch sensor installed in the switch operation unit, an operation detection means of the switch operation unit, a memory storing configuration information around the switch operation unit, a head-up display device and a head-up display control device, characterized such that this head-up display control device reads based on the signals from the said touch sensor the switch operation unit and its surrounding configuration information from the memory if the said switch operation unit is in a touched state, in order to display the switch operation unit and its surrounding configuration information in the head-up display device, while the said switch operation unit in the display is distinguished from its surrounding configuration information and based on the signals from the operation detection means, the said switch operation unit in an operation state is displayed differently from the switch operation unit in a touched state.

[Claim 3] A vehicle switch device comprising of respective touch sensors installed in multiple switch operation units, a discrimination circuit, a memory storing configuration information around the switch operation unit, a head-up display device and a head-up display control device, characterized such that the discrimination circuit sends information specifying the switch operation unit in a touched state to the head-up display control device based on the signals from the touch sensors, the head-up display control device reads based on the signals from the said touch sensor the switch operation unit and its surrounding configuration information from the memory if the said switch operation

unit is in a touched state, in order to display the switch operation unit and its surrounding configuration information in the head-up display device, while the said switch operation unit in the display is distinguished from its surrounding configuration information.

[Claim 4] The vehicle switch device as described in Claims 1, 2 or 3 wherein the said switch operation unit is a pressed or push type button.

[Claim 5] The vehicle switch device as described in Claims 1, 2 or 3 wherein the said switch operation unit is a slide type lever knob.

[Claim 6] The vehicle switch device as described in Claims 1, 2 or 3 wherein the said switch operation unit is a knob operated by rotation.

[Claim 7] A vehicle switch device comprising of a touch sensor installed in the slide type lever knob, a knob operation detection means, a position detection means for the said lever, a memory storing configuration information around the lever, a head-up display device and a head-up display control device, characterized such that the head-up display control device reads the configuration information surrounding the lever from the memory based on the signals from the touch sensor and the position detection means if the said knob is in a touched state, in order to display the lever surrounding configuration information in the head-up display device and displays the said knob distinguished from the surrounding configuration at the position corresponding to the lever position, and when the said knob is in an operation state based on the signals from the operation detection means, the knob is displayed differently from that in the touched state at the position corresponding to the new lever position.

[Claim 8] A vehicle switch device comprising of a touch sensor installed in the rotary type switch knob, a knob operation detection means, a rotation angle detection means for the said switch, a memory storing configuration information around the lever, a head-up display device and a head-up display control device, characterized such that the head-up display control device reads the configuration information surrounding the knob from the memory based on the signals from the touch sensor and the rotary angle detection means if the said knob is in a touched state, in order to display the knob surrounding configuration information in the head-up display device and displays the said knob distinguished from the configuration information around the knob and if the said

Knob is in an operation state based on the signals from the operation detection means, its rotation direction is displayed near the knob.

[Detailed Description of the Invention]

[0001]

[Industrial Field of Application]

The present invention relates to a vehicle switch device with improved operational properties.

[0002]

[Prior Art] Various switches are arranged around the driver seat in the vehicle for the operation of the loaded instruments as shown in Figure 14. For example, in the hands-free automobile telephone switch 1 installed at the steering wheel, push buttons 3 are arranged on a switch panel 2 on the steering pad portion as shown in Figure 15 so that input of telephone numbers and switching send/receive can be executed by button operations. Whenever the buttons are pressed or switches are turned on, lamps 4 installed near the switches are lighted. In this case, a tone such as "beep" sound may be generated. Similar technologies are disclosed in the following patents: Kokai JP No. S59-32540 and Kokai JP No. S59-227535.

[0003] In the case of a car interior air control switch installed in the instrument panel, besides air control blow mode selection buttons 6, levers 7 for humidity setting are also installed so that a driver can set at a desirable position by sliding.

[0004]

[Problems to be Solved by the Invention] However, with the aforementioned conventional vehicle switches, when operating such switches, a driver must search for switches to be operated by the naked eye or must check by hand. This is the same for other switches: stereo/cassette switches 10, television navigation display touch switches 11, dial ten-key switches of car telephone handsets 12 placed near the center console, radio station selection switch and volume switch or power window switches 14 installed on the door, and door lock switch 15.

[0005] For this reason, when operating switches while driving or when checking the positions or types of the switches, the disadvantages are that the eyes must be moved and that an error may be made in a very short time so that intended buttons may not be

selected. When generating a tone, if a correct button is selected, the advantage is that the operational key input can be confirmed without visual checking, but if a correct button is not selected, this is meaningless.

[0006] The purpose of the present invention is to provide a vehicle switch device with which a driver can easily and safely access intended switches and levers without moving the direction of the eyes and furthermore, the fact whether the accessed button is properly operated can be checked.

[0007]

[Means for Solving the Problem] For this purpose, the invention disclosed in various claims, as shown in Fig. 1, comprises of a touch sensor 25 installed in the switch operational unit 20, a memory 30 storing configuration information of the switch operational unit 20, a head-up display device 45, and head-up display control device 40. The head-up display control device 40 has a basic configuration such that based on the signals from the touch sensor 25, configuration information surrounding the switch operation unit 20 is read from the memory 30 if the aforementioned switch operation unit 20 is in a touched state, to display the configuration information in the switch operation unit 20 and its surrounding areas in the head-up display device 45, while the said switch operation unit 20 is displayed differently from the surrounding configuration information.

[0008] Moreover, an operation detection means is installed so that if the switch operation unit is in an operation state, it is displayed differently from that in a touched state. Alternatively, if there are multiple switch operation units, the switch operation units that are in a touched state are displayed differently from the other surrounding switch operation units.

[0009]

[Actions] When the switches are operated with the fingers, the switch operation unit 20 including the buttons and knobs that have been touched with fingers is displayed in the head-up display device 45 as well as layouts of surrounding other operation units. In particular, the switch operation unit that is in a touched state is displayed differently so that the driver can check whether the intended switch operation unit is selected while keeping the visual direction straight while driving in order to perform the operation.

[0010] If an operation detection means is further installed to display it differently from the touched state, the driver can check whether the switch operation unit is definitely operated. In addition, if multiple switch operation units are installed, and if the switch operation unit that was displayed differently from the intended one, the surrounding switch operation units are also displayed, thus, one can easily determine in which direction the switch operation unit is positioned from the one that has been touched.

[0011]

[Examples] Figure 2 shows an example of application of the present invention to the switch for a hands-free car telephone installed on the steering pad. A car telephone switch panel 50 in the steering pad is composed of ten-key buttons corresponding to the dial from "0" to "9" as a switch operation unit, a push type sending/receiving button 54 to execute start and end telephone connection, and a volume control button 56 and a radio station selection button 58. With a command from this switch panel, a radio machine 60 is controlled and a connection is made via an antenna that is not shown.

[0012] At respective buttons 52 through 58 in the switch panel 50, a touch sensor 25 is installed to detect the status when the fingers are in contact. For example, a capacity sensor is pasted on the button surface to be used as a touch sensor 25. Alternatively, as shown in Figure 3, two kinds of springs 71 and 72 having different spring constants are mounted and a touch sensor 25 is configured such that a soft spring 71 is bent by a slight dislocation of a button represented by 70 to turn on the button side contact point 73 with the first contact point 74. In this figure, the second contact point 75 turns on when the stronger spring 72 is bent to push the button 70. If the button 70 is a ten-key button, a dial signal representing the number is output.

[0013] In this example, in addition to the touch sensor 25, an operation detection means 80 is also installed in order to detect the selected status or an on status by push operation by pressing or pushing the button. As an operation detection means 80, a dislocation of the button can be detected, or a pressure sensor or a capacity sensor is used along with a touch sensor 25 to detect a difference in the output levels. In the example shown in Figure 3, the dial signal output from the second contact point 75 can also be used.

[0014] The outputs from the touch sensor 25 and from the operation detection means 80 are entered into a discrimination circuit 85 wherein either a touched state or an operation

state is determined and a button is specified. The signals from the discrimination circuit 85 are input to the head-up display control device 94. A memory 93 is connected to the head-up display control device 94, and the shape of the button displayed in the head-up display device 45 and the button layout information at the steering pad section are memorized in this memory 93. The head-up display device 45 displays a button layout overlapping with the landscape view at the front of the vehicle at the display site 46 of the front window indicated by the broken line in front of the driver in Figure 4 in response to the command from the head-up display control device 94.

[0015] From the switch panel 50, signal lines are connected to the radio machine 60 for car telephone functions, and in addition, the signal lines are also connected to the tone transmitting device 62. Additionally, a voice synthesizer 87 is connected to the discrimination circuit 85 for the outputs from the voice synthesizer 87 and from the tone transmitting device 62 to be input to a speaker 64.

[0016] A series of actions in the aforementioned configuration will be explained with reference to the flowcharts shown in Figure 5 and Figure 6. At Step 100, whether the fingers are in touch with a button is checked. That is, in order to execute connection transmission operations, when a driver traces the ten-key button 52 and touches one of the buttons 52, a touch sensor 25 installed on that button 52 transmits a touch detection signal. At Step 110, a discrimination circuit 85 determines a button 52t in a touched state and sends such information so that the button is in a touched state to the head-up display control device 94.

[0017] At Step 115, in response to the button in the touched state, the head-up display control device 94 selects and reads from the memory 93 image data expressing the layout of the buttons 52t in the touched state and other surrounding buttons as configuration information. At Step 120, as shown in Figure 7, a layout image of the button 52t that is in the touched state as mentioned above and the surrounding buttons is displayed on the head-up display device 45. If a finger touches the button "No. 7", when displaying as in Figure 7 (a), the "No. 7" button as the button 52t that is in the touched state is displayed in highlight by tracing the outline of the button as a discrimination display. As a discrimination display, a thicker outline than the others can be used or a different color display or a reversed display can be used.

[0018] The same information is sent from the discrimination circuit 85 to the voice synthesizer 87 and a voice expressing this button 52t, "nana", is synthesized in the voice synthesizer 87 and the voice is output from the speaker 64.

[0019] The driver confirms that the finger is touching the button based on the display on the head-up display device 45 and from the voice from the speaker 64, and if it is not different from the button to be operated, the driver continues with a push operation.

[0020] At the next Step 130, the button that is in an operation state is checked. That is, when a push operation is performed for the button, an operation detection signal is output from the operation detection means 80 that has been set on that button.

[0021] When the button is not in an operation state, it is returned to the start and the abovementioned processes are repeated. If the button that a finger is touching is not the intended button, the driver can easily determine in which direction the intended button is to be found from the surrounding layout displayed in the head-up display device 45 and moves the finger. Since the aforementioned flow is repeated, when the driver moves the finger and touches the other button, the highlighted button displayed in the head-up display device 45 changes in response to the touch.

[0022] When the button is operated and a signal flows to radio machine 60, simultaneously a tone generation device 62 operates to output a "beep" sound from the speaker 64.

[0023] At Step 130, the operation state of the button is checked. If it is in an operation state, the discrimination circuit 85 specifies the button 52p that is in an operation state at Step 140 and an information carrying a message that that button is in an operation state is sent to the head-up display control device 94.

[0024] The head-up display control device 94 displays at Step 145 a layout image of the button 52p in the said operation state and its surrounding buttons in the head-up display device 45. In this case, as shown in Figure 7(b), the button 52p in an operation state, "No. 7" button is distinguished from the highlighted display of said Figure 7 (a) showing that the button is in a touched state. For example, if another highlighted display appears, only this button is displayed in a color.

[0025] The number corresponding to the button 52p operated is registered in a radio instrument 60 at Step 150 as a telephone number to be dialed. This registration operation

is repeated so that all the numbers of the telephone number of the call destination are registered. When the completion of registration of the telephone number is confirmed at Step 160 similarly as in the case of ten-key button 52 at Step 170, whether the transmission/reception button 54 for starting a connection is in a touched state is checked using a touch sensor 25.

[0026] When the transmission/reception button 54 is determined to be in a touched state by the discrimination circuit 85, the process moves up to Step 175 where the head-up display control device 94 reads image data around the transmission/reception button 54 from the memory 93 to display them in the head-up display device 45 at Step 180. Subsequently, whether the transmission/reception button 54 is in an operation state is checked at Step 190 by the operation detection means 80.

[0027] The driver pushes the button and when the button is in an operation state is determined by the discrimination circuit 85, the head-up display control device 94 displays in highlight in another mode from that in a touched state at Step 200, while the radio instrument 60 calls the telephone number registered in advance at Step 210 to start a connection. For these buttons, tones and synthesized voices similar to those used for ten-key buttons are used.

[0028] With the above-mentioned configuration, when the driver brings a finger to the switch panel 50 on the steering pad, the status around the button that was touched by the finger is displayed on the front window in front of the driver so that the intended button can be searched without moving the direction of the eyes. In addition, when pushing the button, the fact that the button was pushed can be confirmed by the display on the front window. With the addition of outputs from voice synthesis or tones, operation quality is improved and the operation is further secured.

[0029] Figure 8 shows a second example of an application to the air control switch in a car. In the air control switch panel 200, sliding type levers 203 and 204 are installed in addition to the selection button 202 in the air control blow mode in order to set up the temperature of the air control blow or to set up the blow rate. Therefore, an air controller 220 is controlled in response to the positions of the lever.

[0030] Regarding the selection button in the blow mode 202, as in the previous example, it is sufficient if the layout of the button where the finger is touching and other

surrounding buttons is displayed. In particular, the application to the sliding type levers will be explained below. At the knobs 205 and 206 of the levers 203 and 204, a touch sensor 25 and an operation detection means 80 are installed as in the previous example. Moreover, a position detection means 215 for detecting the positions of the levers in the slide paths 207 and 208 is installed in the lever operation unit. As this position detection means 215, for example, a potentiometer installed in relation to levers 203 and 204 can be used. Alternatively, temperature setup signals or blow rate setup signals that are used for controlling air controller 220 can also be used.

[0031] The outputs from the touch sensor 25 and the operation detection means 80 are input to a discrimination circuit 285 in order to determine either a touched state or an operation state, and which lever to be used is specified. The signals from the discrimination circuit 285 and the signals of the position detection means 215 are input to the head-up display control device 240. Layout of the switch panel 200 as configuration information including knob shapes displayed in the head-up display device 45, temperature gauge 209 along the slide paths 207 and 208, or function display marks 210 is memorized in the memory 230

[0032] The head-up display control device 240 displays the layout of the switch panel 200 as in Fig. 9 (a) based on the signals from the discrimination circuit 285 if a finger touches a knob of the lever, while based on the signals from the position detection means 215, it is highlighted at the position corresponding to the layout displaying the knob if the knob 205 is in a touched state.

[0033] After confirming the lever having a touching knob by the display in the head-up display device 45, if a driver slides this lever, the knob 205 of the lever in an operation state is highlighted differently from the case in a touched state as shown in Fig. 9 (b) at a newly shifted position.

[0034] For this reason, although the position of the knob changes with operation, the knob touched by a finger is displayed in the front window in relation to the surrounding layout so that the driver can check which knob of the lever he/she is touching. In addition, when operating the lever, it is displayed at a position corresponding in the layout image including the gauge so that the driver can find out until which position it has been slid without moving the direction of the eyes.

[0035] Figure 10 shows a third example of an application to the switch for car radio/cassettes. In the radio cassette switch panel 300, besides the push type button 302 for cassette operation, a rotary volume switch is installed in order to control sound volume, sound quality or left and right balance, and the respective sound volume control knob 305, sound quality control knob 306, and left and right balance control knob 307 are arranged to be projected from the panel surface.

[0036] Here, the application to rotary type control knobs will be explained. As in the previous examples, touch sensors 25 are installed for each control knobs 305, 306 and 307. In each volume switch having these control knobs, a rotary angle detection means 315 is installed to detect an angle of rotation. As a rotary angle detection means 315, a potentiometer can be installed in relation to the control knobs 305, 306 and 307, or the output of each volume switch used for controlling can also be used.

[0037] The outputs of the touch sensor 25 are input to the discrimination circuit 385 to determine whether it is in a touched state or which controller knob is to be specified. The signals from the discrimination circuit 385 and the signals of the rotary angle detection means 315 are input to the head-up display control device 340. In addition, the layout of the switch panel as configuration information including positions and knob shapes of the control knob, marks around the knob or gauges that are displayed in the head-up display device 45 is memorized in the memory 330.

[0038] Based on the signals from the discrimination circuit 385, the head-up display control device 340, if a finger touches the sound volume control knob 305, it displays the layout surrounding the sound volume control knob 305 in a touched state as shown in Figure 11 (a) in the head-up display device 45, while the sound volume control knob 305 is highlighted.

[0039] After confirming the knob that has been touched in the display in the head-up display device, if the driver turns this control knob, a pointed arc mark 310 showing the amount of rotation of the knob is displayed as shown in Fig. 11 (b), and the length of the arc corresponding to the angle of rotation of the knob.

[0040] According to this example, when operating the rotary operation blindfolded, the operational direction is displayed while the knob operated is highlighted so that the advantage is that there are fewer operational errors.

[0041] Additionally, this invention can be applied to the control switches for electrically operated power seats in a car. In the case of a button type, it can be implemented by a configuration based on the first example. In this case, a display example in the head-up display device is shown in Figure 12 as a fourth example. The seat front and rear position control buttons and the up and down position control buttons are arranged at the side 400 of the seat cushion as shown in Figure 12 (a). An upward mark 402 is indicated on the upper half portion of the up and down position control button 401 and a downward mark 403 is indicated on the lower half portion, a forward mark 406 is indicated on the front half portion of the front and rear position control button 405 and a backward mark 407 is indicated on the rear half portion. When the respective half portion is pushed, the seat is adjusted in the direction indicated by the mark.

[0042] A touch sensor is installed on each control button. For example, a finger touches the up and down position control button 401, as shown in Fig. 12 (b), a layout image of the control button is displayed, while the up and down position control button 401 is highlighted. After confirming the button that has been touched by the display in the head-up display device, when the driver pushes the upper half portion of the up and down position control button 401, the upward mark 402 is highlighted in the same display as shown in Figure 12 (c), and upward control is indicated to be in operation.

[0043] According to this example, in contrast to the conventional operation of seat control switches with blindfolding due to the absence of visual confirmation since it is located below the hip level near the door, the advantages are that an operation becomes much easier and that the direction of the moving seat can be visually checked.

[0044] Moreover, the present invention is applicable to remote control switches that are placed on the console and are operated while holding with a hand. Since this is a button type, a configuration is based on the first example. A touch sensor and an operation detection means are installed on each button and signal transmission to the head-up display control device is done by means of electrical waves or infrared rays.

[0045] An example of display is shown as a fifth example in Figure 13. As shown in Fig. 13 (a), numerous buttons 502 are installed on a remote control switch 50 and an intended button is searched. If a finger touches a "button C", the "button C" and its surrounding buttons, in particular the adjacent buttons, are displayed in the head-up display device as

shown in Figure 13 (b), while the outline of the "button C" is highlighted, indicating that it is in a touched state. If this button is determined to be the intended one and then pushed, the inside outline of the "button C" is reversed as shown in Figure 13 (c), changing to a highlighted state that is different from that in a touched state.

[0046] In contrast, after viewing the display in (b), the driver learns that the intended button is located to the left of the button that is currently being touched, and shifts a finger to the left. When the finger approaches to the "button B", as shown in Figure 13 (d), the display changes to a layout image primarily around the "button B" so that a surrounding arrangement including the "button A" and the "button C" that are adjacent to the "button B" is displayed. In this case, the "button B" is highlighted, indicating a touched state.

[0047]

[Effects of the Invention] As mentioned above, according to the present invention, a touch sensor is installed in the switch operation unit so that based on the signals from the touch sensor, if the switch operation unit is in a touched state, the switch operation unit and its surrounding position information are displayed in the head-up display device, and the switch operation unit in a touched state is discriminated from the surrounding configuration information. Therefore, a driver can check whether the switch operation unit touched is the intended one while driving keeping the eyes straight forward. Even if the switch operation unit that is touched is not the intended switch operation unit among numerous arrangements, its position can be easily determined from the surrounding configuration information displayed so that a desired switch operation unit can be accessed easily.

[0048] When an operation detection means is installed and the operation of the switch operation unit is displayed differently from that in a touched state, the driver can visually confirm the operation of the switch operation unit without moving the direction of the eyes even under such conditions such as when it is difficult to check the conventional beeping tones with loud noises, resulting in fewer operational errors. In addition to the aforementioned common effects, in the first example, outputs of voice synthesis and tones are further added so that searching for the switch operation unit and security of operation are further improved.

[0049] According to the second example, even in the cases of slide type lever switches where positions of knobs are unstable, it is possible to check whether the knob that has been touched belongs to which lever switch in relation to the layout including the displayed surrounding gauges. When operating the lever, the location of the knob displayed changes so that a driver can determine how far that it has been slid without moving the visual direction.

[0050] According to the third example, a pointed arc mark showing the amount of rotation of the knob is displayed and the length of the arc is adjusted to correspond to the angle of rotation of the knob so that when searching for a rotary knob to be operated, the amount of rotation can be checked and operational errors can be eliminated.

[0051] According to the fourth example, when searching for the seat adjustment switches that are installed at such places that it is impossible for a driver to directly see after being seated, they can be easily found and the directions of seat movement can be checked in the front visual field.

[0052] According to the fifth example, in the remote control switches where numerous buttons are installed in a narrow panel so that searching for a button by moving the visual direction is difficult while driving, the button that has been touched by a finger and the surrounding buttons can be displayed in a front visual field such that they can be recognized easily so that it is possible to move a finger to a desired button quickly, markedly improving operational quality.

[0053] As clearly shown in any of these examples, operational switches can be installed in a range of places where fingers can reach even though drivers cannot check visually, thus, the advantage is that the degree of freedom when designing switch positions in a vehicle increases.

[Brief Description of the Drawings]

[Fig. 1] is a diagram showing a configuration of the present invention.

[Fig. 2] is a diagram showing a first example of the present invention.

[Fig. 3] is a diagram showing a configuration example of a touch sensor.

[Fig. 4] is a diagram showing sites of display in the head-up display device.

[Fig. 5] shows a flow of display actions.

[Fig. 6] shows a flow of display actions.

[Fig. 7] is a diagram showing display examples in the head-up display device.

[Fig. 8] is a diagram showing a second example.

[Fig. 9] is a diagram showing display example in the head-up display device in the second example.

[Fig. 10] is a diagram showing a third example.

[Fig. 11] is a diagram showing display example in the head-up display device in the third example.

[Fig. 12] is a diagram showing a fourth example.

[Fig. 13] is a diagram showing a fifth example.

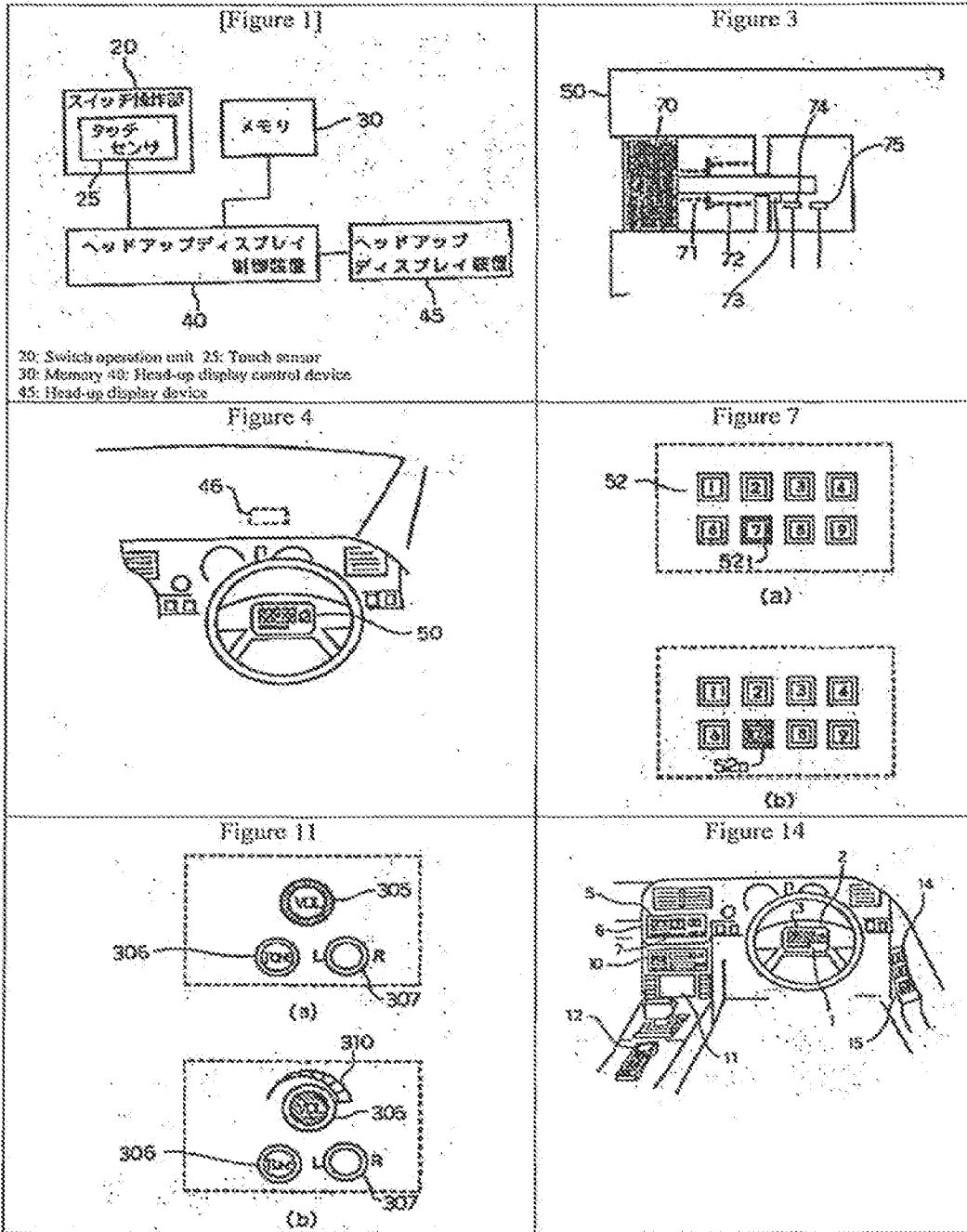
[Fig. 14] is a diagram showing the status of positions of switches around the driver seat.

[Fig. 15] is a diagram showing an example of the conventional switch panel surface.

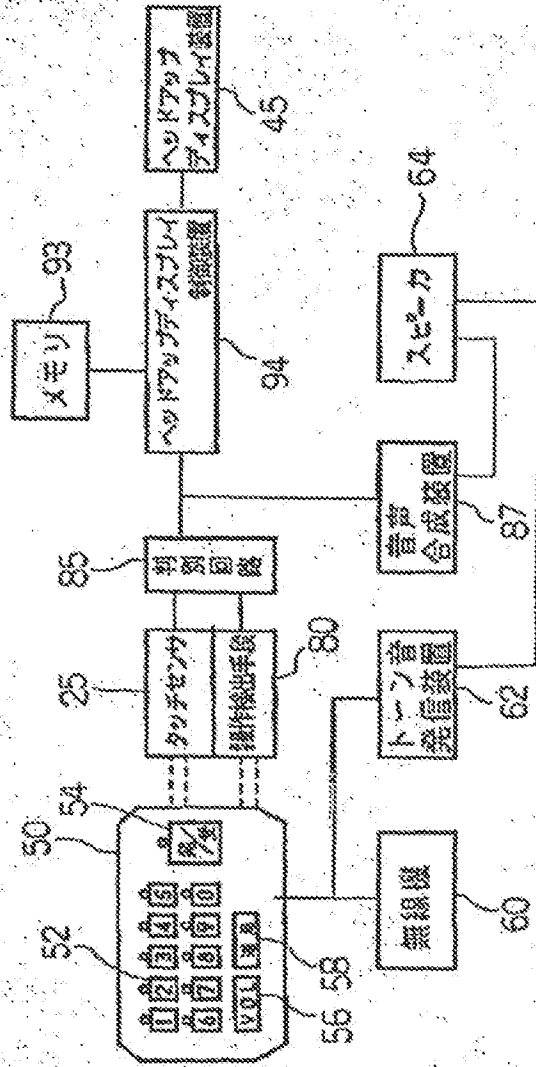
[Explanation of Symbols]

20: Switch operation unit
25: Touch sensor
30, 93, 230, 330: Memory
40, 94, 240, 340: Head-up display control devices
45: Head-up display device
46: Display sites
50, 200, 300: Switch panel
52: Ten-key button
54: Transmission/reception button
56: Sound volume control button
58: Station selection button
60: Radio instrument
62: Tone transmitting device
64: Speaker
70: Button
71, 72: Springs
73, 74, 75: Contact points
80: Operation detection means
85, 285, 385: Discrimination circuits
87: Voice synthesizer
202: Selection button
203, 204: Levers
205, 206: Knobs
207, 208: Slide paths
209: Temperature gauge
210: Function display marks
215: Position detection means
220: Air controller

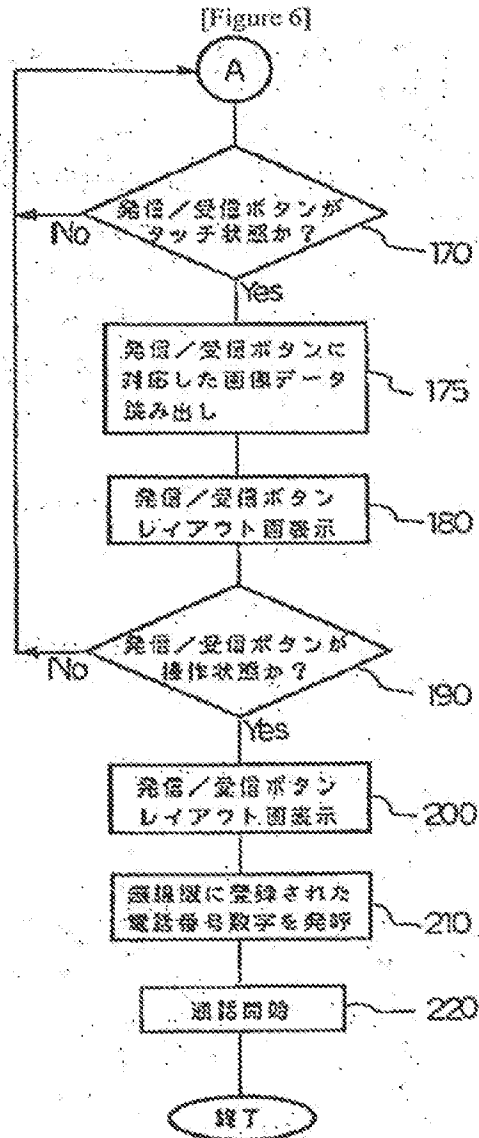
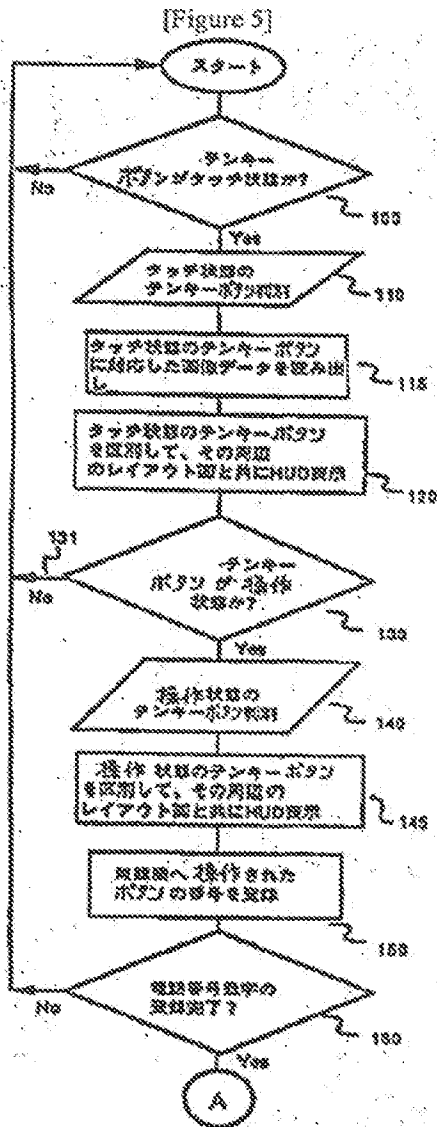
305: Sound volume control knob
306: Sound volume control knob
307: Left and right balance adjustment knob
310: Arc mark
315: Rotary angle detection means
401: Up and down position adjustment button
402: Upward mark
403: Downward mark
405: Front and rear position adjustment button
406: Forward mark
407: Backward mark
500: Remote control switch
502: Button



[Fig. 2]



- 25: Touch sensor
- 45: Head-up display device
- 54: Transmission/reception
- 56: Operation detector means
- 60: Radio instrument
- 62: Tone transmitting device
- 64: Speaker
- 80: Discrimination circuit
- 85: Memory
- 94: Head-up display device



[Fig. 5]

Start

100: Ten-key: Is the button in a touched state?

110: Determination of a ten-key button in a touched state.

115: Reading the image data corresponding to the ten-key button in a touched state.

120: Distinguishing the ten-key button in a touched state

130: Is the ten-key button in an operation status?

140: Distinguish a ten-key in an operation status.

145: Distinguishing ten-key buttons in an operation status, displaying HLP along with the surrounding layout image.

150: Registration of button numbers operated to a radio instrument

180: Registration completed for telephone numbers

[Fig. 6]

170: Are transmission/reception buttons in a touched state?

175: Read image data corresponding to transmission/reception buttons

180: Display a layout image of transmission/reception buttons

190: Are transmission/reception buttons in an operation state?

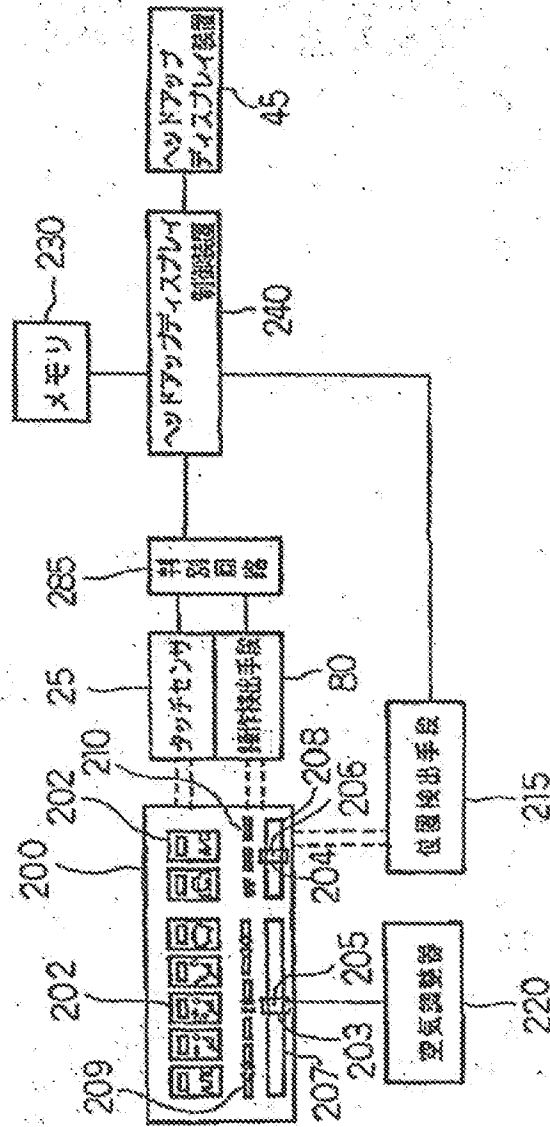
200: Display a layout image of transmission/reception buttons

210: Calling the telephone numbers registered in a radio instrument

220: Start connection

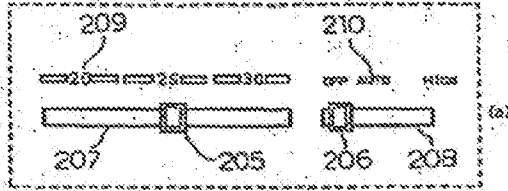
End

[Figure 8]

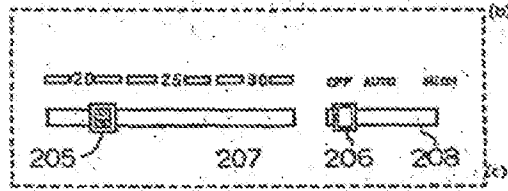


- 25: Touch sensor
- 45: Head-up display device
- 80: Operation execution means
- 230: Air controller
- 215: Position detection means
- 240: Head-up display control device
- 285: Discrimination circuit

[Figure 9]

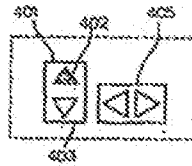
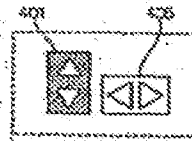
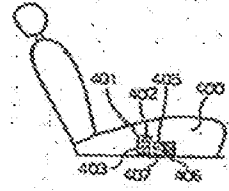


(a)

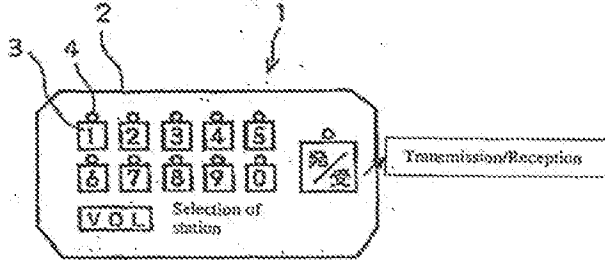


(b)

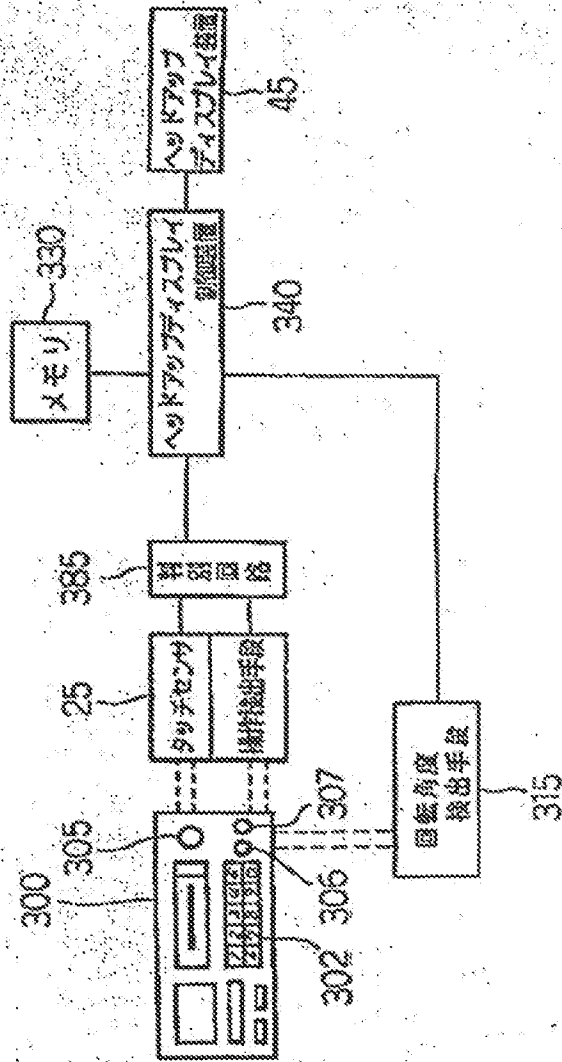
[Figure 12]



[Figure 15]

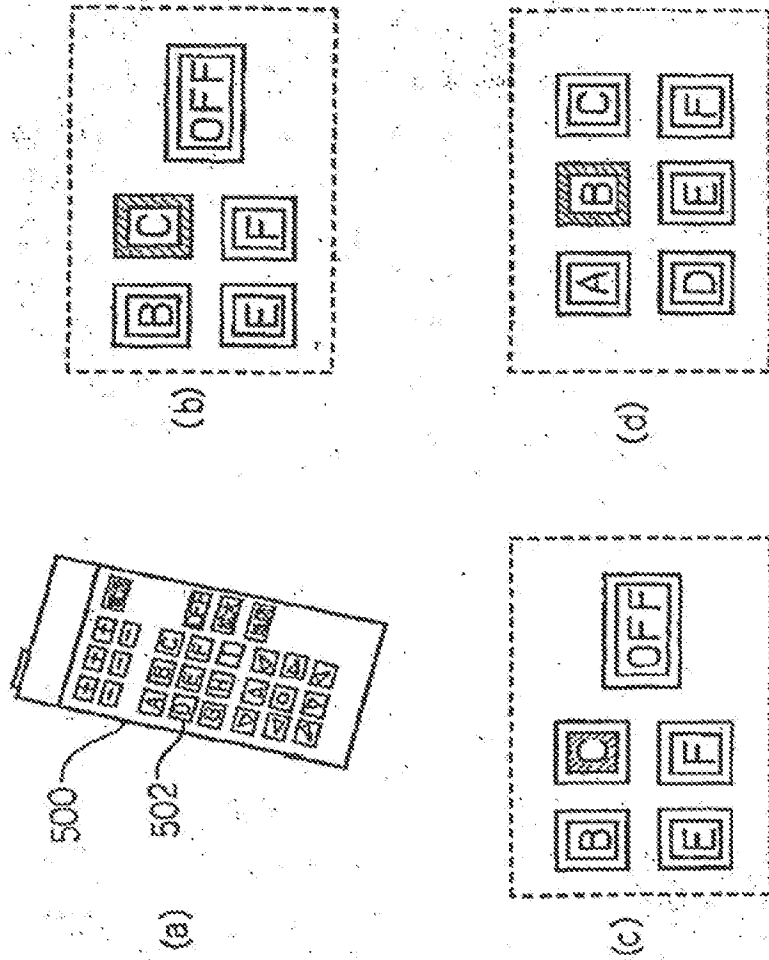


[Figure 10]



- 25: Touch sensor
- 45: Head-up display device
- 80: Operation detection means
- 320: Memory
- 315: Position detection means
- 340: Head-up display control device
- 385: Discrimination circuit

[Figure 13]



DRIVE GUIDE APPARATUS FOR AUTOMOBILE

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Applicant: NISSAN MOTOR

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G05D1/02; G08G1/09; G08G1/0969; G08G1/123;
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- European:

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(全 5 頁)

⑧ 自動車のドライブガイド装置

⑨ 発明者 伊藤敏行

⑩ 特 願 昭57—196134

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要 約

1. 発明の名称

自動車のドライブガイド装置

2. 特許請求の範囲

(1) 道路地図データを記憶する記憶手段と、この記憶手段に記憶されたデータに基づいて道路地図を表示する表示手段と、自動車は進行方向および進行距離の検出データから道路地図の位置を算出する位置算出手段と、この位置算出手段で算出された位置を上記記憶手段に読み込んだ道路地図上に付加表示させる位置表示制御手段と、道路地図の図面を介してデータサービスセンターとのデータ通信を行うデータ通信手段と、このデータ通信手段によって上記データサービスセンターから受信した情報の道路地図表示手段に読み込んだ道路地図上にこれを表示させる付加表示させる制御装置等の表示制御手段とを備えることを特徴とする自動車のドライブガイド装置。

3. 発明の詳細な説明

この発明は、自動車の運転者に対する道路地図を

行っている道路の道路地図データとともに各種の情報を提供するためのドライブガイド装置に関する。

最近、この種の自動車のドライブガイド装置として、道路地図データを記憶する記憶手段と、この記憶手段に記憶されたデータに基づいて道路地図を表示する表示手段と、自動車の進行方向および進行距離の検出データから道路地図の位置を算出する位置算出手段と、この位置算出手段で算出された位置を上記記憶手段に読み込んだ道路地図上に付加表示させる位置表示制御手段とを備える装置が提案された。

このドライブガイド装置によれば、道路の位置が上記表示手段の表示から一層明確になり、自動車での運転者について信頼性のある情報を提供することになり、不案内な道路でも安心してドライブすることが出来る等の効果を挙げ、実用上極めて有益な装置として大いに採用されている。

また最近では、道路の道路状況、車庫情報、道路工事情報あるいは交通規制情報等の各種の道路

は、その不変性を保っている状態の図形状態や車線、工場の状況あるいは交通規制の状況等が表示されるので、運転者は一目瞭然と自分の位置と周辺の道路状況がわかり、目的地までの経路を覚える上で極めて有益であり、不変的な情報でも安心して、かつ不要な地図をかきまくることなく目的地までの運転が行える等、実用上様々な便宜をもたらす。

4. 図面の簡単な説明

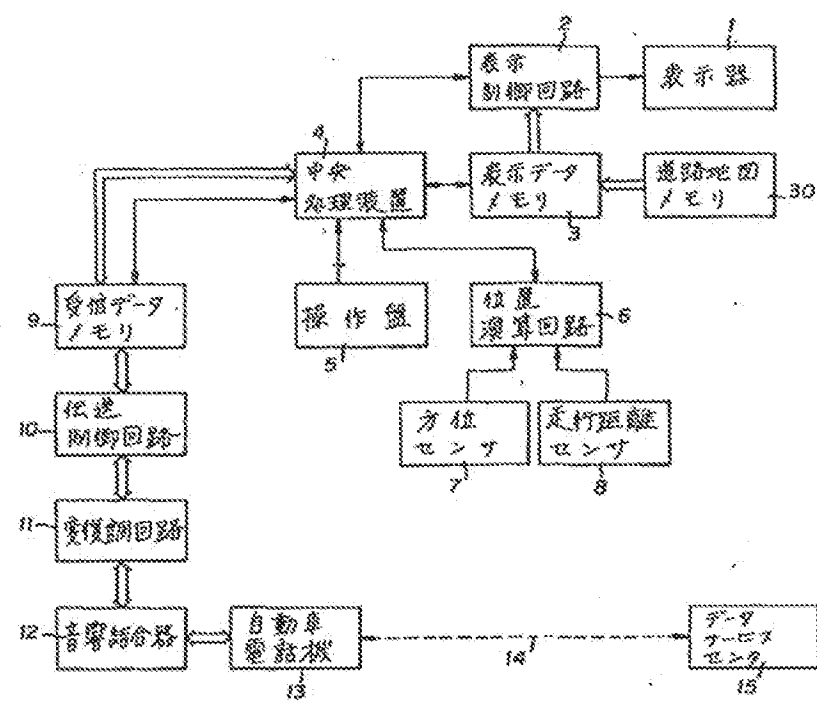
第1図はこの発明に係る自動車のドライバガイド装置の一例を示すブロック図、第2図は同じく他の実施例を示すブロック図である。

- 1 --- 表示器
- 2 --- 表示制御回路
- 3 --- 表示データメモリ
- 30 --- 道路地図メモリ
- 4 --- 中央処理装置
- 5 --- 操作盤
- 6 --- 位置演算回路
- 7 --- 方位センサー
- 8 --- 走行距離センサー
- 9 --- 受信データメモリ
- 10 --- 伝送制御回路
- 11 --- 受信制御回路
- 12 --- 音声結合器
- 13 --- 自動車電話機
- 14 --- データケーブルセンサー
- 15 --- データケーブルセンサー

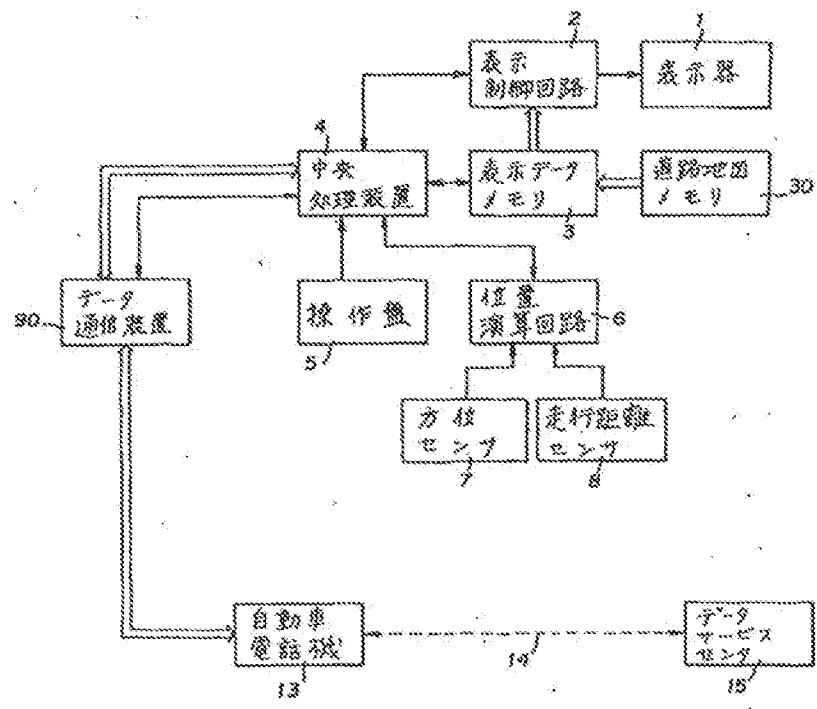
- 8 --- 走行距離センサー
- 9 --- 受信データメモリ
- 10 --- 伝送制御回路
- 11 --- 受信制御回路
- 12 --- 音声結合器
- 13 --- 自動車電話機
- 14 --- 表示回路
- 15 --- データサービスセンサ
- 30 --- データ記憶装置

特許出願人
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第1図



第 2 図



RADIO DATA SYSTEM RECEIVER

Patent number: JF63136828
Publication date: 1988-05-09
Inventor: MORI SHIGETO; GO YASUNAO; ARAKI MORIO; KANEKO MICHIMIRO
Applicant: PIONEER ELECTRONIC CORP
Classification:
- international: H04B1/16; H04H1/00
- european:
Application number: JP19860283675 19861128
Priority number(s): JF19860283675 19861128

View INPADOC patent family

Abstract of JP63136828

PURPOSE: To very easily select a desirable program by storing broadcasting stations classified by main types of programs sorted by means of a PTY code in plural memory blocks. **CONSTITUTION:** When a sweep command is issued to a system controller 9 by operating a key matrix 15, the broadcasting station which can be received is received with a searching function. At this time, a memory control circuit 17 stores the frequency information and the FS code of the receiving station in one of the specified memory blocks of the memory blocks 10a-10n, which are previously classified by the main types of programs, according to the data (numerical value information) obtained by the PTY code decoder 8b of an RDS decoder 8. The system controller 9 displays the name of program type prescribed in the memory 10b on a display 14 and at the same time displays the names of the broadcasting stations by the frequency information and the FS code stored in the memory 10h on the display 14 through an ASCII code conversion tool 9h.

◎日本国特許庁(JP)

◎特許出願公開

◎公開特許公報(A)

昭63-136828

◎Int. Cl.

識別記号

庁内整理番号

◎公開 昭和63年(1988)6月9日

H 04 B 1/16
H 04 H 1/08

M-6745-5K
C-7608-5K

審査請求 未請求 発明の数 1 (全7頁)

◎発明の名称 ラジオデータシステム受信機

◎特 願 昭61-283675

◎出 願 昭61(1986)11月28日

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明 細 書

1. 発明の名称

ラジオデータシステム受信機

2. 特許請求の範囲

FM放送波に送信データ等のデータ信号を混載して放送信号と共に送信する放送システムを受信する受信機であって、前記データ信号を復調するデコーダと、前記デコーダによって復調されたデータ内容に基づいた分類によって予め定められたメモリブロックに受信した放送波の副搬送波帯及び放送波のデータ信号を少なくとも記憶する記憶回路を備え、前記記憶回路により前記メモリブロックの1つを呼び出すと共に、前記メモリブロックに格納された放送波を受信する表示手段を備えたことを特徴とするラジオデータシステム受信機。

3. 発明の効果を説明

【従来の技術分野】

この従前は、データ信号が混載された放送波を

受信するラジオ受信機に関するものである。

【発明の要旨】

従来技術等では送信機側でデータ等の信号を混載したシステム(Autofreier Sendfunk in Frequenz) (略称ARFI)が考案されている。

このARFIはFM放送のパイロットトーンである19kHzの副搬送波である7kHzにサブキャリアを用いたことで副搬送波とし、これをメインキャリアに同位相変換して放送していた。この副搬送波はFM信号と複合され、復調機はこのFM信号を復調することにより副搬送波を復調している放送機の受信を容易にしていた。

しかしARFIシステムは放送機側に関する技術のみを提供するものであり、それ以上のサービスを提供するものではない。

そこで同じ57kHzのサブキャリアにARFIの副搬送波の0°異なる位相でパイロースコード化されたデータ信号をFSK(Frequency Shift Keying)変換して送信するシステム(Radio Data

System : 通常のR/Dシステム)が提供された。

R/Dシステムにおいて供給されるデータは第1図に示されるスライスパルスコードインジケータに示されるように完全なビットからなる4つのブロックによりグループが形成されている。

各々のブロックは16ビットの識別コードと10ビットのチェックワード及びパリティワードからなり、識別コードは識別ワードから生成されることを目的として、パリティワードの生成を容易にすることが可能である。

第1図のデータフォーマットに基づいて基本的な説明を説明する。

第1ブロックにはプログラム識別コード(PICコード)16ビットが与えられている。このPICコードは

- ① 識別コード (4ビット)
 - ② 識別識別コード (4ビット)
 - ③ プログラム識別番号コード (8ビット)
- の計16ビットにより構成され、その識別コードの識別は各々の場合、他種とも同じ識別が与えられて

④ 識別番号コード (TACコード・16ビット)

⑤ エラーチェック/スライススイッチコード (MC/SCコード・16ビット)

⑥ チェックコントロールビット (016ビット、1ビット)

⑦ アドレスビット (20ビット)

が与えられている。

上記データにおいて、TPコードとTACコードは放送中の部を識別するものであるが、あるいはそれが放送中の部であることを示すコードの部を併せて示している。

PTYコードは0-31の32種類の番組タイプ(音楽番組、ニュース番組、スポーツ番組など)を識別するものであり、あらかじめ定められた順序に基づいて順序を付けてあり、その一覧を第1図に示す。

(以下省略)

いるが、ローカル放送局のメッシュ-放送局の各々の番組をあらかじめ定められた順序に基づいてデータとして送られる。

第2ブロックにはグループタイプコード(4ビット)、バージョンコード(1ビット)の計5ビットによるグループタイプ識別コードが与えられている。このグループタイプ識別コードは、その識別されるデータには含まれていないものを識別するためのものであり、第2図に示す2⁵-32種類のグループタイプを識別可能であるが、現在ではグループ0-3の4つのグループに対してバージョン及び日の2バージョンが定められており、これに未定数のグループを加えて9つのグループを識別可能にしている。グループタイプ及び日に含まれるデータの種別は各々の場合ここでその説明を説明する。

グループタイプ識別コードに基づいて

- ① 交通番組コード (TPコード・16ビット)
- ② プログラムタイプコード (PTYコード・5ビット)

第1

NO.	PTYコード	番組タイプ
1	00000	無音なし
2	00001	ニュース
3	00010	音楽
4	00011	マンガ
5	00100	スポーツ
6	00101	教育
7	00110	子供向け番組
8	00111	若人向け番組
9	01000	音楽番組
10	01001	ドラマ
11	01010	ロックミュージック
12	01011	軽音楽
13	01100	シリアスマジック
14	01101	ジャズ
15	01110	フォークミュージック
16	01111	バラエティ
17-30		未定数
31	11111	緊急放送

入/出ポートは「0」の出力ポート、「1」の出力ポートであることを示している。

ポートは、図1に示すように、各ポートは、ポート番号とポート名とを対応させている。ポート番号は、ポート名を4桁の数字で表し、ポート名は、ポート番号を4桁の数字で表している。

ポート番号とポート名を対応させたポート番号とポート名を、この装置で使用するポート番号とポート名とを対応させている。図1に示すように、ポート番号とポート名を対応させている。

図1のポート番号とポート名を対応させたポート番号とポート名を、この装置で使用するポート番号とポート名とを対応させている。

このポート番号とポート名を対応させたポート番号とポート名を、この装置で使用するポート番号とポート名とを対応させている。

ポート番号	ポート名	ポート番号	ポート名
0	00000000	87	5MHz
1	00000001	87	6MHz

してある。

ポート番号	ポート名	ポート番号	ポート名
0	0	1	2MHz
0	1	3	4MHz
1	0	5	6MHz
1	1	7	8MHz

このポート番号とポート名を対応させたポート番号とポート名を、この装置で使用するポート番号とポート名とを対応させている。

【請求の範囲】

本発明は、ポート番号とポート名を対応させたポート番号とポート名を、この装置で使用するポート番号とポート名とを対応させている。

このポート番号とポート名を対応させたポート番号とポート名を、この装置で使用するポート番号とポート名とを対応させている。

204 11001100 107, 8MHz

これは、図1に示すように、各ポートは、ポート番号とポート名とを対応させている。ポート番号は、ポート名を4桁の数字で表し、ポート名は、ポート番号を4桁の数字で表している。

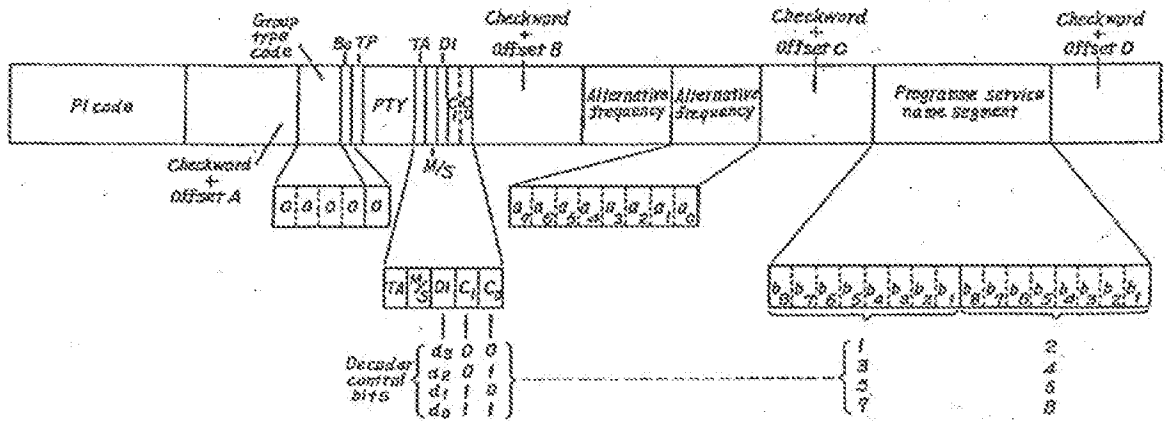
図4のポート番号とポート名を対応させたポート番号とポート名を、この装置で使用するポート番号とポート名とを対応させている。

このポート番号とポート名を対応させたポート番号とポート名を、この装置で使用するポート番号とポート名とを対応させている。

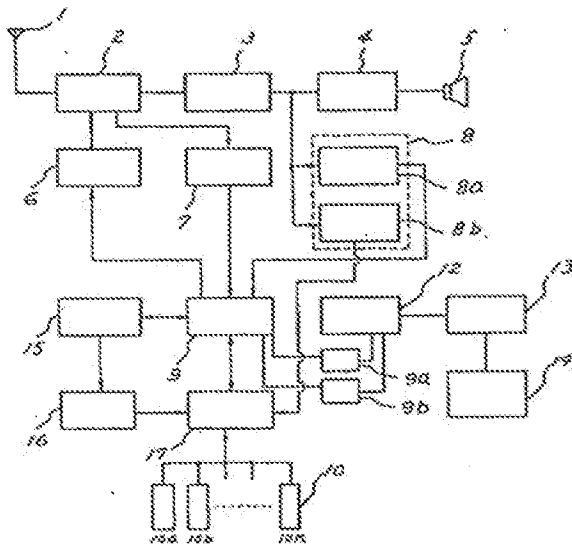
図1に示すように、各ポートは、ポート番号とポート名とを対応させている。ポート番号は、ポート名を4桁の数字で表し、ポート名は、ポート番号を4桁の数字で表している。

このポート番号とポート名を対応させたポート番号とポート名を、この装置で使用するポート番号とポート名とを対応させている。

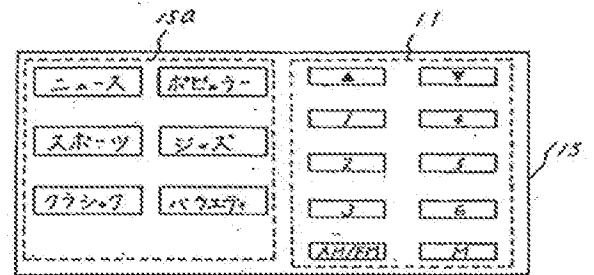
第 1 図



第 2 図



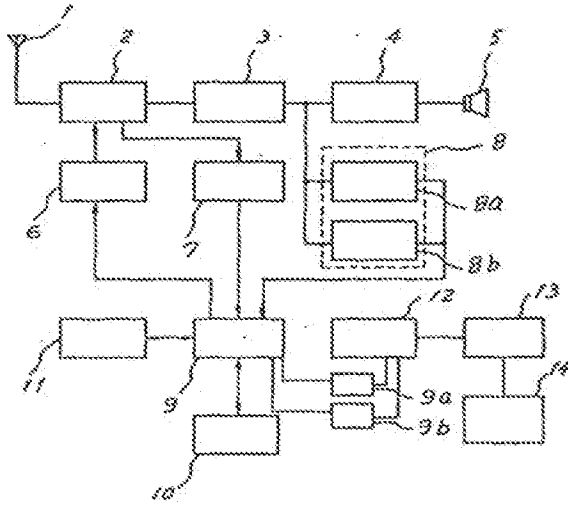
第 3 図



第 4 図

FM CH2	SPORT
1 80.0 MHz	FM TOKYO
2 82.5 MHz	TOKYO
3 80.3 MHz	YOKOHAMA
4 85.1 MHz	URAWA
5	
6	

第 5 図



Patent Laid-Open Publication No. 63-136828

Laid-Open Publication Date: June 09, 1988

Patent Application No. 61-283675

Filing Date: November 28, 1986

Applicant: Pioneer Corporation

SPECIFICATION

1. TITLE OF THE INVENTION

RADIO DATA SYSTEM RECEIVER

2. CLAIM

A radio data system receiver for receiving a signal of a broadcast system designed to transmit a data signal other than main signal components together with a broadcast signal, in such a manner as to be superimposed on a FM broadcast wave, comprising:

a decoder operable to demodulate said data signal;

a control circuit operable to store at least information about frequency and broadcast channel name of a received broadcast channel on a predetermined one of a plurality of memory blocks in accordance with a classification based on the content of data demodulated by said decoder; and

display means operable to call up one of the memory blocks in response to a user's operation, and display the classified name allocated into said memory block and the broadcast channel name stored on said memory block.

3. DETAILED DESCRIPTION OF THE INVENTION

[Field of Industrial Application]

This invention relates to a radio receiver for receiving a broadcast wave having a data signal

superimposed thereon.

[Background of the Invention]

Heretofore, a system designed to form a superimposed data signal for identifying a traffic information channel (Autofahrer Rundfunk Information: abbreviated to ARI) has been devised in West Germany, etc.

This ARI has been broadcasted by allowing a subcarrier to be held by a 57 KHz wave, which is a third harmonic wave of a 19 KHz wave serving as a pilot tone for FM broadcasting, to form an identifying signal, and frequency-converting the identifying signal to a main carrier. This identifying signal is referred to as "SK signal". A demodulation side can demodulate the SK signal to facilitate receiving of a broadcast channel providing traffic information.

However, the ARI system is intended to provide only identification data about a traffic information channel but not to provide any other service.

For this reason, a system designed to superimpose onto the same 57 KHz subcarrier a data signal bi-phase coded in a phase different from that of the ARI by 90 degrees, by means FSK (Frequency Shift Keying) and then transmit the data signal (Radio Data System: abbreviated to RDS) has been proposed.

As seen in a baseband coding as shown in FIG. 1, one group of data to be provided by the RDS system is formed of four blocks each consisting of 26 bits.

Each of the blocks comprises a 16-bit information word, and 10-bit check word and offset word, and a receiving side can receive various services by demodulating the information word.

With reference to the data format in FIG. 1, fundamental information will be described below.

16-bit program identification information (PI Code) is allocated into a first block. This PI Code comprises the following total 16-bit codes:

- (1) Country Code (4 bits)
- (2) Broadcast Coverage or Reach (4 bits)
- (3) Program Reference Number Code (4 bits)

, and information about by which of countries a target program is broadcasted, whether the same

program is broadcasted in other country, whether the target program is local or major, etc., is transmitted as data according to a predetermined rule.

A total 5-bit Group Type Identification Code consisting of Group Type Code (4 bits) and Version Code (1 bit) are allocated into a second block. The Group Type Identification Code is provided as a means to identify what data to be transmitted after current data is. While $2^5 = 32$ kinds of group types can be theoretically identified, two versions consisting of versions A and B are set up for four groups consisting of groups 0 to 3, and total 9 groups can be currently identified if undefined groups are added thereto. While a type of data to be subsequently transmitted is changed depending on the groups, its description will be omitted herein.

Subsequently to the group type identification codes, the following codes are allocated:

- (1) Traffic Program Code (TP Code: 1 bit)
- (2) Program Type Code (PTY Code: 5 bits)
- (3) Traffic Announce Code (TA Code: 1 bit)
- (4) Music/Speech Switch Code (M/S Code: 1 bit)
- (5) Decoder Control Bit (DI Bit: 1 bit)
- (6) Address Bit (2 bits)

In the above data, each of the TP Code and TA Code indicates whether a currently-receiving broadcast channel is a traffic information channel or whether the traffic information channel is currently transmitting traffic information, by means of a combination of codes thereof.

The PTY Code is provided as a means to identify 32 kinds of program types consisting of program types 0 to 31 (music program, news program, sports program, etc.), and defined according to a predetermined rule. The list is shown in Table 1.

Table 1

No.	PTY Code	Program Type
1	00000	no program
2	00001	news
3	00010	current events
4	00011	comics
5	00100	sports
6	00101	education
7	00110	program for children
8	00111	program for young people
9	01000	religious program
10	01001	drama
11	01010	rock music
12	01011	light music
13	01100	serious music
14	01101	jazz music
15	01110	folk music
16	01111	variety program
17-30		undefined
31	11111	emergency broadcast

The M/S Code indicates that a speech program is being broadcasted if it is "0", and that a music program is being broadcasted if it is "1".

The DI Bit is provided as a means to provide demodulation information required for demodulating an incoming broadcast wave. While the DI Bit has 1 bit, the DI Bit can be repeatedly received 4 times to obtain 4-bit information (16 kinds of decode information).

While the Address Bit has a function to be changed depending on the aforementioned group types, the Address Bit in this embodiment serves as means to indicate an address of an after-mentioned PS Code. Thus, details of the Address Bit will be described in connection with the PS Code.

Two of 8-bit additional-channel's frequency information (AF Code) are allocated into a third

block.

The AF Code is provided as a means to transmit information about frequency of an additional channel which is transmitting the same program as that of a currently-receiving channel. This frequency information corresponds to 8-bit data at 100 KHz intervals.

No.	AF Code	Carrier Frequency
0	00000000	87.5 MHz
1	00000001	87.6 MHz
.	.	.
.	.	.
202	11001100	107.9 MHz

In this way, each of the 8-bit codes corresponding to the above Nos. is assigned with a different meaning to allow various informations, for example, how many AM channels exist, to be transmitted. This AF Code is repeatedly transmitted up to 25 channels to form an additional channel list.

A Program Service Code (PS Code) for transmitting a broadcast channel name using the ASCII code is allocated into a fourth block. The ASCII code requires an 8-bit binary code per character, and thereby information corresponding to only 2 characters can be transmitted by the fourth block. In the RDS, ASCII data corresponding to 8 characters can be obtained only after data in the fourth block is received 4 times.

During this process, the aforementioned Address Bit in the second block serves as a means to determine to what number character a currently-transmitted PS Code corresponds, and indicates the following correspondence.

Address Bit	Character Order
00	1st, 2nd character
01	3rd, 4th character
10	5th, 6th character
11	7th, 8th character

As above, the Address Bit designates to what number character of a channel name information in a currently-transmitted PS Code corresponds, and a receiving/demodulation side can demodulate a broadcast channel name consisting of 8 characters by repeating a demodulation operation 4 times. [Prior Art]

By taking advantage of the above RDS system, a listener can learn the content of a program of a currently-receiving radio broadcast according to the PTY Code, and display the name of the broadcast channel providing the program, on a display or the like according to the PS Code.

One example using a conventional RDS tuner is shown in FIG. 5.

In this figure, a signal passing through a front end module 2 and a FM wave detector circuit 3 after being received from an antenna 1 is amplified by an amplifier 4, and output from a speaker 5 in an audio manner. The output of the amplifier 4 is also entered into an RDS decoder 8 including a PS Code decoder 8a and PTY data decoder 8b. The aforementioned RDS data demodulated by the RDS decoder 8 is send to a system controller 9. The system controller 9 determines the presence of a receivable channel in accordance with an output of an S-meter detection circuit for detecting an S-meter output obtained by detecting from the front end module 2 DC components of an intermediate frequency output of a currently-receiving channel, and sends PLL data to a PLL 6 to perform a conventional tuning operation, or instructs to sequentially sweep over the entire receive band in response to a sweeping command signal from an input section 11.

The reference numeral 10 indicates a memory for storing information about frequency of a receivable channel. The frequency information is called from a given block of the memory in response of an operation of the input section 11, and the system controller 9 sends tuning information to the PLL 6. In this process, the frequency information, the broadcast channel name using the PS Code and/or the program content using the PTY Code are converted to character information by use of a PTY data table 9a for storing character information corresponding to the PTY Code, and an ASCII code conversion tool 9a, and then displayed on a display 14 composed of a dot-matrix display tube or the like, through a character generator 12 and a liquid-crystal driver 13

When the RDS receiver in FIG. 5 sequentially sweeps over the entire band, and the S-meter detection circuit 7 detects the presence of a receivable channel, the RDS decoder 8 demodulates RDS codes consisting of the PTY Code from the second block and the PS Code from the fourth block, and the system controller instructs to display the demodulated information on the display 14 and store/hold the frequency information and the PS Code on the memory 10.

The input section 11 can be operated to call the broadcast channel preset in the memory 10 so as to receive the broadcast channel to provide an audio output, and display the program type and the name of the broadcast channel on the display 14. This provides an improved service for a listener. [Problem to be solved by the Invention]

As described above, in the conventional RDS receiver, only after calling up a preset broadcast channel, a listener can know the content of a currently-broadcasting program of the broadcast channel or the name of the broadcast channel. However, when a listener intends to "listen to news" or "find a broadcast channel transmitting sports program on the spot", the listener has to call up all preset channels or to search a desired broadcast channel while commanding a sweeping operation and confirming the content of a caught broadcast channel. Particularly, in an in-vehicle receiver, such an operation during driving involves the risk of deterioration in safety due to distraction, and becomes a sort of social issue.

[Means for solving the Problem]

It is an object of this invention to provide a receiver capable of overcoming the aforementioned problem of the conventional technique, wherein a plurality of broadcast channels obtained by sequentially sweeping over the entire receive band according to a sweeping command are classified on a PTY Code-by-PTY Code basis to store them, respectively, on a group of different memories, and display a program type and a broadcast channel name classified and preset in the group of memories are displayed on a display.

[Embodiment of the Invention]

One embodiment of this invention is shown in FIG. 2. In this figure, the same component as that in the conventional technique is defined by the same reference numeral, and its description will

be omitted.

In this invention, a memory 10 has a plurality of memory blocks a to n, and each of the memory blocks has a memory table.

As with the conventional input section 11, a key matrix 15 comprises a preset channel selection key and a sweeping command key. Further, as shown in FIG. 3, the key matrix 15 includes a major program typing input section 15a conforming to a classification of a PTY Code. The number of keys in the program typing input section 15a is set to be equal to the number of the memory blocks.

When the key matrix 15 is operated to issue a sweeping command to a system controller 9, a receivable broadcast channel is received by a conventional search function. During this process, a memory control circuit 17 operates to allow information about frequency and PS Code of the received channel to be stored on a given one of the memory blocks 10a to 10n pre-classified on a major program type-by-major program type basis, depending on data (numerical value information) obtained by a PTY Code decoder 8b of an RDS decoder 8. The memory control circuit 17 controls a writing operation to the memory in such a manner as to allow a predetermined program type of broadcast channel to be preset in a corresponding one of the memory blocks, for example, in such a manner that a news program defined by PTY Code No. 1 and a sports program defined by PTY Code No. 4 are stored, respectively, on the memory block 10a and the memory block 10b. Thus, after one cycle of the search, information about a plurality of broadcast channels classified by the PTY Code is stored on the memory blocks.

After completion of the presetting, when a user intends to listen, for example, to "sports program", the user can operate a "sports" key of the key matrix 15. In response to this operation, a key decoder 16 controls the memory control circuit 17 in such a manner as to select the memory content of the memory block 10b.

The system controller 9 instructs a display 14 to display thereon a program type name defined by the memory 10b and to display thereon information about frequency and a PS Code-based broadcast channel name stored in the memory block 10b through an ASCII code conversion tool 9b.

One example of a screen image of the display is shown in FIG. 4.

A user can further operate a preset channel switch of the key matrix 15 while looking at the broadcast channel names and a preset key numbers displayed on the display, to freely select a suitable broadcast channel.

As will be understood, this receiver is designed such that, if another program type of key on the key matrix is operated, broadcast channel names, frequencies and preset channel numbers stored on the corresponding memory block are displayed.

[Another Embodiment of the invention]

In the above embodiment, the broadcast channels stored on the memory blocks are stored in accordance with a search result, and thereby arranged in the order corresponding to their frequencies. These broadcast channels may be rearranged in the order corresponding to an S-meter output detected by an S-meter detection circuit 7 in such a manner that a broadcast channel having the strongest field intensity is displayed at a top position to allow the displayed data to be used as a criterion of user's judgment during channel selection. For this purpose, in addition to frequency information and PS codes, information about field intensity may be stored in the memory to rearrange broadcast channels in the order corresponding to field intensity. As to a technique for the rearrangement, a field intensity of a preset channel at a top position in the memory is compared with a field intensity of a received broadcast channel, and, when the field intensity of the received broadcast channel is greater than that of the preset channel, the received broadcast channel is placed at the top position in place of the preset channel, and previously stored data are shifted in turn. If the field intensity of the received broadcast channel is greater than that of the preset channel at the top position in the memory, the field intensity of the received broadcast channel is compared with that of a preset channel at the next position in sequence. In this way, the broadcast channels in the memory blocks will be rearranged in the order corresponding to their field intensities, in the last result.

The technique for the rearrangement is not limited to the above technique, but a conventional sorting technique may also be used.

[Effect of the Invention]

As mentioned above, according to this invention, broadcast channels classified on a major program type-by-major program type basis using the PTY Code are stored on a plurality of memory block. A user can select a desired program type using a key matrix to display on a display only receivable channels transmitting the selected type of program. This is significantly effective in selecting a desired program, and is capable of receiving services in a manner that was previously impossible.

4. BRIEF DESCRIPTION OF THE DRAWINGS

FIG. 1 is a diagram showing a data format of a broadcast data to be used for an RDS system.

FIG. 2 is a block diagram showing the configuration of a receiver of the present invention.

FIG. 3 is a front view showing one example of a key matrix for use in the present invention.

FIG. 4 is a front view showing one example of a screen image on a display.

FIG. 5 is a block diagram showing the configuration of a conventional RDS receiver.

8: RDS decoder

9: system controller

10a to 10n: memory block

14: display

15: key matrix

16: key decoder

17: memory control circuit

FIG. 3

15a

news pop

sports jazz

classical variety

◎ 日本国特許庁 (J P)

◎ 特許出願公開

◎ 公開特許公報 (A)

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要 約

1. 発明の名称

ラジオデータシステム受信機

2. 特許請求の範囲

FM放送波に送信機成分以外のデータ信号を乗せて放送波と共に送出する放送システムを受信する受信機であって、前記データ信号を復調するデコーダと、前記デコーダによって復調されたデータ内容に基づいた分類によって予め定められたメモリブロックに受信した放送波の周波数情報及び放送局名データ情報を少なくとも記憶する制御回路を備え、制御回路の操作により前記メモリブロックの1つを呼び出すと共に、前記メモリブロック内に格納された放送局名を表示する表示手段を備えたことを特徴とするラジオデータシステム受信機。

3. 発明の詳細な説明

【産業上の技術分野】

この発明は、データ信号が乗置された放送波を

受信するラジオ受信機に関するものである。

【発明の背景】

従来既知等で交通情報提供のためのデータ信号を生成したシステム (Autofahrer Bandfunk Information: 略称 ARI) が開発されている。

この ARI は FM 放送のパイロットトーンである 19 KHz の 3 次高調波である 57 KHz にサブキャリアを持たせて識別信号とし、これをメインキャリアに周波数変換して放送していた。この識別信号は R 信号と称され、復調機はこの R 信号を復調することにより交通情報を供給している放送局の送信を容易にしていた。

しかし ARI システムは交通情報に関する類別のみを提供するものであり、それ以上のサービスを提供するものではない。

そこで同じ 57 KHz のサブキャリアに ARI の送信と 90° 異なる位相でバイフェーズコード化されたデータ信号を FSK (Frequency Shift Keying) 変換して送出するシステム (Radio Data

System : 専用RDSシステム)が提供された。

RDSシステムにおいて供給されるデータは第1図に示されるベースバンドコーディングで見られるように夫々が25ビットからなる4つのブロックにより1グループが形成されている。

夫々のブロックには15ビットの制御ワードと10ビットのチャネルワード及びオフセットワードからなり、受信側では制御ワードをデータ復調することにより様々なサービスの供給を受けることが可能となる。

第1図のデータフォーマットに基づいて基本的な仕様を説明する。

第1ブロックにはプログラム識別コード(PICコード)16ビットが与えられている。このPICコードは

- ①識別コード(4ビット)
 - ②放送期間コード(4ビット)
 - ③プログラム番号コード(8ビット)
- の計16ビットにより構成され、その放送先別の別の放送のものか、他国でも同じ放送が行われて

④放送アナウンサーコード(TACコード・1ビット)

⑤ミュージック/スピーチスイッチコード(M/Sコード・1ビット)

⑥チロックスコントロールビット(DIビット、1ビット)

⑦アドレスビット(2ビット)

が与えられている。
上記データにおいて、TPコードとTACコードは放送中の放送先識別情報であるか、あるいはそれが現在放送中であるかを夫々のコードの値で知らせる。

PTYコードは0〜31の32種類の番組タイプ(音楽番組、ニュース番組、スポーツ番組など)を識別するものであり、あらかじめ定められた値に基づいて取用されており、その一覧を表1に示す。

(以下省略)

いるか、ローカルな番組のかメジャーな番組なのか等の情報をあらかじめ定められた値に基づいてデータとして送られる。

第2ブロックにはグループタイプコード(4ビット)、バージョンコード(1ビット)の計5ビットによるグループタイプ識別コードが与えられている。このグループタイプ識別コードは、その後に送られるデータには何が送られているかを識別させるためのものであり、理論的には2⁵ = 32通りのグループタイプを識別可能であるが、現在ではグループ0-2の4つのグループに於いてバージョンA及びBの2バージョンが定められており、これに未定数のグループを加えて計9つのグループを識別可能にしている。グループによって実際に送られるデータの種別が異なるがここではその説明を省略する。

- グループタイプ識別コードに依りて
- ⑧放送番組コード(TPCコード・1ビット)
 - ⑨プログラムタイプコード(PTYコード・5ビット)

表1

NO.	PTYコード	番組タイプ
1	00000	番組なし
2	00001	ニュース
3	00010	時事
4	00011	マンガ
5	00100	スポーツ
6	00101	教育
7	00110	子供向け番組
8	00111	若人向け番組
9	01000	宗教番組
10	01001	ドキュ
11	01010	ロックミュージック
12	01011	軽音楽
13	01100	ソリアシスミュージック
14	01101	ジャズ
15	01110	フォークミュージック
16	01111	バラエティ
17-30		未定数
31	11111	緊急放送

0/1のロー下位"0"が0ビット、"1"が1ビットであることを示している。

0ビットは、送られてくる送信データを送るためのロー下位ビットを与えるものであり、1ビットが与えられているが、これを4回繰り返し送って送信する毎に4ビットの送信(1回送りのロー下位ビット)を送るものとしている。

また、1ビットを送信した後に7サイクルより送信する間隔があるが、この間隔が送信するクロックの7サイクルを送るものであり、詳しくはクロックの図中で説明する。

第3ブロックには送信データ送信(AFワード)8ビットが2回送られている。

このAFワードは送信中の第1回送信データを送信中の送信データ送信を送信する。この送信データ送信は100KHz帯の8ビットのデータを送信している。

ナンバー	AFワード	キャリア周波数
0	00000000	87.5MHz
1	00000001	87.8MHz

している。

アドレスビット	文字記号
0 0	1. 2文字記号
0 1	3. 4文字記号
1 0	5. 6文字記号
1 1	7. 8文字記号

この第1アドレスビットにより送信データを送るクロックの送信データ送信の第1文字記号に送るかを指示しており、送信・受信部では4回繰り返して送信4回ごとに8文字記号の送信データを送信するに可能となる。

【従来の技術】

上述したRDSシステムを用いて、送信機が現在送信中のRDS送信データのような送信データをPTTYコードによって送るにできず、またクロックによってその送信データをシステムクロックに送るにできない。

第3図に従来のRDSシステムを用いた送信機を示す。

204 11001100 107.9MHz

これは上のナンバーに送る8ビットロー下位は別の意味が与えられており、送信機AFワードが送信データ送信の送信を送っている。このAFワードは25回まで繰り返し送信をやり、送信データを送る。

第4ブロックには送信データAFワードで送られてくるプログラムサービスワード(PSワード)が与えられている。AFワードは1キログラムに送るハイナリーワードで8ビットを必要とするため、第4ブロックでは2文字記号を送るにできない。RDSにおいては送信データ送信8文字で与えるようにしているため、4回のデータを送らなくてはならない8文字分のAFワードを送るにできる。

このときに送られているPSワードは8文字の送信データに送るかを定めるのに送った第2ブロックのアドレスビットであり、次の図を示す。

図において、アンテナ1からフロントエンド2、及びFM送信回路3を介した送信機、アンテナ4で送信されてスピーカ5から音響出力されるほか、アンテナ4の出力はPSコードデコーダ6及びPTYデコーダ7のRDSデコーダ8に入力され、RDSデコーダ8で送信したデータのRDSデータは、システムコントローラ9で与えられる。システムコントローラ9はフロントエンド2から送信機の中継出力を制御して得られるRDS出力を抽出するRDS送信回路7の出力により送信機の状態を識別すると共に、PLLロックデータを送って周波数の制御動作を行わせたり送り入力部11からの制御命令によって送信機パナ領域内を制御する。

10は受信機の送信機データを記憶するメモリであり、入力部11の操作によって所定のメモリから送信機データを送り出してシステムコントローラ9よりPLLに送信機データを送る。このときの送信機データはPSコードを利用した送信機データであり、PTTYコードを利用した送信機データを送る。

TTYコードに対応する文字列を記憶するPTTY
 チームアップ及びPTTYチームアップ
 の両方ともによってキャラクタ列を記憶した際
 にキャラクタ列をメモリ12及び記憶下タイプ
 13を介してメモリ4に記憶する。

第5図のメモリ14は記憶のためにメモリ12及びメモリ13の両方からメモリ14に記憶される。メモリ14はメモリ12及びメモリ13の両方からメモリ14に記憶される。メモリ14はメモリ12及びメモリ13の両方からメモリ14に記憶される。

メモリ10のプリセットされた状態をメモリ11に記憶する。メモリ11はメモリ10のプリセットされた状態をメモリ11に記憶する。

下記の図はメモリ12及びメモリ13の両方からメモリ14に記憶されることを示すものである。

【発明の要旨】

第2図はこの発明の一例を示す。この例は従来の例と同一の部分には同一の符号を付してその説明を省略する。

この発明はメモリ10がメモリ12及びメモリ13の両方からメモリ14に記憶されることを示す。

キーマトリクス15は従来の入力部11と同様のプリセットチャンネル及び制御命令キーなどの機能を備える。第3図に示すようにPTTYコードの分類に基づいた主要なタイプ入力部12はメモリ12を介して、この主要なタイプ入力部13のキーの動作、メモリ13の動作を記憶している。

キーマトリクス15を操作してシステムコントローラ14に対して制御命令を送ると、制御の手段によって制御可能な状態を記憶する。

【発明の要旨】

従来のメモリ10の状態を、上述したようにメモリ12及びメモリ13の両方からメモリ14に記憶する。メモリ14はメモリ12及びメモリ13の両方からメモリ14に記憶される。

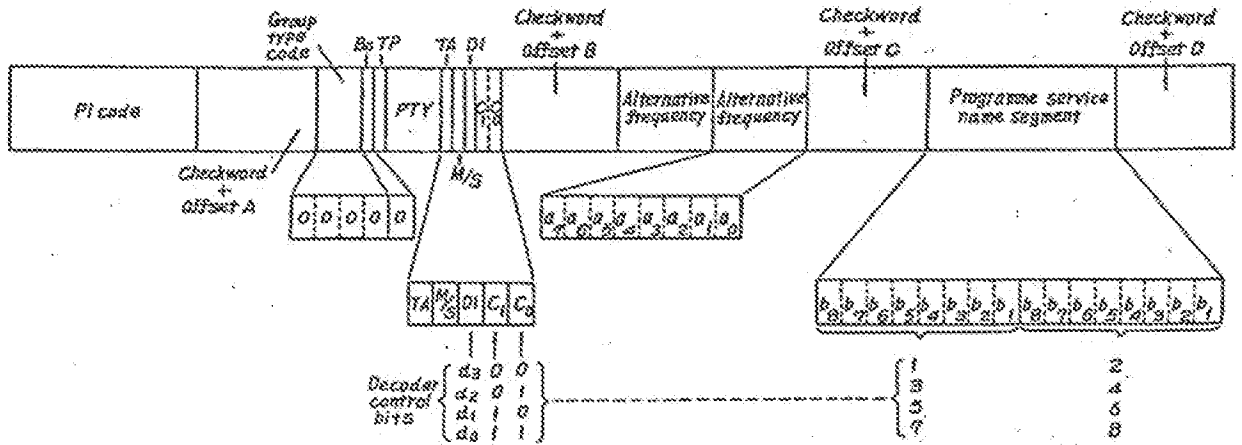
【発明の要旨】

この発明は、上述した状態を記憶するための装置を提供することを目指すものであり、制御命令によってメモリ12及びメモリ13の両方からメモリ14に記憶される。

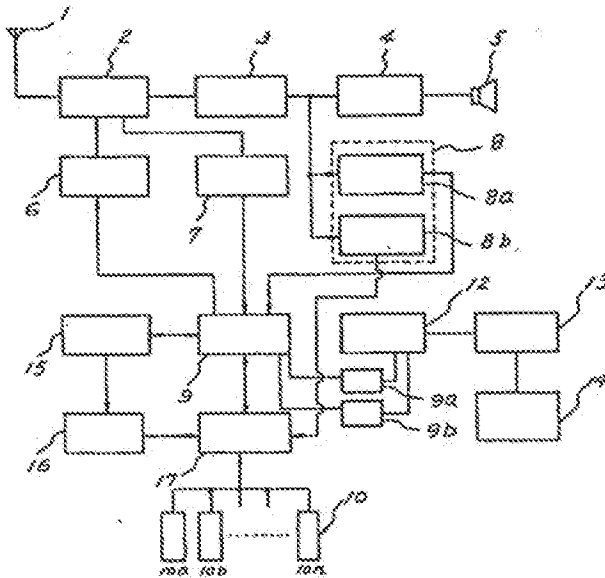
このときメモリ10の状態をPTTYコードチームアップによって記憶する。メモリ12及びメモリ13の両方からメモリ14に記憶される。

プリセットされた後に使用者が操作した「ストップ」状態を記憶したい場合には、キーマトリクス15の「ストップ」キーを操作することによって、キーマトリクス15はメモリ12及びメモリ13の両方からメモリ14に記憶される。

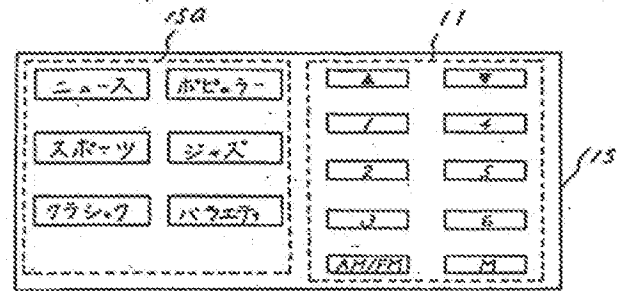
第 1 図



第 2 図



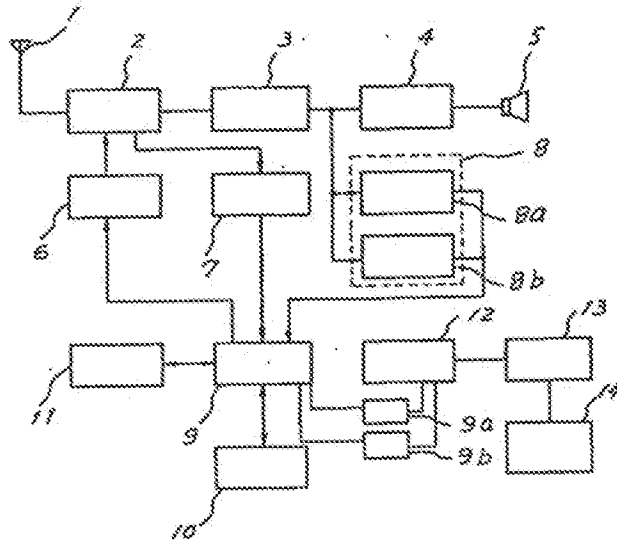
第 3 図



第 4 図

	FM CHZ	SPORT
1	80.0 MHz	FM TOKYO
2	82.5 MHz	TOKYO
3	80.3 MHz	YOKOHAMA
4	85.1 MHz	URAWA
5		
6		

第 5 圖



Patent Laid-Open Publication No. 63-136828

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Patent Application No. 61-283675

Filing Date: November 28, 1986

Applicant: Pioneer Corporation

SPECIFICATION

1. TITLE OF THE INVENTION

RADIO DATA SYSTEM RECEIVER

2. CLAIM

A radio data system receiver for receiving a signal of a broadcast system designed to transmit a data signal other than main signal components together with a broadcast signal, in such a manner as to be superimposed on a FM broadcast wave, comprising:

a decoder operable to demodulate said data signal;

a control circuit operable to store at least information about frequency and broadcast channel name of a received broadcast channel on a predetermined one of a plurality of memory blocks in accordance with a classification based on the content of data demodulated by said decoder; and

display means operable to call up one of the memory blocks in response to a user's operation, and display the classified name allocated into said memory block and the broadcast channel name stored on said memory block.

3. DETAILED DESCRIPTION OF THE INVENTION

[Field of Industrial Application]

This invention relates to a radio receiver for receiving a broadcast wave having a data signal

superimposed thereon.

[Background of the Invention]

Heretofore, a system designed to form a superimposed data signal for identifying a traffic information channel (Autofahrer Rundfunk Information: abbreviated to ARI) has been devised in West Germany, etc.

This ARI has been broadcasted by allowing a subcarrier to be held by a 57 KHz wave, which is a third harmonic wave of a 19 KHz wave serving as a pilot tone for FM broadcasting, to form an identifying signal, and frequency-converting the identifying signal to a main carrier. This identifying signal is referred to as "SK signal". A demodulation side can demodulate the SK signal to facilitate receiving of a broadcast channel providing traffic information.

However, the ARI system is intended to provide only identification data about a traffic information channel but not to provide any other service.

For this reason, a system designed to superimpose onto the same 57 KHz subcarrier a data signal bi-phase coded in a phase different from that of the ARI by 90 degrees, by means FSK (Frequency Shift Keying) and then transmit the data signal (Radio Data System: abbreviated to RDS) has been proposed.

As seen in a baseband coding as shown in FIG. 1, one group of data to be provided by the RDS system is formed of four blocks each consisting of 26 bits.

Each of the blocks comprises a 16-bit information word, and 10-bit check word and offset word, and a receiving side can receive various services by demodulating the information word.

With reference to the data format in FIG. 1, fundamental information will be described below.

16-bit program identification information (PI Code) is allocated into a first block. This PI Code comprises the following total 16-bit codes:

- (1) Country Code (4 bits)
- (2) Broadcast Coverage or Reach (4 bits)
- (3) Program Reference Number Code (4 bits)

, and information about by which of countries a target program is broadcasted, whether the same

program is broadcasted in other country, whether the target program is local or major, etc., is transmitted as data according to a predetermined rule.

A total 5-bit Group Type Identification Code consisting of Group Type Code (4 bits) and Version Code (1 bit) are allocated into a second block. The Group Type Identification Code is provided as a means to identify what data to be transmitted after current data is. While $2^5 = 32$ kinds of group types can be theoretically identified, two versions consisting of versions A and B are set up for four groups consisting of groups 0 to 3, and total 9 groups can be currently identified if undefined groups are added thereto. While a type of data to be subsequently transmitted is changed depending on the groups, its description will be omitted herein.

Subsequently to the group type identification codes, the following codes are allocated:

- (1) Traffic Program Code (TP Code: 1 bit)
- (2) Program Type Code (PTY Code: 5 bits)
- (3) Traffic Announce Code (TA Code: 1 bit)
- (4) Music/Speech Switch Code (M/S Code: 1 bit)
- (5) Decoder Control Bit (DI Bit: 1 bit)
- (6) Address Bit (2 bits)

In the above data, each of the TP Code and TA Code indicates whether a currently-receiving broadcast channel is a traffic information channel or whether the traffic information channel is currently transmitting traffic information, by means of a combination of codes thereof.

The PTY Code is provided as a means to identify 32 kinds of program types consisting of program types 0 to 31 (music program, news program, sports program, etc.), and defined according to a predetermined rule. The list is shown in Table 1.

Table 1

No.	PTY Code	Program Type
1	00000	no program
2	00001	news
3	00010	current events
4	00011	comics
5	00100	sports
6	00101	education
7	00110	program for children
8	00111	program for young people
9	01000	religious program
10	01001	drama
11	01010	rock music
12	01011	light music
13	01100	serious music
14	01101	jazz music
15	01110	folk music
16	01111	variety program
17-30		undefined
31	11111	emergency broadcast

The M/S Code indicates that a speech program is being broadcasted if it is "0", and that a music program is being broadcasted if it is "1".

The DI Bit is provided as a means to provide demodulation information required for demodulating an incoming broadcast wave. While the DI Bit has 1 bit, the DI Bit can be repeatedly received 4 times to obtain 4-bit information (16 kinds of decode information).

While the Address Bit has a function to be changed depending on the aforementioned group types, the Address Bit in this embodiment serves as means to indicate an address of an after-mentioned PS Code. Thus, details of the Address Bit will be described in connection with the PS Code.

Two of 8-bit additional-channel's frequency information (AF Code) are allocated into a third

block.

The AF Code is provided as a means to transmit information about frequency of an additional channel which is transmitting the same program as that of a currently-receiving channel. This frequency information corresponds to 8-bit data at 100 KHz intervals.

No.	AF Code	Carrier Frequency
0	00000000	87.5 MHz
1	00000001	87.6 MHz
.	.	.
.	.	.
202	11001100	107.9 MHz

In this way, each of the 8-bit codes corresponding to the above Nos. is assigned with a different meaning to allow various informations, for example, how many AM channels exist, to be transmitted. This AF Code is repeatedly transmitted up to 25 channels to form an additional channel list.

A Program Service Code (PS Code) for transmitting a broadcast channel name using the ASCII code is allocated into a fourth block. The ASCII code requires an 8-bit binary code per character, and thereby information corresponding to only 2 characters can be transmitted by the fourth block. In the RDS, ASCII data corresponding to 8 characters can be obtained only after data in the fourth block is received 4 times.

During this process, the aforementioned Address Bit in the second block serves as a means to determine to what number character a currently-transmitted PS Code corresponds, and indicates the following correspondence.

Address Bit	Character Order
00	1st, 2nd character
01	3rd, 4th character
10	5th, 6th character
11	7th, 8th character

As above, the Address Bit designates to what number character of a channel name information in a currently-transmitted PS Code corresponds, and a receiving/demodulation side can demodulate a broadcast channel name consisting of 8 characters by repeating a demodulation operation 4 times. [Prior Art]

By taking advantage of the above RDS system, a listener can learn the content of a program of a currently-receiving radio broadcast according to the PTY Code, and display the name of the broadcast channel providing the program, on a display or the like according to the PS Code.

One example using a conventional RDS tuner is shown in FIG. 5.

In this figure, a signal passing through a front end module 2 and a FM wave detector circuit 3 after being received from an antenna 1 is amplified by an amplifier 4, and output from a speaker 5 in an audio manner. The output of the amplifier 4 is also entered into an RDS decoder 8 including a PS Code decoder 8a and PTY data decoder 8b. The aforementioned RDS data demodulated by the RDS decoder 8 is send to a system controller 9. The system controller 9 determines the presence of a receivable channel in accordance with an output of an S-meter detection circuit for detecting an S-meter output obtained by detecting from the front end module 2 DC components of an intermediate frequency output of a currently-receiving channel, and sends PLL data to a PLL 6 to perform a conventional tuning operation, or instructs to sequentially sweep over the entire receive band in response to a sweeping command signal from an input section 11.

The reference numeral 10 indicates a memory for storing information about frequency of a receivable channel. The frequency information is called from a given block of the memory in response of an operation of the input section 11, and the system controller 9 sends tuning information to the PLL 6. In this process, the frequency information, the broadcast channel name using the PS Code and/or the program content using the PTY Code are converted to character information by use of a PTY data table 9a for storing character information corresponding to the PTY Code, and an ASCII code conversion tool 9a, and then displayed on a display 14 composed of a dot-matrix display tube or the like, through a character generator 12 and a liquid-crystal driver 13

When the RDS receiver in FIG. 5 sequentially sweeps over the entire band, and the S-meter detection circuit 7 detects the presence of a receivable channel, the RDS decoder 8 demodulates RDS codes consisting of the PTY Code from the second block and the PS Code from the fourth block, and the system controller instructs to display the demodulated information on the display 14 and store/hold the frequency information and the PS Code on the memory 10.

The input section 11 can be operated to call the broadcast channel preset in the memory 10 so as to receive the broadcast channel to provide an audio output, and display the program type and the name of the broadcast channel on the display 14. This provides an improved service for a listener.
[Problem to be solved by the Invention]

As described above, in the conventional RDS receiver, only after calling up a preset broadcast channel, a listener can know the content of a currently-broadcasting program of the broadcast channel or the name of the broadcast channel. However, when a listener intends to "listen to news" or "find a broadcast channel transmitting sports program on the spot", the listener has to call up all preset channels or to search a desired broadcast channel while commanding a sweeping operation and confirming the content of a caught broadcast channel. Particularly, in an in-vehicle receiver, such an operation during driving involves the risk of deterioration in safety due to distraction, and becomes a sort of social issue.

[Means for solving the Problem]

It is an object of this invention to provide a receiver capable of overcoming the aforementioned problem of the conventional technique, wherein a plurality of broadcast channels obtained by sequentially sweeping over the entire receive band according to a sweeping command are classified on a PTY Code-by-PTY Code basis to store them, respectively, on a group of different memories, and display a program type and a broadcast channel name classified and preset in the group of memories are displayed on a display.

[Embodiment of the Invention]

One embodiment of this invention is shown in FIG. 2. In this figure, the same component as that in the conventional technique is defined by the same reference numeral, and its description will

be omitted.

In this invention, a memory 10 has a plurality of memory blocks a to n, and each of the memory blocks has a memory table.

As with the conventional input section 11, a key matrix 15 comprises a preset channel selection key and a sweeping command key. Further, as shown in FIG. 3, the key matrix 15 includes a major program typing input section 15a conforming to a classification of a PTY Code. The number of keys in the program typing input section 15a is set to be equal to the number of the memory blocks.

When the key matrix 15 is operated to issue a sweeping command to a system controller 9, a receivable broadcast channel is received by a conventional search function. During this process, a memory control circuit 17 operates to allow information about frequency and PS Code of the received channel to be stored on a given one of the memory blocks 10a to 10n pre-classified on a major program type-by-major program type basis, depending on data (numerical value information) obtained by a PTY Code decoder 8b of an RDS decoder 8. The memory control circuit 17 controls a writing operation to the memory in such a manner as to allow a predetermined program type of broadcast channel to be preset in a corresponding one of the memory blocks, for example, in such a manner that a news program defined by PTY Code No. 1 and a sports program defined by PTY Code No. 4 are stored, respectively, on the memory block 10a and the memory block 10b. Thus, after one cycle of the search, information about a plurality of broadcast channels classified by the PTY Code is stored on the memory blocks.

After completion of the presetting, when a user intends to listen, for example, to "sports program", the user can operate a "sports" key of the key matrix 15. In response to this operation, a key decoder 16 controls the memory control circuit 17 in such a manner as to select the memory content of the memory block 10b.

The system controller 9 instructs a display 14 to display thereon a program type name defined by the memory 10b and to display thereon information about frequency and a PS Code-based broadcast channel name stored in the memory block 10b through an ASCII code conversion tool 9b.

One example of a screen image of the display is shown in FIG 4.

A user can further operate a preset channel switch of the key matrix 15 while looking at the broadcast channel names and a preset key numbers displayed on the display, to freely select a suitable broadcast channel.

As will be understood, this receiver is designed such that, if another program type of key on the key matrix is operated, broadcast channel names, frequencies and preset channel numbers stored on the corresponding memory block are displayed.

[Another Embodiment of the invention]

In the above embodiment, the broadcast channels stored on the memory blocks are stored in accordance with a search result, and thereby arranged in the order corresponding to their frequencies. These broadcast channels may be rearranged in the order corresponding to an S-meter output detected by an S-meter detection circuit 7 in such a manner that a broadcast channel having the strongest field intensity is displayed at a top position to allow the displayed data to be used as a criterion of user's judgment during channel selection. For this purpose, in addition to frequency information and PS codes, information about field intensity may be stored in the memory to rearrange broadcast channels in the order corresponding to field intensity. As to a technique for the rearrangement, a field intensity of a preset channel at a top position in the memory is compared with a field intensity of a received broadcast channel, and, when the field intensity of the received broadcast channel is greater than that of the preset channel, the received broadcast channel is placed at the top position in place of the preset channel, and previously stored data are shifted in turn. If the field intensity of the received broadcast channel is greater than that of the preset channel at the top position in the memory, the field intensity of the received broadcast channel is compared with that of a preset channel at the next position in sequence. In this way, the broadcast channels in the memory blocks will be rearranged in the order corresponding to their field intensities, in the last result.

The technique for the rearrangement is not limited to the above technique, but a conventional sorting technique may also be used.

[Effect of the Invention]

As mentioned above, according to this invention, broadcast channels classified on a major program type-by-major program type basis using the PTY Code are stored on a plurality of memory block. A user can select a desired program type using a key matrix to display on a display only receivable channels transmitting the selected type of program. This is significantly effective in selecting a desired program, and is capable of receiving services in a manner that was previously impossible.

4. BRIEF DESCRIPTION OF THE DRAWINGS

FIG 1 is a diagram showing a data format of a broadcast data to be used for an RDS system.

FIG 2 is a block diagram showing the configuration of a receiver of the present invention.

FIG 3 is a front view showing one example of a key matrix for use in the present invention.

FIG 4 is a front view showing one example of a screen image on a display.

FIG 5 is a block diagram showing the configuration of a conventional RDS receiver.

8: RDS decoder

9: system controller

10a to 10n: memory block

14: display

15: key matrix

16: key decoder

17: memory control circuit

FIG 3

15a

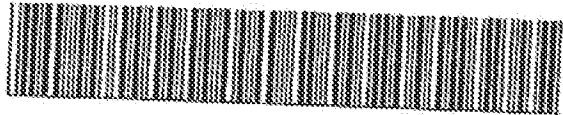
news pop

sports jazz

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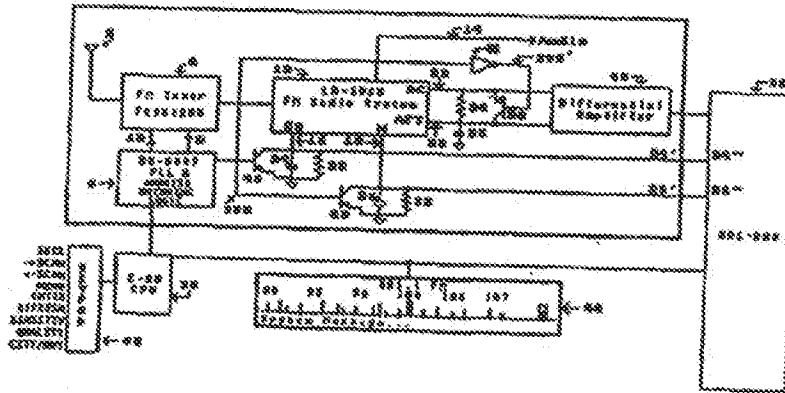
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(57) Abstract

A method is described for operating a radio receiver (4, 12) in such a manner as to accurately and rapidly identify unlistenable, very listenable and marginally listenable channels, and display the listenable and very listenable channels along with an indication of their signal strength, noise and quality on a screen (44). A reference value of automatic fine tuning voltage is found for the particular receiver. Capacitors (24, 26) that are charged in accordance with the levels of signal strength, noise and automatic fine tuning voltages are sampled before being fully charged at each channel change, and averages of the respective samples are computed as well as the offset between the average of the automatic fine tuning samples and the reference value of automatic fine tuning voltage. A channel having sample averages not meeting certain criteria is rejected as unlistenable, and, of the others, a channel having a very low average on its noise capacitor is identified as very listenable. Those of the remaining channels that are at least marginally listenable are identified by similar analysis of a second group of samples. The criteria for signal strength and noise may be varied with ambient temperature, and the criteria for noise can be adjusted on the basis of the noisiest channel or the noise produced when the antenna (2) is grounded. Those channels having the greatest signal strength are associated with tuning buttons (42), and indications of these associations are made on the screen.

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RADIO SCANNER AND DISPLAY SYSTEMField Of The Invention

This invention is in the field of radio reception and in particular to a system for identifying listenable stations in a band.

Background Of The Invention

5 Automated tuning systems for radio receivers usually include a button for initiating operation in a seek mode in which the tuning advances to the next listenable station and stops, and a button for initiating operation in a scan mode in which the tuning pauses at successive listenable stations unless the button is activated during a pause so as to lock onto the station being
10 received.

In FM receivers, listenable stations are determined by their signal strength, SS, the amount of super audible noise, N, and the automatic fine tuning voltage, AFT. If the SS is too
15 weak, the station is obviously not listenable, but even if the SS is large enough, the presence of too much noise, such as may occur because of co-channel interference, causes the station to be unlistenable. The AFT voltage indicates that an erroneous or unbalanced intermediate frequency is being produced as, for
20 example, may occur when side currents of a station in another channel are present in the channel to which the receiver is tuned.

Voltages corresponding to SS, N and AFT charge associated filtering capacitors. The AFT capacitor is connected so as to filter the voltage appearing across the parallel circuit of the audio discriminator that is nominally resonant at the intermediate frequency. When tuned to a listenable station, the current charging the AFT capacitor will be minimal (zero in the ideal case), and when tuned to a side current of another station, the current will be large. The manufacturer's circuit recommendation for the LM1865 amplifier FM-IF chip, which is used in illustrative circuits in this document, uses the voltage produced on a capacitor of $4.7\mu\text{F}$ in response to the charging current of ± 130 microamps, representing a frequency deviation of approximately $\pm 40,000\text{Hz}$ on a 10.7MHz IF signal, as the acceptable range of listenable stations. Current magnitudes greater than ± 130 microamps indicate unlistenable stations and cause the LM1865 chip to produce a voltage on a Mute/Stop output pin to indicate that a station is invalid. It is the function of the CPU for the associated receiver to interpret the voltage on the output pin and initiate whatever action is necessary.

Generally, very unlistenable signals in a channel like the side currents of a station on an adjacent channel will cause the AFT current, and hence the voltage on the AFT capacitor to swing toward their maximum values. The voltage on the AFT capacitor is fairly reliable at detecting an unlistenable channel where no station is actually transmitting directly on the channel to which the receiver is tuned.

The problem with the prior art version of AFT Mute just described is that it unreliably differentiates listenable and marginally listenable stations from unlistenable stations that are actually transmitting on the selected channel, as occurs with distant co-channel stations and in other situations wherein a station's signal is degraded by interference. Unlistenable stations of this nature may generate a much more modest AFT current. However, the AFT circuit also carries recovered audio and noise which is superimposed on the AFT current. The AFT MUTE/STOP detection circuit must be set broadly enough so it is not triggered by these unwanted signals. Therefore, if the modest AFT current just described is smaller than the broadly set MUTE/STOP detection level, the unlistenable station will be accepted as listenable.

Furthermore, the AFT current level is affected by several factors which have nothing to do with the received station's signal. They are temperature drift, factory misalignment, poor component value selection, and component aging. Because these factors can cause the AFT current to vary widely, independently of the quality of the received signal, its use to evaluate the listenability of a signal received on a channel requires that the range of AFT voltage for an acceptable signal be very large. The so-called AFT Deviation Mute Window, meaning the range of current levels, and hence voltages, for which a station will be considered very listenable or marginally listenable is, as previously noted, typically set at +/-130 microamps (i.e. frequency deviation of +/-40,000Hz) for the

LN1865. The acceptance range of ± 130 microamps is much larger than the modest AFT current generated by distant unlistenable stations. Furthermore, if the AFT circuit is precisely tuned to the I.F. frequency, any station producing an AFT current more than ± 15 microamps (i.e. frequency deviation of $\pm 4,500\text{Hz}$) is generally unlistenable, although prior art FM radio designs generally are unable to illustrate this fact. Thus, an unlistenable station producing 50 microamps of AFT current is well within the acceptance range of ± 130 microamps and therefore would be accepted as listenable, causing this method of using the AFT current for the identification of listenable and marginally listenable stations to be inaccurate.

In addition, the AFT current level has no intrinsic self-zeroing characteristic and thus it can vary widely from one radio to the next, and from one time to another because it is highly dependent upon several factors including the adjustment of the quad-coil, the component values in the quad-coil and AFT circuits, and the temperature of the radio. The quad-coil and AFT circuits are so temperature dependent that the AFT current level can typically fluctuate by as much as ± 80 microamps just because of temperature change of the radio. A station that would be accepted as listenable when the radio is at one temperature may be rejected at another temperature and vice-versa. Because it is usually too expensive to substantially eliminate the effects of these variables, identical radios sitting side-by-side perform differently. In practice, one finds radios that will

reject listenable stations and other radios of the same model that will stop on unlistenable stations.

In conclusion, it can be said that the AFT muting system of the prior art is better than nothing, but barely adequate at best.

In an FM receiver, the intermediate frequency varies with the amplitude of the audio signal being transmitted. In order to limit the effect of these audio variations on the voltage produced on the AFT capacitor, it has been customary to make the charging RC time constant of the AFT capacitor large enough to prevent the lowest audio noise frequency from producing significant voltage fluctuations on the AFT capacitor. Thus, it takes a long time to derive the AFT voltage for each channel and an inconveniently long time to check the AFT voltage of all the one hundred channels in the FM band. If the effect of the audio signal on the AFT voltage is to be substantially eliminated, it would take 16.5 seconds to find all of the listenable channels in a scan mode of operation. Most receivers are designed to actually take only about 9 seconds, but there is some error because a compromise is made between the accuracy of the AFT signal for each channel, by not filtering the super-imposed audio, and the time required to obtain it.

Furthermore, the SS, N and AFT capacitors must be allowed to charge or discharge at each channel change from their present value to a new value and this may require considerable additional time.

Present tuning systems indicate the station that is tuned in and provide several buttons that can be programmed to respectively tune the receiver to selected stations. In some cases automatic programming is provided while scanning a band so that the buttons select stations in accordance with their signal strength. Whereas preprogrammed buttons are useful while the radio is being operated within a given listening area, they are of little advantage when the radio is moved to a different area as in the case of a car radio during a long drive. During such a drive, stations may fade in and out so that the preprogrammed buttons are of no use. The operator must then use the seek or scan modes to obtain a listenable station or use the automatic programming feature, if provided, to reprogram the buttons. For reasons previously set forth, neither seek mode nor scan mode nor the auto programming scan mode, as carried out by the prior art, will accurately distinguish between very listenable and marginally listenable stations on the one hand, and unlistenable stations on the other. And, as also pointed out, different stations may be rejected by different radios of the same model because the components of the APT circuits have different values within the manufacturing tolerance limits. Narrowing the tolerance limits would significantly increase the cost of the radio.

Even when a given radio is operating in an area within which the respective radio signals received are essentially the same, variations in temperature often change the stations that

are rejected. Changes in temperature also affect the stations that are rejected as the radio is moved from place to place.

In AM radios, a channel is considered to be listenable if the signal strength, SS, and the amount of IF energy passing through a narrow bandpass filter of an IF threshold circuit causes a stop circuit voltage to exceed a predetermined threshold. If the voltage is exceeded, the stop circuit stops the tuning. Both the automatic gain control (AGC) circuit, from which SS is usually derived, and the IF threshold circuit have capacitors that require considerable time to charge so that scanning the AM band to identify listenable and marginally listenable stations takes an inconveniently long time.

A number of prior references teach circuits and systems for tuning in radio signals in an automated manner. Certain of these references show various displays for presenting information associated with a particular station or channel, such as signal strength, for example. These prior references include U.S. 3,575,662; U.S. 3,890,574; U.S. 3,974,452; U.S. 4,040,719; U.S. 4,079,320; U.S. 4,114,104; U.S. 4,123,716; U.S. 4,264,976; U.S. 4,282,602; U.S. 4,317,225; U.S. 4,336,534; U.S. 4,348,666; U.S. 4,365,347; U.S. 4,405,947; U.S. 4,538,300; U.S. 4,580,285; U.S. 4,679,042; U.S. 4,763,195; U.S. 4,780,909; U.S. 4,817,192; U.S. 4,833,728; U.S. 4,881,273; U.S. 5,063,610; U.S. 5,073,975; U.K. patent No. GB 2,089,607, and Japan 1-202030(A).

Summary Of The Invention

This invention applies to both AM and FM radios. An AM or FM radio of otherwise standard construction that is equipped with a tuning system of this invention can discriminate between channels having listenable stations and channels having unlistenable signals more accurately and more quickly than radios of prior art, and can do so at widely different temperatures with the same speed and accuracy. Furthermore, the channels that are accepted or rejected will be essentially the same for all radios of the same design, thereby solving significant radio design and manufacturing problems. A basic radio system incorporating the features as described in this invention would cost no more to design or manufacture than currently available Electronically Tuned Radios, and would have minimal requirements for critical-tolerance components compared to conventional designs. Instead, the tuner design compensates for component variances between radios, for factory misalignments, as well as for component aging and temperature drift. Consequently, in addition to the improved performance that this invention offers, it may also result in radios that are less expensive to manufacture.

The fast tuning features would enable a radio built according to this design, and also incorporating a prior art "best station memory" feature, to scan the entire AM or FM broadcast band as quickly as in one second with a very high degree of accuracy in the acceptance of listenable stations and the rejection of unlistenable channels. Currently available scanning radios that incorporate a "best station memory" feature

take from several seconds to as long as thirty or more seconds to scan the AM and FM broadcast bands, and offer the same unpredictable and inaccurate assessment of listenable versus unlistenable stations as other current state of the art radios.

5 In addition to the tuning enhancements, this invention provides for a display system which can indicate all the listenable stations that are broadcasting, along with indications of their signal strength, noise, and other factors. The display screen can be designed to be representative of the AM or FM
0 broadcast band so that the indicator for each station will be displayed at the location where it would appear on a manually tuned radio dial in order to provide a familiar format and to aid the user in visually identifying specific stations. The accuracy feature of this invention is valuable because if a user manually
5 tunes channel by channel, what they hear in terms of listenability will be accurately reflected on the display. Another feature is that the listenable stations presented on the display constitute a "tuning list", such that operation of the seek or scan tuning buttons will only select stations which are
0 indicated on the display.

An obvious advantage of the display system occurs with auto radios when the vehicle is driven from one broadcast area to another, and for portable radios which are taken from place to place. The display can portray the listening options
5 available in each area in a way that is far more meaningful than can be achieved by manually tuning the radio, by using seek or

scan buttons, or by using a best station memory feature. It offers complete information of the broadcast band at a glance.

A greater advantage occurs with automobile radios when the vehicle is used for country driving because in the absence of knowledge about the broadcast area, one tunes in a station not knowing if it broadcasts a desired type of program material, not knowing how strong or weak the station might be, and not knowing if there were any better options available. As a result, listeners might spend the entire trip fiddling with the tuning buttons--as soon as they get a station they like, it fades out and they must change stations again. Having a display of the broadcast area provides an instant representation of the listening options and allows the listener to make intelligent choices. Because the display can communicate the situation at a glance, driver safety is improved compared with the alternative of fiddling with the radio which continually draws the driver's eyes off the road. If there are no desirable stations, a mute button could cause the display to continuously scan without any audio until the vehicle arrived at another broadcast area.

An advantage of a display system for a console radio is that it would give discriminating listeners the opportunity to evaluate their listening options and choose a strong, clear station that is broadcasting the desired type of material.

The fast scanning speed makes it possible to build an economical display system radio which has a single tuner for each band, as in conventional radios. The scanning speed is fast enough so that a scan to update the entire display can take place

automatically and unobtrusively during user-initiated tuning operations, or a scan can be initiated by activation of a "display refresh" button and the scan will almost be completed before the user's finger leaves the button.

The invention also defines a dual tuner system which incorporates a second tuner (for each band) to continuously scan the frequency band. In a dual tuner system the display can be continuously updated to reflect changes in the displayed channels, as well as their signal strength and other parameters.

The tuners can also monitor the broadcast stations for digital SCA or RDS data such as SCA radio paging data, or RDS information such as the type of program material the station is broadcasting, and present that data on the display. While listening to an audio program a single tuner system can monitor only the tuned-in station for this type of data; a dual tuner system, however, can monitor and present this type of data for both the tuned-in and the non-tuned-in stations, without interrupting the audio program, and therefore can present broadcast information for all stations on the display simultaneously. Therefore, a dual tuner scanning display radio system can denote items of special interest on the display for all stations in the broadcast area, for example, all stations broadcasting the news. A single tuner could also collect and present this data, but the data monitoring time is relatively long (about 1/10 second per station to collect the station's "static" RDS data -- call letters, city, and type of program material, etc.) and of course cannot be performed while listening to an audio program.

This ability to display data for all stations in the band would be of value to broadcasters as well as listeners because it gives lesser known stations the opportunity to inform listeners of the kind of program material they offer.

5 The tuning enhancement aspects of this invention referenced previously incorporate the following major features. Tuning speed is accelerated by discharging or precharging certain signal parameter capacitors to a desired state on channel changes. Signal parameters of signal strength, noise, and AFT
10 deviation, related to the listenability of a station, are evaluated as soon as 4 ms after channel changes to accept very good stations as very listenable and reject very bad channels as unlistenable. In comparison, prior art designs typically allocate about 70ms to evaluate each channel regardless of how
15 good or bad it might be. In most listening areas those channels which are either very good or very bad represent more than half of all available channels. The fast acceptance and fast rejection of these channels speeds the tuning process because only stations that do not meet either of these criteria need to
20 be subjected to longer measurements. Extrapolation techniques are used to estimate the signal level driving the associated circuits, since the capacitors haven't fully charged by this early stage.

A "dual pass" aspect of this invention offers a side
25 channel elimination feature which also accelerates the tuning process by eliminating stations from further review which can be determined to be side channels of a main station.

Sampling and averaging techniques are used to minimize the influence of signal artifacts and determine precise levels of the underlying signal, especially for AFT which is dominated by recovered audio that is super-imposed on the AFT signal. The precise data arrived at by the sampling and averaging techniques enhances the extrapolation techniques to correctly estimate the signal parameters of the channel being measured. The typical AFT deviation mute circuit in currently manufactured radios has an acceptance window of approximately $\pm 130\mu\text{A}$, representing a frequency deviation of approximately 40,000Hz. The ability to determine a precise level of AFT has allowed the observation that all "good" stations will exhibit almost exactly the same AFT level for a given receiver, plus or minus about one or two microamps. This is because all good stations whose signals are not being interfered with or distorted by the atmosphere will be broadcast and received exactly on their designated frequency. And when that designated frequency is exactly the frequency to which the radio is tuned, zero AFT current will be generated given proper alignment of the radio receiver's circuitry. This observation, in turn, has resulted in the feature of this invention whereby the AFT signal of each channel as it is tuned in is evaluated in relation to the AFT signal (the "nominal AFT") of a station which has been determined to be "very listenable" via an extended measurement with tight acceptance parameters. A reasonable acceptance window based on this invention is approximately $\pm 30\mu\text{A}$, or approximately $\pm 4800\text{Hz}$, for the receiver design set forth in this document. That design produces

approximately twice the AFT current as the comparative manufacturer's recommended circuit, which would be approximately $\pm 15\mu\text{A}$ for the same frequency deviation. Thus, the design specified by this invention is about ten times as sensitive as
5 the current state of the art. The nominal AFT feature results in all receivers performing the same in the acceptance and rejection of channels since the decision criteria is based on a parameter external to the receiver and which is therefore independent of the receiver's components or temperature, etc.

10 This invention also offers other features which are described in appropriated locations in this application.

All embodiments of the invention as applied to FM receivers have an initialization procedure that provides a reference value of AFT voltage. This can be done by selecting
15 an empirically determined voltage value in accordance with the ambient temperature, or by searching to find a very listenable station and using its AFT voltage as a reference value, as mentioned previously, or by using both methods together. In evaluating channels as to their listenability, the difference
20 between their AFT voltage and the reference AFT voltage is used rather than the AFT voltage itself as this eliminates the effects of factors previously noted that relate to the radio rather than the received signal. The difference between an AFT voltage and the reference value is hereinafter referred to as the AFT offset.
25 Prior art designs are incapable of precisely determining AFT values because of the dynamic fluctuations of the super-imposed recovered audio, and therefore would not be able to derive a

meaningful AFT offset. This invention arrives at precise AFT values by taking multiple samples and then computing the average of those samples. Taking the average tends to cancel out the super-imposed audio fluctuations and reveal the true underlying
5 AFT current.

In the simplest embodiment of the invention as applied to FM receivers, there is no display and memory buttons are not provided. After finding a reference value of AFT, one or more samples of the voltages on the SS, N and AFT capacitors are taken
0 prior to the time of full charge. If these samples are outside of wide limits, the channel is rejected. All other channels are considered to be listenable.

The channels not rejected may include unlistenable stations because the limits are so wide. Thus, in other
5 embodiments of the invention, the channels not rejected are subjected to further analysis. The first step of this analysis is to identify on the basis of the samples referred to, those stations that are very listenable on the basis of their having virtually no noise. The listenability of the remaining stations
10 cannot be accurately determined at this point, and therefore are further examined by obtaining additional samples and using tighter limits of SS, N and AFT offset so as to eliminate only the worst stations. The latter limits may be varied.

The process just described is designed to permit tuning
15 to stations that are of very poor selected quality because there are times when a person will listen to them, e.g. if it is a broadcast of the "big game" of one's alma mater. At the same

time it is desirable to eliminate really worthless stations. Thus, in accordance with another aspect of this invention, a further analysis may be made of the additional samples of SS, N and AFT offset to determine a quality factor QF. The precise AFT values derived by this invention enable the computation of a QF, which would otherwise not be possible. The radio might offer a user adjustable QF, and stations not meeting the QF setting are omitted from the display and from the tuning list. Although other formulas may be used, the following expression for QF has been found on the basis of much listening to yield results indicated in Table 1 below. The average N, N range, and AFT offset are obtained from successive groups of samples taken after each channel change is initiated.

$$QF = \sqrt{AVG N \cdot AFT \text{ offset}} + \frac{N \text{ range}}{2}$$

TABLE 1

QUALITY FACTOR (QF)	RECEPTION
0-1	Best Possible
2-5	Good but Some Static
6-9	Noisy but Listenable
10-19	Very Noisy
20+	Very Poor

The parameters of noise, AFT deviation, and QF are each valuable in discriminating listenable from unlistenable stations. Many invalid channels will exhibit sufficiently high ultrasonic noise levels to reject the channel based on noise. Occasionally, however, a side-channel, image frequency, cross talk channel, or other invalid signal will not have a sufficient ultrasonic noise level to be rejected, but will exhibit a high AFT which will reject the channel. The combination of both noise and AFT deviation into the QF allows the rejection of stations with intermediate noise and AFT levels which would exhibit audible impairment but could not be rejected based on either parameter independently. Additionally, certain interference conditions will cause a valid station to exhibit intermediate to high ultrasonic noise along with low AFT levels, and the QF can be arranged to allow the selection of these stations. A radio designed in accordance with this invention might implement a user-settable QF so that the radio's tuning criteria can be controlled by the listener.

An example of a user-settable QF might be a console radio with a City/Country switch that would have tighter acceptance parameters in the City mode so as to restrict channel acceptance to those with the best listenability.

Another example might be a console radio with a menu operated QF setting mechanism, as suggested by the menu system illustrated in Fig. 36.

A third example might be an auto radio with a City/Highway switch that would have tighter acceptance parameters

in the Highway mode, perhaps including a higher SS threshold. This method of operation would be intended to solve the problem of country driving where stations fade in and out at an annoying rate, causing the listener to constantly fiddle with the tuning
5 buttons to find a listenable station. In this highway mode, only stations good enough to be listenable for at least a few minutes will meet the acceptance criteria.

In any of these embodiments of the invention, any of the stations not rejected can be respectively stored in memory
10 locations associated with programmable memory buttons, respectively, and/or presented on a display. In the latter case, information as to their SS, N, APT and QF as well as RDS information as to program material etc. can be shown.

In the tuning systems having single tuners, the
15 determination of a reference value for APT, whether it be done on the basis of ambient temperature or on the APT of a valid station, or on both, may be made periodically based on duration of time or change in temperature, or may be made at each channel change initiated in the seek or scan modes. In the latter case,
20 the operation is hardly noticeable because it is performed so rapidly.

In what is called a dual pass system, the channels that are not rejected and are not found to be virtually noise-free on the basis of a first group of samples are subjected to a side
25 channel elimination algorithm analysis before they are more thoroughly analyzed for listenability on the basis of a second group of samples of SS, N and APT. In this algorithm, if a

channel's SS is more than a given %, e.g., 30%, stronger than the SS's of the channels on either side, then both side channels are rejected as being unlistenable. This algorithm may also require that both side channels have noise levels exceeding a minimum in order for both to be considered unlistenable so that a distant, weaker, channel at the frequency of a local station's side channel will not be inadvertently rejected.

When there is only one tuner, the SS and QF values displayed for the tuned-in channel can be updated dynamically but those for the other channels were obtained during the initialization procedure or the last time a scan was performed, so that they may not always be valid. Thus, one may tune to another channel that appears to be very listenable only to find that it has poor quality or in fact is totally rejected by the analysis that is done at each channel change. The display will be updated on this channel change. This situation can be avoided by embodiments of the invention using two tuners, one for listening and the other a scan tuner for analyzing the listenability of all stations in the band in a continuous repeated sequence. This means that the display of such factors as SS and QF values for channels other than the one to which the listening tuner is tuned are also always up-to-date.

A greater advantage of a second tuner is that, for all stations being received rather than just for the tuned in channel, it can be used to bring up on the display coded information that is often broadcast along with the main program. This is referred to as RDS information and may include signals

indicating the type of program being broadcast, e.g. whether it is news, classical music, contemporary music or a sportscast.

A number of aspects of the invention contribute to the speed with which very listenable and listenable stations can be identified by the methods just described.

In the first place, time is saved by the rejection of unlistenable channels and the identification of very listenable channels on the basis of a first group of samples obtained after a change in channel is initiated, because these channels are not subjected to further analysis of a second group of samples. If, for example, sixteen milliseconds are required for further analysis of each channel, and there are seventy-five channels having either no station or a very good station, twelve hundred milliseconds are saved.

The speed with which a channel can be identified as being listenable or not is greatly increased by this invention. In the prior art, voltages as to the signal strength, SS, the noise, N, and the automatic fine tuning, (AFT), are developed on respective capacitors. For each radio design the manufacturer specifies the minimum or threshold voltage required across the SS capacitor, the maximum or limit voltage for the N capacitor, and the maximum value of current, and therefore, voltages for the AFT capacitor. If any of these criteria are not met, the channel is considered to be unlistenable. Previous designs use large value filter capacitors to average out and integrate the SS, N, and AFT signals in order to properly assess them. The bigger the capacitor the more accurate the averaging/integration will be,

but the longer it will take to charge or discharge the capacitors to the new level on each channel change.

This invention provides for clamping each of these capacitors to a respective neutral value on channel changes to minimize the amount of time required to charge or discharge from the previous state to the new state, and to provide for a known charge condition at the beginning of each channel measurement period. Starting with a known charge condition allows for the use of rapid samples and the use of extrapolation techniques as described in this application.

In the prior art, the determination of the listenability of a channel is made by examining at least one of the voltages on the SS, N and APT capacitors after they are almost fully charged. As noted above, this is necessary to minimize fluctuations and to reduce the effects of noise and the effect of the audio signal on the voltage on the APT capacitor.

In accordance with this invention, however, the voltages on these capacitors are measured very soon after a channel change is initiated and extrapolated to see what they would be when fully charged. These measurements are made by taking a single sample, or by taking an average of multiple samples, of each voltage. The extrapolation can be conservatively modified to minimize the risk of rejecting a listenable channel that might have experienced a momentary signal fluctuation at the time the samples were taken. The extrapolated values may be used for the final tuning decision in one aspect of this invention. In another aspect, the extrapolated values

may provide an initial acceptance of very good stations and rejection of very bad channels, with a subsequent review of the remaining channels based on additional data samples.

5 Additionally, this invention provides for faster tuning by permitting the use of smaller (and hence, faster) capacitors, or smaller associated resistors resulting in a faster R-C time constant for the charging or discharging of the capacitors. The ability to use faster charge/discharge circuits is attributable to two factors, the first being the extrapolation procedures in
10 conjunction with the initial and subsequent review procedure, as just discussed. In this context, smaller capacitors and the associated greater signal fluctuation rate can be tolerated for the initial review because it is non-critical in the sense that only the obviously good stations will be accepted, i.e., only
15 those having acceptable SS and APT and having virtually no noise, and only the obviously bad stations will be rejected, i.e., channels that don't meet the minimum SS threshold, or have noise or APT levels that "peg the meter".

The second factor permitting the use of smaller
20 capacitors or associated resistors is the scheme of taking the average of multiple data samples, either in the initial or the subsequent review, or in both. The averaging technique statistically adjusts for momentary signal fluctuations and thus accomplishes mathematically what otherwise must be accomplished
25 electrically with larger capacitors.

Greater accuracy in the identification of the listenability of a channel is achieved in accordance with other