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(54) Abstract Title
Displaying an EPG guide bar with a recorded program indicator

(57) Apparatus for displaying an EPG guide bar has an EPG data extraction part extracting EPG data from a signal though a transmission channel, a first memory storing the EPG data and a second memory storing a broadcast programme. A user interface display part and graphics processor produce a guide bar having a fixed indicator displaying a present time, and title areas of broadcast programmes corresponding to the EPG data of the first memory which move linearly in the guide bar in real-time correspondingly to the present-time. The user interface display part and graphics processor update the title areas with a predetermined time interval centred around the fixed indicator so as to produce information indicating a record-proceeding status on at least one of the title areas of the broadcast programmes which are being recorded in the second memory. The portion of the broadcast which is currently stored may be indicated by a shaded area on the EPG guide bar.

FIG.4

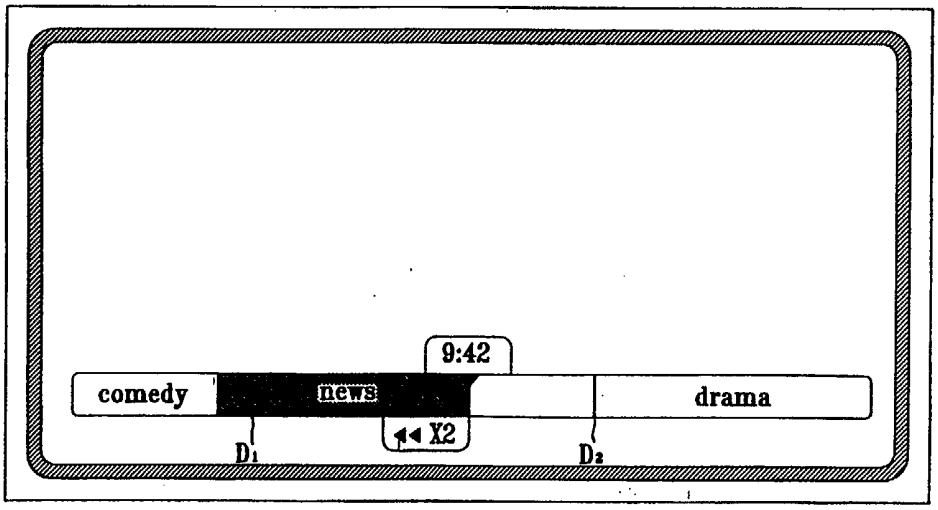

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FIG. 1
Related Art

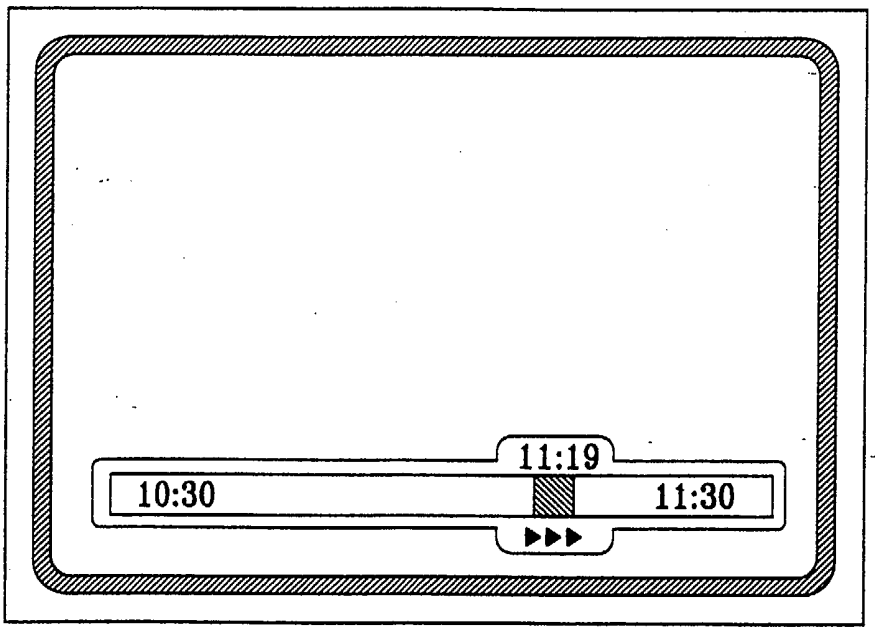


FIG.2

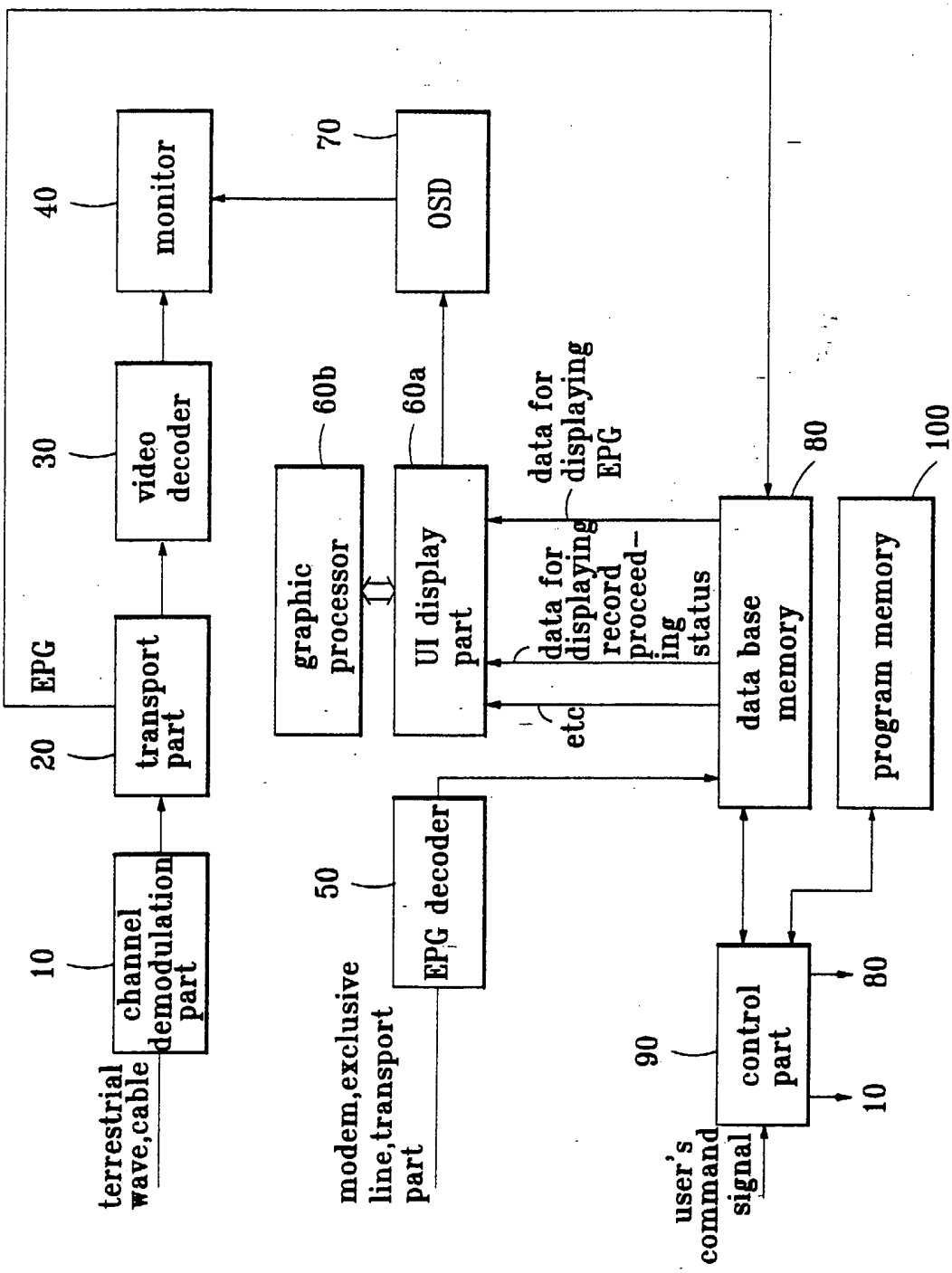

terrestrial wave,cable
10
channel demodulation part
20
transport part
EPG
30
video decoder
40
monitor
modem,exclusive line,transport part
50
EPG decoder
graphic processor
60b
UI display part
60a
70
OSD
data for displaying EPG
data for displaying record proceed-ing status
etc
data base memory
80
program memory
100
user's command signal
90
control part
80
10

FIG.3

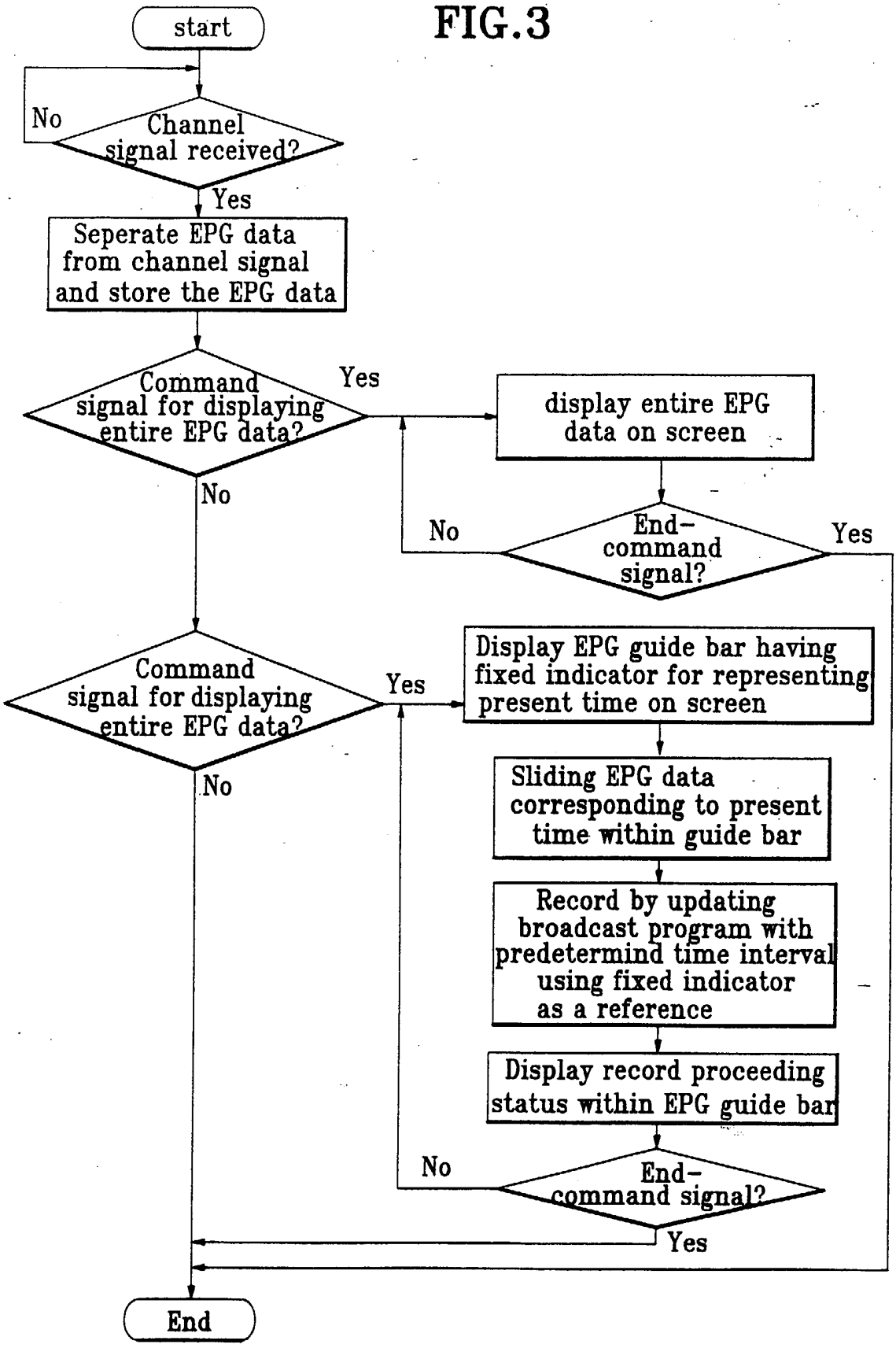
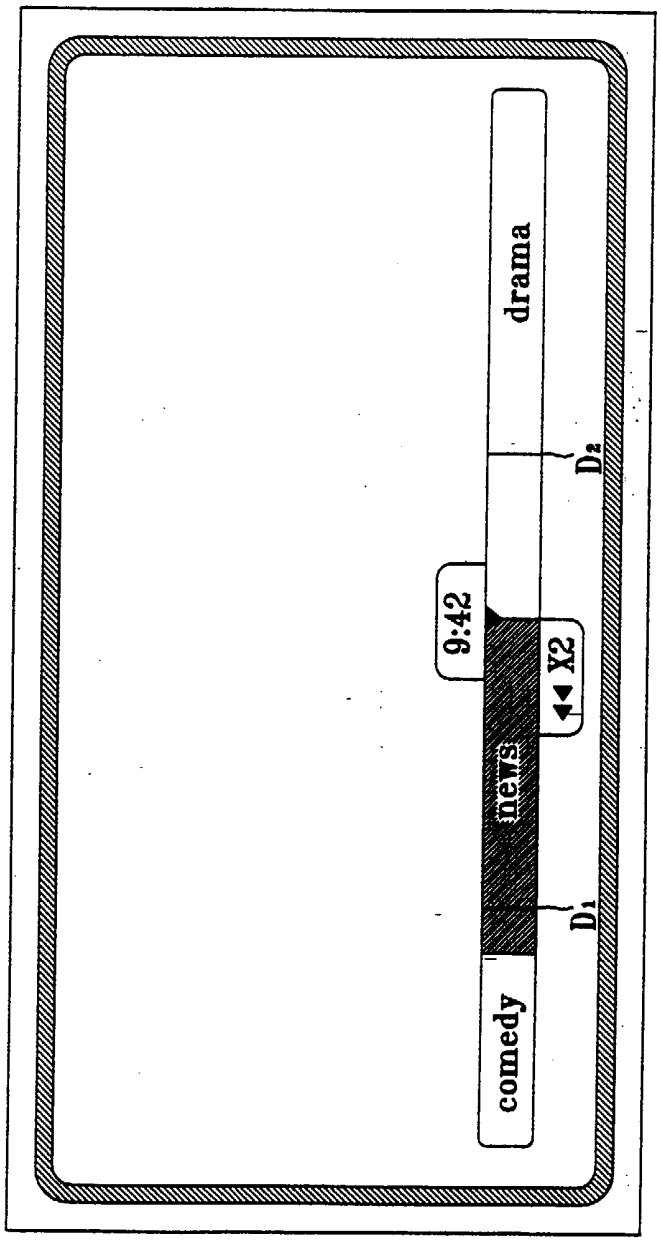

start
No
Channel signal received?
Yes
Seperate EPG data from channel signal and store the EPG data
Command signal for displaying entire EPG data?
Yes
display entire EPG data on screen
No
End-command signal?
No
Yes
Command signal for displaying entire EPG data?
Yes
Display EPG guide bar having fixed indicator for representing present time on screen
No
Sliding EPG data corresponding to present time within guide bar
Record by updating broadcast program with predetermind time interval using fixed indicator as a reference
Display record proceeding status within EPG guide bar
No
End-command signal?
Yes
End

FIG.4



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APPARATUS AND METHOD FOR DISPLAYING EPG GUIDE BAR

The present invention relates to apparatus and a method for displaying an EPG guide bar in, for instance, the display produced by a TV set.

Generally, the progression status of broadcasting a TV program is displayed as a time shifting bar or as a circular indicator such as a watch or clock.

For instance, a horizontal bar is frequently used for a computer or a TV set. Such a bar can display a limited portion of a program on a screen, corresponding to one hour or half an hour.

Figure 1 is a diagram illustrating a screen on which a time shifting bar is displayed in a known manner. Such a bar generally has an indicator which, depending on the progress of the programme, shifts from a left end when the program starts to a right end when the program ends. In other words, the indicator indicates the extent of the progress of a broadcast programme or the remaining extent of the programme.

The bar displayed on the screen is tuned to the TV set to be used for providing a record of the extent of the program on air. Generally, the TV set is equipped with a built-in memory enabling about one hour of broadcast programme to be recorded. Besides, the lengths of broadcast programs are different. For instance, there may be broadcast programs which last for half an hour, one hour, or more.

In this case, the bar has an indicator providing a recording extent indication of the program as shown in Figure 1. The indicator may display the progress of recording data in a memory having a capacity of one hour. In other words, a presently broadcasted program is continuously stored in the memory. When the broadcast program of one hour is completely stored in a memory having a capacity of one hour, the front parts of the contents stored in the memory are erased in order and, simultaneously, the contents of the programme in progress are stored in the parts from which the previously-stored

data are erased. In this case, the indicator moves slowly from the left end to the right end of the guide bar while the contents of the programme in progress are stored in the memory. Accordingly, the indicator moves from the left to the right of the guide bar for an hour. After one hour, the indicator starts to move from right to left of the bar. Therefore, at least two broadcast programmes may be stored in the memory entirely or in part or, instead, a signal broadcast program may be stored in the memory entirely or in part.

The memory stores the contents of the programmes broadcasted through one channel consecutively with an interval of one hour therein and the indicator of the bar indicates the extent of data storage in the memory, the memory having a capacity, for instance, of one hour. Hence, a viewer may not check the progress of the presently broadcasted programme nor how much of the memory has been used for storing the data.

For instance, the viewer may leave the TV set temporarily whilst watching a TV program. If, then the viewer wishes to watch the missing part of the program, he or she needs to know how far the program has run using the guide bar. If knowing how far the programme that the viewer missed and how much the memory is used for recording the programme, the viewer manipulates a key panel or a remote controller to keep up with the missing parts, i.e. time shifting to the starting point of the missing part stored in the memory. However, the guide bar and its indicator fail to indicate the exact location of the missing part. This is because the indicator merely indicates the extent of storage of the memory.

Moreover, the known guide bar indicator, as shown in Figure 1 moves within a guide bar having a fixed area. Such technology, which is generally used for a scale or a car speedometer is not applied to the case in which the length of the program exceeds the maximum range of the scale.

To take another instance, TV broadcast programs have different lengths. It is substantially impossible to indicate the starting and ending points of the respective programs while recording such programmes in or erasing them from a memory having a

capacity of, e.g. one hour. In other words, when a program of at least one hour is recorded, the indicator of a guide bar having a length equivalent to the capacity of the one-hour memory is supposed to be located at the right end of the guide bar. Therefore, in order to indicate that the program has been recorded for at least an hour, it is necessary to show another bar on the screen.

It is an object of the present invention to provide an indicator that substantially obviates one or more of the problems of the prior art.

According to a first aspect of the invention, there is provided apparatus for displaying an EPG guide bar, comprising: EPG data extraction means arranged to extract EPG data from a signal received through a transmission channel; first memory means arranged to store the EPG data; second memory means arranged to store a broadcast programme; user interface displaying means arranged to produce, using graphic processing means, a guide bar having a fixed indicator displaying a present time, and title areas representing broadcast programmes corresponding to the EPG data stored in the first memory, the title areas moving linearly in the guide bar in real-time correspondingly to the present time, and to update the title areas with a predetermined time interval centred around the fixed indicator so as to produce information indicating a record-proceeding status on at least one of the title areas of the broadcast programmes which are being recorded in the second memory; and display means arranged to convert the information from the user interface display means into an on-screen display form so as to display the converted information on a display.

According to another aspect of the present invention, there is provided a method of displaying an EPG guide bar, comprising the steps of: displaying a guide bar on a display screen and a fixed indicator fixed at a predetermined position on the guide bar, wherein the fixed bar represents a present time; displaying title areas of broadcast programmes corresponding to EPG data in real-time by taking the fixed indicator as a reference, wherein the title areas slide within the guide bar; storing the broadcast programs corresponding to the sliding title areas in a manner such that the broadcast programs corresponding to the sliding title areas are updated with a predetermined time

interval by taking the fixed indicator as a reference and displaying within a guide bar a record-proceeding status on the title areas of the broadcast programs which are being recorded in the memory.

Preferably, the fixed indicator representing the present time is positioned at a centre of the guide bar.

Preferably, the length of each of the title areas of the broadcast programs is proportional to the broadcast length of the corresponding real broadcast program. The extent of the recording may be indicated in the guide bar by areas shaded differently, e.g. using a different colour, from the remaining parts of the title areas.

Accordingly, in relation to a presently-broadcast program, the viewer can be informed of the progress of the programme and the amount of the programme recorded using the present time represented by the fixed indicator as time goes by. The viewer may be given information about the time interval in which the progress location of the viewer-demanding broadcast programme enables to be shifted to the previous temporal location.

The disclosed apparatus and method allow display of an EPG guide bar which enables the viewer to erase presently-broadcast programmes updated by a predetermined time interval using the present time as a reference as well as displaying a recording status on a display screen graphically. A broadcast programme being watched by a viewer can be shifted temporally back to a viewer-demanded previous temporal location while the viewer watches the broadcast programme.

It is to be understood that both the foregoing general description and the following detailed description of this invention are exemplary. The detailed description which follows refers to the drawings, in which:

Figure 1 is a diagram showing a screen on which a time shifting bar is displayed in a manner according to the prior art;

Figure 2 is a block diagram of exemplary apparatus in accordance with the invention for displaying an EPG guide bar;

Figure 3 is a flowchart of a program used in the apparatus of Figure 2; and

Figure 4 is a diagram showing a screen displaying an EPG guide bar produced in accordance with the invention.

Referring to Figure 2, apparatus in the form of a television unit is constructed with a channel demodulation part 10, a transport part 20, a video decoder 30, a monitor 40, an EPG decoder 50, a UI (user interface) display part 60a, a graphic processor 60b, an OSD (on-screen display) part 70, a data base memory 80, a control part 90, and a program memory 100.

The channel demodulation part 10, which receives a broadcast signal including EPG information via a transmission channel such as a terrestrial wave or a cable signal, removes noise generated in the channel and then outputs the noise-reduced signal. The transport part 20 divides the signal outputted from the channel demodulation part 10 into data relating to the EPG information and a video signal respectively.

The video decoder 30 decodes the video signal data from the transport part 20 and then outputs the decoded signal to the monitor 40. The decoded video signal is displayed on the monitor 40.

Meanwhile, the EPG decoder 50, when receiving the EPG related signal from the transport part 20 and the data relating to a UI (user interface) including the EPG information through an additional channel such as a modem or a cable line, extracts EPG data from the UI-related data and then stores the extracted EPG data in the data base memory 80 in a predetermined format under the control of the control part 90.

The UI display part 60a, operating under the control of the control part 90 and in conjunction with the graphic processor 60b, produces an EPG guide bar having a fixed indicator for displaying the present time, using data for displaying EPG and a record-proceeding extent. In the meantime, the control part 90 records the received broadcast programme corresponding to the predetermined time using the fixed indicator as a reference. In this case, the UI display part 60a displays a record-proceeding status on the areas in the EPG guide bar corresponding to the broadcast programme which is being recorded by taking the present time as a reference or other broadcast programmes with the help of the graphic processor 60b.

Note that the fixed indicator representing the present time displayed on the guide bar is fixed to the same location, i.e. without varying position as time passes. In Addition, the extent to which each broadcast programme has been recorded is represented by a shading technique in a manner such that the record-proceeding status(es) is(are) distinguished from the area(s) representing the programme(s) move along the guide bar as an area in a distinguishing colour.

Moreover, the recording process is, for example, carried out for one or two hours so as to be stored in the programme memory 100. After the scheduled record time elapses, the previously-recorded broadcast programme(s) is(are) erased by under control of the control part 90 and the presently broadcast programme is recorded therein. Such a process is repeated continuously as long as power to the TV set is turned on.

Meanwhile, the OSD part 70 processes the display information outputted from the UI display part 60a in an OSD form and then provides the monitor with the processed information. The monitor 40 displays the EPG guide bar as a fixed indicator in OSD form, the EPG data sliding within the guide bar corresponding or referenced to the present time, and the record-proceeding status of at least one broadcast programme which is being recorded by taking the present time as a reference on the screen thereof.

The data base memory 80 stores the EPG data from the EPG decoder 50 associated with it in accordance with control signals from the control part 90. The program memory

100 is updated for a predetermined time corresponding to the present time to store the broadcast programmes updated every predetermined time interval therein. In addition, the UI display part 60a is provided with data for displaying an EPG data relating to the extent of recording, and other necessary data in accordance with control signals from the control part 90.

The control part 90, as explained previously, controls all of the components 10 to 80 to perform the EPG display process.

In the EPG guide bar, areas representing past, present, and future broadcast programmes slide from the right end of the guide bar to the left end as time passes, using the present time as a reference. In each of the guide bar programme areas, the title of the corresponding programme is displayed. In addition, the current progress of recording status is displayed on the programme areas, regardless of the boundaries of the respective programme areas, with colour shading different from that of the guide bar itself. Such a shaded part informs the viewer of an interval enabling the broadcast programme, which is on the air as well as being recorded, to be shifted back to the past.

The fixed indicator and EPG guide bar may be displayed on the screen of the monitor 40 temporarily or continuously during the EPG display process, according to viewer selection.

The functioning of the UI display part 60a will now be explained in detail. When the extracted EPG data are stored in the database memory 80, the UI display part 60a carries out various data processing operations in conjunction with the graphic processor 60b using the EPG data, in accordance with the viewer's command.

For instance, the UI display part 60a may carry out data processing to display the entire EPG data on the screen of the monitor 40. The UI display part 60a may allow display of the guide bar, the broadcast programme areas having corresponding titles in the guide bar as sliding elements, and the recording statuses of the broadcast programmes

recorded with a predetermined time interval by taking the present time as a reference on the sliding areas of the broadcast programmes.

The flowchart shown in Figure 3 is merely exemplary and is not to be construed as limiting the present invention. The present teachings can be readily applied to other types of apparatus and associated methods. Referring to Figure 3, the control part 90 checks whether signals are received from channels such as a terrestrial wave, a cable, a modem, an exclusive line and the like. When a channel signal is received from one of the channels, EPG data are separated from the received channel signal and then the separated EPG data are stored in the memory 80. The system them checks for command signals for the entire EPG display are received due to viewer selection. When such a command signal exists, the control part 90 displays the entire EPG data on the screen of the monitor 40. Subsequently, the control part 90 checks whether there is an end-command signal instructed by the viewer. If the end-command signal exists, the control part 90 terminates display of the entire EPG data.

If the command signal for displaying the entire data is not received, the control part 90 checks whether a command signal for displaying EPG record status is received. If such a command signal is inputted, a frame type EPG guide bar corresponding to the absolute time is firstly displayed on the screen of the monitor 40 and the fixed indicator representing the present time is displayed at a middle part of the bar. When the power of the TV set is turned on and the viewer provides the command signal for displaying the EPG record status, as shown in Figure 4, the broadcast programmes corresponding to a predetermined channel are displayed on the screen. The title areas of the broadcast programmes then enter the EPG guide bar from the right end in broadcast order so as to move to the left end of the status window. In this case, each of the title areas of the broadcast programmes has a length proportional to the time length of the corresponding programme.

Figure 4 illustrates a displayed EPG guide bar produced in accordance with the invention.

Referring to Figure 4, the moment the title area representing a broadcast programme entering the EPG guide bar from the right hand end passes through the fixed indicator (which, in this case, displays the actual time 9:42AM), the broadcast programme is recorded and stored in the programme memory 100 of the TV set. The shaded part shown in Figure 4 represents the storage extent of the broadcast programme stored in the programme memory 100. In the present embodiment, it is assumed that the maximum record extent amounts to one hour and that the storage capacity of the memory 100 is one hour as well. The storage capacity may be modified according to design practices of the producer.

In this embodiment, when the title area of a broadcast programme *A* passes through the fixed indicator, display of the programme *A* begins on the monitor 40 (or the screen of a TV set) in real-time. At the same time, recording of the contents of the broadcast programme *A* in the memory 100 begins in real-time. If the length of the programme *A* is one hour or more, the front end of the programme previously stored in the memory starts to be erased from the corresponding area of the memory 100 and then the remaining content of the programme after the front end to the end point of the programme are stored in the memory 100 when one hour lapses. Thereafter, when the title area of a broadcast programme *B* passes through the fixed indicator line and the contents of *B* start to be displayed on the screen, the contents of programme *A* stored in the memory are erased from the memory in the order in which they were previously stored in the memory following the front end. Then, the introduction part of programme *B* is stored in the erased part of the memory 100 from the end part of programme *A* amounting to the erased area. Such a procedure is carried out continuously while the viewer watches the TV set. In the example shown in Figure 4, the fixed indicator indicates 9:42AM as the present time and a news program (not shown in the drawing) which is being broadcast is displayed on the present screen. A comedy programme, as the previously broadcast programme, has been stored in part in the front part of the memory 100. Thus, continuing on from the previous comedy programme, the news programme currently on the air is being stored thereafter. In this case, when the end point D2 of the news programme passes through the fixed indicator, the front part of the news programme starts to be erased from the memory 100 as soon

as the front part of a following drama programme is stored in the memory 100, continuing on from the end point of the news programme.

In other words, as shown in Figure 4, the viewer is able to determine the title of a presently-broadcast programme and the extent to which it has been broadcast as well as titles corresponding to the previous and following broadcast programmes. In Figure 4, the EPG guide bar is displayed on a lower part of the screen, which is optional insofar as it may be displayed on another part of the screen according to the designer's choice.

Moreover, with regard to the programme on the air, the viewer is able to determine the progress and recorded amount of the presently-broadcast programme by taking the present time indicated by the fixed indicator as a reference with the lapse of time. Therefore, the viewer can play back the programme contents of the previously-recorded amount to watch the played back part on the screen. While the viewer is watching the played back part, as mentioned above, the remaining part of the previously-broadcast programme is continuously stored in the memory 100. Thus, the viewer is able to watch the entire programme, which is being broadcasted presently, without missing parts.

As mentioned in the foregoing description, the apparatus is characterised in that the fixed indicator indicating the present time on the guide bar is fixed at a predetermined position (i.e. the central part of the bar in the present embodiment). In other words, while the fixed indicator designating the present time is fixed to one location, the title area of the presently-broadcast programme moves towards the fixed indicator and the indication of the previous part of the presently-broadcast programme being recorded is displayed through the EPG guide bar. Accordingly, it is unnecessary to produce the guide bar having been displayed on the screen again. Moreover, the written programme title is associated with the guide bar title area representative of the programme, this title area having a length proportional to the programme length and moving in real-time. Thus, the viewer is able to recognise the previous, present, and following programmes exactly by taking the present time as a reference.

The control part terminates the above procedures once an end command signal is inputted to the control part 90 by viewer selection.

The following advantages and effects are obtained.

Firstly, as the title areas of the broadcast programmes scroll past, centred around the fixed indicator, the viewer can recognise the title and extent to which the presently-broadcast programme has already been broadcast, as well as other titles corresponding to previous and following broadcast programmes.

Secondly, with regard to the presently-broadcast programme, the viewer is informed of the proceeding (running) extent and the amount or duration of the recorded material of the presently-broadcast programme by taking the present time, as represented by the fixed indicator, as a reference with the elapse of time. That is, the viewer can obtain information about how far the proceeding location of the viewer-demanded broadcast programme will be shifted back to a previous temporal location. Therefore, the viewer can play a viewer-demanded part of the recorded broadcast programme within the checked time shift interval without missing parts, as well as further watching the played back part using the monitor screen.

CLAIMS

1. Apparatus for displaying an EPG guide bar, comprising:

EPG data extraction means arranged to extract EPG data from a signal received through a transmission channel;

first memory means arranged to store the EPG data;

a second memory means arranged to store a broadcast programme;

user interface displaying means arranged to produce, using graphic processing means, a guide bar having a fixed indicator displaying a present time, and title areas representing broadcast programmes corresponding to the EPG data stored in the first memory, the title areas moving linearly in the guide bar in real-time correspondingly to the present time, and to update the title areas with a predetermined time interval centred around the fixed indicator so as to produce information indicating a record-proceeding status on at least one of the title areas of the broadcast programmes which are being recorded in the second memory; and

display means arranged to convert the information from the user interface display means into an on-screen display form so as to display the converted information on a display.

2. Apparatus according to claim 1, wherein the EPG extraction means comprise:

a channel demodulation part arranged to remove noise from a signal received through the channel;

a transport part arranged to divide a signal outputted from the channel demodulation part into data containing EPG information and a signal containing video information; and

an EPG decoder arranged to detect the data containing the EPG information and the EPG data from channel signals.

3. Apparatus according to claim 1 or claim 2, arranged such that the fixed indicator representing the present time is located at the centre of the displayed guide bar.

4. Apparatus according to any preceding claim, arranged such that the lengths of the displayed title areas of the broadcast programmes are proportional to the broadcast lengths of the real broadcast programmes.

5. Apparatus according to any proceeding claim, arranged such that the guide bar is displayed in a lower part of the display screen.

6. Apparatus according to any proceeding claim, wherein the first and second memory means comprise two areas existing in a single memory.

7. A method of displaying an EPG guide bar, comprising the steps of:

displaying a guide bar on a display screen and a fixed indicator fixed at a predetermined position on the guide bar, wherein the fixed bar represents a present time;

displaying title areas of broadcast programmes corresponding to EPG data in real-time by taking the fixed indicator as a reference, wherein the title areas slide within the guide bar;

storing the broadcast programmes corresponding to the sliding title areas in a manner such that the broadcast programmes corresponding to the sliding title areas are updated with a predetermined time interval by taking the fixed indicator as a reference; and

displaying within the guide bar a record-proceeding status on the title areas of the broadcast programmes which are being recorded in the memory.

8. A method according to claim 7, wherein the title areas of the broadcast programmes slide from a right end of the guide bar through or past the fixed indicator to a left end of the guide bar.

9. A method according to claim 7 of claim 8, wherein the record-proceeding status is displayed on the title areas in a manner such that each of the corresponding title areas is distinguishable as each recording process proceeds.

10. A method according to claim 9, wherein the title area of recorded portion of the broadcast program is shaded in colour.

11. A method according to any of claims 7 to 10, further comprising the steps of:

checking whether a channel signal is received;

separating the EPG data from the received channel signal;

storing the separated EPG data in a memory; and

displaying the guide bar on the screen when a command signal for displaying an EPG record state is inputted by viewer selection.

12. A method according to claim 11, further comprising:

checking whether a command signal for displaying the entire EPG data is inputted by viewer selection;

displaying the entire EPG data on the screen when such a command signal is inputted; and

displaying the entire EPG data when an end command signal is inputted by the viewer.

13. A method according to claim 11 or claim 12, wherein the channel signal is inputted via one of a terrestrial wave, a cable line, a telephone modem line, and a satellite.

14. A method according to any of claims 7 to 13, wherein the fixed indicator representing the present time is positioned at the centre of the guide bar.

15. A method according to any of claims 7 to 14, wherein the length of each of the title areas of the broadcast programmes is proportional to the broadcast length of the corresponding real broadcast programme.

16. A method according to any of claims 7 to 15, wherein the guide bar is displayed on a lower part of the screen.

17. A method according to any of claims 7 to 16, wherein the predetermined time interval is at least an hour.

18. Video apparatus for displaying a video picture and an electronic programme guide, comprising:

a video signal input;

first memory means for storing programme guide information;

second memory means for storing video data received via the video signal input;

display means; and

a display interface coupled between the first and second memory means and the display means;

wherein the display interface is arranged to generate on the display means, according to the stored programme guide information, an electronic programme guide in the form of a track, a present-time indicator which is stationary on or adjacent the track, and at least one programme indicator which extends along the track, the or each programme indicator having a start end and a finish end representing the start and finish times of the broadcast programme received or to be received via the video signal input, the programme indicator moving along the track as time passes; and

wherein the display interface is further arranged to generate a recorded material indicator associated with the programme indicator or indicators and indicating the parts of the corresponding broadcast programme or programmes stored in the second memory means, the duration and timing of the recording of the said parts being indicated by the length and position of the recorded material indicator on the track.

19. Apparatus according to claim 18, wherein the display interface is arranged to cause the display means to display the electronic programme guide as a bar with the present-time indicator stationary in the display at a position intermediate the ends of the bar, the or each programme indicator comprising a linearly moving strip on the bar and the recorded material indicator comprising a shaded area of at least one programme indicator.

20. Apparatus according to claim 18 or claim 19, further comprising a user command device linked to the display interface and operable to control commencement of the recording of video information in the second memory means, wherein the display interface is arranged such that the time of commencement of recording is indicated by a start end of the recorded material indicator located at the corresponding temporal position in the respective programme indicator, which start end moves synchronously with the programme indicator.

21. Apparatus for displaying an EPG guide bar, the apparatus being constructed and arranged substantially as herein described and shown in Figures 2 to 4 of the drawings.

22. A method of displaying an EPG guide bar, the method being substantially as herein described with reference to Figures 2 to 4 of the drawings.

INVESTOR IN PEOPLE

Application No: GB 0125226.1 **Examiner:** Ms Ceri Witchard
Claims searched: 1, 7 and 18 **Date of search:** 11 April 2002

Patents Act 1977
Search Report under Section 17

Databases searched:

UK Patent Office collections, including GB, EP, WO & US patent specifications, in:

UK Cl (Ed.T): H4F (FBBG)

Int Cl (Ed.7):

Other: Online: WPI, EPODOC, JAPIO

Documents considered to be relevant:

Category	Identity of document and relevant passage		Relevant to claims
X	EP 1014715 A2	NEC CORPORATION See especially column 2 lines 16-50 and column 13 lines 11-20.	7-17 at least

X	Document indicating lack of novelty or inventive step	A	Document indicating technological background and/or state of the art.
Y	Document indicating lack of inventive step if combined with one or more other documents of same category.	P	Document published on or after the declared priority date but before the filing date of this invention.
&	Member of the same patent family	E	Patent document published on or after, but with priority date earlier than, the filing date of this application.