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A CUSTOMIZABLE MENU FOR A TELEVISION RECEIVER ACCESSED VIA A REMOTE CONTROL KEYBOARD

The subject invention generally concerns menu generation circuitry for electronics equipment, such as, television receivers, and specifically relates to a novel "FETCH" menu, a user-customizable menu for holding a list of the user's favorite commands.

Control of modern television receivers has become increasingly complicated in recent years, as more and more user-controllable features have been implemented by manufacturers in television receivers of ever-greater complexity. For example, in addition to the normal television receiver controls, some user-controllable features which were unheard-of just a few years ago are now commonly available to consumers, such as, COLOR TEMPERATURE, VIDEO NOISE REDUCTION, SURROUND SOUND, and SLEEP TIMER, just to name a few.

In an attempt to present an orderly array of these controllable functions, manufacturers introduced the concept of function control menus. In such well-known schemes, a menu is called up to the screen, and a particular function to be controlled, such as COLOR, is selected by the viewer for adjustment. Unfortunately, the menus soon grew too long for convenient screen display, and were expanded to include sub-menus allowing selection of related items. For example, selecting the menu item entitled VIDEO brings up yet another menu listing such related items as, BRIGHTNESS, CONTRAST, COLOR, TINT, SHARPNESS, COLOR TEMPERATURE, and VIDEO NOISE REDUCTION. While such an arrangement may seem straight-forward to a computer programmer, it may be extremely confusing, and even intimidating, to the average nontechnical user, who was quite happy to adjust the brightness of his receiver by turning a knob on the front panel, without having to wade through a mire of menus and submenus to accomplish that simple task. In many cases, complex hierarchical menus found on today's receivers must be searched from top to bottom in order to locate the

desired function to be executed. It is noted that the location of commands within the hierarchy may have seemed "intuitively obvious" to the programmer, but may be confusing to the nontechnical user.

A television system includes a menu generating feature which provides a plurality of menus comprising menu items corresponding to functions within a television signal processor for selecting the functions for controlling, e.g., the display of a video image. A user-defined "fetch" menu, which is absent from the screen during normal program viewing, and which is easily accessible by means of a single key, holds a given number of the user's favorite menu items. The user may add menu items to the fetch menu which normally reside any position in the plurality of menus. The user may thereafter cause display of his list of favorite commands, and cause the execution of his desired menu item without having to find that menu item at its normal position in the hierarchy

FIGURES 1-3 and 7 show illustrations of screen displays of menus of user-selectable functions.

FIGURE 4 is a simplified drawing of a remote control unit suitable for use with the invention.

FIGURE 5 shows, in block diagram form, the relevant portion of the circuitry of a television receiver operating in accordance with the invention.

FIGURE 6 is a simplified flowchart of a relevant portion of a control program for the microcomputer of FIGURE 5.

FIGURES 1 and 4 will be referred-to concurrently in the following discussion. FIGURE 1 illustrates a screen display produced in response to the pressing of a FETCH key on a remote control unit such as remote control unit 400 shown in FIGURE 4. FIGURE 1 shows, on its right-most portion 108, a simplified, generic plan view (i.e., overhead view) of a user's family room displayed on a television receiver and showing a given speaker configuration representing the actual equipment which the user possesses, based on data entered by the user in response to the various options presented in an audio configuration menu. The

left-most portion of FIGURE 1 includes "virtual buttons" 101-107 which are operated by a user by positioning a cursor (not shown), or by highlighting areas, by use of MOVE keys generally designated 409, over the particular desired button, and pressing a MENU key 410 on remote control unit 400. The virtual buttons comprise an EXIT Button 101, a HELP button 102, AUDIO PROCESSOR buttons 103, a CONTRAST slide bar 104, and CLOSED CAP DISP (closed caption display) buttons 105. Note that button fields 106 and 107 are unassigned.

Selecting the HELP button 102 causes a display of detailed instructions. Selecting the EXIT button 101 causes a return to the last channel watched. Note that the functions of elements 103-105 are not closely related to one another. That is, one would not normally expect to find them in the same menu. However, for purposes of explanation it is to be assumed that those items came preprogrammed in the FETCH menu from the factory, or that the FETCH menu was empty when the receiver was purchased, and that a user subsequently programmed the first three locations (103-105) with his favorite or frequently used commands. In any event, any command from any menu or submenu can be assigned to any of locations 103-107 of the FETCH menu and thereby be made immediately accessible to the user upon pressing FETCH key 411 of remote control 400.

In order to add a command to the FETCH menu, a user first presses MENU key 410 of remote control 400 to enter the menu system in the normal fashion. The user "navigates" (i.e., moves through) the menu hierarchy until coming upon the desired command to be added to the FETCH menu. At that point, the user presses FETCH key 411 which causes the display of FIGURE 2 to appear on the display screen Note that the desired command (in this example the MUTE command 209) appears in the display area 208 on the right side of the screen display. The user is then prompted by an on-screen message 210 to move the cursor (or highlighting, other appropriate position indication), by means of the up and down direction keys of key array 409, to the desired placement area (in this example, area 206) for the new

command. Upon pressing MENU key 410 the MUTE command will be added to the FETCH menu at the desired location replacing any command previously assigned to that location. The result of this FETCH menu programming operation is shown in FIGURE 3, wherein the MUTE command is shown installed in area 306, the user is advised that the MUTE command is installed by a message 310, and is then prompted to press MENU key 410 to continue (i.e., exit this display) and return to the original (i.e., last) position in the menuing system.

The above-described Fetch menu exhibits the following advantage in the television environment, over menus in the computer environment. In the television environment, the primary purpose is entertainment, and the user generally does not want to clutter the screen with text and graphics when a television program is being viewed. In contrast, a computer user (whose primary interest is working efficiently), needs immediate access to the menus via a number of continuously displayed on-screen pull-down menu headers and "tool button" graphics. Thus, in a television environment, a customizable menu is a desirable feature, but to be of even greater value, it should be absent from the screen most of the time, yet easily accessible to the user when needed.

FIGURE 5 shows a simplified block diagram of that section of the receiver which provides the above-described screen displays. OSD (On Screen Display) Processor 500 is preferably a bit-mapped graphics generator for masking the majority of the display screen with graphics, under control of a Main Microprocessor 510. Main microprocessor 510 receives data input by a user via a local keyboard (not shown) and via an IR receiver 511. OSD Processor 500 produces image signals at Red, Green, and Blue color signal output terminals. Main Microprocessor 510 also receives a video signal from the television chassis and derives closed caption information therefrom. It produces closed caption display signals at Red, Green, and Blue color signal output terminals. The outputs of OSD Processor 500 and of Main Microprocessor 510 are summed together in an array of summing

circuits, generally designated 515. These summing circuits may comprise, for example, the well-known non-additive mixer circuit, which has the property that it will pass the greater of the two signals at its inputs while blocking the lesser of the two input signals. The outputs of the summing circuits are applied to a VIDEO PROCESSOR unit 520. A fast switch signal generated by either OSD Processor 500 or Main Microprocessor 510 causes the graphics signal (or closed caption signal) to be substituted for the video signal for the duration of the fast switching signal.

A simplified flowchart for that portion of the control program of microcontroller 510 which concerns the operation of the FETCH key is shown in FIGURE 6. Step 600 is entered upon receipt of a keycode. At step 605 the keycode is examined and a determination is made as to whether or not the keycode is that of the FETCH command. If not, this portion of the routine is exited at step 635, and the program advances to other portions of the keyboard decoding routines. If, at step 605, it is determined that a FETCH command was received, the program advances to step 610 to see if the user is already accessing the menu. This determination is important because there are two distinct modes of operation initiated by the FETCH command. Those modes are, a selection and store mode of operation which is entered if the user is already accessing the menu system, and a display and execute mode of operation which is entered if the user is not accessing the menu system. The display and execute mode of operation is illustrated in the path shown down the left side of FIGURE 6 (i.e., steps 615-630), and the selection and store mode of operation is illustrated in the path shown down the right side of FIGURE 6 (i.e., steps 640-660). If the user is not accessing the menu system, the NO path is taken from step 610 to step 615 wherein the FETCH screen of FIGURE 1 is displayed. At step 620 the program waits for the menu key to be pressed. When it is, the YES path is taken to step 625 at which the currently-highlighted command from the currently accessed branch of the menu system is read. The program then advances to step 630 at which the routine prepares to exit to execute the highlighted command. Preparation for

exiting may include clearing the display, and accessing data needed to execute the command, for example. At step 635 the routine is exited.

If, however, at step 610, the user had already accessed the menu system when the FETCH key was pressed, then the user wants to read a command from its normal location in the menu hierarchy, and store it in the FETCH menu. Therefore, the YES path is taken from step 610 to step 640. At step 640, the currently-highlighted command from the currently accessed branch of the menu system is read. At step 645, the FETCH menu of FIGURE 2 is displayed. Note that the currently accessed command (in this example, the MUTE command 209) is displayed in a blank area 208 of the screen. At step 650, a check is made to see if the menu key is pressed. If not, the routine loops back repeatedly. If so, the routine advances to step 655, where the 'fetched" command (i.e., the command read at step 640), is written to the currently highlighted command location (i.e., one of elements 203-207), as shown in FIGURE 3, and a message 310 is displayed to "prompt" (i.e., instruct) the user that the installation process is complete, and that the menu key is to be pressed to exit. Note that the MUTE command is now installed at command location 306.

Alternatively, upon pressing the FETCH key while within the menu, a list of commands may be displayed, as shown in FIGURE 7. A list 710 may be scrolled up and down in order to find, read, and store the desired command into the FETCH menu locations 703-707. List 710 is shown displayed in a blank area 708. While the list of FIGURE 7 is shown displayed in alphabetical order, the list may also be grouped according to function. For example, television picture controls such as brightness, color, contrast, and tint would appear in a first group, and audio controls such as mono, prologic, stereo, and surround sound would appear together in a second group.

Thus, the user-customizable (i.e., modifiable) FETCH menu described above is useful with a graphical display, and is also applicable to a text-based menu, or a combination of the two,

and the scope of the claims below is intended to encompass all of the above-recited kinds of menus.

While a single FETCH key is preferred, a combination of keys of the remote control unit, or a menu selection from a main menu may also be used to call up the display of the FETCH menu.

The phrases "system controller" and main microprocessor are used interchangeably herein and are intended to also encompass microcomputers and dedicated custom integrated circuits. The term "television receiver" as used in the specification and claims is intended to encompass television receivers having a display device (commonly called TV sets) and television receivers not having a display device (such as VCRs, satellite receivers, and cable converters).

Claims:

1. A television system comprising:

a television signal processing means (520) including functions which affect the processing of said television signal; and

menu generation means (500,510) coupled to said processing means for generating a plurality of menus, each menu comprising items corresponding to said functions for selecting ones of said functions to be controlled;

said menu generating means (500,510) responsive to a control signal (output of 511) for including selected ones of said items from said plurality of menus in a user-determined menu of items.

2. The television system of claim 1 wherein,

said television system provides a hierarchy of menus, and

said user-determined menu of items contains default items before modification by said user.

3. The television system of claim 1 wherein,

said television system provides a hierarchy of menus, and

said user-determined menu of items contains no items before modification by said user.

4. The television system of claim 1 wherein,

said television system provides a hierarchy of menus, and

said user-determined menu of items is programmed by navigating through said menu hierarchy and selecting desired items for inclusion as said items are encountered.

5. The television system of claim 1 wherein,

said television system provides a hierarchy of menus, and

said user-determined menu of items is programmed by a user by selecting desired items for inclusion from a list of items of said menu hierarchy.

6. A method for use in television system, said television system comprising a television signal processing means (520) including functions which affect the processing of said television signal, and menu generation means (500,510) coupled to said processing means for generating a plurality of menus, each menu comprising items corresponding to said functions for selecting ones of said functions to be controlled, said method comprising the steps of:

receiving a control signal (output of 511) indicative of a selection of ones of said items from said plurality of menus;

including said selected ones of said items in a user-determined menu of items.