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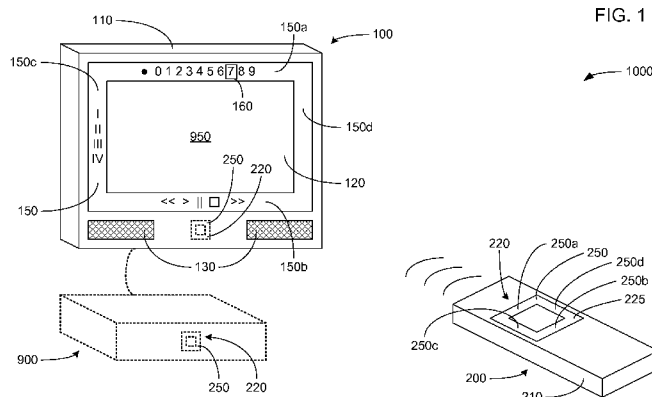
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12/886,688 21 September 2010 (21.09.2010) US(71) **Applicant** (for all designated States except US): **BOSE CORPORATION** [US/US]; The Mountain Road MS 40, Framingham, Massachusetts 01701 (US).

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(54) Title: AUDIO/VISUAL DEVICE GRAPHICAL USER INTERFACE

(57) **Abstract:** A user interface for an audio/visual device incorporates one or both of a touch sensor having a touch surface on which is defined a racetrack surface having a ring shape and a display element on which is displayed a racetrack menu also having a ring shape, and where the user interface incorporates both, the ring shapes of the racetrack surface and the racetrack menu are structured to generally correspond such that the position of a marker on the racetrack menu is caused to correspond to the position at which a digit of a user's hand touches the racetrack surface.

AUDIO/VISUAL DEVICE GRAPHICAL USER INTERFACE

TECHNICAL FIELD

[001] This disclosure relates to user interfaces incorporating a visual display and/or a touch-sensitive control.

BACKGROUND

[002] Part of enjoying the playing of an audio/visual program (e.g., a piece of music, a recorded lecture, a recorded live performance, a movie, a slideshow, family pictures, an episode of a television program, etc.) is the task of selecting the desired audio/visual program to be played. Unfortunately, the increasing variety of choices of sources of audio/visual programs and the increasing variety of mechanisms by which audio/visual programs are able to be stored and played has greatly complicated what was once the relatively simple act of watching or listening to the playing of an audio/visual program to enjoy it.

[003] For example, those wishing to "tune in" an audio/visual program being broadcast must now select a channel on which to view an audio/visual program from as many as 500 channels available through typical cable and/or satellite connections for television and/or radio. Further, it has become commonplace to employ audio/visual devices that are able to be programmed to autonomously tune in and record an audio/visual program for playing at a later time. Still further, it is now becoming increasingly commonplace to obtain audio/visual programs from websites accessible through the Internet, either by receiving those audio/visual programs as streaming data while they are played, or downloading those audio/visual programs as a storable digital file on an audio/visual device for playing at a later time. Yet further, some of these possible sources of audio/visual programs require paid subscriptions for which key cards and/or decryption keys are required to gain access to at least some audio/visual programs.

[004] Those seeking to avail themselves of even a modest subset of such a wide array of options for playing an audio/visual program have often found themselves having to obtain multiple audio/visual devices (e.g., tuners, descramblers, disc media players, video recorders, web access devices, digital file

players, televisions, visual displays without tuners, etc.). Each such audio/visual device often has a unique user interface, and more often than not, is accompanied by a separate handheld wireless remote control by which it is operated. Attempts have been made to grapple with the resulting plethora of remote controls that often accompany a multitude of audio/visual devices by providing so-called "universal remotes" enabling multiple audio/visual devices to be operated using a single remote control. However, a universal remote tends to go only so far in satisfying the desire of many users to simplify the coordination required in the operation of multiple audio/visual devices to perform the task of playing an audio/visual program.

[005] Efforts have recently been made through cooperation among multiple purveyors of audio/visual devices to further ease the coordinated operation of multiple audio/visual devices through the adoption of standardized command codes and various approaches to coupling multiple audio/visual devices to enable the exchange of those standardized command codes among multiple audio/visual devices. An example of this effort is the CEC standardized command set created as part of the HDMI interface specification promulgated by HDMI Licensing, LLC of Sunnyvale, CA. However, these efforts, even in conjunction with a universal remote, still only go so far in making the playing of an audio/visual program into a truly simple undertaking.

SUMMARY

[006] A user interface for an audio/visual device incorporates one or both of a touch sensor having a touch surface on which is defined a racetrack surface having a ring shape and a display element on which is displayed a racetrack menu also having a ring shape, and where the user interface incorporates both, the ring shapes of the racetrack surface and the racetrack menu are structured to generally correspond such that the position of a marker on the racetrack menu is caused to correspond to the position at which a digit of a user's hand touches the racetrack surface.

[007] In one aspect, an apparatus includes a display element capable of visually displaying a visual portion of an audio/visual program and a racetrack menu having a ring shape; a processing device; and a storage accessible to the processing device and storing a sequence of instructions. When the sequence of instructions is executed by the processing device, the processing device is caused to: cause the racetrack menu to be visually displayed on the display element such that the racetrack menu surrounds a first display area in which the visual portion of the audio/visual program may be visually displayed; cause a plurality of menu items to be visually displayed in the racetrack menu; cause a first marker to be visually displayed in the racetrack menu; receive an indication that a first manually-operable control is being operated to move the first marker; in response to the indication of the first manually-operable control being operated to move the first marker, move the first marker about the racetrack menu and constrain movement of the first marker to remain within the racetrack menu; receive an indication of the first manually-operable control being operated to select a menu item of the plurality of menu items that is in the vicinity of the first marker at a time subsequent to the first manually-operable control being operated to move the first marker about the racetrack; and in response to the indication of the first manually-operable control being operated to select the menu item that is in the vicinity of the first marker, cause the menu item to be selected, wherein causing the menu item to be selected comprises taking an action to cause the audio/visual program to be selected for playing.

[008] Implementations may include, and are not limited to, one or more of the following features. The apparatus may further include a source interface operable to

select a source from which to receive an audio/visual program, wherein the action taken to cause the audio/visual program to be selected for playing is selected from the group of actions consisting of: selecting the source interface to enable receipt of the audio/visual program from the source through the source interface; transmitting a command through the source interface to the source to select the audio/visual program from among a plurality of audio/visual programs available from the source; and transmitting a command through the source interface to the source to cause the source to provide the audio/visual program to the apparatus as part of playing the audio/visual program. Transmitting a command through the source interface to the source to select the audio/visual program from among the plurality of audio/visual programs available from the source may include causing the source to operate a radio frequency tuner to receive the audio/visual program, and/or causing the source to begin playing the audio/visual program from a storage medium accessible to the source.

[009] The first manually-operable control may be a touch sensor having a touch-sensitive surface that is manually operable with a digit of a hand. Execution of the sequence of instructions by the processing device may further cause the processing device to cause the racetrack menu to be visually displayed in response to an indication of the digit touching the touch-sensitive surface followed by an indication of the digit moving about the touch-sensitive surface in a wiping motion at a time when the racetrack menu is not being visually displayed, and cause a command concerning playing the audio/visual program to be transmitted to a source of the audio/visual program in response to an indication of the digit touching the touch-sensitive surface followed by an indication of the digit ceasing to touch the touch-sensitive surface at a time when the racetrack menu is not being visually displayed. Execution of the sequence of instructions by the processing device may further cause the processing device to cause the racetrack menu to be visually displayed in response to an indication of the digit touching the touch-sensitive surface followed by an indication of the digit remaining in contact with the touch-sensitive surface for at least a predetermined period of time at a time when the racetrack menu is not being visually displayed, and cause a command concerning playing the audio/visual program to be transmitted to a source of the audio/visual program in response to an indication of the digit touching the touch-sensitive surface followed by an indication

of the digit ceasing to touch the touch-sensitive surface at a time when the racetrack menu is not being visually displayed. Execution of the sequence of instructions by the processing device may further cause the processing device to cause a second marker to be visually displayed in the vicinity of the first marker in response to an indication of the digit touching the touch-sensitive surface, and move the second marker to a position relative to the first marker such that the position of the second marker relative to the first marker more precisely indicates the position where the digit is touching the touch-sensitive surface than does the position of the first marker within the racetrack menu in response to an indication of the digit moving about the touch-sensitive surface in a wiping motion.

[010] Execution of the sequence of instructions by the processing device may further cause the processing device to move the first marker about the racetrack menu in a manner in which the first marker snaps between being in the vicinity of a first menu item of the plurality of menu items and being in the vicinity of a second menu item of the plurality of menu items, and the processing device may be further caused to operate an acoustic driver to acoustically output a sound at each instance of the first marker snapping between the vicinities of the first and second menu items. Execution of the sequence of instructions by the processing device may further cause the processing device to alter a dimension of the size of the first marker as the processing device is caused to move the first marker about the racetrack menu between the vicinity of a first menu item of the plurality of menu items and the vicinity of a second menu item of the plurality of menu items. The first marker may have the form of an arrow pointer pointing at a menu item of the plurality of menu items, a box surrounding a menu item of the plurality of menu items, or an alteration to the appearance of a menu item of the plurality of menu items that is distinct from the appearance of other menu items of the plurality of menu items. The racetrack menu may have a rectangular ring shape having four sides; and execution of the sequence of instructions by the processing device may further cause the processing device to receive an indication that the first manually-operable control is being operated, and cause a second marker to be visually displayed in the racetrack menu in the vicinity of one of the four sides of the rectangular ring shape of the racetrack menu to visually indicate which one of the four sides the first marker is currently located within.

[011] Execution of the sequence of instructions by the processing device may further cause the processing device to cause the racetrack menu to be visually displayed on the display element in response to receiving any indication of any manual operation of the first manually-operable control, and cause the racetrack menu to cease to be visually displayed on the display element in response to a predetermined period of time having elapsed without any receipt of any indication of any manual operation of the first manually-operable control. Execution of the sequence of instructions by the processing device may further cause the processing device to: cause both the first display area and a second display area to be displayed on the display element in a manner in which both the first and second display areas are surrounded by the racetrack menu; cause a first menu item that is associated with a visual portion of an audio/visual program being played in the first display area to be located in a first portion of the racetrack menu located closer to the first display area than a second portion of the racetrack menu; and cause a second menu item that is associated with a visual portion of an audio/visual program being played in the second display area to be located in the second portion of the racetrack menu. The first display area may be positioned to overlies a portion of the second display area. The first display area and the second display area may be positioned adjacent to each other in a manner in which neither of the first and second display areas overlies the other.

[012] In one aspect, a method includes visually displaying a racetrack menu having a ring shape on a display element that is capable of visually displaying both the racetrack menu and a visual portion of an audio/visual program such that the racetrack menu surrounds a first display area in which the visual portion of the audio/visual program may be visually displayed; visually displaying a plurality of menu items in the racetrack menu; visually displaying a first marker in the racetrack menu; receiving an indication that a first manually-operable control is being operated to move the first marker; in response to the indication of the first manually-operable control being operated to move the first marker, moving the first marker about the racetrack menu and constraining movement of the first marker to remain within the racetrack menu; receiving an indication of the first manually-operable control being operated to select a menu item of the plurality of menu items that is in the vicinity of the first marker at a time subsequent to the first manually-operable control being

operated to move the first marker about the racetrack; and in response to the indication of the first manually-operable control being operated to select the menu item that is in the vicinity of the first marker, selecting the menu item, wherein selecting the menu item comprises taking an action to cause the audio/visual program to be selected for playing.

[013] Implementations may include, and are not limited to, one or more of the following features. The method may further include visually displaying the racetrack menu in response to receiving an indication of a digit of a hand touching a touch-sensitive surface of the first manually-operable control followed by an indication of the digit moving about the touch-sensitive surface in a wiping motion at a time when the racetrack menu is not being visually displayed; and transmitting a command concerning playing the audio/visual program to a source of the audio/visual program in response to an indication of the digit touching the touch-sensitive surface followed by an indication of the digit ceasing to touch the touch-sensitive surface at a time when the racetrack menu is not being visually displayed. The method may further include visually displaying the racetrack menu in response to receiving an indication of a digit of a hand touching a touch-sensitive surface of the first manually-operable control followed by an indication of the digit remaining in contact with the touch-sensitive surface for at least a predetermined period of time at a time when the racetrack menu is not being visually displayed; and transmitting a command concerning playing the audio/visual program to a source of the audio/visual program in response to an indication of the digit touching the touch-sensitive surface followed by an indication of the digit ceasing to touch the touch-sensitive surface at a time when the racetrack menu is not being visually displayed. The method may further include visually displaying the racetrack menu on the display element in response to receiving any indication of any manual operation of the first manually-operable control; and ceasing to visually display the racetrack menu on the display element in response to a predetermined period of time having elapsed without any receipt of any indication of any manual operation of the first manually-operable control.

[014] The action taken to cause the audio/visual program to be selected for playing is selected from the group of actions may include selecting a source interface to enable receipt of the audio/visual program from a source of the audio/visual

program through the source interface; transmitting a command through the source interface to the source to select the audio/visual program from among a plurality of audio/visual programs available from the source; and transmitting a command through the source interface to the source to cause the source to provide the audio/visual program to the apparatus as part of playing the audio/visual program. Transmitting a command through the source interface to the source to select the audio/visual program from among the plurality of audio/visual programs available from the source may include causing the source to operate a radio frequency tuner to receive the audio/visual program and/or causing the source to begin playing the audio/visual program from a storage medium accessible to the source.

[015] The method may further include moving the first marker about the racetrack menu in a manner in which the first marker snaps between being in the vicinity of a first menu item of the plurality of menu items and being in the vicinity of a second menu item of the plurality of menu items, and may further include operating an acoustic driver to acoustically output a sound at each instance of the first marker snapping between the vicinities of the first and second menu items. The racetrack menu may have a rectangular ring shape having four sides; and the method may further include receiving an indication that the first manually-operable control is being operated, and causing a second marker to be visually displayed in the racetrack menu in the vicinity of one side of the four sides of the rectangular ring shape of the racetrack menu to visually indicate which one of the four sides the first marker is currently located within.

[016] The method may further include displaying both the first display area and a second display on the display element in a manner in which both the first and second display areas are surrounded by the racetrack menu; where a first menu item is associated with a visual portion of an audio/visual program being played in the first display area, displaying the first menu item in a first portion of the racetrack menu located closer to the first display area than a second portion of the racetrack menu; and where a second menu item is associated with a visual portion of an audio/visual program being played in the second display area, displaying the second menu item in the second portion of the racetrack menu. The method may further include positioning the first display area to overlies a portion of the second display area, or

positioning the first display area and the second display area adjacent to each other in a manner in which neither of the first and second display areas overlies the other.

[017] A user interface for an audio/visual device incorporates a display element on which is displayed a racetrack menu having a ring shape, where the selection of a menu item positioned along the racetrack menu is responded to with the display of a submenu positioned within a display area on the display element that is surrounded by the racetrack menu, and where the manner in which menu items of the submenu are selected in substantially the same manner as menu items positioned along the racetrack menu.

[018] In one aspect, an apparatus includes a display element capable of visually displaying a visual portion of an audio/visual program and a racetrack menu having a ring shape, a processing device, and a storage accessible to the processing device and storing a sequence of instructions. When the sequence of instructions is executed by the processing device, the processing device is caused to cause the racetrack menu to be visually displayed on the display element such that the racetrack menu surrounds a first display area in which the visual portion of the audio/visual program may be visually displayed; cause a first plurality of menu items to be visually displayed in the racetrack menu; cause a first marker to be visually displayed in the racetrack menu; in response to an indication of a manually-operable control being operated to move the first marker, move the first marker about the racetrack menu and constrain movement of the first marker to remain within the racetrack menu; and in response to receiving an indication of the manually-operable control being operated to select a first menu item of the first plurality of menu items that is in the vicinity of the first marker, cause the menu item to be selected. Causing the menu item to be selected further includes causing the processing device to cause a submenu to be visually displayed within the first display area, cause a second plurality of menu items to be visually displayed in the submenu, and cause the first marker to be displayed within the submenu.

[019] Implementations may include, and are not limited to, one or more of the following features. The submenu may be displayed in the first display area such that the submenu overlies the visual portion of the audio/visual program at a time when the visual portion of the audio/visual program is displayed on the display element

within the first display area. The racetrack menu and the submenu, together, may surround a second display area occupying a subset of the first display area, and wherein the visual portion of the audio/visual program is displayed within the second display area such that no portion of either the racetrack menu or the submenu overlies the visual portion of the audio/visual program at a time when the audio/visual program is displayed on the display element. The submenu may have a spiral configuration having four sides that correspond to and are positioned adjacent to four sides of the ring shape of the racetrack menu, and having a fifth side that corresponds to and is positioned adjacent to one of the four sides of the submenu with that one of the four sides of the submenu being positioned between the fifth side and a portion of the racetrack menu. Execution of the sequence of instructions by the processing device may further cause the processor to cause submenu to cease to be displayed and to cause the first marker to be moved to a position within the racetrack menu in response to the passage of a predetermined period of time without receiving any indication of the manually-operable control being operated.

[020] The submenu may have a ring shape having four sides that correspond to four sides of the ring shape of the racetrack menu. The submenu may be positioned relative to the racetrack menu such that the ring shape of the submenu is positioned concentrically within the ring shape of the racetrack menu.

[021] The manually-operable control may be a touch sensor having a touch-sensitive surface that is manually operable with a digit of a hand. The apparatus may further include the manually-operable control. Execution of the sequence of instructions by the processing device may further causes the processing device to cause a second marker to be visually displayed in the vicinity of the first marker at a time when the first marker is positioned within one of the racetrack menu and the submenu, and in response to an indication of the digit touching the touch-sensitive surface; and cause the second marker to be moved to a position relative to the first marker such that the position of the second marker relative to the first marker more precisely indicates the position where the digit is touching the touch-sensitive surface than does the position of the first marker in response to an indication of the digit moving about the touch-sensitive surface in a wiping motion.

[022] Execution of the sequence of instructions by the processing device may further cause the processing device to: in response to receiving an indication of the manually-operable control being operated to move the first marker, cause the first marker to be moved about the submenu menu and to be constrained to moving within the submenu; and in response to receiving an indication of the manually-operable control being operated to select a second menu item of the second plurality of menu items that is in the vicinity of the first marker, select the second menu item. The processing device may alter a configuration setting affecting how the audio/visual program may be played in response to receiving an indication of the manually-operable control being operated to select the second menu item. Execution of the sequence of instructions by the processing device may further cause the processing device to cause the first marker to be moved about the submenu in a manner in which the first marker snaps between being in the vicinity of one menu item of the second plurality of menu items and being in the vicinity of another menu item of the second plurality of menu items. The processing device may be further caused to operate an acoustic driver to acoustically output a sound at each instance of the first marker snapping between the vicinities of the one and the another menu items.

[023] Execution of the sequence of instructions by the processing device may further cause the processing device to cause a second marker to be displayed within at least the submenu and in the vicinity of the first menu item of the racetrack menu to indicate a location within the submenu to which the first marker may be moved within the submenu to enable the first marker to be moved back to the racetrack menu. The processing device may be further caused to cause the submenu to cease to be displayed and to cause the first marker to be moved to a position within the racetrack menu in response to receiving an indication of the manually-operable control being operated to select the second marker.

[024] In one aspect, a method includes visually displaying a racetrack menu having a ring shape on a display element that is capable of visually displaying both the racetrack menu and a visual portion of an audio/visual program such that the racetrack menu surrounds a first display area in which the visual portion of the audio/visual program may be visually displayed; visually displaying a first plurality of

menu items in the racetrack menu; visually displaying a first marker in the racetrack menu; in response to receiving an indication of a manually-operable control associated with the racetrack menu being operated to move the first marker, moving the first marker about the racetrack menu and constraining movement of the first marker to remain within the racetrack menu; and in response to receiving an indication of the manually-operable control being operated to select a first menu item of the first plurality of menu items that is in the vicinity of the first marker, selecting the first menu item. Selecting the first menu item includes visually displaying a submenu within the first display area, visually displaying a second plurality of menu items in the submenu, and visually displaying the first marker within the submenu.

[025] Implementations may include, and are not limited to, one or more of the following features. The method may include displaying the visual portion of the audio/visual program within the first display area, and displaying the submenu such that the submenu overlies the first display area. The racetrack menu and the submenu, together, may surround a second display area occupying a subset of the first display area, the method comprising displaying the visual portion of the audio/visual program within the second display area such that no portion of either the racetrack menu or the submenu overlie the visual portion of the audio/visual program. The submenu may have a spiral configuration having four sides that correspond to and are positioned adjacent to four sides of the ring shape of the racetrack menu, and having a fifth side that corresponds to and is positioned adjacent to one of the four sides of the submenu with that one of the four sides of the submenu being positioned between the fifth side and a portion of the racetrack menu. The method may further include ceasing to display the submenu and moving the first marker to a position within the racetrack menu in response to the passage of a predetermined period of time without receiving any indication of the manually-operable control being operated.

[026] The submenu may have a ring shape having four sides that correspond to four sides of the ring shape of the racetrack menu. Visually displaying the submenu within the first display area may include positioning the submenu relative to the racetrack menu such that the ring shape of the submenu is positioned concentrically within the ring shape of the racetrack menu.

[027] The method may further include: in response to receiving an indication of the manually-operable control being operated to move the first marker, moving the first marker about the submenu menu and constraining movement of the first marker to remain within the submenu; and in response to receiving an indication of the manually-operable control being operated to select a second menu item of the second plurality of menu items that is in the vicinity of the first marker, selecting the second menu item. The method may further include altering a configuration setting affecting how the audio/visual program may be played in response to receiving an indication of the manually-operable control being operated to select the second menu item. The method may further include moving the first marker about the submenu in a manner in which the first marker snaps between being in the vicinity of one menu item of the second plurality of menu items and being in the vicinity of another menu item of the second plurality of menu items.

[028] Displaying the submenu within the first display area may further include displaying a second marker within at least the submenu and in the vicinity of the first menu item of the racetrack menu to indicate a location within the submenu to which the first marker may be moved within the submenu to enable the first marker to be moved back to the racetrack menu. The method may further include ceasing to display the submenu and moving the first marker to a position within the racetrack menu in response to receiving an indication of the manually-operable control being operated to select the second marker.

[029] A user interface for an audio/visual device enables a user to customize the selection of menu items that are displayable on a menu, perhaps a racetrack menu, provided by the user interface to enable the user to operate the audio/visual device, in which a multitude of menu items that may be selected for being so displayed are visually displayed and the user is able to operate a first manually-operable control (or a first set of manually-operable controls) to select a menu item from among that multitude for being displayed on the menu. It may be that the menu is simultaneously displayed with the multitude of menu items to enable the user to immediately see the results of their selections. It may be that the user is able to again select that menu item within the multitude of menu items to cause that menu item to cease being displayed on the menu. It may be that a second manually-

operable control is provided to the user to enable the user to select another menu item already being displayed on the menu to cause that menu item to cease being displayed.

[030] In one aspect, an apparatus includes a display element capable of visually displaying a visual portion of an audio/visual program and a racetrack menu having a ring shape; a processing device; and a storage accessible to the processing device and storing a sequence of instructions. When executed by the processing device, the sequence of instructions causes the processing device to: cause a first plurality of menu items to be visually displayed within a first portion of the display element; cause a first marker to be visually displayed within the first portion of the display element; in response to receiving an indication of the first manually-operable control being operated to select a first menu item of the first plurality of menu items that is in the vicinity of the first marker, cause the first menu item to become displayable on the racetrack menu.

[031] Implementations may include, and are not limited to, one or more of the following features. Causing the first menu item to be displayable on the racetrack menu may include further causing the processing device to display the first menu item on the racetrack menu as one of a second plurality of menu items displayed on the racetrack menu at a time when the sequence of instructions further cause the processing device to cause the racetrack menu to be displayed on the display element. The processing device may be further caused by the sequence of instructions to display the racetrack menu within a second portion of the display element adjacent the first portion of the display element and simultaneously with the display of the first plurality of menu items within the first portion. Further, the second portion may surround the first portion, and the first plurality of menu items may be displayed within the first portion within the racetrack menu displayed within the second portion so as to surround the first plurality of menu items displayed within the first portion.

[032] The racetrack menu may have a geometric shape comprised of a plurality of sides comprising a first side and a second side; the processing device may be caused to display the first plurality of menu items divided among a plurality of scrollable columns of menu items comprising a first column and a second column;

the first column may correspond to the first side and the second column may correspond to the second side; the first menu item may be displayed within the first column; and in response to receiving an indication of the manually-operable control being operated to select the first menu item, the processing device may be further caused by the sequence of instructions to cause the first menu item to become displayable within the first side of the racetrack menu.

[033] The racetrack menu may have a geometric shape comprised of a plurality of sides comprising a first side, a second side and a third side; the processing device may be caused to display the first plurality of menu items divided among a plurality of scrollable columns of menu items comprising a first column and a second column; the first column may correspond to the first side; the second column may correspond to the second side and third side; the first menu item may be displayed within the second column; and in response to receiving an indication of the manually-operable control being operated to select the first menu item, the processing device may be further caused by the sequence of instructions to select to cause the first menu item to become displayable within the second side in response to there being a lesser quantity of menu items of the second plurality of menu items being caused to be displayed on the second side than the quantity of menu items of the second plurality of menu items being caused to be displayed on the third side so as to balance the quantities of menu items being displayed on the second and third sides.

[034] In another aspect a method includes visually displaying a first plurality of menu items within a first portion of a display element that is capable of visually displaying a visual portion of an audio/visual program and a user interface comprising a menu; visually displaying a first marker among the first plurality of menu items and positioned in the vicinity of one of the menu items of the first plurality of menu items; simultaneously with visually displaying the first plurality of menu items, visually displaying the menu within a second portion of the display element, where the second portion is adjacent the first portion; visually displaying a second plurality of menu items within the menu; visually displaying a second marker among the second plurality of menu items and positioned in the vicinity of one of the menu items of the second plurality of menu items; and in response to receiving an indication of the first manually-operable control being operated to select a first menu

item of the first plurality of menu items that is in the vicinity of the first marker, wherein the first menu item is not displayed on the menu, display the first menu item on the menu as part of the second plurality of menu items.

[035] Implementations may include, and are not limited to, one or more of the following features. In response to receiving an indication of the first manually-operable control again being operated to select the first menu item of the first plurality of menu items that is in the vicinity of the first marker, wherein the first menu item is displayed on the menu as one of the second plurality of menu items, perhaps removing the first menu item from being displayed on the menu as part of the second plurality of menu items.

[036] In response to receiving an indication of the second manually-operable control being operated to select a second menu item of the second plurality of menu items that is in the vicinity of the second marker, perhaps removing the second menu item from being displayed on the menu. Perhaps also displaying the second menu item within the first portion as one of the first plurality of menu items.

[037] Other features and advantages of the invention will be apparent from the description and claims that follow.

DESCRIPTION OF THE DRAWINGS

[038] Figure 1 is a perspective view of an embodiment of a user interface.

[039] Figure 2 depicts correlations between movement of a digit on a racetrack sensor of the user interface of Figure 1 and movement of a marker on a racetrack menu of the user interface of Figure 1.

[040] Figures 3a, 3b, 3c and 3d, together, depict possible variants of the user interface of Figure 1 incorporating different forms and combinations of markers.

[041] Figure 4 is a block diagram of a possible architecture of the user interface of Figure 1.

[042] Figure 5 is a perspective view of another embodiment of the user interface of Figure 1 combining more of the features of the user interface into a single device.

[043] Figure 6 depicts a possibility of switching between displaying and not displaying the racetrack menu of the user interface of Figure 1.

[044] Figures 7a and 7b, together, depict additional possible details of the user interface of Figure 1.

[045] Figure 8 is a perspective view of the embodiment of the user interface of Figure 5, additionally incorporating the possible details of Figures 7a and 7b.

[046] Figure 9 is a block diagram of the controller of the architecture of Figure 4.

[047] Figures 10a and 10b, together, depict possible variants of the touch sensor employed in the user interface of Figure 1.

[048] Figures 11a and 11b, together, depict possible variants of the user interface of Figure 1 incorporating more than one display area.

[049] Figure 12 depicts another embodiment of the user interface of Figure 1 in which the racetrack menu and the display area surrounded by the racetrack menu do not occupy substantially all of a display element.

[050] Figures 13a and 13b, together, depict additional possible details of the user interface of Figure 1.

[051] Figure 14 depicts a variant of the additional user interface details of Figures 13a-b.

[052] Figures 15a, 15b and 15c, together, depict additional possible details of the user interface of Figure 1.

DETAILED DESCRIPTION

[053] What is disclosed and what is claimed herein is intended to be applicable to a wide variety of audio/visual devices, i.e., devices that are structured to be employed by a user to play an audio/visual program. It should be noted that although various specific embodiments of audio/visual devices (e.g., televisions, set-top boxes and hand-held remotes) are presented with some degree of detail, such presentations of specific embodiments are intended to facilitate understanding through the use of examples, and should not be taken as limiting either the scope of disclosure or the scope of claim coverage.

[054] It is intended that what is disclosed and what is claimed herein is applicable to audio/visual devices that employ a tuner and/or a network interface to receive an audio/visual program. It is intended that what is disclosed and what is claimed herein is applicable to audio/visual devices structured to cooperate with other devices to play an audio/visual program and/or to cause an audio/visual program to be played. It is intended that what is disclosed and what is claimed herein is applicable to audio/visual devices that are wirelessly connected to other devices, that are connected to other devices through electrically and/or optically conductive cabling, or that are not connected to any other device, at all. It is intended that what is disclosed and what is claimed herein is applicable to audio/visual devices having physical configurations structured to be either portable or not. Still other configurations of audio/visual devices to which what is disclosed and what is claimed herein are applicable will be apparent to those skilled in the art.

[055] **Figure 1** depicts a user interface 1000 enabling a user's hand-eye coordination to be employed to more intuitively operate at least one audio/visual device to select and play an audio/visual program. The user interface 1000 incorporates a displayed "racetrack" menu 150 and a corresponding "racetrack" surface 250. As depicted, the user interface 1000 is implemented by an interoperable set of devices that include at least an audio/visual device 100 and a handheld remote control 200, and as will be explained in greater detail, may further include another audio/visual device 900. However, as will also be explained in greater detail, the user interface 1000 may be substantially fully implemented by a single audio/visual device, such as the audio/visual device 100.

[056] The racetrack menu 150 is visually displayed on a display element 120 disposed on a casing 110 of the audio/visual device 100, and as depicted, the audio/visual device 100 is a flat panel display device such as a television, employing a flat panel form of the display element 120 such as a liquid crystal display (LCD) element or a plasma display element. Further, the audio/visual device 100 may further incorporate acoustic drivers 130 to acoustically output sound. However, as those skilled in the art will readily recognize, the racetrack menu 150 may be displayed by any of a variety of types, configurations and sizes of audio/visual device, whether portable or stationary, including and not limited to, a projector or a handheld device.

[057] The racetrack surface 250 is defined on a touch-sensitive surface 225 of a touch sensor 220 disposed on a casing 210 of the handheld remote control 200, and as depicted, the touch-sensitive surface 225 has a rectangular ring shape that physically defines the shape and position of the racetrack surface 250 such that the racetrack surface 250 encompasses substantially all of the touch-sensitive surface of the touch sensor 220. However, as those skilled in the art will readily recognize, the touch sensor 220 may be incorporated into any of a wide variety of devices, whether portable or stationary, including and not limited to, a wall-mounted control panel or a keyboard. Further, it is also envisioned that the touch sensor 220 may have a variant of the touch-sensitive surface 225 (see **Figure 2**) that is of a shape other than a ring shape with the racetrack surface 250 defined on that variant of the touch-sensitive surface 225 in another way such that the racetrack surface 250 encompasses only a subset of that variant of the touch-sensitive surface 225 of the touch sensor 220. Further, the touch sensor 220 may be based on any of a variety of technologies.

[058] As depicted, both the racetrack menu 150 and the racetrack surface 250 have a ring shape that is a generally rectangular ring shape with corresponding sets of four sides. More specifically, the four sides 150a, 150b, 150c and 150d of the racetrack menu 150 are arranged to correspond to the four sides 250a, 250b, 250c and 250d of the racetrack surface 250. This four-sided nature of both of the racetrack menu 150 and the racetrack surface 250 are meant to accommodate the rectilinear nature of the vast majority of display elements currently found in

audio/visual devices and the rectilinear nature of the visual portion of the vast majority of currently existing audio/visual programs that have a visual portion. However, it is important to note that although the racetrack menu 150 and the racetrack surface 250 are depicted and discussed herein as having a rectangular ring shape, other embodiments are possible in which the ring shape adopted by the racetrack surface 250 has a circular ring shape, an oval ring shape, a hexagonal ring shape or still other geometric variants of a ring shape. Further, where the racetrack menu 150 and/or the racetrack surface 250 have a ring shape that is other than a rectangular ring shape, one or both of the display element 120 and the touch sensor 220 may have a shape other than the rectangular shapes depicted herein.

[059] As will be explained in greater detail, the four sides 150a-d of the racetrack menu 150 surround or overlie the edges of a display area 950 in which the visual portion of an audio/visual program selected via the user interface 1000 may be played. It is this positioning of the racetrack menu 150 about the periphery of the display element 120 and the display area 950 (whether surrounding or overlying the periphery of the display area 950) that supplies the impetus for both the racetrack menu 150 and the racetrack surface 250 having a ring shape that is generally a rectangular ring shape, rather than a ring shape of some other geometry. Where a selected audio/visual program does not have a visual portion (e.g., the audio/visual program is an audio recording having only an audio portion), the display area 950 may remain blank (e.g., display only a black or blue background color) or display status information concerning the playing of the selected audio/visual program as the selected audio/visual program is played, perhaps with the audio portion being acoustically output by the acoustic drivers 130. As depicted, the four sides 150a-d of the racetrack menu 150 are displayed by the display element 120 at the edges of the display element 120. However, it is also envisioned that the four sides 150a-d of the racetrack menu 150 may be positioned about the edges of a "window" of a graphical user interface of the type commonly employed in the operation of typical computer systems, perhaps where the audio/visual device 100 is a computer system on which audio/visual programs are selected and played through the user interface 1000.

[060] As shown in Figure 2, at various positions along one or more of the four sides 150a-d of the racetrack menu 150 are menu items 155 that may be selected by

a user of the user interface 1000. The menu items 155 may include alphanumeric characters (such as those depicted as positioned along the side 150a) that may be selected to specify a channel or a website from which to select and/or receive an audio/visual program, symbols (such as those depicted as positioned along the side 150b) representing commands to control the operation of an audio/visual device capable of playing an audio/visual program (e.g., "play" and "stop" commands for a video cassette recorder, a disc media player, or solid state digital file player, etc.), and indicators of inputs (such as those depicted as positioned along the side 150c) to an audio/visual device that may be selected and through which an audio/visual program may be selected and/or received. Although the various menu items 155 positioned along the racetrack menu 150 could conceivably serve any of a wide variety of purposes, it is envisioned that much of the functionality of the menu items 155 will be related to enabling a user to select an audio/visual program for playing, and/or to actually play an audio/visual program.

[061] To operate the user interface 1000, a user places the tip of a digit of one of their hands (i.e., the tip of a thumb or finger) on a portion of the racetrack surface 250 defined on the touch-sensitive surface 225 of the touch sensor 220, and a marker 160 is displayed on a portion of the racetrack menu 150 that has a position on the racetrack menu 150 that corresponds to the position 260 on the racetrack surface 250 at which the tip of their digit is in contact with the touch-sensitive surface 225 of the touch sensor 220. Figure 2 also depicts how the marker 160 moves about and is constrained to moving about the racetrack menu 150 to maintain a correspondence between its location on the racetrack menu 150 and the position 260 of the digit on the racetrack surface 250 as the user moves that digit about the racetrack surface 250. In some embodiments, the marker 160 may move about the racetrack menu 150 in a manner in which the marker 160 "snaps" from being centered about one menu item 155 to an adjacent menu item 155 as the marker 160 is moved about a portion of the racetrack menu 150 having adjacent ones of the menu items 155. Further, such "snapping" of the marker 160 between adjacent ones of the menu items 155 may be accompanied by the concurrent acoustic output of some form of sound (e.g., a "click" or "beep" sound that accompanies each "snap" of the marker 160) to provide further feedback to a user of the marker 160 moving from one such menu item 155 to another.

[062] When the marker 160 is positioned over a menu item 155 that the user wishes to select, the user selects that menu item 155 by pressing whichever one of their digits that is already in contact with the racetrack surface 250 with greater pressure than was used in simply placing that digit in contact with the racetrack surface 250. In some embodiments, the touch sensor 220, itself, is capable of distinguishing different degrees of pressure with which the digit is put into contact with the touch-sensitive surface 225 of the touch sensor 220 on which the racetrack surface 250 is defined in order to distinguish an instance in which the user is pressing harder with that digit to select one of the menu items 155. In other embodiments, the touch sensor 220 is able to function in a manner not unlike a mechanically depressible button in which the additional pressure applied through that digit by the user causes the touch sensor 220 to be pressed inward towards the casing 210 as part of selecting a menu item. This may be accomplished by overlying one or more buttons disposed within the casing 210 with the touch sensor 220 so that such buttons are depressed by the touch sensor 220 as the touch sensor 220 is itself depressed towards the casing 210. Where the touch sensor 220 is able to be pressed inward towards the casing 210, such inward movement may be accompanied by a "click" sound that may be heard by the user and/or a tactile "snap" sensation that can be sensed by the user through their digit to give the user some degree of positive feedback that they've successfully selected one of the menu items 155. Regardless of whether the touch sensor 220 is able to be pressed inward towards the casing 210, or not, a "click" or other sound accompanying the user's use of increased pressure on the racetrack surface 250 to select one of the menu items 155 may be acoustically output through an acoustic driver (not shown) incorporated into the remote control 200 and/or through the acoustic drivers 130 of the audio/visual device 100.

[063] **Figures 3a, 3b, 3c and 3d** depict other variations of forms of marker and combinations of markers. As will be made clear, different forms of marker and combinations of multiple markers may be used to enhance the rapidity with which the eyes of a user of the user interface 1000 is drawn to a specific location on the racetrack menu 150, and to aid the hand-eye coordination of that user.

[064] Although the marker 160 was depicted in Figure 2 as taking the form of a box-shaped graphical element sized to surround one of the menu items 155 at a time when positioned in the vicinity of one or more of the menu items 155, Figure 3a depicts another variant of the marker 160 having the form of a triangular pointer. Still other possible graphical representations of the marker 160 will occur to those skilled in the art, such as forms of the marker 160 having other geometric shapes (e.g., a dot, a circle, an arrow, etc.) or other ways of being positioned in the vicinity of a given one of the menu items 155 (e.g., overlying, surrounding, pointing to, touching, etc., one of the menu items 155). Still further, instead of the marker 160 being a graphical element that is separate and distinct from any of the menu items 155, the marker 160 may instead be a modified form of a given one of the menu items 155, such as a change in a color of a menu item, an enlargement of a menu item in comparison to others, or some form of recurring animation or movement imparted to a menu item. In other words, the position of the marker 160 (and by extension, the position 260 of the tip of a digit on the racetrack surface 250) may be indicated by one of the menu items 155 changing color, changing font, becoming larger, becoming brighter, or being visually altered in comparison to the others of the menu items 155 in any of a number of ways to draw a user's eyes to it.

[065] Figure 3a also depicts an optional additional marker 165 that follows the location of the marker 160 and provides a visual "highlight" of which one of the four sides 150a-d the marker 160 is currently positioned within as a visual aid to enable a user's eyes to be more quickly directed to that one of the four sides 150a-d when looking at the racetrack menu 150. Though not specifically depicted, in other embodiments, the additional marker 165 may be implemented as a highlighting, change in color, change in background color, change in font, enlargement or other visual alteration made to all of the menu items 155 that are positioned in that one of the four sides 150a-d.

[066] Figure 3b depicts the manner in which the marker 160 may be dynamically resized as it is moved about the racetrack menu 150, especially in embodiments where the marker 160 is of a form that in some way overlaps or surrounds one of the menu items 155 at a time in order to take into account the different sizes of different ones of the menu items 155. More specifically, and as depicted in Figure 3b, the

numeral "3" has visibly smaller dimensions (i.e., occupies less space in the racetrack menu 150) than does the numeral "III" that is also present on the same racetrack menu 150. Thus, when the depicted form of the marker 160 (i.e., the "box" form of the marker 160 that has been discussed at length) is positioned on one or the other of these two particular ones of the menu items 155, the marker 160 is resized to be larger or smaller as needed to take into account the different sizes of these two particular ones of the menu items 155.

[067] Figure 3c also depicts an optional additional marker 162 that follows the location of the marker 160 and provides a more precise visual indication than does the marker 160 of the position 260 of the tip of a user's digit along a corresponding portion of the racetrack surface 250. As depicted, the marker 162 takes the form of what might be called a "dash" positioned along one of the edges of the box form of the marker 160. However, it should be noted that the marker 162 may take any of a variety of forms (e.g., a dot, a circle, an arrow, etc.). The provision of the marker 162 may be deemed desirable in embodiments where the marker 160 moves in the manner previously described in which the marker 160 "snaps" between adjacent ones of the menu items 155 such that the marker 160 does not, itself, provide as precise an indication of the position 260 of the tip of the user's digit. More specifically, Figure 3c depicts a succession of views of a portion of the racetrack menu 150 on which menu items 155 taking the form of the numerals "1" through "5" are positioned. As can be seen in this depicted succession, the marker 162 provides a more precise indication of the movement of the position 260 of the tip of the user's digit along a portion of the racetrack surface 250 from left to right than does the marker 160 which remains on the one of the menu items 155 having the form of the numeral "2" on this portion of the racetrack menu 150. Such a higher precision indication of the position 260 of the tip of the user's digit may aid the user in improving their hand-eye coordination in operating the user interface 1000. Such a higher precision indication of the position 260 may also provide a user with some degree of reassurance that the user interface 1000 is responding to their actions (or more specifically, whatever processing device is incorporated into the user interface 1000 is responding to their actions) by seeing that the exact position 260 of the tip of their digit is being successfully detected.

[068] Figure 3d depicts yet another alternate variation of the marker 160 in a variant of the user interface 1000 in which the racetrack menu 150 is divided into multiple segments, with each such segment serving as a background to one of the menu items 155. As depicted, the marker 160 is implemented as both a change in the color and/or brightness of one of those segments of the racetrack menu 150 and an enlarging of the graphical element representing the one of the menu items 155 (specifically, the numeral "3") positioned within that segment. As so depicted, the marker 160 might be said to have a form that is a variant of the earlier-depicted box, but a box that is made visible by having a color and/or brightness that differs from the rest of the racetrack menu 150, rather than a box that is made visible by a border or outline. Figure 3d also depicts this alternate variation of the marker 160 being used in combination with the earlier-described additional marker 162 that provides a more precise indication of the position 260 of the tip of a user's digit along a portion of the racetrack surface 250.

[069] Figure 3d also depicts how this variant of the marker 160 is resized to accommodate the different sizes of the different ones of the menu items 155, although this resizing now corresponds to the differing dimensions of different ones of the segments into which the racetrack menu 150 is divided. In some variants, each of the segments may be individually sized to fit the visual size and shape of its corresponding one of the menu items 155, as depicted in Figure 3d. Thus, since the numeral "3" of one of the menu items 155 is smaller in at least one dimension than the numeral "III" of another one of the menu items 155 (even with the numeral "3" being enlarged in font size), the segment of the racetrack menu 150 in which the numeral "3" is positioned is smaller than the segment in which the numeral "III" is positioned. However, in other variants, the segments filling at least one of the four sides 150a-d may all be sized based on the quantity of the menu items 155 positioned in that one of the four sides so as to divide that one of the four sides 150a-d into equal-sized segments. Where the ones of the menu items 155 along that one of the four sides 150a-d may change in response to a selection of an input or for other reasons, the size of the segments in that one of the four sides 150a-d may change in response to a change in quantity of the menu items 155 positioned in that one of the four sides 150a-d. Thus, for example, a reduction in the quantity of menu items 155 in that one of the four sides 150a-d results in each of its segments

becoming larger in at least one dimension, and an increase in the quantity of menu items 155 results in that one of the four sides 150a-d results in each of its segments becoming smaller.

[070] **Figure 4** is a block diagram of a possible architecture of the user interface 1000 by which a controller 500 receives input through a user's use of at least the racetrack surface 250 defined on at least a portion of a touch-sensitive surface 225 of the touch sensor 220 to which the controller 500 is coupled, and provides at least the racetrack menu 150 as a visual output to the user through at least the display element 120 to which the controller 500 is also coupled. In various possible embodiments, the controller 500 may be incorporated directly into the audio/visual device 100, or into another audio/visual device 900 coupled to the audio/visual device 100 and shown in dotted lines in Figure 1. As also depicted in Figure 1, the remote control 200 communicates wirelessly through the emission of radio frequency, infrared or other wireless emissions to whichever one of the audio/visual devices 100 and 900 incorporates the controller 500. However, as those skilled in the art will readily recognize, the remote control 200 may communicate through an electrically and/or optically conductive cable (not shown) in other possible embodiments. Alternatively and/or additionally, the remote control 200 may communicate through a combination of wireless and cable-based (optical or electrical) connections forming a network between the remote control 200 and the controller 500.

[071] Still other embodiments may incorporate the touch sensor 220 directly on a user accessible portion of one or both of the audio/visual devices 100 and 900, either in addition to or as an alternative to providing the touch sensor 220 on the remote control 200. Indeed, Figure 5 depicts an alternate variant of the audio/visual device 100 having more of a portable configuration incorporating both the display element 120 displaying the racetrack menu 150 and the touch sensor 220 with the touch-sensitive surface 225 on which the racetrack surface 250 is defined. This alternative variant of the audio/visual device 100 may also incorporate the controller 500, such that much (if not substantially all) of the user interface 1000 is implemented solely by the audio/visual device 100.

[072] Returning to Figure 4, regardless of which audio/visual device incorporates the controller 500, the controller 500 incorporates multiple interfaces in the form of one or more connectors and/or one or more wireless transceivers by which the controller 500 is able to be coupled to one or more sources 901, 902, 903 and/or 904. Any such connectors may be disposed on the casing of whatever audio/visual device the controller 500 is incorporated into (e.g., the casing 110 of the audio/visual device 100 or a casing of the audio/visual device 900). In being so coupled, the controller 500 is able to transmit commands to one or more of the sources 901-904 to access and select audio/visual programs, and is able to receive audio/visual programs therefrom. Each of the sources 901-904 may be any of a variety of types of audio/visual device, including and not limited to, RF tuners (e.g., cable television or satellite dish tuners), disc media recorders and/or players, tape media recorders and/or players, solid-state or disk-based digital file players (e.g., a MP3 file player), Internet access devices to access streaming data of audio/visual programs, or docking cradles for portable audio/visual devices (e.g., a digital camera). Further, in some embodiments, one or more of the sources 901-904 may be incorporated into the same audio/visual device into which the controller 500 is incorporated (e.g., a built-in disc media player or built-in radio frequency tuner).

[073] In embodiments where one of the sources 901-904 is not incorporated into the same audio/visual device as the controller 500, and where that one of the sources 901-904 is coupled to the controller 500 via an interface of the controller 500 employing a connector, any of a variety of types of electrical and/or optical signaling conveyed via electrically and/or optically conductive cabling may be employed. Preferably, a single cable is employed both in relaying commands from the controller 500 to that one of the sources 901-904 and in relaying audio/visual programs to the controller 500. However, combinations of cabling in which different cables separately perform these functions are also possible. Some of the possible forms of cabling able to relay both commands and audio/visual programs may conform to one or more industry standards, including and not limited to, Syndicat des Constructeurs d'Appareils Radiorecepteurs et Televiseurs (SCART) promulgated in the U.S. by the Electronic Industries Alliance (EIA) of Arlington, VA; Ethernet (IEEE-802.3) or IEEE-1394 promulgated by the Institute of Electrical and Electronics Engineers (IEEE) of Washington, DC; Universal Serial Bus (USB) promulgated by the USB Implementers

Forum, Inc. of Portland, OR; Digital Visual Interface (DVI) promulgated by the Digital Display Working Group (DDWG) of Vancouver, WA; High-Definition Multimedia Interface (HDMI) promulgated by HDMI Licensing, LLC of Sunnyvale, CA; or DisplayPort promulgated by the Video Electronics Standards Association (VESA) of Milpitas, CA. Other possible forms of cabling able to relay only one or the other of commands and audio/visual programs may conform to one or more industry standards, including and not limited to, RS-422 or RS-232-C promulgated by the EIA; Video Graphics Array (VGA) maintained by VESA; RC-5720C (more commonly called "Toslink") maintained by the Japan Electronics and Information Technology Industries Association (JEITA) of Tokyo, Japan; the widely known and used Separate Video (S-Video); or S-Link maintained by Sony Corporation of Tokyo, Japan.

[074] In other embodiments where one of the sources 901-904 is not incorporated into the same audio/visual device as the controller 500, and where that one of the sources 901-904 is coupled to the controller 500 via a wireless transceiver, any of a variety of types of infrared, radio frequency or other wireless signaling may be employed. Preferably, a single wireless point-to-point coupling is employed both in relaying commands from the controller 500 to that one of the sources 901-904 and in relaying audio/visual programs to the controller 500. However, combinations of separate wireless couplings in which these functions are separately performed are also possible. Some of the possible forms of wireless signaling able to relay both commands and audio/visual programs may conform to one or more industry standards, including and not limited to, IEEE 802.11a, 802.11b or 802.11g promulgated by the IEEE; Bluetooth promulgated by the Bluetooth Special Interest Group of Bellevue, WA; or ZigBee promulgated by the ZigBee Alliance of San Ramon, CA.

[075] In still other embodiments where one of the sources 901-904 is not incorporated into the same audio/visual device as the controller 500, a combination of cabling-based and wireless couplings may be used. An example of such a combination may be the use of a cabling-based coupling to enable the controller 500 to receive an audio/visual program from that one of the sources 901-904, while an infrared transmitter coupled to the controller 500 may be positioned at or near the one of the sources 901-904 to wirelessly transmit commands via infrared to that one

of the sources 901-904. Still further, although Figure 4 depicts each of the sources 901-904 as being directly coupled to the controller 500 in a point-to-point manner, those skilled in the art will readily recognize that one or more of the sources 901-904 may be coupled to the controller 500 indirectly through one or more of the others of the sources 901-904, or through a network formed among the sources 901-904 (and possibly incorporating routers, bridges and other relaying devices that will be familiar to those skilled in the art) with multiple cabling-based and/or wireless couplings.

[076] Some of the above-listed industry standards include specifications of commands that may be transmitted between audio/visual devices to control access to and/or control the playing of audio/visual programs, including most notably, SCART, IEEE-1394, USB, HDMI, and Bluetooth. Where such an industry standard for coupling the controller 500 to one or more of the sources 901-904 is employed, the controller 500 may limit the commands transmitted to one or more of the sources 901-904 to the commands specified by that industry standard and map one or more of those commands to corresponding ones of the menu items 155 such that a user is able to cause the controller 500 to send those commands to one or more of the sources 901-904 by selecting those corresponding ones of the menu items 155. However, where the benefit of such a standardized command set is unavailable, the controller 500 may employ any of a wide variety of approaches to identify one or more of the sources 901-904 to an extent necessary to "learn" what commands are appropriate to transmit and the manner in which they must be transmitted.

[077] A user of the user interface 1000 may select one of the sources 901-904 as part of selecting an audio/visual program for being played by employing the racetrack surface 250 and the marker 160 to select one or more of the menu items 155 shown on the racetrack menu 150, such as the "I" through "IV" menu items 155 depicted as displayed by the controller 500 on the side 150c of the racetrack menu 150. Those menu items 155 depicted on the side 150c correspond to the sources 901 through 904, which are depicted as bearing the labels "source I" through "source IV" in Figure 4. The controller 500 receives input from the touch sensor 220 indicating the contact of the user's digit with a portion of the racetrack surface 250, indicating movement of the position 260 of contact of the digit about the racetrack surface 250, and indicating the application of greater pressure by the user through

that digit against the touch sensor 220 at the position 260 (wherever the position 260 is at that moment) when selecting one of the menu items 155. The selection of one of the sources 901-904 by the user causes the controller 500 to switch to receiving audio/visual programs from that one of the sources 901-904, and to be ready to display any visual portion in the display area 950 and acoustically output any audio portion through the acoustic drivers 130 (or whatever other acoustic drivers may be present and employed for playing audio/visual programs).

[078] The selection of one of the sources 901-904 may further cause the controller 500 to alter the quantity and types of menu items 155 displayed on one or more of the sides 150a-d of the racetrack menu 150 such that the displayed menu items 155 more closely correspond to the functions supported by whichever one of the sources 901-904 that has been selected. This changing display of at least a subset of the menu items 155 enables the user to operate at least some functions of a selected one of the sources 901-904 by selecting one or more of the menu items 155 to thereby cause the controller 500 to transmit one or more commands corresponding to those menu items to the selected one of the sources 901-904. By way of example, where the one of the sources 901-904 with the ability to record an audio/visual program was previously selected, the racetrack menu 150 may include one or more menu items 155 that could be selected to cause the controller 500 to transmit a command to that previously selected one of the sources 901-904 to cause it to start recording an audio/visual program. However, if the user then selects another one of the sources 901-904 that does not have the ability to record an audio/visual program, then the controller 500 would alter the menu items 155 displayed on the racetrack menu 150 to remove one or more menu items associated with recording an audio/visual program. In this way, at least a subset of the menu items 155 displayed on the racetrack menu 150 are "modal" in nature, insofar as at least that subset changes with the selection of different ones of the sources 901-904.

[079] The coupling and/or uncoupling of one or more of the sources 901-904 to and/or from whatever audio/visual device into which the controller 500 is incorporated may also cause the controller 500 to alter the quantity and/or types of menu items 155 that are displayed in another example of at least a subset of the menu items 155 being modal in nature. By way of example, the uncoupling of one of

the sources 901-904 where that one of the sources 901-904 had been coupled through cabling may cause the controller 500 to remove the one of the menu items 155 by which that now uncoupled one of the sources 901-904 could be selected. Alternatively and/or additionally, where that uncoupled one of the sources 901-904 was already selected at the time of such uncoupling such that a subset of the menu items 155 is displayed that is meant to correspond to the functions able to be performed by that now uncoupled one of the sources 901-904, the controller 500 may respond to such an uncoupling by autonomously selecting one of the other of the sources 901-904 and altering the subset of the menu items 155 to correspond to the functions able to be performed by that newly selected one of the sources 901-904. In contrast, and by way of another example, the uncoupling of one of the sources 901-904 where that one of the sources 901-904 had been wirelessly coupled may or may not cause the controller 500 to remove the one of the menu items 155 by which that now uncoupled one of the sources 901-904 could be selected. If there is a mechanism provided in the chosen form of wireless communications used in the coupling that indicates that the uncoupling is due simply to that one of the sources 901-904 entering into a low-power or "sleep" mode, then it may be that no change is made by the controller 500 to the menu items 155 that are displayed, especially if the form of wireless communications used allows the controller 500 to signal that one of the sources 901-904 to "wake up" in response to the user selecting one of the menu items 155 that is associated with it. However, if no such mechanism to indicate the circumstances of an uncoupling are available, then the uncoupling may well result in an alteration or removal of at least some of the menu items 155 displayed on the racetrack menu 150. Where a previously uncoupled one of the sources 901-904 is subsequently coupled, once again, regardless of the type of coupling, the controller 500 may be caused to automatically select that now coupled one of the sources 901-904. This may be done based on an assumption that the user has coupled that source to whatever audio/visual device into which the controller 500 is incorporated with the intention of immediately playing an audio/visual program from it.

[080] While at least some of the menu items 155 may be modal in nature such that they are apt to change depending on the selection and/or condition of one or more of the sources 901-904, others of the menu items 155 may not be modal in

nature such that they are always displayed whenever the racetrack menu 150 is displayed. More specifically, where one or more of the sources 901-904 are incorporated into the same audio/visual device as the controller 500, the ones of the menu items 155 associated with those sources may remain displayed in the racetrack menu 150, regardless of the occurrences of many possible events that may cause other menu items 155 having a modal nature to be displayed, to not be displayed, or to be displayed in some altered form. By way of example, where a radio frequency tuner is incorporated into the same audio/visual device into which the controller 500 is incorporated, then a subset of the menu items 155 associated with selecting a radio frequency channel (e.g., the decimal point and numerals "0" through "9" depicted as displayed within the side 150a) may be a subset of the menu items 155 that is always displayed in the racetrack menu 150. It may be that the selection of any menu item of such a subset of the menu items 155 may cause the controller 500 to automatically switch the selection of a source of audio/visual programs to the source associated with those menu items 155. Thus, in the example where an audio/visual device incorporates a radio frequency tuner and menu items 155 associated with selecting a radio frequency channel are always displayed, the selection of any one of those menu items would cause the controller 500 to automatically switch to that radio frequency tuner as the source from which to receive an audio/visual program if that tuner were not already selected as the source. By way of another example, one or more of the menu items 155 associated with selecting a source of audio/visual programs (e.g., the roman numerals "I" through "IV" depicted as displayed within the side 150c) may be menu items that are always displayed in the racetrack menu 150.

[081] Regardless of what source is selected or how the source is selected, if an audio/visual program received by the controller 500 from that source has a visual portion, then the controller 500 causes that visual portion to be displayed in the display area 950. As has so far been depicted and described, the racetrack menu 150 has a rectilinear configuration with the four sides 150a-d that are configured to surround or overlie edges of the display area 950. However, in some embodiments, it may be that the racetrack menu 150 is not always displayed such that what is shown on the display element 120 of the audio/visual device 100 could be either the

display area 950 surrounded by the racetrack menu 150, or the display area 950 expanded to fill the area otherwise occupied by the racetrack menu 150.

[082] As depicted in **Figure 6**, what is shown on the display element 120 could toggle between these two possibilities, and this toggling could occur in response to observed activity and/or a lack of observed activity in the operation of at least the racetrack surface 250. More specifically, on occasions where no indication of contact by a user's digit on the racetrack surface 250 has been received by the controller 500 for at least a predetermined period of time, the controller 500 may provide the display element 120 with an image that includes substantially nothing else but the display area 950 such that a visual portion of an audio visual program is substantially the only thing shown on the display element 120. However, once the controller 500 has received an indication of activity such as the tip of a digit making contact with racetrack surface 250, the controller 500 then provides the display element 120 with an image that includes a combination of the display area 950 and the racetrack menu 150.

[083] In some embodiments, at a time when both the display area 950 and the racetrack menu 150 are displayed, the controller 500 reduces the size of the display area 950 to make room around the edges of the display area 950 for the display of the racetrack menu 150 on the display element 120, and in so doing, may rescale the visual portion (if there is one) of whatever audio/visual program may be playing at that time. In other embodiments, the display area 950 is not resized, and instead, the racetrack menu 150 is displayed in a manner in which the racetrack menu 150 overlies edge portions of the display area 950 such that edge portions of any visual portion of an audio/visual program are no longer visible. However, in those embodiments in which the racetrack menu overlies edge portions of the display area 950, the racetrack menu 150 may be displayed in a manner in which at least some portions of the racetrack menu have a somewhat "transparent" quality in which the overlain edge portions of any visual portion of an audio/visual program can still be seen by the user "looking through" the racetrack menu 150. As will be familiar to those skilled in the art, this "transparent" quality may be achieved through any of a number of possible approaches to combining the pixels of the image of the racetrack menu 150 with pixels of the overlain portion of any visual portion of an audio/visual

program (e.g., by averaging pixel color values, alternately interspersing pixels, or bit-wise binary combining of pixels with a pixel mask).

[084] Along with combining the visual display of the display area 950 and the racetrack menu 150, the controller 500 may also combine audio associated with operation of the user interface 1000 with an audio portion (if present) of an audio/visual program being played. More specifically, "click" sounds associated with the user pressing the racetrack surface 250 defined on a surface of the touch sensor 220 with greater pressure and/or with the "snapping" of the marker 160 between adjacent ones of the menu items 155 may be combined with whatever audio portion is acoustically output as part of the playing of an audio/visual program.

[085] In some embodiments, at a time when the racetrack menu 150 is not displayed (e.g., at a time when only the display area 950 is displayed), the controller 500 may do more than simply cause the racetrack menu 150 to be displayed in response to a user touching a portion of the racetrack sensor 250. More specifically, in addition to causing the racetrack menu 150 to be displayed, the controller 500 may take particular actions in response to particular ones of the sides 250a-d of the racetrack surface 250 being touched by a user at a time when the racetrack menu 150 is not being displayed. By way of example, at a time when the racetrack menu 150 is not being displayed, the detection of a touch to the side 250d may cause a command to be sent to one of the sources 901-904 to provide an on-screen guide concerning audio/visual programs able to be provided by that source, where such a guide would be displayed in the display area 950, with edges of the display area 950 being either surrounded or overlain by the racetrack menu 150 as has been previously described.

[086] In a variation of such embodiments, it may be that causing the racetrack menu 150 to be displayed requires both a touch and some minimum degree of movement of the tip of a user's digit on the racetrack surface 250 (i.e., a kind of "touch-and-drag" or "wiping" motion across a portion of the racetrack surface 250), while other particular actions are taken in response to where there is only a touch of a tip of a user's digit on particular ones of the sides 250a-d of the racetrack sensor 250. By way of example, while the racetrack menu 150 is not displayed, touching the side 250a may cause a command to be sent to a source to turn that source on or

off, and touching the side 250b may cause an audio portion of an audio/visual program to be muted, while both touching and moving a digit across a portion of the racetrack surface 250 in a "wiping" motion is required to enable the display and use of the racetrack menu 150.

[087] Figures 7a and 7b, taken together, depict additional features that may be incorporated into the user interface 1000. Where a selected one of the sources 901-904 displays its own on-screen menu 170 (e.g., a guide concerning audio/visual programs available from that source), either in place of a visual portion of an audio/visual program or overlying a visual portion of an audio/visual program, some embodiments of the user interface 1000 may be augmented to support at least partly integrating the manner in which a user would navigate such an on-screen menu 170 into the user interface 1000. In such embodiments, the touch sensor 220, with its ring shape (whether that ring shape is a rectangular ring shape, or a ring shape of a different geometry), may be configured to surround a set of controls for use in navigating the on-screen menu 170 just as the racetrack menu 150 surrounds the on-screen menu 170, itself.

[088] In particular, Figure 7b depicts the manner in which the touch sensor 220 disposed on the casing 210 of the remote control 200 of Figure 1 may surround navigation buttons 270a, 270b, 270c and 270d, as well as a selection button 280, that are also disposed on the casing 210. In alternate variants, other forms of one or more manually-operable controls may be surrounded by the touch sensor 220, in addition to or in place of the navigation buttons 270a-d and the selection button 280, including and not limited to, a joystick, or a four-way rocker switch that may either surround a selection button (such as the selection button 280) or be useable as a selection button by being pressed in the middle. As a result of the ring shape of the touch sensor 220 being employed to surround the navigation buttons 270a-d and the selection buttons 280, a nested arrangement of concentrically located manually operable controls is created. Figure 7a depicts a form of possible on-screen menu that will be familiar to those skilled in the art, including various menu items 175 that may be selected via the selection button 280, and a marker 180 that may be moved by a user among the menu items 175 via the navigation buttons 270a-d. The concentrically nested arrangement of manually-operable controls surrounded by the

racetrack surface 250 defined on the touch-sensitive surface 225 of the touch sensor 220 that is disposed on the casing 210 of the remote control 200 corresponds to the similarly nested arrangement of the on-screen menu 170 surrounded by the racetrack menu 150 that is displayed on the display element 120.

[089] Figure 7b also depicts additional controls 222, 224, 226 and 228 that may be employed to perform particular functions where it may be deemed desirable to provide at least some degree of functionality in a manner that does not require the selection of menu items to operate. In one possible variant, the controls 222, 224, 226 and 228 are operable as a power button, a mute button, volume rocker switch and a channel increment/decrement rocker switch, respectively. **Figure 8** depicts a variant of the handheld form of the audio/visual device 100 depicted in Figure 5 in which the touch sensor 220 is positioned so as to surround the navigation buttons 270a-d and the selection button 280, and in which this variant of the handheld form of the audio/visual device 100 may further incorporate the controls 222, 224, 226 and 228.

[090] **Figure 9** is a block diagram of a possible architecture of the controller 500 in which the controller 500 incorporates an output interface 510, a sensor interface 520, a storage 540, a processing device 550 and a source interface 590. The processing device 550 is coupled to each of the output interface 510, the sensor interface 520, the storage 540 and the source interface 590 to at least coordinate the operation of each to perform at least the above-described functions of the controller 500.

[091] The processing device 550 may be any of a variety of types of processing device based on any of a variety of technologies, including and not limited to, a general purpose central processing unit (CPU), a digital signal processor (DSP), a microcontroller, or a sequencer. The storage 540 may be based on any of a variety of data storage technologies, including and not limited to, any of a wide variety of types of volatile and nonvolatile solid-state memory, magnetic media storage, and/or optical media storage. It should be noted that although the storage 540 is depicted in a manner that is suggestive of it being a single storage device, the storage 540 may be made up of multiple storage devices, each of which may be based on different technologies.

[092] Each of the output interface 510, the sensor interface 520 and the source interface 590 may employ any of a variety of technologies to enable the controller 500 to communicate with other devices and/or other components of whatever audio/visual device into which the controller 500 is incorporated. More specifically, where the controller 500 is incorporated into an audio/visual device that also incorporates one or both of a display element (such as the display element 120) and at least one acoustic driver (such as the acoustic drivers 130), the output interface 510 may be of a type able to directly drive a display element with signals causing the display of the racetrack menu 150 and the display area 950 to display visual portions of audio/visual programs, and/or able to directly drive one or more acoustic drivers to acoustically output audio portions of audio/visual programs. Alternatively, where one or both of a display element and acoustic drivers are not incorporated into the same audio/visual device into which the controller 500 is incorporated, the output interface 510 may be of a type employing cabling-based and/or a wireless signaling (perhaps signaling conforming to one of the previously listed industry standards) to transmit a signal to another audio/visual device into which a display element and/or acoustic drivers are incorporated (e.g., the audio/visual device 100).

[093] Similarly, where the controller 500 is incorporated into an audio/visual device into which the touch sensor 220 is also incorporated, the sensor interface 520 may be of a type able to directly receive electrical signals emanating from the touch sensor 220. With such a more direct coupling, the sensor interface 520 may directly monitor a two-dimensional array of touch-sensitive points of the touch-sensitive surface 225 of the touch sensor 220 for indications of which touch-sensitive points are being touched by a tip of a user's digit, and thereby enable the processing device 550 to employ those indications to directly determine where the touch-sensitive surface 225 is being touched. Thus, a determination of whether or not the tip of the digit is touching a portion of the racetrack surface 250 and/or the position 260 by the processing device 550 may be enabled. However, where the controller 500 is incorporated into a device into which the touch sensor 220 is not also incorporated (e.g., the controller 500 is incorporated into the audio/visual device 100 and the touch sensor is incorporated into the remote control 200), the sensor interface 520 may be of a type able to receive cabling-based and/or wireless signaling transmitted by that other device (e.g., infrared signals emitted by the remote control 200). With

such a more remote coupling, circuitry (not shown) that is co-located with the touch sensor 220 may perform the task of directly monitoring a two-dimensional array of touch-sensitive points of the touch-sensitive surface 225, and then transmit indications of which touch-sensitive points are being touched by the tip of a user's digit to the sensor interface 520.

[094] Although it is possible that the audio/visual device into which the controller 500 is incorporated may not incorporate any sources (such as the sources 901-904) from which the controller 500 receives audio/visual programs, it is deemed more likely that the audio/visual device into which the controller 500 is incorporated will incorporate one or more of such sources in addition to being capable of receiving audio/visual programs from sources not incorporated into the same audio/visual device. By way of example, it is envisioned that the controller 500 may be incorporated into an audio/visual device into which a radio frequency tuner and/or an Internet access device is also incorporated to enable access to audio/visual programs for selection and playing without the attachment of another audio/visual device, while also having the capability of being coupled to another audio/visual device to receive still other audio/visual programs. In other words, it is envisioned that the controller 500 may well be incorporated into an audio/visual device that is at least akin to a television, whether portable (e.g., as depicted in Figure 5) or stationary (e.g., as depicted in Figure 1). Therefore, although the source interface 590 may have any of a number of configurations to couple the controller 500 to any of a number of possible sources, it is envisioned that the source interface 590 will be configured to enable the controller 500 to be coupled to at least one source that is also incorporated into the same audio/visual device into which the controller 500 is incorporated, and to also enable the controller 500 to be coupled to at least one source that is not incorporated into the same audio/visual device.

[095] Thus, the source interface 590 incorporates one or more of an electrical interface 595, an optical interface 596, a radio frequency transceiver 598 and/or an infrared receiver 599. The electrical interface 595 (if present) enables the source interface 590 to couple the controller 500 to at least one source, whether incorporated into the same audio/visual device as the controller 500, or not, to receive electrical signals (e.g., Ethernet, S-Video, USB, HDMI, etc.) conveying an

audio/visual program to the controller 500. The optical interface 596 (if present) enables the source interface 590 to couple the controller 500 to at least one source to receive optical signals (e.g., Toslink) conveying an audio/visual program to the controller 500. The radio frequency transceiver 598 (if present) enables the source interface 590 to wirelessly couple the controller 500 to at least one other audio/visual device functioning as a source to receive radio frequency signals (e.g., Bluetooth, a variant of IEEE 802.11, ZigBee, etc.) conveying an audio/visual program to the controller 500 from that other audio/visual device. The infrared receiver 599 (if present) enables the source interface 590 to wirelessly couple the controller 500 to at least one other audio/visual device functioning as a source to receive infrared signals conveying an audio/visual program to the controller 500 from that other source. It should be noted that although the output interface 510 and the sensor interface 520 are depicted as separate from the source interface 590, it may be deemed advantageous, depending on the nature of the signaling supported, to combine one or both of the output interface 510 and the sensor interface 520 with the source interface 590.

[096] Stored within the storage 540 are one or more of a control routine 450, a protocols data 492, a commands data 493, an audio/visual data 495, a rescaled audio/visual data 496, and menu data 498. Upon being executed by the processing device 550, a sequence of instructions of the control routine 450 causes the processing device 550 to coordinate the monitoring of the touch sensor 220 for user input, the output of the racetrack menu 150 to a display element (e.g., the display element 120), the selection of a source of an audio/visual program to be played, and one or both of the display of a visual portion of an audio/visual program on a display element on which the racetrack menu 150 is also displayed and the acoustic output of an audio portion of the audio/visual program via one or more acoustic drivers (e.g., the acoustic drivers 130).

[097] Upon execution, the control routine 450 causes the processing device 550 to operate the sensor interface 520 to await indications of a user placing a tip of a digit in contact with a portion of the racetrack surface 250 defined on a surface of the touch sensor 220, moving that digit about the racetrack surface 250 and/or applying greater pressure at the position 260 on the racetrack surface 250 to make a

selection. Upon receiving an indication of activity by the user involving the racetrack surface 250, the processing device 550 may be caused to operate the output interface 510 to display the racetrack menu 150 with one or more of the menu items 155 positioned thereon and surrounding the display area 950 via a display element, if the racetrack menu 150 is not already being displayed. The processing device 550 is further caused to display and position at least the marker 160 on the racetrack menu 150 in a manner that corresponds to the position 260 of the user's digit on the racetrack surface 250. Further, in response to the passage of a predetermined period of time without receiving indications of activity by the user involving the racetrack surface 250, the processing device 550 may be caused to operate the output interface 510 to cease displaying the racetrack menu 150, and to display substantially little else on a display element than the display area 950.

[098] Upon execution, the control routine 450 causes the processing device 550 to operate the sensor interface 520 to await an indication of a selection of a menu item 155 that corresponds to selecting a source from which the user may wish an audio/visual program to be provided for playing, and may operate the source interface 590 to at least enable receipt of an audio/visual program from that selected source. Where an audio/visual program is received, the processing device 550 may be further caused to buffer audio and/or visual portions of the audio/visual program in the storage 540 as the audio/visual data 495. In embodiments in which a visual portion of an audio/visual program is rescaled to be displayed in the display area 950 at a time when the display area 950 is surrounded by the racetrack menu 150, the processing device 550 may be further caused to buffer the rescaled form of the visual portion in the storage 540 as the rescaled audio/visual program data 496.

[099] Upon execution, the control routine 450 causes the processing device 550 to operate the sensor interface 520 to await an indication of a selection of a menu item 155 corresponding to the selection of a command (e.g., "play" or "record" commands, numerals or other symbols specifying a radio frequency channel to tune, etc.) to be transmitted to an audio/visual device serving as a source, and may operate the source interface 590 to transmit a command to that audio/visual device (e.g., one of sources 901-904) that corresponds to a menu item 155 that has been selected. In transmitting that command, the processing device 550 may be further

caused to refer to the protocols data 492 for data concerning sequences of signals that must be transmitted by the source interface 590 as part of a communications protocol in preparation for transmitting the command, and/or the processing device 550 may be further caused to refer to the commands data 493 for data concerning the sequence of signals that must be transmitted by the source interface 590 as part of transmitting the command. As will be familiar to those skilled in the art, some of the earlier listed forms of coupling make use of various protocols to organize various aspects of commands and/or data that are conveyed, including and not limited to, Ethernet, Bluetooth, IEEE-1394, USB, etc. In support of the processing device 550 responding to the selection of various ones of the menu items 155, the processing device 550 is further caused to store data correlating at least some of the various menu items with actions to be taken by the processing device 550 in response to their selection by the user in the storage 540 as the menu data 498.

[0100] Amidst operating the source interface 590 to enable receipt of an audio/visual program from a source selected by the user, the processing device 550 may be caused to operate the output interface 510 to alter the quantity and/or type of menu items 155 that are displayed at various positions on the racetrack menu 150. In so doing, the processing device 550 may be further caused to store information concerning the size, shape, color and other characteristics of the racetrack menu 150, at least some of the graphical representations of the menu items 155, and/or at least one graphical representation of the marker 160 in the storage 540 as part of the menu data 498.

[0101] **Figures 10a and 10b**, taken together, depict and contrast two variants of the touch sensor 220. Both variants are depicted in perspective as distinct touch-sensitive devices that are typically mounted within a recess of a casing of a device, including either the casing 110 of any variant of the audio/visual device 100 or the casing 210 of any variant of the remote control 200. However, as those skilled in the art will readily recognize, other touch-sensitive device technologies may yield variants of the touch-sensitive device 220 that are film-like overlays that may be positioned to overlies a portion of a casing or of a circuitboard of a device. The discussion that follows is centered more on the shape and utilization of the touch-

sensitive surface 225 of the touch sensor 220, and not on the touch-sensitive technology employed.

[0102] Figure 10a depicts the variant of the touch sensor 220 having the ring shape that has been discussed above at length that permits other manually-operable controls (e.g., the navigation buttons 270a-d and the selection button 280) to be positioned in a manner in which they are surrounded by the ring shape of the touch sensor 220. As has already been discussed, the ring shape of this variant of the touch sensor 220 provides a form of the touch-sensitive surface 225 that is bounded by the ring shape of the touch sensor 220, and this in turn defines the ring shape of the racetrack surface 250 (where the racetrack surface 250 is defined on the touch-sensitive surface 225 to encompass substantially all of the touch-sensitive surface 225). Once again, although this variant of the touch sensor 220 is depicted as having a rectangular ring shape having four sides, other embodiments are possible in which the touch sensor 220 has a ring shape of a different geometry, such as a circular ring shape, an oval ring shape, a hexagonal ring shape, etc.

[0103] Figure 10b depicts an alternate variant of the touch sensor 220 having a rectangular shape that provides a continuous form of the touch-sensitive surface 225 that is bounded by this rectangular shape (i.e., there is no "hole" formed through the touch-sensitive surface 225). This rectangular shape more easily enables more than the ring shape of the racetrack surface 250 to be defined on the touch-sensitive surface 225 in a manner in which the racetrack surface 250 encompasses only a portion of the touch-sensitive surface 225 and leaves open the possibility of one or more other surfaces that serve other functions also being defined on thereon. In this alternate variant, the ring shape of the racetrack surface 250 may be defined by a processing device executing a sequence of instructions of a routine, such as the processing device 550 executing the control routine 450 in Figure 9. In other words, the location of the racetrack surface 250 may be defined by a processing device first being provided with indications of which touch-sensitive points of an array of touch-sensitive points making up the touch-sensitive surface 225 are being touched by a tip of a user's digit, and second treating some of those touch-sensitive points as belonging to the racetrack surface 250 and others of those touch-sensitive points as

belonging to other surfaces that are defined on the touch-sensitive surface 225 (and which serve other functions).

[0104] Alternatively and/or additionally, one or more ridges 227 and/or grooves (not shown) may be formed in the touch-sensitive surface 225 to at least provide a tactile guide as to where the racetrack surface 250 is defined on the touch-sensitive surface 225. Such ridges 227 may be formed integrally with the touch-sensitive surface 225, may be formed as part of a casing on which the touch sensor 220 is disposed, or may be adhered to the touch-sensitive surface 225. Further, such ridges 227 and/or grooves (not shown) may coincide with locations on the touch-sensitive surface 225 at which the touch sensor 220 is incapable of detecting the touch of a tip of a digit (i.e., the touch-sensitive surface 225 may be made up of multiple separate touch-sensitive portions, of which one is a portion having a ring shape where the racetrack surface 250 is defined).

[0105] More specifically, and as depicted in dotted lines in Figure 10b, the racetrack surface 250 is defined on the touch-sensitive surface 225 so as to be positioned about the periphery of the touch-sensitive surface 225 such that the ring shape of the racetrack surface 250 surrounds the remainder of the touch-sensitive surface 225. As also depicted, at least a portion of the touch-sensitive surface 225 that is surrounded by the racetrack surface 250 may be employed to provide the equivalent function of other manually-operable controls, such as the navigation buttons 270a-d and the selection button 280. In other words, the navigation buttons 270a-d and the selection button 280 may be implemented as navigation surfaces and a selection surface, respectively, defined on the touch-sensitive surface 225 of the touch sensor 220 (perhaps by a processing device executing a sequence of instructions), along with the racetrack surface 250.

[0106] It should be noted that although both of the variants of the touch sensor 220 have been depicted in Figures 10a and 10b as having rectangular shapes with right angle corners, either variant may alternatively have rounded corners. Indeed, where such a variant of the touch sensor 220 has one or more of the ridges 227 and/or grooves (not shown), such ones of the ridges 227 and/or grooves may also have rounded corners, despite being depicted as having right angle corners in Figures 10a and 10b.

[0107] Figures 11a and 11b, taken together, depict two variants of the user interface 1000 in which more than one display area is defined within the portion of the display element 120 that is surrounded by the racetrack menu 150. These variants enable more than one visual portion of one or more selected audio/visual programs to be played on the display element 120 in a manner that enables a user to view them simultaneously. Also depicted is the manner in which various ones of the menu items 155 associated within only one of the display areas may be positioned along the racetrack menu 150 to provide a visual indication of their association with that one of the display areas.

[0108] More specifically, Figure 11a depicts a configuration that is commonly referred to as "picture-in-picture" in which a display area 970 having smaller dimensions than the display area 950 is positioned within and overlies a portion of the display area 950. As also depicted, ones of the menu items 155 that are associated with the visual portion displayed in the display area 970 are positioned along portions of the racetrack menu 150 that are located closer to the display area 970 (specifically, portions of the sides 150b and 150d) to provide a visual indication to the user of that one association. Further, ones of the menu items 155 that are associated with the visual portion displayed in the display area 950 are positioned along portions of the racetrack menu 150 that are further from the display area 970 (specifically, the sides 150a and 150c) to provide a visual indication to the user of that other association. As suggested in the depiction of Figure 11a, the ones of the menu items 155 that are associated with the display area 950 correspond to commands to play or to stop playing an audio/visual program, selection of an input, and radio frequency channel tuning. The ones of the menu items 155 that are associated with the display area 970 correspond to commands to play or to stop playing an audio/visual program, and selection of an input.

[0109] Also more specifically, Figure 11b depicts a configuration that is commonly referred to as "picture-by-picture" in which the display areas 950 and 970 are positioned adjacent each other (as opposed to one overlapping the other) within the portion of the display element surrounded by the racetrack menu 150. Again as depicted, ones of the menu items 155 that are associated with the visual portion displayed in the display area 950 are positioned along portions of the racetrack

menu 150 that are located closer to the display area 950 (specifically, the side 150c and portions of the sides 150a and 150b) to provide a visual indication to the user of that one association. Further, ones of the menu items 155 that are associated with the visual portion displayed in the display area 970 are positioned along portions of the racetrack menu 150 that are located closer to the display area 970 (specifically, the side 150d and portions of the sides 150a and 150b) to provide a visual indication to the user of that other association. As suggested in the depiction of Figure 11b, each of the display areas 950 and 970 are associated with separate ones of the menu items 155 that correspond to commands to play or to stop playing an audio/visual program, selection of an input, and radio frequency channel tuning.

[0110] Although Figures 11a and 11b depict embodiments having only two display areas (i.e., the display areas 950 and 970) within the portion of the display element 120 surrounded by the racetrack menu 150, those skilled in the art will readily recognize that other embodiments incorporating more than two such display areas are possible, and that in such embodiments, each of the menu items 155 may be positioned along the racetrack menu 150 in a manner providing a visual indication of its association with one of those display areas. Indeed, it is envisioned that variants of the user interface 1000 are possible having 2-by-2 or larger arrays of display areas to accommodate the simultaneous display of multiple visual portions, possibly in security applications.

[0111] Although Figures 11a and 11b depict separate sets of the menu items 155 corresponding to commands to play and to stop playing an audio/visual program that are separately associated with each of the display areas 950 and 970, and although this suggests that the visual portions played in each of the display areas 950 and 970 must be from different audio/visual programs, it should be noted that the simultaneously displayed visual portions in the display areas 950 and 970 may be of the same audio/visual program. As those skilled in the art will readily recognize, an audio/visual program may have more than one visual portion. An example of this may be an audio/visual program including video of an event taken from more than one angle, such as an audio/visual program of a sports event where an athlete is shown in action from more than one camera angle. In such instances, there may be only one set of the menu items 155 corresponding to commands to play, fast-

forward, rewind, pause and/or to stop playing the single audio/visual program, instead of the separate sets of menu items depicted Figures 11a and 11b.

[0112] With the simultaneous display of multiple visual portions, there may be multiple audio portions that each correspond to a different one of the visual portions. While viewing multiple visual portions simultaneously may be relatively easy for a user insofar as the user is able to choose any visual program to watch with their eyes, listening to multiple audio portions simultaneously may easily become overwhelming. To address this, some embodiments may select one of the audio portions to be acoustically output to the user based on the position 260 of a tip of a digit along the racetrack surface 250 (referring back to Figure 2). Where the position 260 at which the user places a tip of a digit on the racetrack surface 250 corresponds to a portion of the racetrack menu 150 that is closer to the display area 950, then an audio portion of the audio/visual program of the visual portion being displayed in the display area 950 is acoustically output to the user. If the user then moves that tip of a digit along the racetrack surface 250 such that the position 260 is moved to a portion of the racetrack surface 250 that corresponds to a portion of the racetrack menu 150 that is closer to the display area 970, then an audio portion of the audio/visual program of the visual portion being displayed in the display area 970 is acoustically output to the user. As the selection of audio portion that is acoustically output to the user changes as the user moves the tip of a digit about the racetrack surface 250, the corresponding position of the marker 160 along the racetrack menu 150 may serve as a visual indication to the user of which visual portion the current selection of audio portion corresponds to.

[0113] **Figure 12** depicts an alternate variant of the user interface 1000 in which the combined display of the racetrack menu 150 and the display area 950 surrounded by the racetrack menu 150 does not fill substantially all of the display element 120. Such an embodiment may be implemented on a more complex variant of the audio/visual device 100 capable of simultaneously performing numerous functions, some of which are entirely unrelated to selection and playing of an audio/visual program. As depicted, this leaves a display area 920 that is outside the racetrack menu 150 and that is overlain by the combination of the racetrack menu 150 and the display area 950 available for such unrelated functions. Such a more

complex variant of the audio/visual device 100 may be a general purpose computer system, perhaps one employed as a "media center system" or "whole house entertainment system." In such an embodiment, the combination of the racetrack menu 150 and the display area 950 may be displayed in a window defined by an operating system having a windowing graphical user interface where the window occupies substantially less than all of the display element 120.

[0114] As also depicted in Figure 12, in such an embodiment, the user may select and control the playing of an audio/visual program through the use of a variant of the touch sensor 220 having a touch-sensitive surface 225 that has a continuous rectangular shape (such as the variant of the touch sensor 220 of Figure 10b), as opposed to having a ring shape (such as the variant of the touch sensor 220 of Figure 10a). The racetrack surface 250 is defined on the touch-sensitive surface 225 in a manner that occupies the periphery of the touch-sensitive surface 225 and that surrounds a remaining portion of the touch-sensitive surface 225 that enables conventional operation of other functions of the audio/visual device 100 that may be unrelated to the selection and playing of an audio/visual program. In essence, this remaining portion of the touch-sensitive surface 225 may be employed in a conventional manner that will be familiar to those skilled in the art of graphical user interfaces in which a user moves about a graphical cursor using a tip of a digit placed on this remaining portion. Thus, the user may choose to engage in selecting audio/visual programs and controlling the playing of those audio/visual programs through the racetrack surface 250, and may choose to engage in performing other tasks unrelated to the selection and playing of audio/visual programs through the remaining portion of the touch-sensitive surface 225.

[0115] To provide tactile guidance to the user as to the location of the racetrack surface 250, one or more ridges 227 and/or grooves (not shown) may be formed in the touch-sensitive surface 225. In this way, the user may be aided in unerringly placing a tip of a digit on whichever one of the racetrack surface 250 or the remaining portion of the touch-sensitive surface 225 that they wish to place that tip upon, without errantly placing that tip on both, and without having to glance at the touch-sensitive surface 225 of the touch sensor 220.

[0116] Figures 13a and 13b depict additional features that may be incorporated into the user interface 1000, in which one or more submenus 151 of the racetrack menu 150 are supported. Provision may be made for one or more submenus 151 to enable a user of the user interface 1000 to control aspects of the operation of one or more audio/visual devices that do not require frequent user interaction, such as various configuration parameters of inputs, outputs, handling of audio and/or handling of video by one or more audio/visual devices. As will be familiar to most people who have ever operated an audio/visual device of some complexity, there are usually settings that may require user interaction to change only at a time when that audio/visual device is first installed, when it is first connected to another audio/visual device, and/or when a significant change is made to the manner in which it is installed or connected to another audio/visual device. Thus, for the sake of easier operation and clarity of appearance, menu items 156 that are associated with these aspects of operation that are so infrequently interacted with are preferably not placed on the racetrack menu 150, but instead, are placed on one or more submenus 151. During normal operation of the user interface 1000, the racetrack menu 150 may be made visible in the manner that has already been described, at length, but usually, no submenus 151 are made visible. Instead, as has been described at length, either the display area 950 or a combination of the display area 950, the racetrack menu 150 and possibly another display area 970 are shown on the display element 120.

[0117] As depicted in Figure 13a, to enable one of the submenus 151 to be displayed, the racetrack surface 250 defined on the touch-sensitive surface 225 of the touch sensor 220 is monitored (perhaps by the processing device 550 of the controller 500 as a result of executing the control routine 450) at a time when the racetrack menu 150 is being displayed for an instance of a user positioning a tip of a digit over a position on the racetrack surface 250 that corresponds to a one of the menu items 155 that corresponds to a one of the submenus 151 (e.g., the depicted menu item 155 that resembles an acoustic driver), and presses harder to select that one of the menu items 155. As has been previously explained, the marker 160 moves about the racetrack menu 150 to constantly maintain a position that generally corresponds to the position at which that tip of a digit is in contact with the racetrack surface 250. In response to the selection made by the user, the one of the submenus 151 that corresponds to that one of the menu items 155 is displayed such

that the one of the submenus 151 is concentrically positioned relative to the racetrack menu 150 so as to be surrounded by the racetrack menu 150 (i.e., nested within the racetrack menu 150).

[0118] With the one of the submenus 151 displayed, the marker 160 ceases to overlie the one of the menu items 155 that was selected by the user, and is repositioned within the one of the submenus 151. In being so repositioned, the marker 160 may be repositioned to a position within the one of the submenus 151 that corresponds to a connection marker 161 that provides a visual reference that both indicates the one of the menu items 155 that is associated with the one of the submenus 151 and indicates the location within the one of the submenus 151 at which the marker 160 must be positioned to enable the user to choose to cause the marker 160 to be repositioned back within the racetrack menu 150. One or more submenu items 156 are positioned about the one of the submenus 151, and with the marker 160 being so positioned within the one of the submenus 151, the user is able to move the marker 160 about the one of the submenus 151 and to select one of the submenu items 156 in a manner very much like what has been described with regard to movement and selection within the racetrack menu 150.

[0119] As has been previously described, when displayed, the racetrack menu 150 may overlie the periphery of the display area 950, or the display area 950 may be resized to fit within the portion of the display element 120 that is surrounded by the racetrack menu 150. In variants in which the racetrack menu 150 overlies the periphery of the display area 950, the one of the submenus 151 may also be displayed in a manner in which the one of the submenus 151 overlies the display area 950. In variants in which the display area 950 is resized to fit within the portion of the display element 120 that is surrounded by the racetrack menu 150, the display area 950 may be further resized to fit within the portion of the display element surrounded by the combination of the racetrack menu 150 and the one of the submenus 151. However, either overlying the display area 950 with both of the racetrack menu 150 and the one of the submenus 151 or resizing the display area 950 to fit within the smaller remaining portion of the display element 120 surrounded by the combination of the racetrack menu 150 and the one of the submenus 151 may be deemed to be too much overlying coverage over the display area 950 or too

much of a reduction in size of the display area 950. Therefore, it may be that the display area 950 is simply not displayed when the one of the submenus 151 is displayed, or that the display area 950 is resized to fit within the portion of the display element 120 that is surrounded only by the racetrack menu 150 with the one of the submenus 151 overlying the display area 950.

[0120] Further, although Figure 13a depicts only the one of the submenus 151 being concentrically positioned (i.e., nested) within the portion of the display element 120 that is surrounded by the racetrack menu 150, and depicts the one of the submenus 151 as having four sides (i.e., sides 151a, 151b, 151c and 151d) that correspond to the four sides (i.e., 150a, 150b, 150c and 150d, respectively) of the racetrack menu 150, Figure 13b depicts the possibilities of another of the submenus 152 being nested within the one of the submenus 151 and having less than four sides. More specifically, Figure 13b depicts the another of the submenus 152 being positioned within the portion of the display element surrounded by the combination of the racetrack menu 150 and the one of the submenus 151, and depicts the another of the submenus 152 having only two sides 152b and 152c. The enabling of the display of the another of the submenus 152 is done very much in the same manner in which the display of the one of the submenus 151 is enabled to be displayed. With the one of the submenus 151 being displayed, the racetrack surface 250 is monitored for an instance of a user operating the user interface 1000 to position the marker 160 over a one of the submenu items 156 that is associated with the another of the submenus 152 and pressing harder at the location on the racetrack surface 250 associated with the one of the submenu items 156 to select it. With the another one of the submenus 152 displayed, the marker 160 is repositioned within the another one of the submenus 152 at a position that corresponds to another connection marker 161, which indicates where within the another of the submenus 152 at which the marker 160 must be positioned to enable the user to choose to cause the marker 160 to be repositioned back within the one of the submenus 151 (or possibly back within the racetrack menu 150).

[0121] A submenu may cease to be displayed where a user operates the user interface 1000 to move the marker 160 back out of that submenu and back to the racetrack menu 150 or back to a submenu in which the submenu item associated

with the submenu that the user has just caused the marker 160 to move back out of. In other words, where the user moves the marker 160 to the position within the another of the submenus 152 at which the user may select to move the marker 160 back to a position within the one of the submenus 151, the act of doing so may cause the another of the submenus 152 to cease to be displayed. The user moving the marker 160 to the position within the one of the submenus at which the user may select to move the marker 160 back to the racetrack menu 150 and doing so may cause the one of the submenus 151 to cease to be displayed. Alternatively, a submenu that the user has moved the marker 160 back out of may be caused to cease being displayed only after a predetermined period time has elapsed since the marker 160 was last positioned within that submenu.

[0122] Further, where the user has operated the user interface 1000 to the extent of causing the marker 160 to be repositioned within a submenu, one or more submenus may be caused to cease being displayed, one at a time, at timed intervals. For example, where the user has operated the user interface 1000 to the extent of causing both of the submenus 151 and 152 to be displayed (as depicted in Figure 13b), and then the user ceases operating the user interface 1000, the another of the submenus 152 may cease to be displayed after the elapsing of a first timed interval, followed by the one of the submenus 151 ceasing to be displayed after the elapsing of a second timed interval, and followed by the racetrack menu 150 ceasing to be displayed after the elapsing of a third timed interval. If the marker 160 is positioned within the another of the submenus 152 when the another of the submenus 152 ceases to be displayed, then the marker 160 may be moved to the one of the submenus 151 without user interaction being required to cause it to be so moved. Similarly, if the marker 160 is positioned within the one of the submenus 151 when the one of the submenus 151 ceases to be displayed, then the marker 160 may be moved to the racetrack menu 150.

[0123] **Figure 14** presents a variation of the one of the submenus 151 depicted in Figures 13a-b, where the one of the submenus 151 again has sides that correspond to the four sides 150a-d of the racetrack menu 150, but in which the sides of this variant of the one of the submenus 151 are arranged to nest among themselves in a "spiral-like" manner. In this way, a greater quantity of menu items may be positioned

within a submenu without requiring a nesting of one submenu within another, and a single submenu can be made as large as necessary to incorporate a great many menu items while making use of more of the display element.

[0124] It should be noted with regard to the depiction of a possible architecture of the controller 500 in Figure 9 that although the source interface 590 is depicted as possibly employing only infrared wireless communications with one or more of the sources 901-904 in the manner only of receiving an audio/visual program therefrom via the infrared receiver 599, other variants of architecture are possible in which the source interface 590 (or some other component of the controller 500) employs an infrared transmitter (not shown) that is incorporated into the source interface 590 (perhaps via replacing the infrared receiver 599 with an infrared transceiver) to provide commands to one or more of the sources 901-904. Further, still other variants of architecture are possible in which one or the other of the optical interface 596 or the electrical interface 595 are employed to couple the controller 500 to an infrared emitter (not shown) that is external to the casing of whatever audio/visual device into which the controller 500 is incorporated, and is physically configured to be placed in relatively close proximity to an infrared receiver of one of the sources 901-904.

[0125] **Figures 15a and 15b** depict additional features that may be incorporated into the user interface 1000, in which customization of the user interface 1000 by a user to the extent of a user choosing which ones of the menu items 155 are displayed on the racetrack menu 150 is enabled. As previously discussed above (especially with respect to Figure 4), an advantage of the user interface 1000 is that the selection of which ones of the menu items 155 are displayed on the racetrack menu 150 is able to be made at least partly based on which one of the sources 901-904 (or other audio/visual device able serve as a source) is selected by a user. In other words, the user interface 1000 is able to be "modal" in nature in that only menu items 155 corresponding to functions that are actually provided by a selected source of audio/visual programs are displayed. Thus, where a selected one of the sources 901-904 is a form of RF tuner with no storage capability, menu items 155 more appropriately associated with a different audio/visual device having storage capability

(e.g., "fast-forward" or "skip track") are not displayed, since they would have no meaning given the characteristics of the selected one of the sources 901-904.

[0126] However, even with the benefits of such a "modal" characteristic, a user may wish to alter what menu items 155 are displayed on the racetrack menu 150 to suit their own personal preferences. By way of example, the selection of menu items 155 that have been made as a "factory setting" to be displayed when a given one of the sources 901-904 is selected may cause one or more menu items 155 to be displayed that a user deems to have little value and/or may cause one or more menu items 155 that could have been displayed (and which would have been appropriate for the functionality of that given one of the sources 901-904) to not be displayed. Further, there may be one or more menu items 155 that as a "factory setting" are displayed on the racetrack menu 150 at times and/or in response to events other than the selection of one of the sources 901-904 (e.g., at times when the user is employing the user interface 1000 to make changes to various configuration settings, etc.).

[0127] In some variants of the user interface 1000, one or more submenus (e.g., the submenus 151 and/or 152 of Figure 13a, 13b or 14) may be made accessible to a user, on which are displayed menu items (e.g., displayed as submenu items 156 on one of the submenus 151 and/or 152 of Figures 13a, 13b or 14) that may be selected for being displayed on the racetrack menu 150. It may be that these menu items displayed in a submenu may have a "togglng" characteristic in which they can be made to change between the state of being displayed on the racetrack menu 150 and the state of not being displayed on the racetrack menu 150 by employing movement of a tip of a digit about the racetrack surface 250 to move the marker 160 to overlie them and then pressing that tip against the racetrack surface 250 with greater force to select them, as has been previously described at length. Alternatively, the user interface 1000 may be provided with a customization mode that is a mode that permits the selection of menu items to be displayed and that is separate and distinct from an operating mode in which a user simply operates the user interface 1000 to select sources and audio/visual programs for being played. In such a customization mode, one or more submenus 151 and/or 152 may be displayable to display menu items (presented as submenu items 156) that may be

selected for being displayed on the racetrack menu 150, and the menu items 155 that are already displayed on the racetrack menu 150 may be made selectable to remove them from being displayed on the racetrack menu 150 and correspondingly to add them to one of the submenus 151 or 152 (as submenu items 156), thus enabling them to be selected from within a submenu at a later time for again being displayed on the racetrack menu 150.

[0128] An advantage of the use of submenus in one of the various ways depicted in Figures 13a-b and 14 is that the racetrack menu 150 continues to be displayed as those submenus are also displayed. Thus there is a simultaneous displaying of menu items that may be selected by a user to be displayed on the racetrack menu 150 and the racetrack menu 150, itself. This enables the provision of immediate feedback of the results to a user of their selections by immediately displaying how the appearance of the racetrack menu 150 is altered as that user makes their selections of what menu items 155 are to be displayed on the racetrack menu 150 and what menu items 155 are to be removed from it.

[0129] As an alternative to using submenus appearing within the portion of the display area 950 that is surrounded by the racetrack menu 150 to enable user customization, Figure 15a depicts another approach to enabling such user customization in which the racetrack menu 150 is displayed alongside a selection of available menu items 155, thereby again allowing a user to immediately see the results of their selections. The racetrack menu 150 is reduced in size relative to the size of the display element 120 so as to not occupy the periphery of the display area 950 provided by the display element 120, and is positioned alongside a plethora of menu items 155 that may be selected to be displayed on the racetrack menu 150. More particularly, the racetrack menu 150 is reduced to occupy only about a quarter of the display area 950, is positioned within one portion of the display area 950 (the right half of the display area 950, as depicted), and is accompanied by multiple menu items 155 positioned alongside the reduce-sized racetrack menu 150 within another portion of the display area 950 (the left half of the display area 950, as depicted). Causing the racetrack menu 150 to be displayed alongside a plethora of menu items 155 selectable for being displayed as depicted in Figure 15a may entail a user operating a manually-operable control and/or selecting a particular one of the menu

items 155 to place the user interface 1000 into a distinct customization mode. Such a manually-operable control may be something akin to a distinct "customize" or "setup" button disposed on a casing of an audio/visual device implementing at least a portion of the user interface 1000 (e.g., one or both of the audio/visual devices 100 or 900 of one of Figures 1, 5 or 8) or possibly on a remote control for such an audio/visual device (e.g., one of the variants of the handheld remote control 200 of one of Figures 1 or 7b).

[0130] It may be that these menu items depicted alongside the reduced-size racetrack menu 150 have a "togglng" characteristic in which they can be made to change between the state of being displayed on the racetrack menu 150 and the state of not being displayed on the racetrack menu 150 by operating manually-operable controls other than the racetrack surface 225 (e.g., the navigation buttons 270a-d and the selection button 280 implemented as entirely separate manually-operable controls from the touch sensor 220 and depicted in Figures 7b or 8, or implemented as control surfaces in the form of the navigation surfaces 270a-d and the equivalent selection surface 280 defined on the touch-sensitive surface 225 and shown in Figure 10b) to first move a marker 166 to overlies them and then select them in a manner not unlike what has been described in navigating the on-screen menu 170 of Figure 7a. Alternatively, it may be that such other manually-operable controls and at least the racetrack surface 250 defined on the touch-sensitive surface 225 are simultaneously operable in a manner in which the other manually-operable controls may be employed to select ones of the menu items 155 to be added for being displayed on the racetrack menu 150, while the racetrack surface 250 may be employed to select ones of the menu items 155 to be removed from being displayed on the racetrack menu 150. In this alternative, a user is able to operate the touch sensor 220 to interact with the racetrack surface 250 defined thereon to select one or more of the menu items 155 already displayed on the racetrack menu 150 for being removed from being displayed on the racetrack menu 150. By using a tip of a digit to move the marker 160 about the racetrack menu 150 to a particular one of the menu items 155 on the racetrack menu 150 and then pressing against the racetrack surface 225 with relatively greater force to select it, that particular one of the menu items is removed from being displayed on the reduced-size racetrack menu 150 positioned within the one portion of the display

area 950, and is added to the plethora of available menu items 155 positioned within the other portion of the display area 950. By operating other manually-operable controls (e.g., the aforementioned manually-operable controls 270a-d and 280, whether implemented as entirely separate manually-operable controls or implemented as control surfaces defined on the touch-sensitive surface 225) to move the marker 166 to overlies a desired one of the menu items 155 positioned within the other portion of the display area 950 and to then select that desired one of the menu items 155 to be removed from the menu items 155 displayed within that other portion of the display area 950 and be added for being displayed on the racetrack menu 150.

[0131] Regardless of the exact manner in which various manually-operable controls are employed to select menu items 155 for being displayed or for not being displayed on the racetrack menu 150, one or more markers 167 may be displayed amidst the display of the reduced-size racetrack menu 150 and the plethora of selectable menu items 155 where within the racetrack menu 150 a menu item 155 overlain by the marker 166 would be positioned if selected to be displayed. Further, a menu item 155 overlain by the marker 166 (such that it could be selected to added for display on the racetrack surface 150) is additionally displayed on, within or otherwise adjacent one or more of the markers 167 in the form of text (in any of a number of possible languages) that is indicative of a function associated with that menu item 155.

[0132] Further, it may be along with the display of both the menu items 155 available to be displayed on the racetrack menu 150 and the reduced-size racetrack menu 150, a visual portion of an audio/visual program provided by one of the sources 901-904 may be simultaneously displayed in a display area 990 that is surrounded by the reduced-size racetrack menu 150.

[0133] Figure 15b depicts still another approach to enabling such user customization in which the racetrack menu 150 is displayed in its normal size and in its normal position about the periphery of the display area 950, and in which a plethora of available menu items 155 that may be selected to be displayed on the racetrack menu 150 is positioned within the portion of the display area 950 surrounded by the racetrack menu 150. More precisely, with the user interface 1000

placed in a customization mode (again, selectable via a menu item or a distinct manually-operable control), the racetrack menu 150 is displayed in its normal size and position with one of the sides 150a-d highlighted via the alternate marker 165 (or in some other manner), and with a scrollable list of menu items 155 that may be selected for being displayed on that highlighted one of the sides 150a-d of the racetrack menu 150. As depicted, the menu items 155 within that scrollable list associated with that highlighted side of the racetrack menu 150 are displayed in the form of text that is indicative of functions associated with each of them, as opposed to being displayed as symbols or other graphical indicators that may provide a more visually compact indication of the function(s) associated with each of the menu items 155 (and which, therefore, are preferred for use in displaying menu items 155 on the racetrack menu 150). Alongside each one of the menu items 155 displayed within the scrollable list is a status indicator 159 (also variously known as a "radio button" or "check box" to those skilled in the art of designing graphical user interfaces) displaying one or the other of two displayable states, in which one displayable state indicates that its associated one of the menu items 155 is selected for being displayed on the highlighted one of the sides 150a-d of the racetrack menu 150, and in which the other displayable state indicates that its associated one of the menu items 155 is not selected for being so displayed.

[0134] Each of the menu items 155 displayed within the scrollable list is given a "toggling" characteristic via the alterable status indicators 159 in which they can be made to change between the state of being displayed on the highlighted side of the racetrack menu 150 and the state of not being so displayed by operating manually-operable controls other than the racetrack surface 225 (e.g., the aforementioned manually-operable controls 270a-d and 280) to first move a marker 166 to overlie an associated one of the status indicators 159 and then selecting that status indicator 159 in a manner not unlike what has been described in navigating the on-screen menu 170 of Figure 7a. Again, causing the racetrack menu 150 to be displayed alongside a plethora of menu items 155 selectable for being displayed as depicted in Figure 15b enables the provision of immediate feedback to a user, in that as a user selects one of the menu items 155 within the scrollable list to either select it for being displayed in the highlighted side of the racetrack menu 150, or not, the visual results of their selection can be immediately displayed.

[0135] Figure 15c depicts yet another approach to enabling such user customization in which the racetrack menu 150 is not displayed, and in which a plethora of available menu items 155 that may be selected to be displayed on the racetrack menu 150 are displayed in multiple columns corresponding to differing ones of the sides 150a-d of the racetrack menu 150. More precisely, with the user interface 1000 placed in a customization mode, display of the racetrack menu 150 and/or of any audio/visual program selected by a user is replaced with the display of side-by-side scrollable lists of menu items 155 in a column corresponding to the side 150b, a column corresponding to the side 150a, and a column corresponding to both of the sides 150c and 150d (i.e., as depicted, the columns labeled, respectively, "Playback Controls" and "Number Entry" and "Other Controls").

[0136] As depicted, each of the menu items 155 within each of the scrollable lists is displayed in the form of text that is indicative of whatever functions are associated with each of them. Also, alongside each of the menu items 155 is displayed a status indicator 159 displaying an indication of one or the other of a state of a menu item 155 being selected for being displayed within a side 150a-d of the racetrack menu 150 that corresponds to the column in which that menu item 155 is displayed, and a state of that menu item 155 is not selected for being so displayed. In a manner very much like what was described with regard to the menu items 155 displayed within the single scrollable column depicted in Figure 15b, each of the menu items 155 displayed within each of the scrollable lists of each of the three columns depicted in Figure 15c is given a "togglng" characteristic via the alterable status indicators 159 in which they can be made to change between the state of being displayed and the state of not being so displayed by operating manually-operable controls other than the racetrack surface 225 (e.g., the manually-operable controls 270a-d and 280) to first move a marker 166 to overlie an associated one of the status indicators 159 (or both one of the menu items 155 and its associated one of the status indicators 159) and then selecting it.

[0137] In a manner not unlike what was discussed with regard to Figure 15a, as the marker 166 is moved about to overlie different ones of the menu items 155 in whichever one of the scrollable columns, the overlain one of the menu items 155 is additionally displayed at another location within the display area 950 to further assist

a user in more readily realizing which one of the menu items 155 is currently overlain by the marker 166 such that operation of a manually-operable control (e.g., the manually-operable control either implemented as a separate selection button 180, as part of a 4-way rocker switch that also incorporates the manually-operable controls 270a-d, or as a control surface defined on the touch-sensitive surface 225) will toggle that particular menu item 155 between the displayed and not displayed states, just described. As depicted, that currently overlain one of the menu items 155 may be displayed in both text and a graphical symbol to ensure its quick and clear identification.

[0138] In a slight variation of this approach to enabling user customization, it may be made possible for the results of a user's selections to be made visible by a user momentarily touching the touch-sensitive surface 225 at a position overlying a portion of the racetrack surface 250. While the user continues touching a portion of the racetrack surface 250, the racetrack menu 150 is displayed, and it may cease to be displayed once the user ceases touching a portion of the racetrack surface 250. Alternatively, the user may be able to toggle between the racetrack menu 150 being displayed and not being displayed by briefly touching a portion of the racetrack surface 250 in a manner akin to a "tap" on a portion of the racetrack surface 250. At times when the racetrack menu 150 is so displayed, the display of the scrollable lists depicted in Figure 15c may be reduced in size and displayed in the portion of the display area 950 that is surrounded by the racetrack menu 150. Further, it may be that ones of the menu items 155 selected in the column corresponding to both the sides 150c and 150d of the racetrack menu 150 (i.e., the column labeled "Other Controls") are automatically positioned in one or the other of the sides 150c and 150d by the processing device 550 as caused by the control program 450. This may be done to enable an automated optimization of the more limited space available within these two sides 150c and 150d, since they are likely to be shorter than the sides 150a and 150b, given the typical ratios of available height versus available width of typical forms of the display element 120.

[0139] Other implementations are within the scope of the following claims and other claims to which the applicant may be entitled.

CLAIMS

1. An apparatus comprising:

a display element capable of visually displaying a visual portion of an audio/visual program and a racetrack menu having a ring shape;

a processing device; and

a storage accessible to the processing device and storing a sequence of instructions that when executed by the processing device, causes the processing device to:

cause the racetrack menu to be visually displayed on the display element such that the racetrack menu surrounds a first display area in which the visual portion of the audio/visual program may be visually displayed;

cause a plurality of menu items to be visually displayed in the racetrack menu;

cause a first marker to be visually displayed in the racetrack menu;

receive an indication that a first manually-operable control is being operated to move the first marker;

in response to the indication of the first manually-operable control being operated to move the first marker, move the first marker about the racetrack menu and constrain movement of the first marker to remain within the racetrack menu;

receive an indication of the first manually-operable control being operated to select a menu item of the plurality of menu items that is in the vicinity of the first marker at a time subsequent to the first manually-operable control being operated to move the first marker about the racetrack; and

in response to the indication of the first manually-operable control being operated to select the menu item that is in the vicinity of the first marker, cause the menu item to be selected, wherein causing the menu item to be selected comprises taking an action to cause the audio/visual program to be selected for playing.

2. The apparatus of claim 1, wherein the first manually-operable control is a touch sensor having a touch-sensitive surface that is manually operable with a digit of a hand.

3. The apparatus of claim 2, wherein execution of the sequence of instructions by the processing device further causes the processing device to:

cause the racetrack menu to be visually displayed in response to an indication of the digit touching the touch-sensitive surface followed by an indication of the digit moving about the touch-sensitive surface in a wiping motion at a time when the racetrack menu is not being visually displayed; and

cause a command concerning playing the audio/visual program to be transmitted to a source of the audio/visual program in response to an indication of the digit touching the touch-sensitive surface followed by an indication of the digit ceasing to touch the touch-sensitive surface at a time when the racetrack menu is not being visually displayed.

4. The apparatus of claim 2, wherein execution of the sequence of instructions by the processing device further causes the processing device to:

cause the racetrack menu to be visually displayed in response to an indication of the digit touching the touch-sensitive surface followed by an indication of the digit remaining in contact with the touch-sensitive surface for at least a predetermined period of time at a time when the racetrack menu is not being visually displayed; and

cause a command concerning playing the audio/visual program to be transmitted to a source of the audio/visual program in response to an indication of the digit touching the touch-sensitive surface followed by an indication of the digit ceasing to touch the touch-sensitive surface at a time when the racetrack menu is not being visually displayed.

5. The apparatus of claim 2, wherein execution of the sequence of instructions by the processing device further causes the processing device to:

cause a second marker to be visually displayed in the vicinity of the first marker in response to an indication of the digit touching the touch-sensitive surface; and

move the second marker to a position relative to the first marker such that the position of the second marker relative to the first marker more precisely indicates the position where the digit is touching the touch-sensitive surface than does the position of the first marker within the racetrack menu in response to an indication of the digit moving about the touch-sensitive surface in a wiping motion.

6. The apparatus of claim 1, further comprising a source interface operable to select a source from which to receive an audio/visual program, wherein the action taken to cause the audio/visual program to be selected for playing is selected from the group of actions consisting of:

selecting the source interface to enable receipt of the audio/visual program from the source through the source interface;

transmitting a command through the source interface to the source to select the audio/visual program from among a plurality of audio/visual programs available from the source; and

transmitting a command through the source interface to the source to cause the source to provide the audio/visual program to the apparatus as part of playing the audio/visual program.

7. The apparatus of claim 6, wherein transmitting a command through the source interface to the source to select the audio/visual program from among the plurality of audio/visual programs available from the source comprises causing the source to operate a radio frequency tuner to receive the audio/visual program.
8. The apparatus of claim 6, wherein transmitting a command through the source interface to the source to select the audio/visual program from among the plurality of audio/visual programs available from the source comprises causing the source to begin playing the audio/visual program from a storage medium accessible to the source.
9. The apparatus of claim 1, wherein execution of the sequence of instructions by the processing device further causes the processing device to move the first marker about the racetrack menu in a manner in which the first marker snaps between being in the vicinity of a first menu item of the plurality of menu items and being in the vicinity of a second menu item of the plurality of menu items.
10. The apparatus of claim 9, wherein the processing device is further caused to operate an acoustic driver to acoustically output a sound at each instance of the first marker snapping between the vicinities of the first and second menu items.
11. The apparatus of claim 1, wherein execution of the sequence of instructions by the processing device further causes the processing device to alter a dimension of the size of the first marker as the processing device is caused to move the first marker about the racetrack menu between the vicinity of a first menu item of the plurality of menu items and the vicinity of a second menu item of the plurality of menu items.
12. The apparatus of claim 1, wherein the first marker has a form selected from the group consisting of:

an arrow pointer pointing at a menu item of the plurality of menu items;

a box surrounding a menu item of the plurality of menu items; and

an alteration to the appearance of a menu item of the plurality of menu items that is distinct from the appearance of other menu items of the plurality of menu items.

13. The apparatus of claim 1, wherein:

the racetrack menu has a rectangular ring shape having four sides; and
execution of the sequence of instructions by the processing device further causes the processing device to:

receive an indication that the first manually-operable control is being operated; and

cause a second marker to be visually displayed in the racetrack menu in the vicinity of one of the four sides of the rectangular ring shape of the racetrack menu to visually indicate which one of the four sides the first marker is currently located within.

14. The apparatus of claim 1, wherein execution of the sequence of instructions by the processing device further causes the processing device to:

cause both the first display area and a second display area to be displayed on the display element in a manner in which both the first and second display areas are surrounded by the racetrack menu;

cause a first menu item that is associated with a visual portion of an audio/visual program being played in the first display area to be located in a first portion of the racetrack menu located closer to the first display area than a second portion of the racetrack menu; and

cause a second menu item that is associated with a visual portion of an audio/visual program being played in the second display area to be located in the second portion of the racetrack menu.

15. The apparatus of claim 14, wherein the first display area is positioned to overlies a portion of the second display area.

16. The apparatus of claim 14, wherein the first display area and the second display area positioned to adjacent to each other in a manner in which neither of the first and second display areas overlies the other.

17. The apparatus of claim 1, wherein execution of the sequence of instructions by the processing device further causes the processing device to:

cause the racetrack menu to be visually displayed on the display element in response to receiving any indication of any manual operation of the first manually-operable control; and

cause the racetrack menu to cease to be visually displayed on the display element in response to a predetermined period of time having elapsed without any receipt of any indication of any manual operation of the first manually-operable control.

18. A method comprising:

visually displaying a racetrack menu having a ring shape on a display element that is capable of visually displaying both the racetrack menu and a visual portion of an audio/visual program such that the racetrack menu surrounds a first display area in which the visual portion of the audio/visual program may be visually displayed;

visually displaying a plurality of menu items in the racetrack menu;

visually displaying a first marker in the racetrack menu;

receiving an indication that a first manually-operable control is being operated to move the first marker;

in response to the indication of the first manually-operable control being operated to move the first marker, moving the first marker about the racetrack menu and constraining movement of the first marker to remain within the racetrack menu;

receiving an indication of the first manually-operable control being operated to select a menu item of the plurality of menu items that is in the vicinity of the first marker at a time subsequent to the first manually-operable control being operated to move the first marker about the racetrack; and

in response to the indication of the first manually-operable control being operated to select the menu item that is in the vicinity of the first marker, selecting the menu item, wherein selecting the menu item comprises taking an action to cause the audio/visual program to be selected for playing.

19. The method of claim 18, further comprising:

visually displaying the racetrack menu in response to receiving an indication of a digit of a hand touching a touch-sensitive surface of the first manually-operable control followed by an indication of the digit moving about the touch-sensitive surface in a wiping motion at a time when the racetrack menu is not being visually displayed; and

transmitting a command concerning playing the audio/visual program to a source of the audio/visual program in response to an indication of the digit touching the touch-sensitive surface followed by an indication of the digit ceasing to touch the touch-sensitive surface at a time when the racetrack menu is not being visually displayed.

20. The method of claim 18, further comprising:

visually displaying the racetrack menu in response to receiving an indication of a digit of a hand touching a touch-sensitive surface of the first manually-operable control followed by an indication of the digit remaining in contact with the touch-sensitive surface for at least a predetermined period of time at a time when the racetrack menu is not being visually displayed; and

transmitting a command concerning playing the audio/visual program to a source of the audio/visual program in response to an indication of the digit touching the touch-sensitive surface followed by an indication of the digit ceasing to touch the touch-sensitive surface at a time when the racetrack menu is not being visually displayed.

21. The method of claim 18, wherein the action taken to cause the audio/visual program to be selected for playing is selected from the group of actions consisting of:

selecting a source interface to enable receipt of the audio/visual program from a source of the audio/visual program through the source interface;

transmitting a command through the source interface to the source to select the audio/visual program from among a plurality of audio/visual programs available from the source; and

transmitting a command through the source interface to the source to cause the source to provide the audio/visual program to the apparatus as part of playing the audio/visual program.

22. The method of claim 21, wherein transmitting a command through the source interface to the source to select the audio/visual program from among the plurality of audio/visual programs available from the source comprises causing the source to operate a radio frequency tuner to receive the audio/visual program.

23. The method of claim 21, wherein transmitting a command through the source interface to the source to select the audio/visual program from among the plurality of audio/visual programs available from the source comprises causing the source to begin playing the audio/visual program from a storage medium accessible to the source.

24. The method of claim 18, further comprising moving the first marker about the racetrack menu in a manner in which the first marker snaps between being in the vicinity of a first menu item of the plurality of menu items and being in the vicinity of a second menu item of the plurality of menu items.

25. The method of claim 24, further comprising operating an acoustic driver to acoustically output a sound at each instance of the first marker snapping between the vicinities of the first and second menu items.

26. The method of claim 18, wherein the racetrack menu has a rectangular ring shape having four sides, and further comprising:

receiving an indication that the first manually-operable control is being operated; and

causing a second marker to be visually displayed in the racetrack menu in the vicinity of one side of the four sides of the rectangular ring shape of the racetrack menu to visually indicate which one of the four sides the first marker is currently located within.

27. The method of claim 18, further comprising:

displaying both the first display area and a second display on the display element in a manner in which both the first and second display areas are surrounded by the racetrack menu;

where a first menu item is associated with a visual portion of an audio/visual program being played in the first display area, displaying the first menu item in a first portion of the racetrack menu located closer to the first display area than a second portion of the racetrack menu; and

where a second menu item is associated with a visual portion of an audio/visual program being played in the second display area, displaying the second menu item in the second portion of the racetrack menu.

28. The method of claim 27, further comprising positioning the first display area to overlie a portion of the second display area.

29. The method of claim 27, further comprising positioning the first display area and the second display area adjacent to each other in a manner in which neither of the first and second display areas overlie the other.

30. The method of claim 18, further comprising:

visually displaying the racetrack menu on the display element in response to receiving any indication of any manual operation of the first manually-operable control; and

ceasing to visually display the racetrack menu on the display element in response to a predetermined period of time having elapsed without any receipt of any indication of any manual operation of the first manually-operable control.

31. An apparatus comprising:

a display element capable of visually displaying a visual portion of an audio/visual program and a racetrack menu having a ring shape;

a processing device; and

a storage accessible to the processing device and storing a sequence of instructions that when executed by the processing device, causes the processing device to:

cause the racetrack menu to be visually displayed on the display element such that the racetrack menu surrounds a first display area in which the visual portion of the audio/visual program may be visually displayed;

cause a first plurality of menu items to be visually displayed in the racetrack menu;

cause a first marker to be visually displayed in the racetrack menu;

in response to an indication of a manually-operable control being operated to move the first marker, move the first marker about the racetrack menu and constrain movement of the first marker to remain within the racetrack menu; and

in response to receiving an indication of the manually-operable control being operated to select a first menu item of the first plurality of menu items that is in the vicinity of the first marker, cause the menu item to be selected, wherein causing the menu item to be selected comprises further causing the processing device to:

cause a submenu to be visually displayed within the first display area;

cause a second plurality of menu items to be visually displayed in the submenu; and

cause the first marker to be displayed within the submenu.

32. The apparatus of claim 31, wherein the submenu is displayed in the first display area such that the submenu overlies the visual portion of the audio/visual program at a time when the visual portion of the audio/visual program is displayed on the display element within the first display area.

33. The apparatus of claim 31, wherein the racetrack menu and the submenu, together, surround a second display area occupying a subset of the first display area, and wherein the visual portion of the audio/visual program is displayed within the second display area such that no portion of either the racetrack menu or the submenu overlies the visual portion of the audio/visual program at a time when the audio/visual program is displayed on the display element.

34. The apparatus of claim 31, wherein the submenu has a ring shape having four sides that correspond to four sides of the ring shape of the racetrack menu.

35. The apparatus of claim 34, wherein the submenu is positioned relative to the racetrack menu such that the ring shape of the submenu is positioned concentrically within the ring shape of the racetrack menu.

36. The apparatus of claim 31, wherein the submenu has a spiral configuration having four sides that correspond to and are positioned adjacent to four sides of the ring shape of the racetrack menu, and having a fifth side that corresponds to and is positioned adjacent to one of the four sides of the submenu with that one of the four sides of the submenu being positioned between the fifth side and a portion of the racetrack menu.

37. The apparatus of claim 31, wherein the manually-operable control is a touch sensor having a touch-sensitive surface that is manually operable with a digit of a hand.

38. The apparatus of claim 37, further comprising the manually-operable control.

39. The apparatus of claim 37, wherein execution of the sequence of instructions by the processing device further causes the processing device to:

cause a second marker to be visually displayed in the vicinity of the first marker at a time when the first marker is positioned within one of the racetrack menu and the submenu, and in response to an indication of the digit touching the touch-sensitive surface; and

cause the second marker to be moved to a position relative to the first marker such that the position of the second marker relative to the first marker more precisely indicates the position where the digit is touching the touch-sensitive surface than does the position of the first marker in response to an indication of the digit moving about the touch-sensitive surface in a wiping motion.

40. The apparatus of claim 31, wherein execution of the sequence of instructions by the processing device further causes the processing device to:

in response to receiving an indication of the manually-operable control being operated to move the first marker, cause the first marker to be moved about the submenu menu and to be constrained to moving within the submenu; and

in response to receiving an indication of the manually-operable control being operated to select a second menu item of the second plurality of menu items that is in the vicinity of the first marker, select the second menu item.

41. The apparatus of claim 40, wherein the processing device alters a configuration setting affecting how the audio/visual program may be played in response to receiving an indication of the manually-operable control being operated to select the second menu item.

42. The apparatus of claim 40, wherein execution of the sequence of instructions by the processing device further causes the processing device to cause the first marker to be moved about the submenu in a manner in which the first marker snaps between being in the vicinity of one menu item of the second plurality of menu items and being in the vicinity of another menu item of the second plurality of menu items.

43. The apparatus of claim 40, wherein the processing device is further caused to operate an acoustic driver to acoustically output a sound at each instance of the first marker snapping between the vicinities of the one and the another menu items.

44. The apparatus of claim 31, wherein execution of the sequence of instructions by the processing device further causes the processing device to cause a second marker to be displayed within at least the submenu and in the vicinity of the first menu item of the racetrack menu to indicate a location within the submenu to which the first marker may be moved within the submenu to enable the first marker to be moved back to the racetrack menu.

45. The apparatus of claim 44, wherein the processing device is further caused to cause the submenu to cease to be displayed and to cause the first marker to be moved to a position within the racetrack menu in response to receiving an indication of the manually-operable control being operated to select the second marker.

46. The apparatus of claim 31, wherein execution of the sequence of instructions by the processing device further causes the processor to cause submenu to cease to be displayed and to cause the first marker to be moved to a position within the racetrack menu in response to the passage of a predetermined period of time without receiving any indication of the manually-operable control being operated.

47. A method comprising:

- visually displaying a racetrack menu having a ring shape on a display element that is capable of visually displaying both the racetrack menu and a visual portion of an audio/visual program such that the racetrack menu surrounds a first display area in which the visual portion of the audio/visual program may be visually displayed;

- visually displaying a first plurality of menu items in the racetrack menu;

- visually displaying a first marker in the racetrack menu;

- in response to receiving an indication of a manually-operable control associated with the racetrack menu being operated to move the first marker, moving the first marker about the racetrack menu and constraining movement of the first marker to remain within the racetrack menu; and

- in response to receiving an indication of the manually-operable control being operated to select a first menu item of the first plurality of menu items that is in the vicinity of the first marker, selecting the first menu item, wherein selecting the first menu item comprises:

- visually displaying a submenu within the first display area;

- visually displaying a second plurality of menu items in the submenu; and

- visually displaying the first marker within the submenu.

48. The method of claim 47, further comprising displaying the visual portion of the audio/visual program within the first display area, and displaying the submenu such that the submenu overlies the first display area.

49. The method of claim 47, wherein the racetrack menu and the submenu, together, surround a second display area occupying a subset of the first display area, the method comprising displaying the visual portion of the audio/visual program within the second display area such that no portion of either the racetrack menu or the submenu overlie the visual portion of the audio/visual program.

50. The method of claim 47, wherein the submenu has a ring shape having four sides that correspond to four sides of the ring shape of the racetrack menu.

51. The method of claim 50, wherein visually displaying the submenu within the first display area comprises positioning the submenu relative to the racetrack menu such that the ring shape of the submenu is positioned concentrically within the ring shape of the racetrack menu.

52. The method of claim 47, wherein the submenu has a spiral configuration having four sides that correspond to and are positioned adjacent to four sides of the ring shape of the racetrack menu, and having a fifth side that corresponds to and is positioned adjacent to one of the four sides of the submenu with that one of the four sides of the submenu being positioned between the fifth side and a portion of the racetrack menu.

53. The method of claim 47, further comprising:

in response to receiving an indication of the manually-operable control being operated to move the first marker, moving the first marker about the submenu menu and constraining movement of the first marker to remain within the submenu; and

in response to receiving an indication of the manually-operable control being operated to select a second menu item of the second plurality of menu items that is in the vicinity of the first marker, selecting the second menu item.

54. The method of claim 53, further comprising altering a configuration setting affecting how the audio/visual program may be played in response to receiving an indication of the manually-operable control being operated to select the second menu item.

55. The method of claim 53, further comprising moving the first marker about the submenu in a manner in which the first marker snaps between being in the vicinity of one menu item of the second plurality of menu items and being in the vicinity of another menu item of the second plurality of menu items.

56. The method of claim 47, wherein displaying the submenu within the first display area further comprises displaying a second marker within at least the submenu and in the vicinity of the first menu item of the racetrack menu to indicate a location within the submenu to which the first marker may be moved within the submenu to enable the first marker to be moved back to the racetrack menu.

57. The method of claim 56, further comprising ceasing to display the submenu and moving the first marker to a position within the racetrack menu in response to receiving an indication of the manually-operable control being operated to select the second marker.

58. The method of claim 47, further comprising ceasing to display the submenu and moving the first marker to a position within the racetrack menu in response to the passage of a predetermined period of time without receiving any indication of the manually-operable control being operated.

59. An apparatus comprising:

a display element capable of visually displaying a visual portion of an audio/visual program and a racetrack menu having a ring shape;

a processing device; and

a storage accessible to the processing device and storing a sequence of instructions that when executed by the processing device, causes the processing device to:

cause a first plurality of menu items to be visually displayed within a first portion of the display element;

cause a first marker to be visually displayed within the first portion of the display element; and

in response to receiving an indication of the first manually-operable control being operated to select a first menu item of the first plurality of menu items that is in the vicinity of the first marker, cause the first menu item to become displayable on the racetrack menu.

60. The apparatus of claim 59, wherein causing the first menu item to be displayable on the racetrack menu comprises further causing the processing device to display the first menu item on the racetrack menu as one of a second plurality of menu items displayed on the racetrack menu at a time when the sequence of instructions further causes the processing device to cause the racetrack menu to be displayed on the display element.

61. The apparatus of claim 60, wherein the processing device is further caused by the sequence of instructions to display the racetrack menu within a second portion of the display element adjacent the first portion of the display element and simultaneously with the display of the first plurality of menu items within the first portion.

62. The apparatus of claim 61, wherein:

the second portion surrounds the first portion; and

the first plurality of menu items is displayed within the first portion with the racetrack menu displayed within the second portion so as to surround the first plurality of menu items displayed within the first portion.

63. The apparatus of claim 60, wherein:

the racetrack menu has a geometric shape comprised of a plurality of sides comprising a first side and a second side;

the processing device is caused to display the first plurality of menu items divided among a plurality of scrollable columns of menu items comprising a first column and a second column;

the first column corresponds to the first side and the second column corresponds to the second side;

the first menu item is displayed within the first column; and

in response to receiving an indication of the manually-operable control being operated to select the first menu item, the processing device is further caused by the sequence of instructions to cause the first menu item to become displayable within the first side of the racetrack menu.

64. The apparatus of claim 60, wherein:

the racetrack menu has a geometric shape comprised of a plurality of sides comprising a first side, a second side and a third side;

the processing device is caused to display the first plurality of menu items divided among a plurality of scrollable columns of menu items comprising a first column and a second column;

the first column corresponds to the first side;

the second column corresponds to the second side and third side;

the first menu item is displayed within the second column; and

in response to receiving an indication of the manually-operable control being operated to select the first menu item, the processing device is further caused by the sequence of instructions to cause the first menu item to become displayable within the second side in response to there being a lesser quantity of menu items of the second plurality of menu items being displayed on the second side than the quantity of menu items of the second plurality of menu items being displayed on the third side so as to balance the quantities of menu items being displayed on the second and third sides.

65. A method comprising:

visually displaying a first plurality of menu items within a first portion of a display element that is capable of visually displaying a visual portion of an audio/visual program and a user interface comprising a menu;

visually displaying a first marker among the first plurality of menu items and positioned in the vicinity of one of the menu items of the first plurality of menu items;

simultaneously with visually displaying the first plurality of menu items, visually displaying the menu within a second portion of the display element, where the second portion is adjacent the first portion;

visually displaying a second plurality of menu items within the menu;

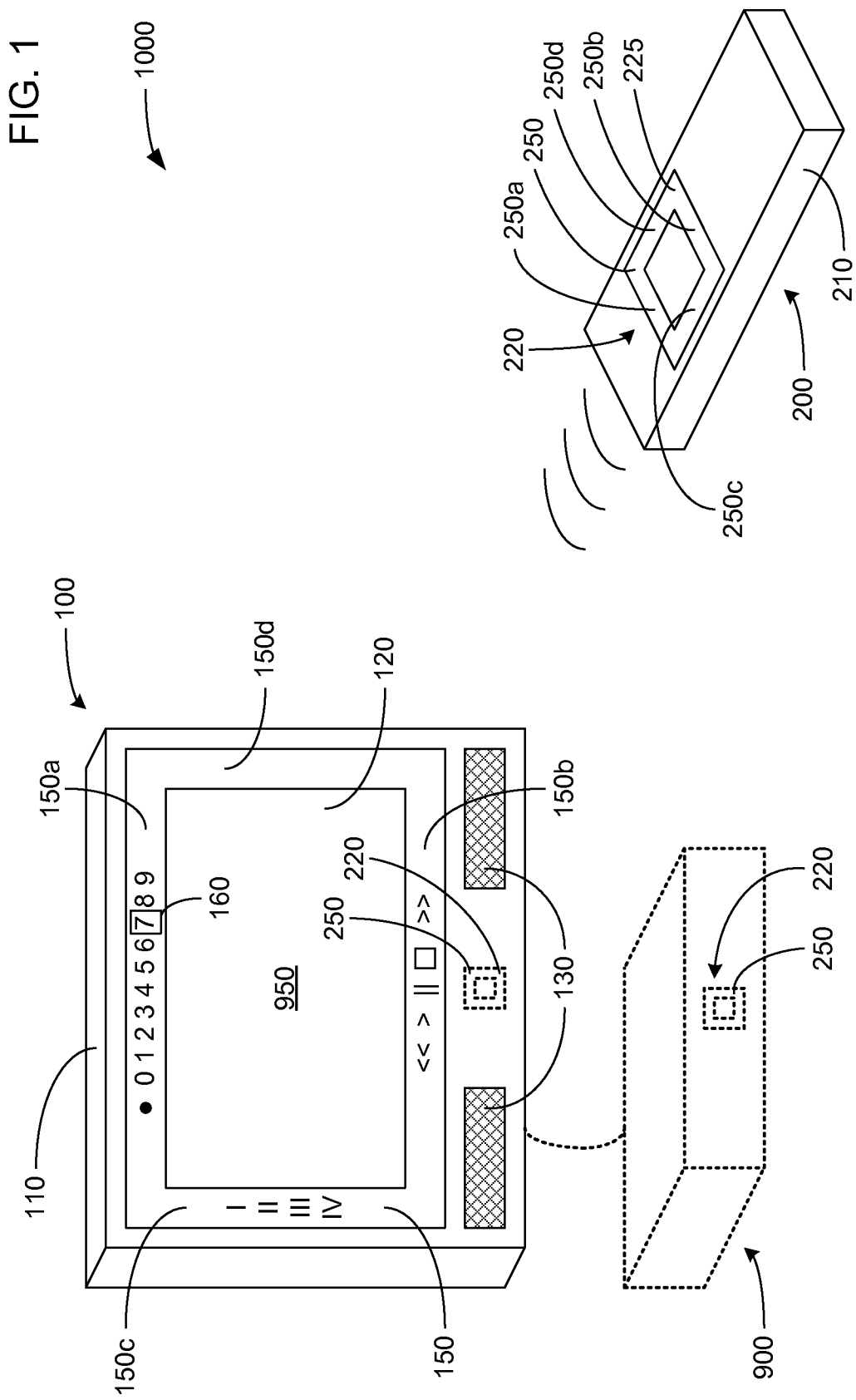
visually displaying a second marker among the second plurality of menu items and positioned in the vicinity of one of the menu items of the second plurality of menu items; and

in response to receiving an indication of the first manually-operable control being operated to select a first menu item of the first plurality of menu items that is in the vicinity of the first marker, wherein the first menu item is not displayed on the menu, display the first menu item on the menu as part of the second plurality of menu items.

66. The method of claim 65, further comprising in response to receiving an indication of the first manually-operable control again being operated to select the first menu item of the first plurality of menu items that is in the vicinity of the first marker, wherein the first menu item is displayed on the menu as one of the second plurality of menu items, removing the first menu item from being displayed on the menu as one of the second plurality of menu items.

67. The method of claim 65, further comprising in response to receiving an indication of the second manually-operable control being operated to select a second menu item of the second plurality of menu items that is in the vicinity of the second marker, removing the second menu item from being displayed on the menu.

68. The method of claim 67, further comprising displaying the second menu item within the first portion as one of the first plurality of menu items, in response to receiving the indication of the second manually-operable control being operated to select the second menu item of the second plurality of menu items.



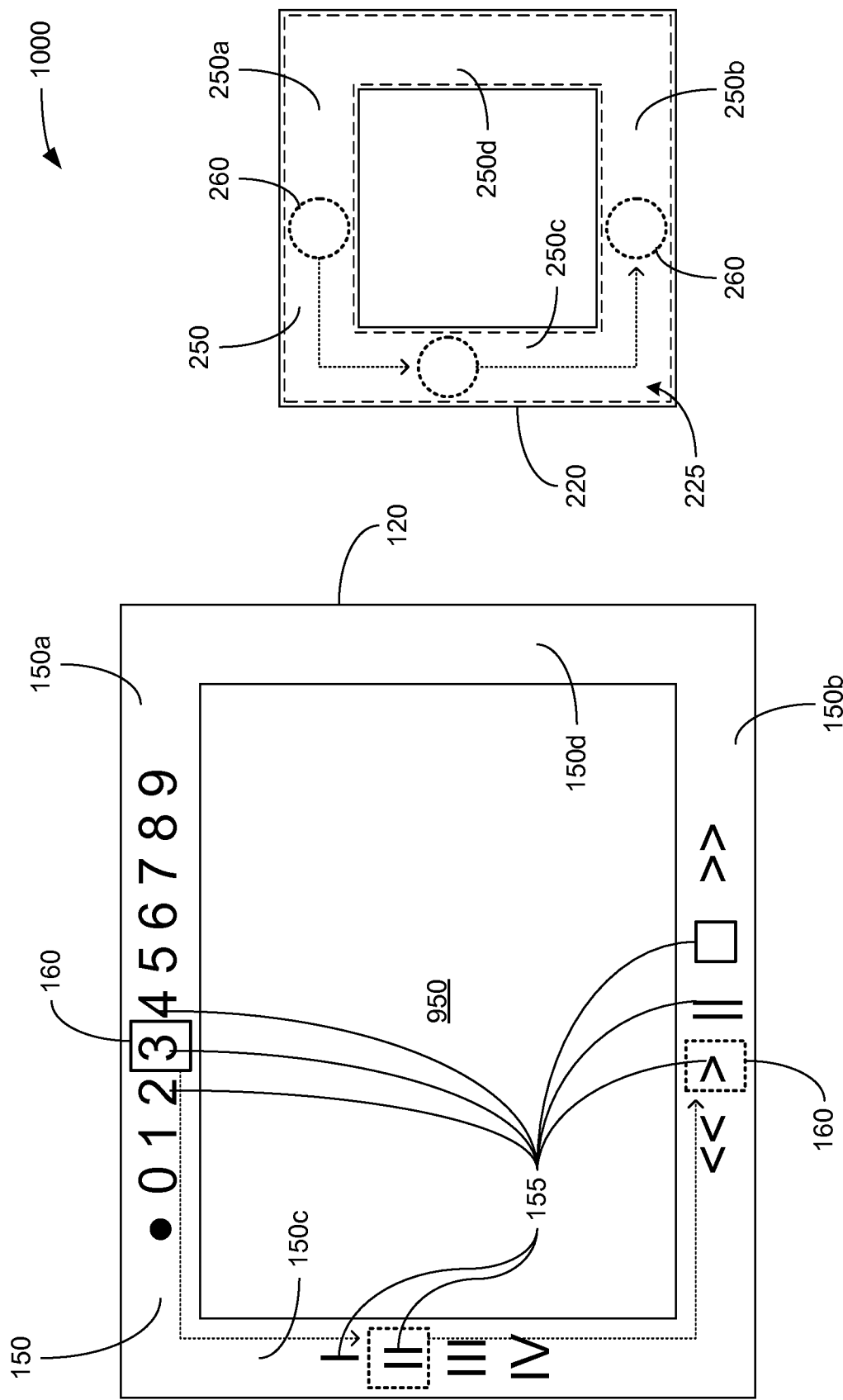


FIG. 2

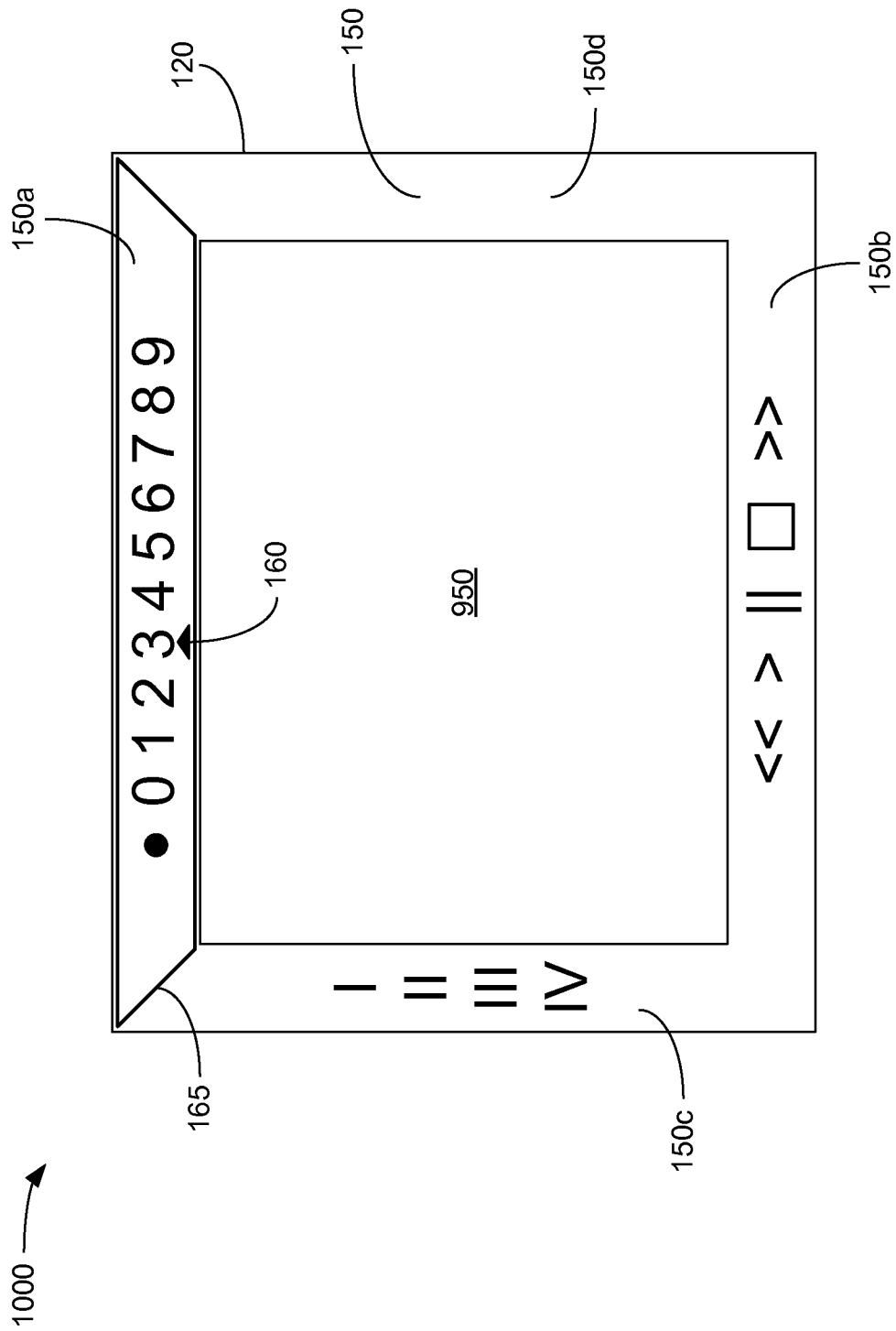


FIG. 3a

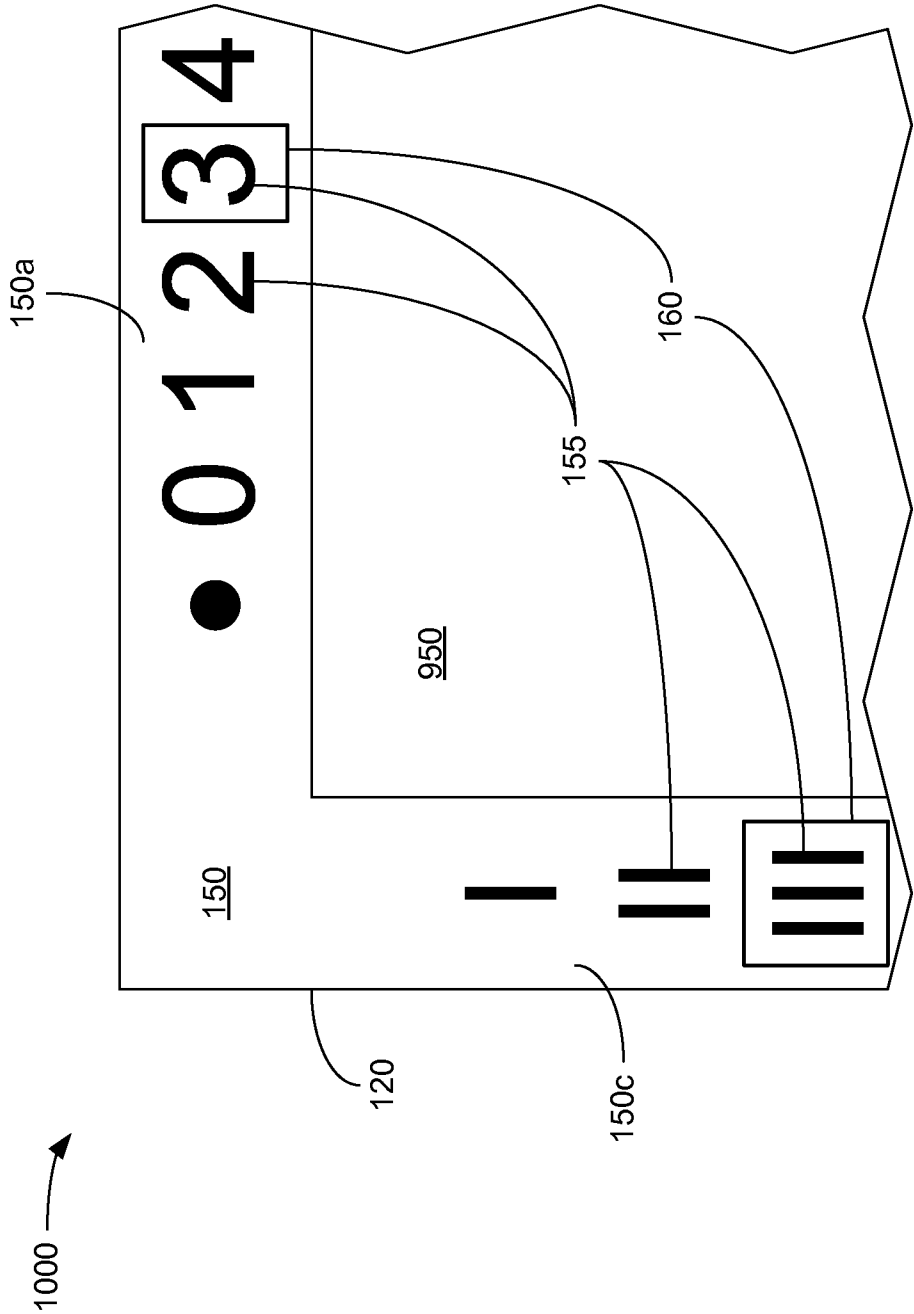


FIG. 3b

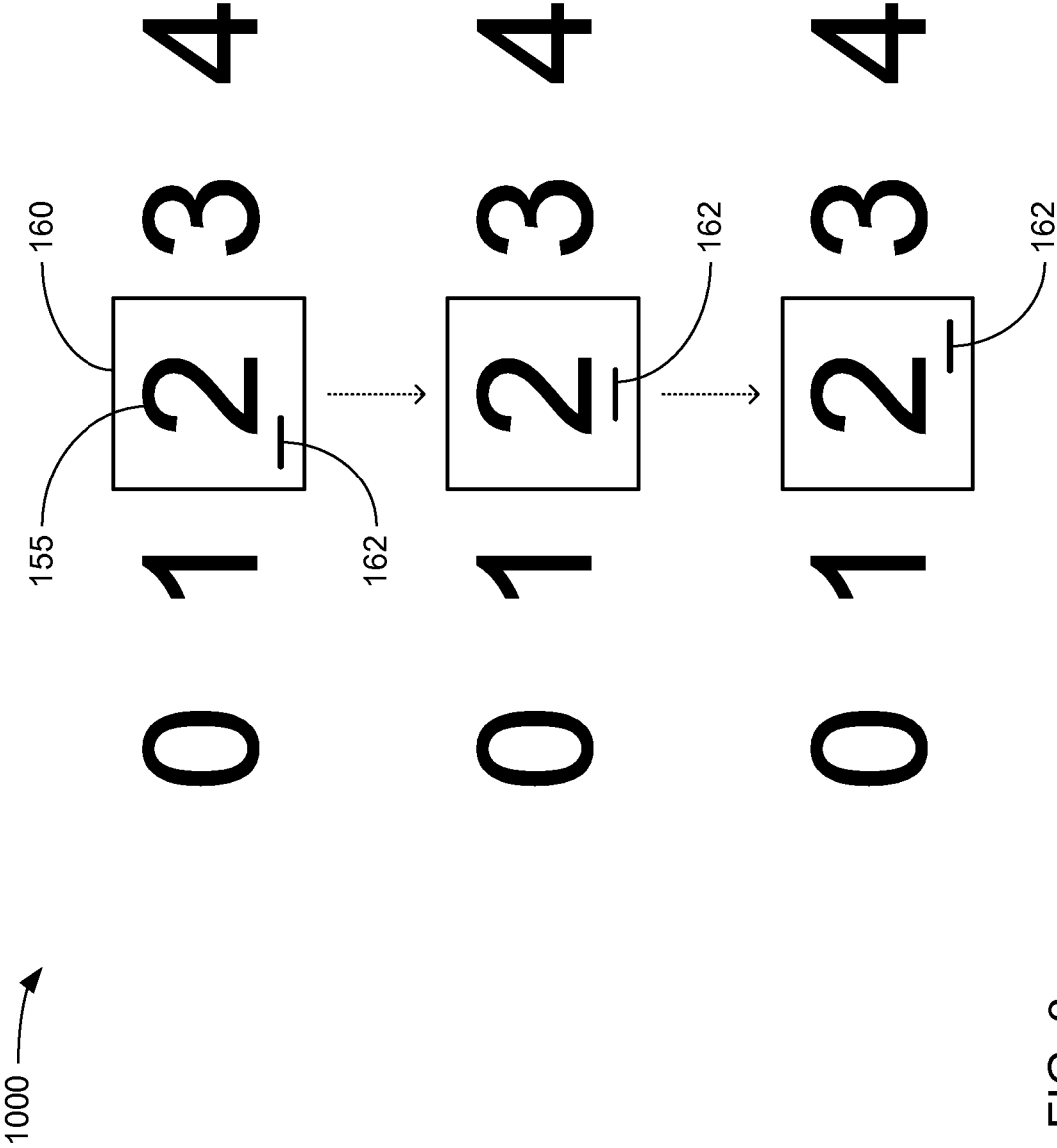


FIG. 3c

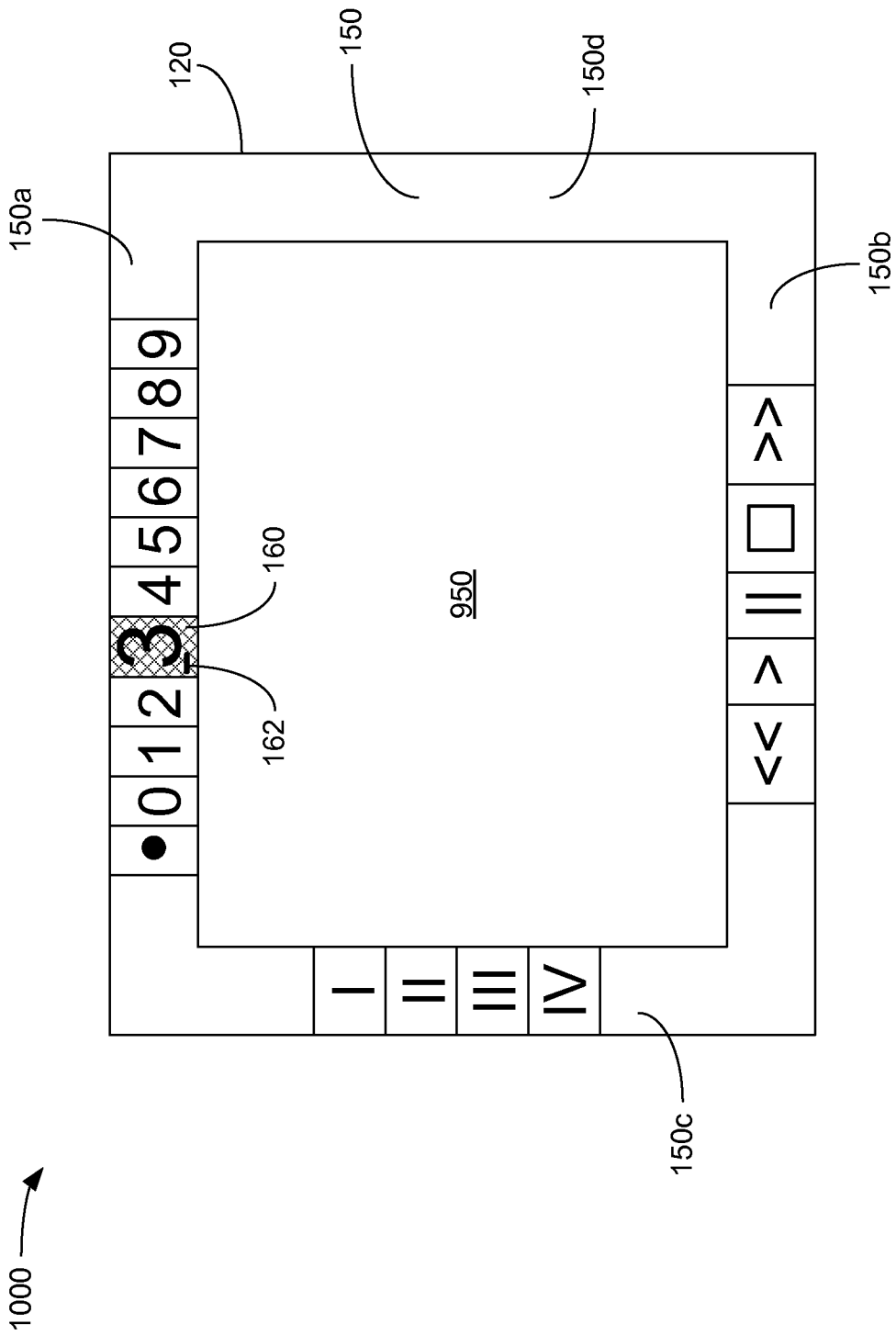


FIG. 3d

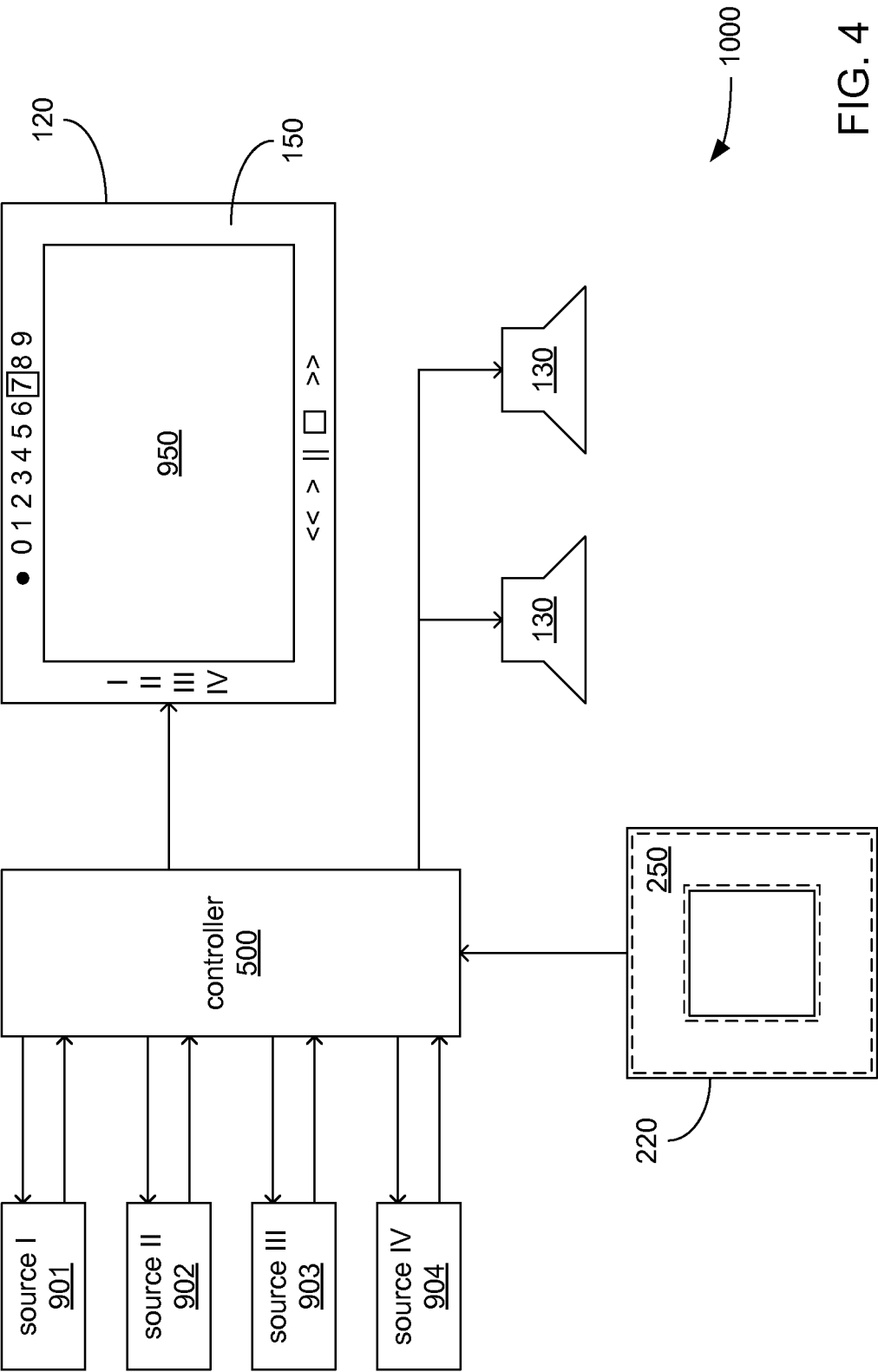


FIG. 4

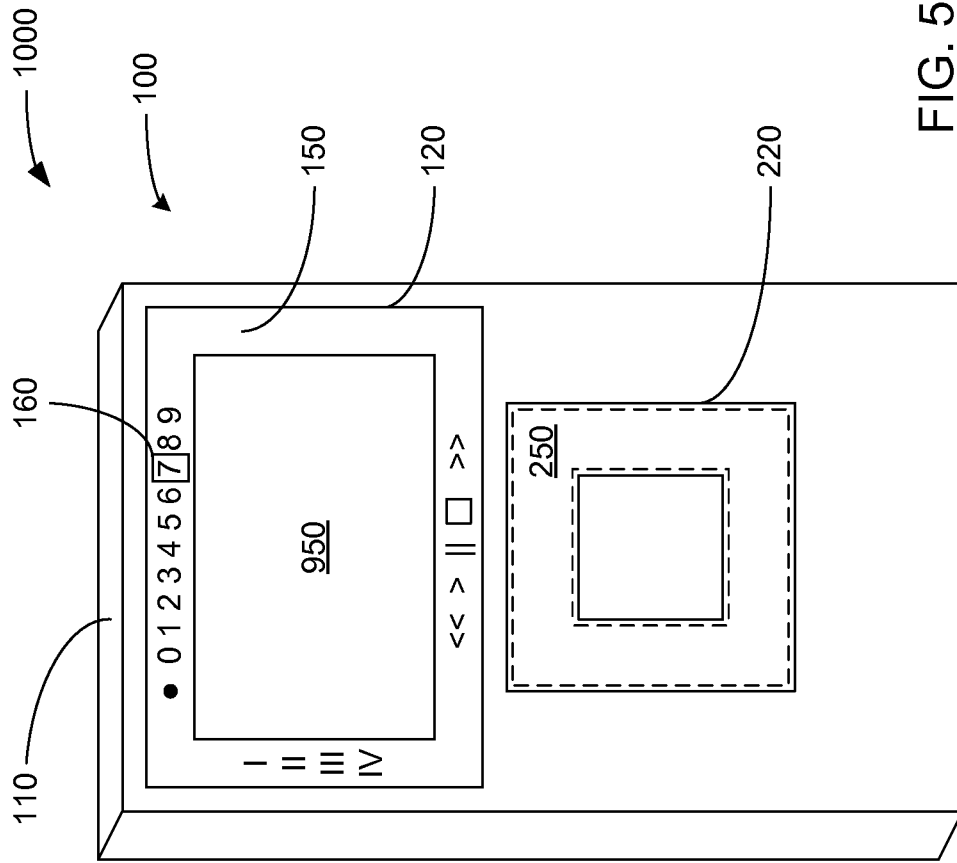


FIG. 5

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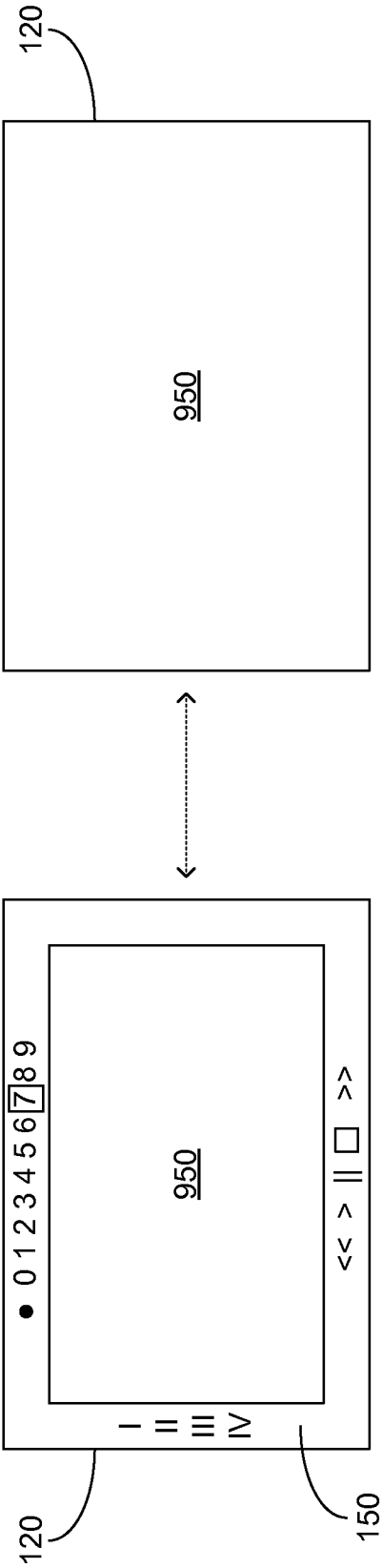
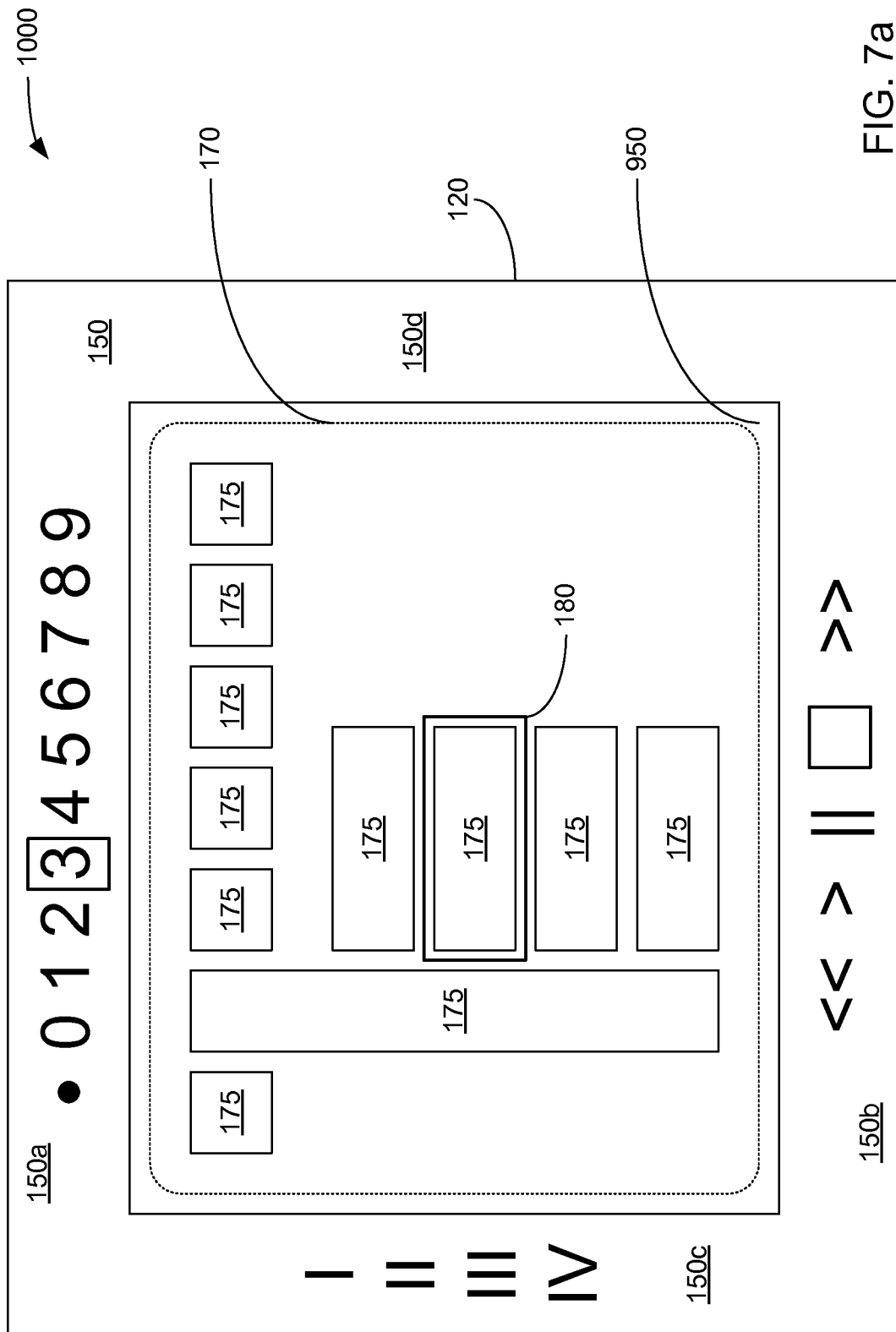


FIG. 6

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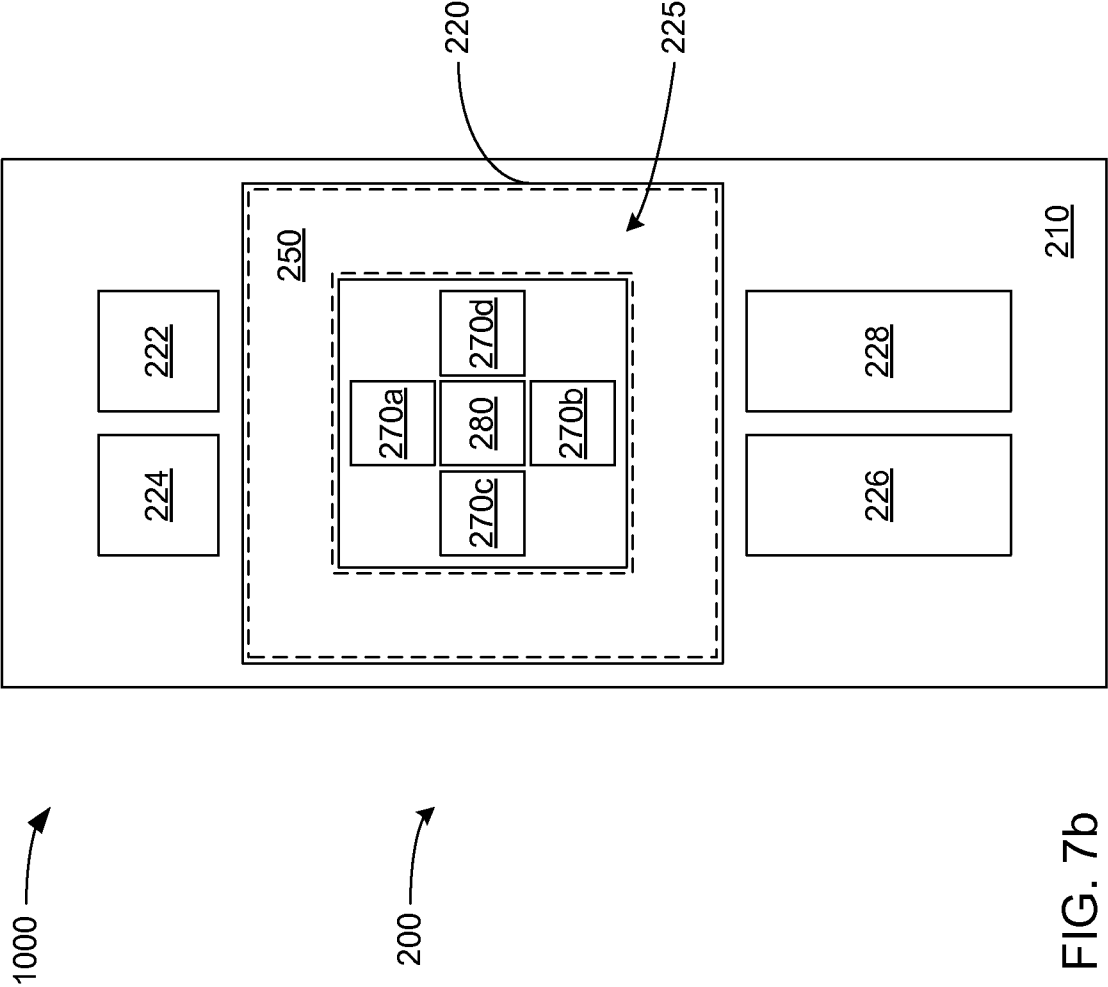


FIG. 7b

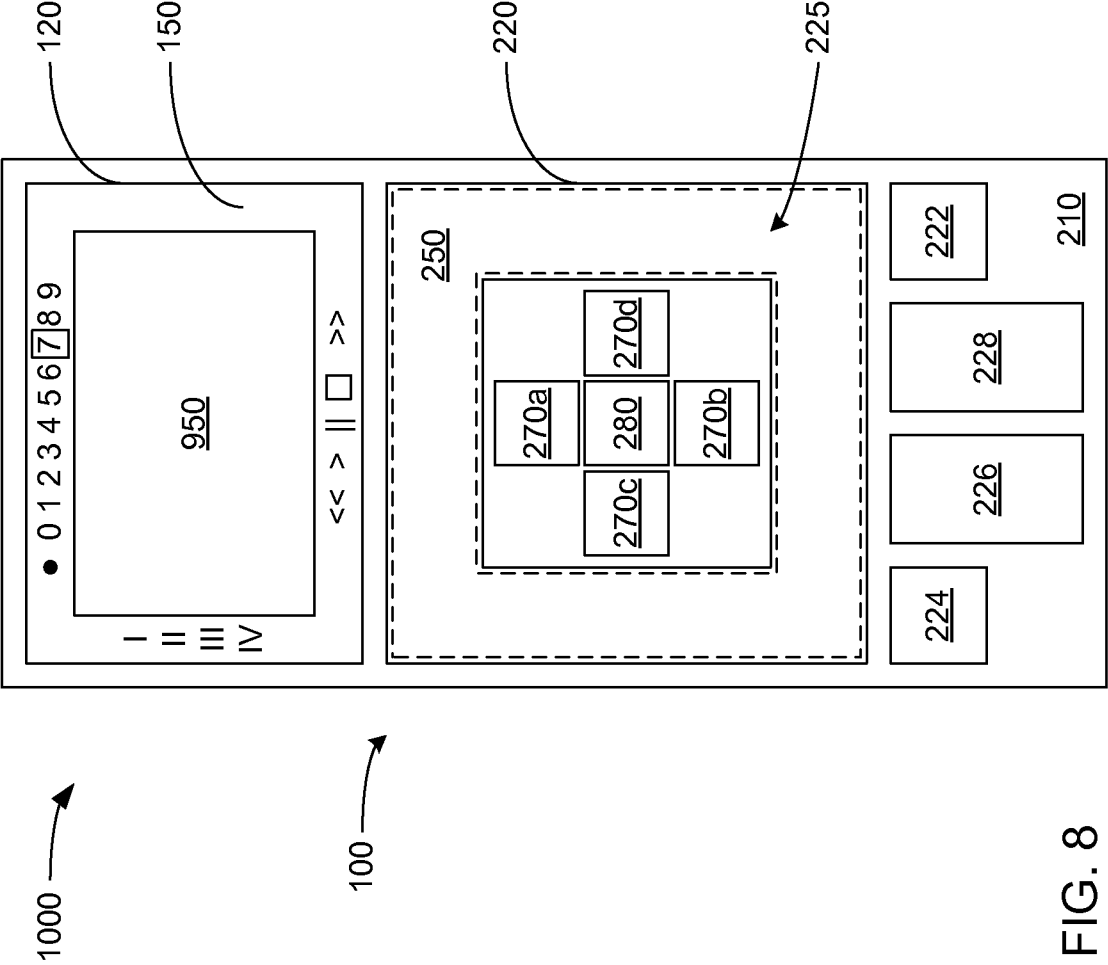


FIG. 8

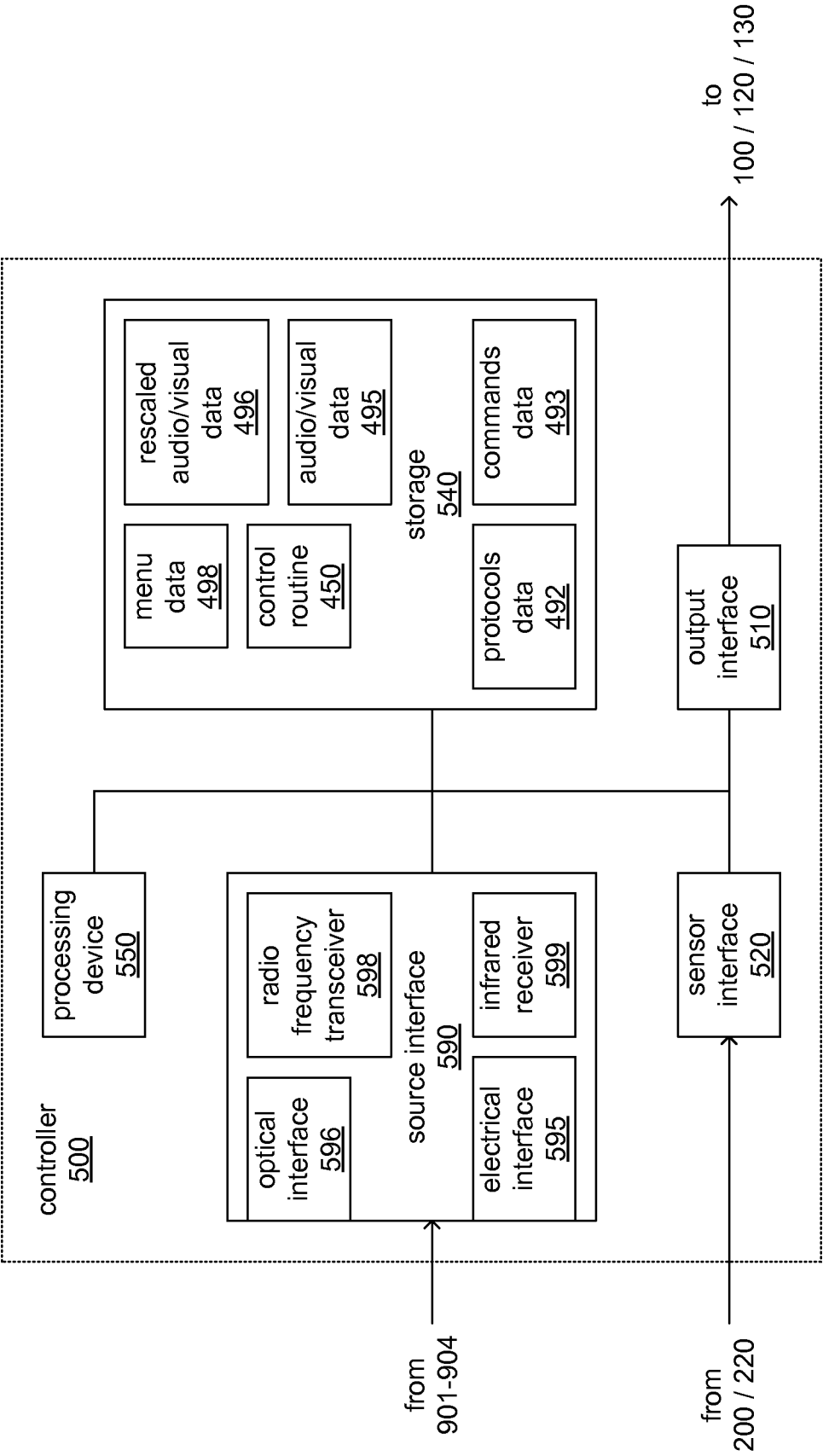


FIG. 9

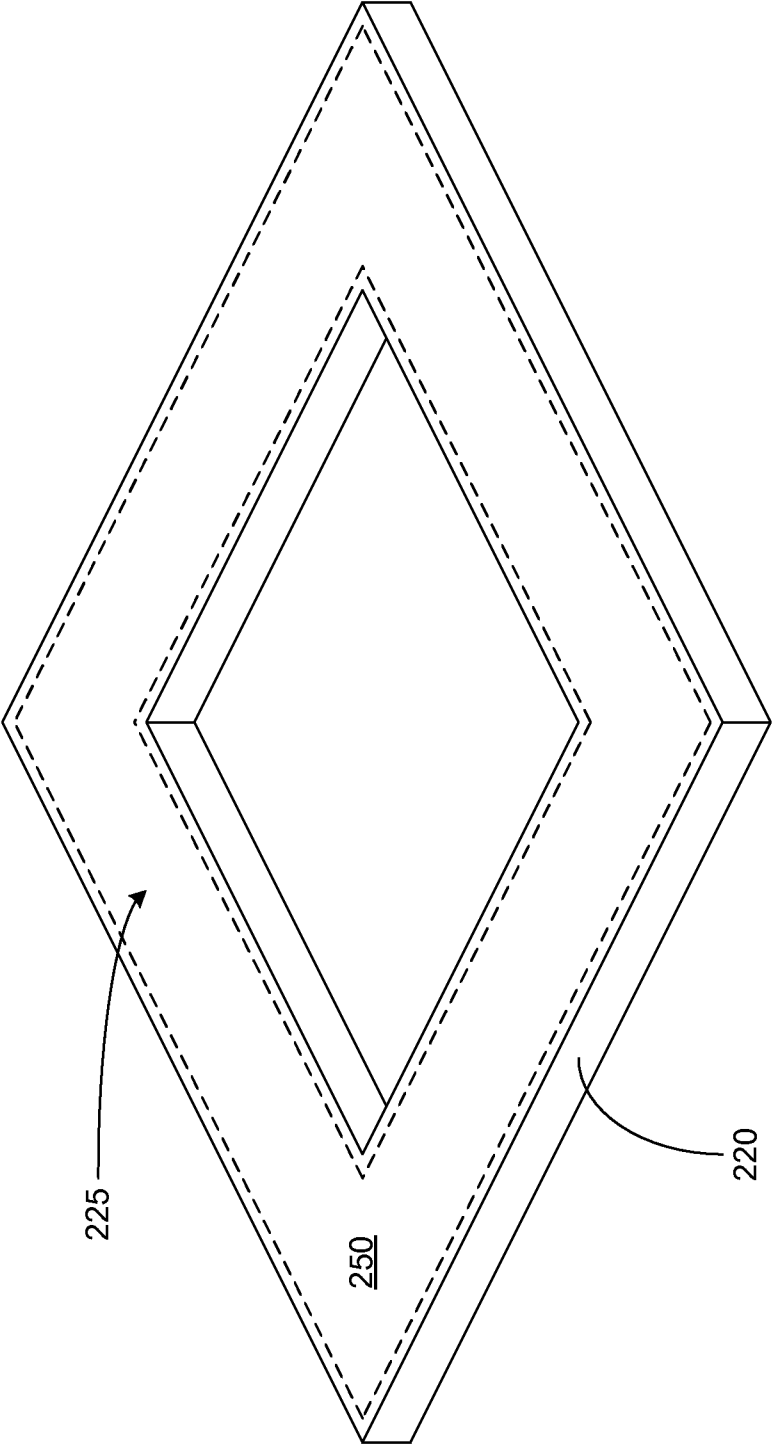


FIG. 10a

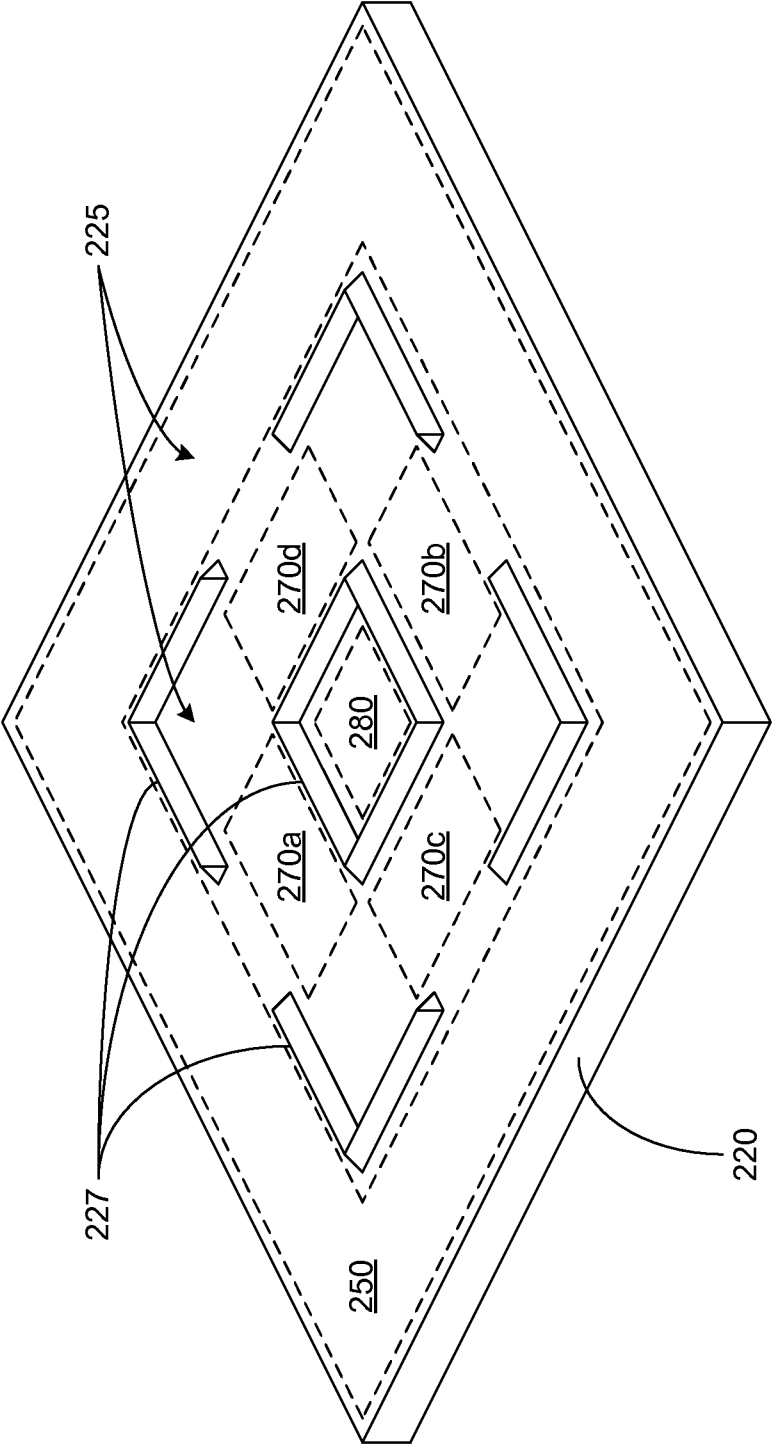


FIG. 10b

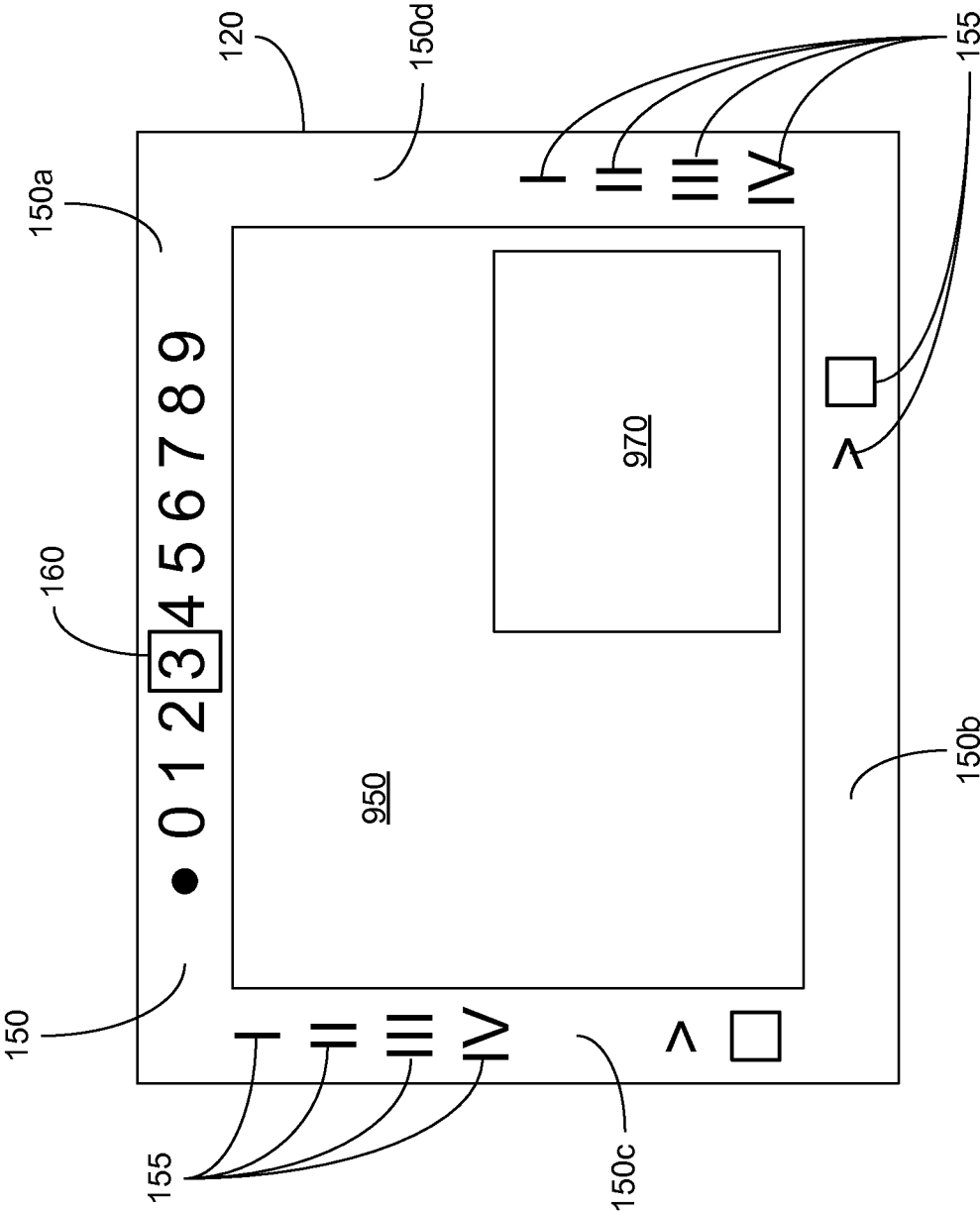


FIG. 11a

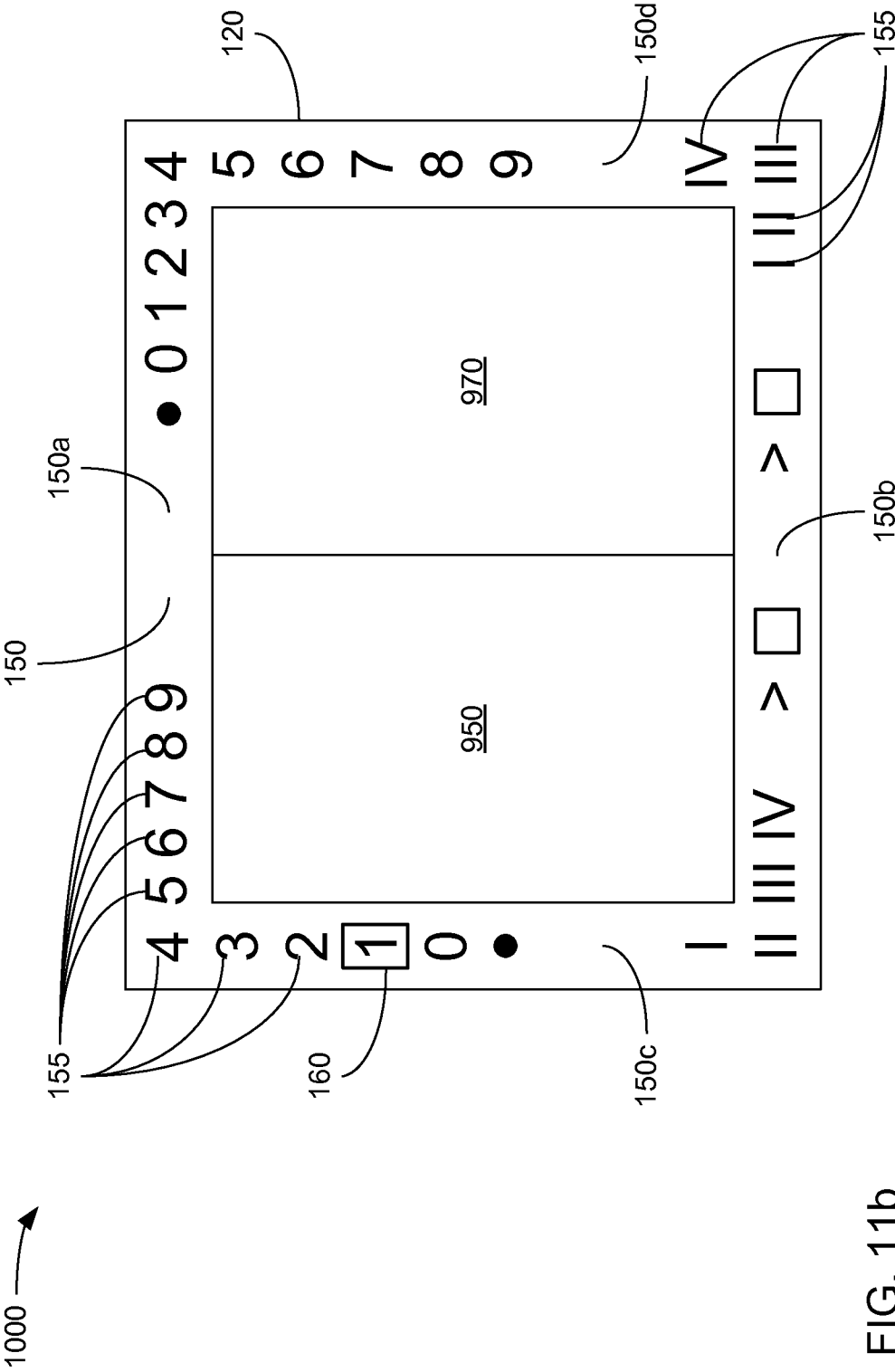


FIG. 11b

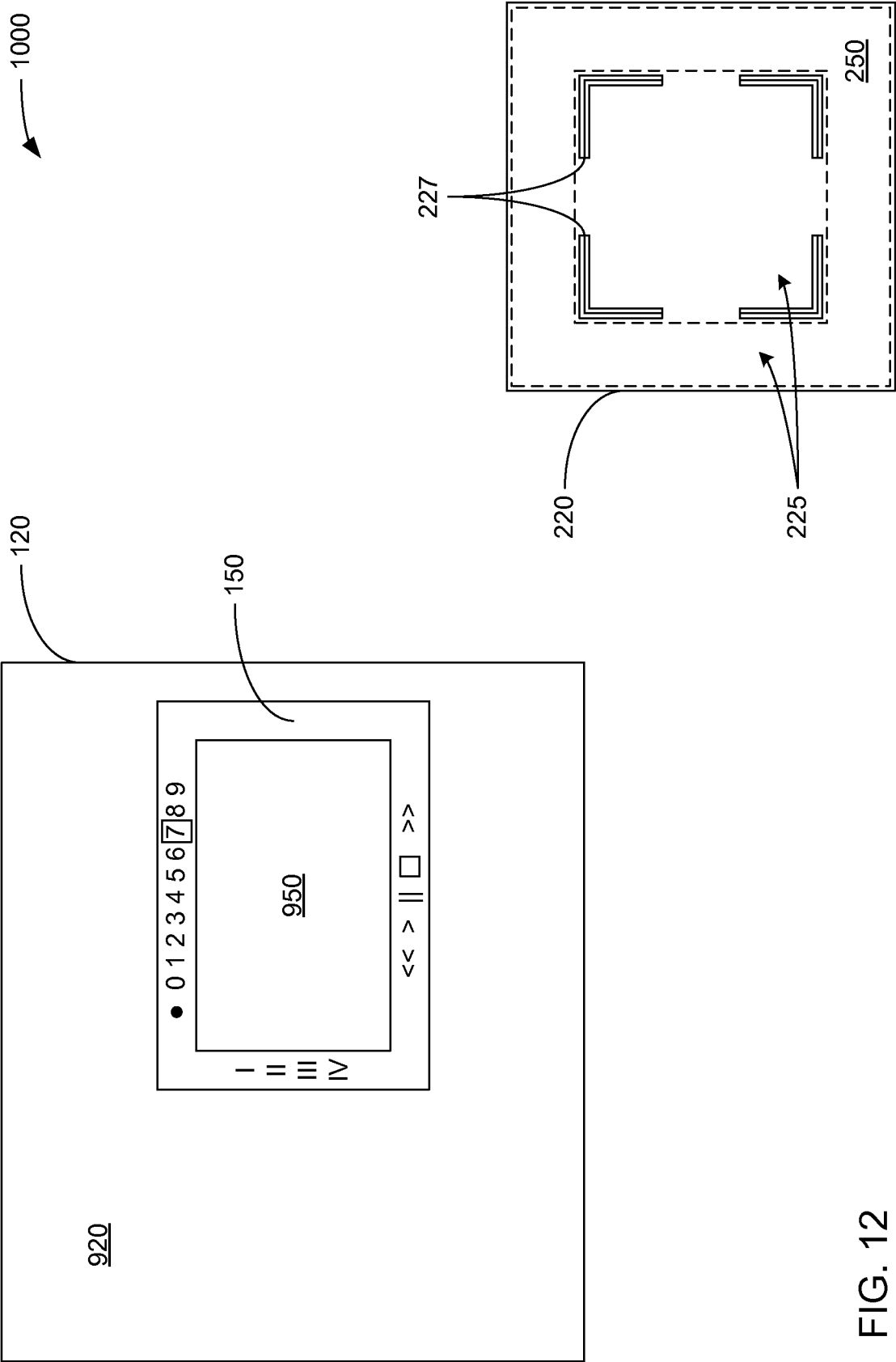
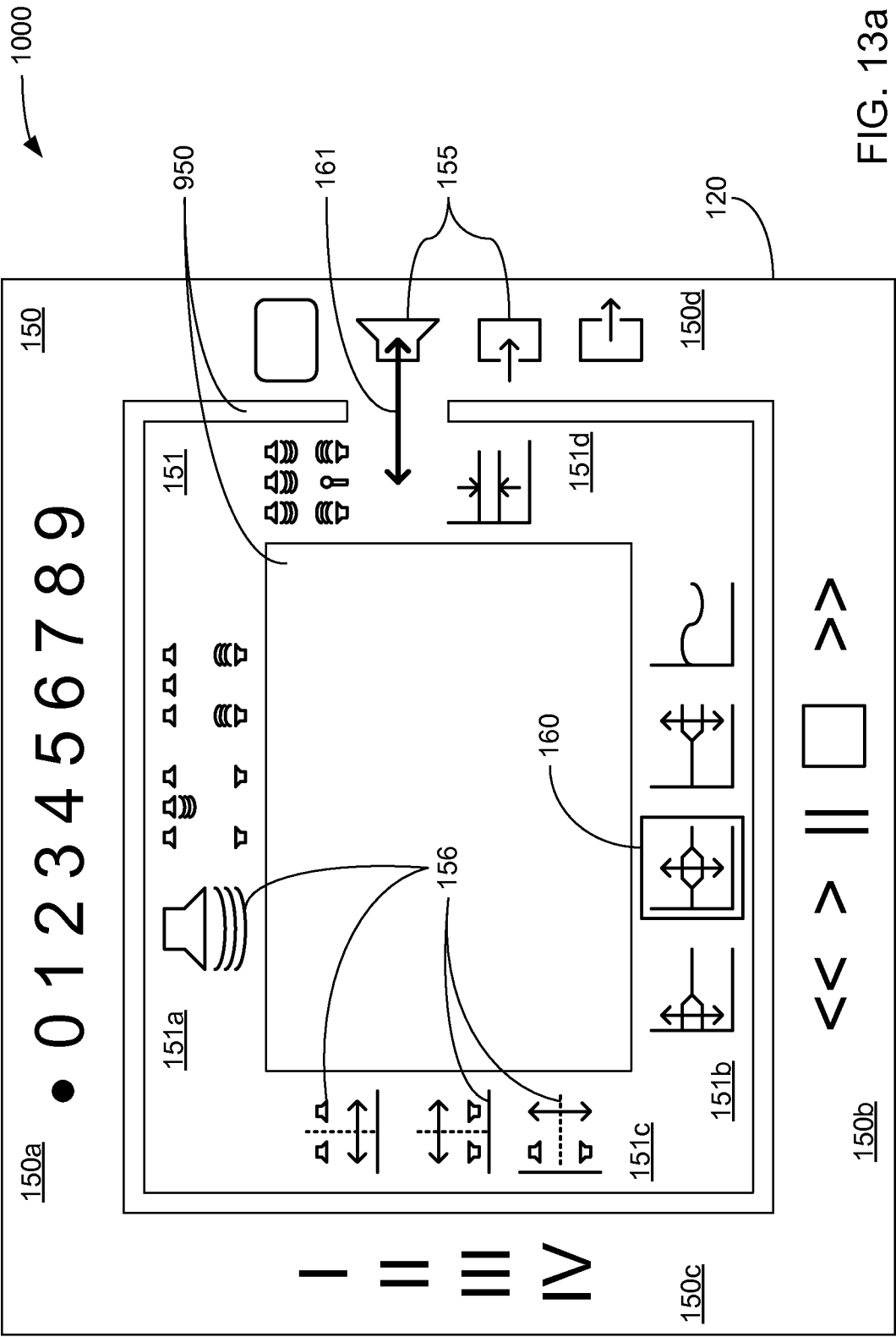


FIG. 12



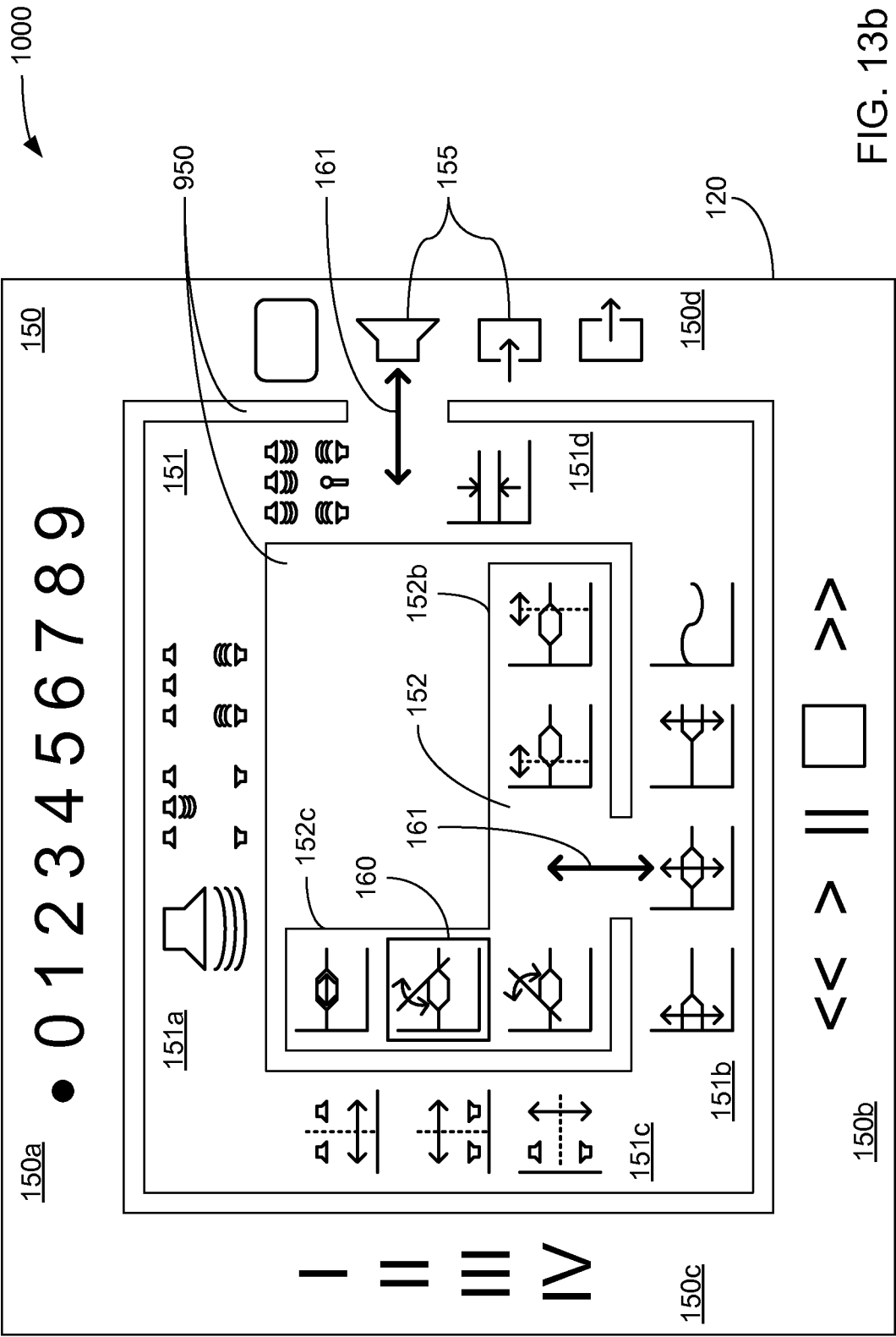


FIG. 13b

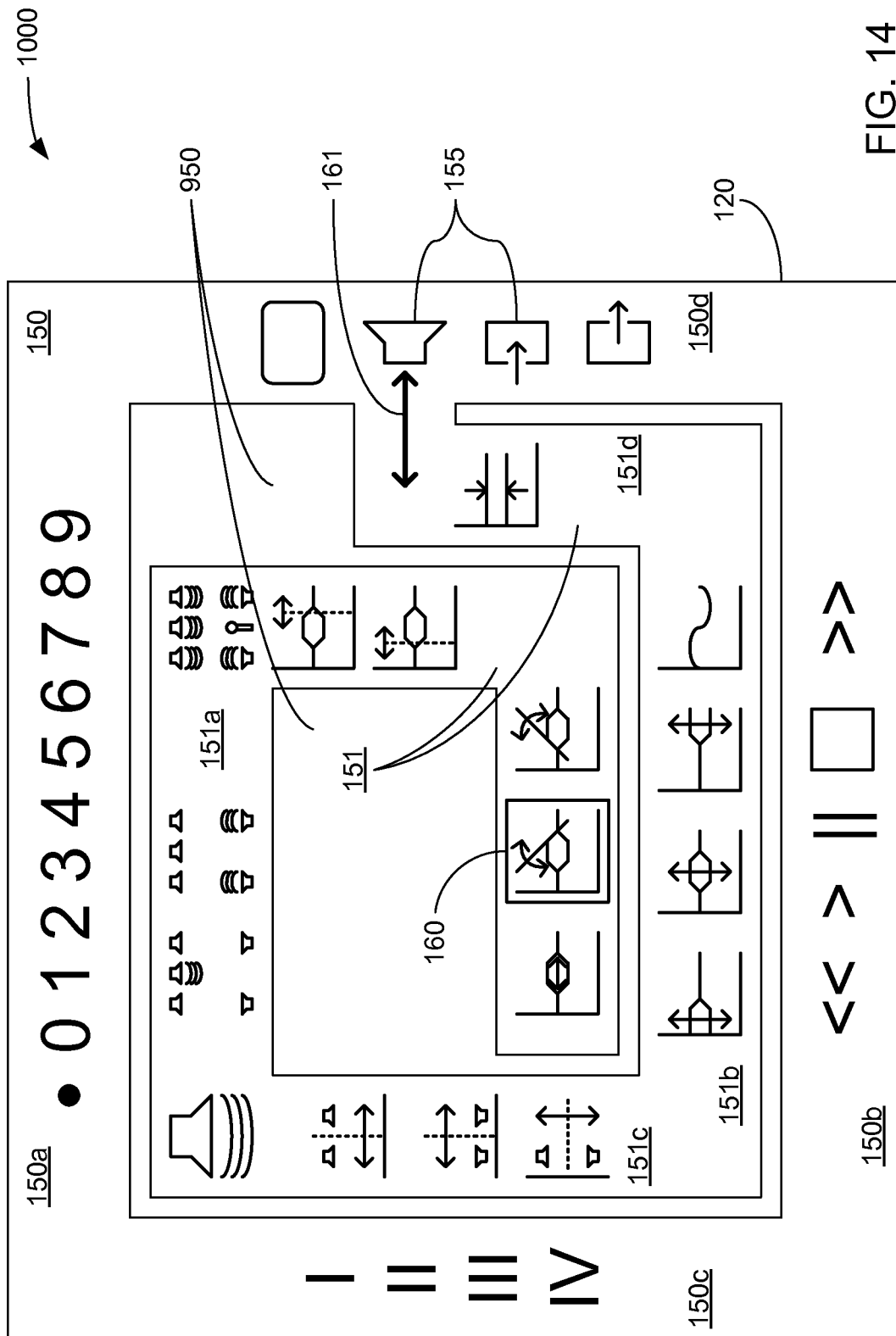


FIG. 14

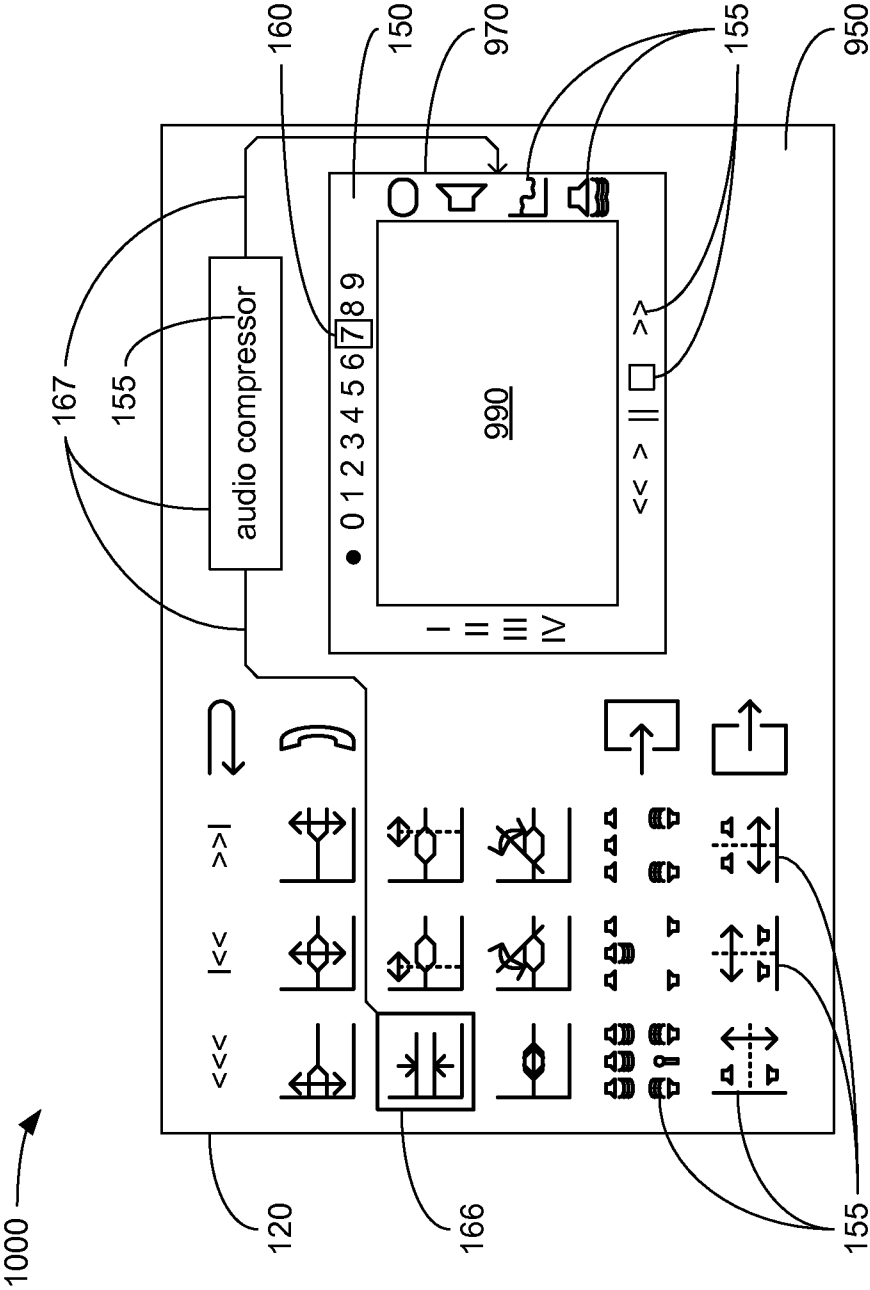
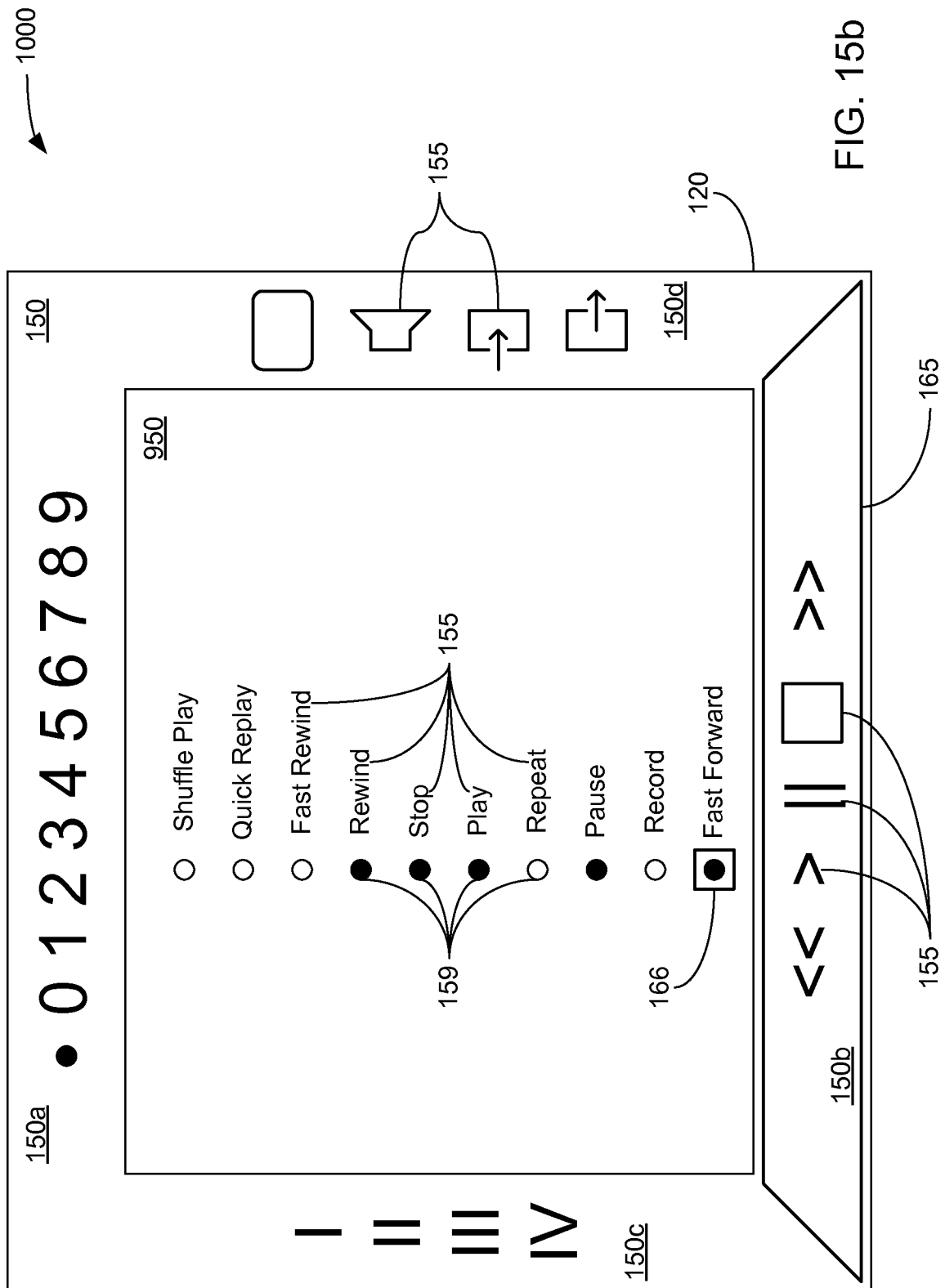


FIG. 15a



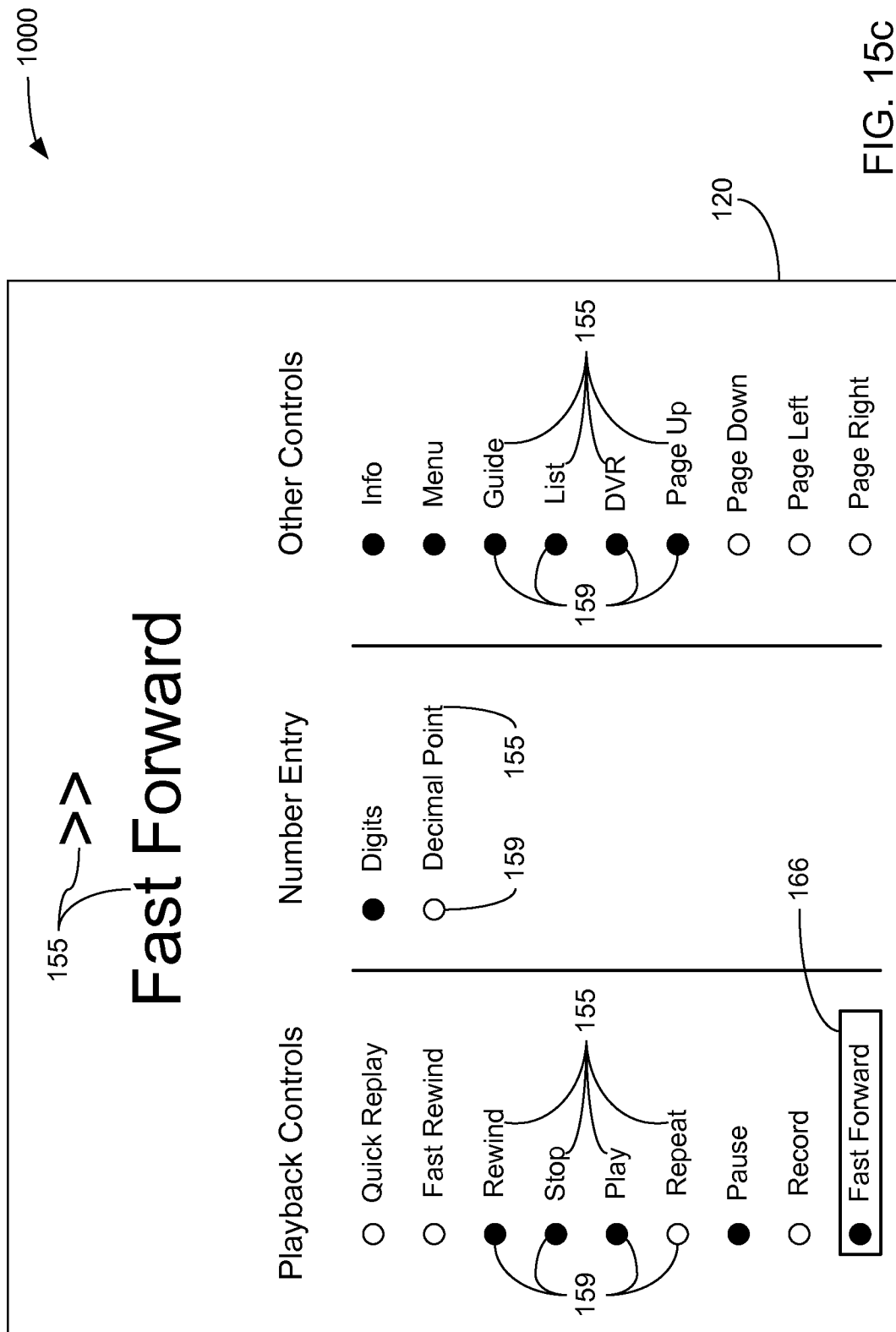


FIG. 15C

INTERNATIONAL SEARCH REPORT

International application No
PCT/US2010/054612

A. CLASSIFICATION OF SUBJECT MATTER

INV. G06F3/048 G06F3/033 H04N5/44

According to International Patent Classification (IPC) or to both national classification and IPC

B. FIELDS SEARCHED

Minimum documentation searched (classification system followed by classification symbols)

G06F H04N

Documentation searched other than minimum documentation to the extent that such documents are included in the fields searched

Electronic data base consulted during the international search (name of data base and, where practical, search terms used)

EP0-Internal

C. DOCUMENTS CONSIDERED TO BE RELEVANT

Category*	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
X	EP 1 655 953 A1 (MATSUSHITA ELECTRIC IND CO LTD [JP]) 10 May 2006 (2006-05-10) abstract figures 1-3,8-41 -----	1-64
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X	WO 2008/038882 A1 (LG ELECTRONICS INC [KR]; LEE JAE KYUNG [KR]; HEO JI MIN [KR]) 3 April 2008 (2008-04-03) abstract page 23, line 14 - page 27, line 17; figures 1,3A-3E,10A-10E, 11 ----- -/--	1-64



Further documents are listed in the continuation of Box C.



See patent family annex.

* Special categories of cited documents :

"A" document defining the general state of the art which is not considered to be of particular relevance

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"L" document which may throw doubts on priority claim(s) or which is cited to establish the publication date of another citation or other special reason (as specified)

"O" document referring to an oral disclosure, use, exhibition or other means

"P" document published prior to the international filing date but later than the priority date claimed

"T" later document published after the international filing date or priority date and not in conflict with the application but cited to understand the principle or theory underlying the invention

"X" document of particular relevance; the claimed invention cannot be considered novel or cannot be considered to involve an inventive step when the document is taken alone

"Y" document of particular relevance; the claimed invention cannot be considered to involve an inventive step when the document is combined with one or more other such documents, such combination being obvious to a person skilled in the art.

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Date of the actual completion of the international search

8 February 2011

Date of mailing of the international search report

08/04/2011

Name and mailing address of the ISA/

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Authorized officer

Schneider, Michael

INTERNATIONAL SEARCH REPORT

International application No

PCT/US2010/054612

C(Continuation). DOCUMENTS CONSIDERED TO BE RELEVANT

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A	EP 1 944 677 A2 (LG ELECTRONICS INC [KR]) 16 July 2008 (2008-07-16) figures 1-14 -----	1-64
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A	US 5 508 703 A (OKAMURA RYO [JP] ET AL) 16 April 1996 (1996-04-16) abstract claim 1; figures 1-4 -----	1-64
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A	EP 0 838 945 A2 (MATSUSHITA ELECTRIC IND CO LTD [JP]) 29 April 1998 (1998-04-29) abstract figures 12, 13, 15, 17 -----	1-64

INTERNATIONAL SEARCH REPORT

International application No.
PCT/US2010/054612

Box No. II Observations where certain claims were found unsearchable (Continuation of item 2 of first sheet)

This international search report has not been established in respect of certain claims under Article 17(2)(a) for the following reasons:

1. ☐ Claims Nos.:
because they relate to subject matter not required to be searched by this Authority, namely:
2. ☐ Claims Nos.:
because they relate to parts of the international application that do not comply with the prescribed requirements to such an extent that no meaningful international search can be carried out, specifically:
3. ☐ Claims Nos.:
because they are dependent claims and are not drafted in accordance with the second and third sentences of Rule 6.4(a).

Box No. III Observations where unity of invention is lacking (Continuation of item 3 of first sheet)

This International Searching Authority found multiple inventions in this international application, as follows:

see additional sheet

1. ☐ As all required additional search fees were timely paid by the applicant, this international search report covers all searchable claims.
2. ☐ As all searchable claims could be searched without effort justifying an additional fees, this Authority did not invite payment of additional fees.
3. ☐ As only some of the required additional search fees were timely paid by the applicant, this international search report covers only those claims for which fees were paid, specifically claims Nos.:
4. ☒ No required additional search fees were timely paid by the applicant. Consequently, this international search report is restricted to the invention first mentioned in the claims; it is covered by claims Nos.:

1-64

Remark on Protest

- ☐ The additional search fees were accompanied by the applicant's protest and, where applicable, the payment of a protest fee.
- ☐ The additional search fees were accompanied by the applicant's protest but the applicable protest fee was not paid within the time limit specified in the invitation.
- ☐ No protest accompanied the payment of additional search fees.

FURTHER INFORMATION CONTINUED FROM PCT/ISA/ 210

This International Searching Authority found multiple (groups of) inventions in this international application, as follows:

1. claims: 1-64

Subject-matter related to visually displaying a racetrack menu having a ring-shape and constraining movement of a marker to remain within the racetrack menu.

2. claims: 65-68

Subject-matter related to visually displaying a first plurality of menu items and a second plurality of menu items.

INTERNATIONAL SEARCH REPORT

Information on patent family members

International application No

PCT/US2010/054612

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