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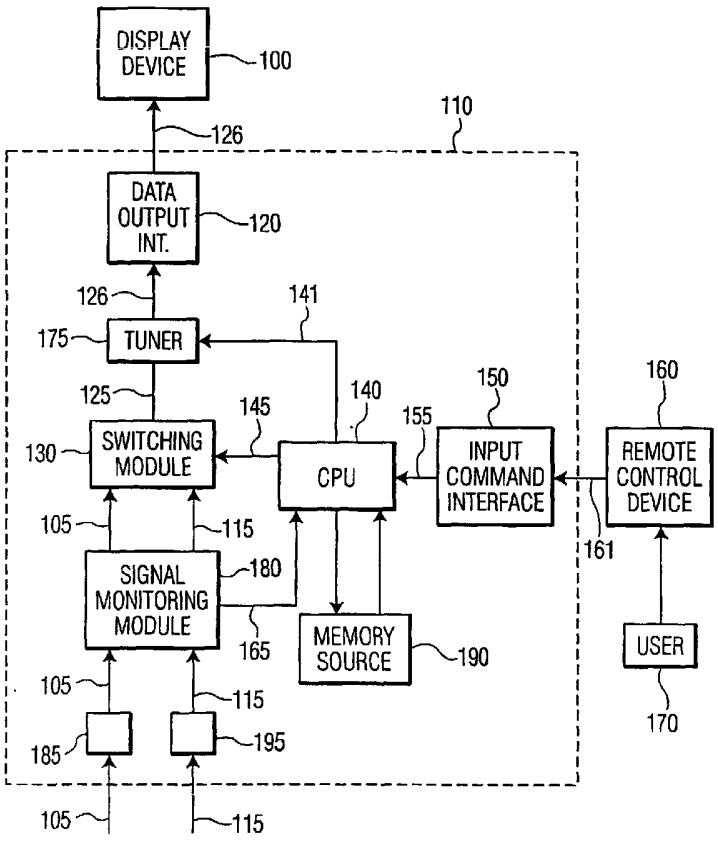
(54) Title: APPARATUS AND METHODS FOR SWITCHING TO AN INTERACTIVE APPLICATION MODE FROM A TELEVISION PROGRAM MODE



(57) Abstract: An apparatus and method for displaying at least two modes comprising an interactive application mode and a television program mode on a display device. In one aspect the apparatus comprises: a television program signal receiver; an interactive application signal receiver; means for switching between said television program mode and said interactive application mode being active in said display device; means to receive remote control signals from a remote control device having a mute key for generating a mute signal; means to enable a mute-to-interactive application feature; and wherein when said mute-to-interactive application feature is enabled and said television program mode is active in said display device, upon receipt of said mute signal, said mode switching means is activated causing said interactive application mode to be active in said display device.

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APPARATUS AND METHODS FOR SWITCHING TO AN INTERACTIVE APPLICATION MODE FROM A TELEVISION PROGRAM MODE

Cross-Reference to Related Application

[0001] This application claims the benefit of United States Provisional Application 60/371,949, filed April 11, 2002.

Technical Field of the Invention

[0002] This invention relates generally to the field of television receivers capable of receiving and displaying television program signals and interactive application signals, such as the Internet, and specifically to apparatus and methods for switching between television program mode and interactive application mode for display on television screens or other display devices.

Background Art

[0003] The television industry has seen rapid development in the number of ways in which television programming can be delivered to and received by individual television sets in homes. While at one time, the only means for providing television programming signal to a television set was through the use of broadcasting signals and antenna reception, recent years have seen the development of cable and satellite transmission. These improved transmission methods have not only increased the quality of television viewing but have the ability to provide increased amounts and different kinds of data to the individual television for viewing and/or interacting. For example, it is now common for Internet access to be supplied through the same cable and/or transmission methods used to provide television program signals.

[0004] In order to display the various kinds of incoming signals/data on a television screen for a user in tangible form, various kinds of hardware and software, commonly referred to as receivers, are needed to decipher and/or decode the incoming signals. Receivers can be manufactured to be separate from television and set atop the television or can be built directly into the television itself. Many receivers have multiple ports for simultaneously receiving

various kinds of incoming signals to be displayed on the television screen, such as television program signals, Internet data signals, or a signal from any type of local device, such as a VCR, a DVD player, or a popular video game console. However, because of the limited display area available on a television screen, it is common that only one type of signal be displayed on the television screen at any one time. While television sets do exist that have picture-in-picture capabilities that allow more than one signal to be displayed at once, only one signal is displayed in the primary display area of the television screen at any one time. Television viewers rarely view a program or any other application in the secondary display area for any extended amount of time.

[0005] Receivers are designed so that a user can easily change the signal that is being displayed on a television screen by entering the appropriate command into the receiver. Such user commands are inputted by a remote control device such as an infrared remote control. For example, suppose a particular receiver is designed to receive both an incoming television program signal and an interactive application signal, such as a browser signal that provides data from the World Wide Web. When the receiver is in television program mode, the incoming television signal is decoded (if necessary) and displayed on the television screen so the user can view a channel of the television program signal that is tuned in. Similarly, if the receiver is switched to the browser mode, the incoming browser signal will be decoded (if necessary) and displayed on the television screen so the user can interact with and navigate the World Wide Web.

[0006] In existing receivers, when a user wishes to switch from one mode to another, the user will press a "Change Mode" or similar key on a remote control device. In existing receivers that provide Internet access via a television, the remote control device will have "Web" key that when pressed will switch the receiver to browser mode if currently in television program mode and vice versa.

[0007] As the popularity of accessing and using the Internet (and other interactive applications) in a television setting increases, the profitability of advertising in these browser screens will also increase. Thus, a need exists for methods and apparatus that will increase the number of times in which a user accesses browser mode. However, increasing the number of occurrences of browser access should be done in such a way so as to minimize interference with a user's television program viewing.

[0008] Another common feature of existing receivers is the ability to automatically tune in a previously viewed channel upon receipt of a go-back command from a user when the receiver is in television program mode. For example, assume a user has the receiver in television program mode and has channel 4 tuned in for viewing on the television screen. Thereafter, the user changes the channel via the appropriate change channel command, tuning in channel 8. The user can automatically tune in and view the previously tuned channel, channel 4, by simply sending a go-back command to the receiver by pressing a go-back key on a remote control device. As such, a user can tune into a previously viewed channel without the need to remember the channel number.

[0009] In existing receivers, the go-back feature is limited to functioning within a single receiver mode and cannot be used to return to the most previously viewed content if that content was in a different mode. For example, if a user was browsing the Internet and then switched to television program mode by entering the appropriate command, the go-back command, when entered, would not return the user to the browser mode. The same is true if the user was watching a specific channel on television program mode and switched the receiver to browser mode. Thus, a need exists for apparatus and methods that will return a user to the most previously viewed item regardless of the mode in which the content exists.

[0010] Moreover, it is common that many television viewers do not like to watch and/or hear commercials that frequently interrupt the television programs that they are watching. Often, a viewer will mute the audio component of the tuned channel during a commercial break and

wait for the desired program to return before un-muting the audio component of the tuned channel. This time is wasted both from the perspective of the viewer and from the perspective of potential browser mode advertisers. Thus, a need exists to be able to automatically switch a receiver to browser mode upon receiving an input signal from a user to mute the audio component of a tuned channel.

[0011] However, not all viewers wish to mute a tuned channel or change modes because they may miss a portion of the program that they were watching. A need exists to provide viewers who wish to avoid watching commercial breaks with a satisfactory way of automatically switching to browser mode when a commercial break starts and automatically returns back to television program mode without resulting in the viewer missing a substantial amount of the desired television program.

[0012] It is typical for receivers having browser mode and Internet capabilities to have the ability to download and store large amounts of data. One problem with downloading is that some downloads can take long periods of time to complete. During this time, the user must wait patiently. However, the user often becomes bored and wishes to undertake other tasks or be amused in some way, such as watching a television program. Thus, a need exists for an apparatus and method that automatically switches the receiver to television program mode during the downloading of large amounts of data and returns to browser mode upon completion of the download.

Disclosure of the Invention

[0013] These needs, and others that will become apparent from the following disclosure and drawings, are met by the present invention which in one aspect is an apparatus for displaying at least two modes comprising an interactive application mode and a television program mode on a display device, the apparatus comprising: a television program signal receiver; an interactive application signal receiver; means for switching between said television program mode and said interactive application mode being active in said display device; means to receive remote control signals from a remote control device having a mute key for generating a mute signal; means to enable a mute-to-interactive application feature; and wherein when

said mute-to-interactive application feature is enabled and said television program mode is active in said display device, upon receipt of said mute signal, said mode switching means is activated causing said interactive application mode to be active in said display device.

[0014] It is preferred that when said mute-to-interactive application feature is enabled and said interactive application mode is active in said display device, upon receipt of said mute signal, said mode switching means is activated causing said television program mode to be active in said display device.

[0015] In one embodiment, it is preferred that the inventive apparatus further comprise: means to switch channels when said television program mode is active in said display device; means to store a last viewed item as a go-back channel; said remote control device having a go-back channel key for generating a go-back channel signal; means to return to said go-back channel for display in said display device upon receipt of said go-back channel signal; wherein when said television program mode is active and said last viewed item is said interactive application mode, upon receipt of said go-back channel signal, said mode switching means is activated causing said interactive application mode to be active in said display device.

[0016] In this embodiment, it is preferred that when said interactive application mode is active and said last viewed item is a first channel of said television program mode, upon receipt of said go-back channel signal, said mode switching means is activated causing said television program mode to be active and said first channel to be displayed in said display device. It is further preferable that when in television program mode and said last viewed item is a first channel, upon receipt of said go-back channel signal, said channel switching means is activated causing said first channel to be displayed in said display device.

[0017] In yet another embodiment, the apparatus further comprises: means to enable a commercial skip feature in response to a commercial skip signal; said remote control device having a commercial skip key for generating a commercial skip signal; wherein when said commercial skip feature is activated and said television program mode is active, upon detecting a beginning of a commercial break, said mode switching means is activated causing said interactive application mode to be active until either detection of an end of a commercial break or upon elapse of a selected period of time. The commercial skip feature can be adapted to detect said beginning and said end of said commercial break.

[0018] In still another embodiment, the apparatus application mode will be a browser mode and the apparatus will further comprise: means to enable a television during download

function; wherein when said browser mode is active and said television during download function is enabled, upon a download above a threshold time being detected, said mode switching means is activated causing said television program mode to be active until detection of completion of said download.

[0019] In another aspect, the invention is a method of switching between at least two modes comprising an interactive application mode and a television program mode, the method comprising: receiving a television program signal; receiving an interactive application signal; displaying one of said television program signal or said interactive application signal in a display device; upon receipt of a mute-to-interactive application enabling command, enabling a mute-to-interactive application feature; wherein when said mute-to-interactive application feature is enabled and said television program signal is being displayed in said display device, upon receipt of a mute signal from a remote control device, activating a mode switching mean causing said interactive application signal to be displayed in said display device.

[0020] In this embodiment of the inventive method, when said mute-to-interactive application feature is enabled and said interactive application signal is being displayed in said display device, upon receipt of said mute signal, it is preferable that the method comprise activating said mode switching means causing said television program signal to be displayed in said display device.

[0021] In another embodiment, the method further comprises: tuning a channel of said television program signal for display in said display device; storing a last viewed item as a go-back channel in a memory source in response to a channel change or a mode switch; and wherein when said television program signal is being displayed and said last viewed item is said interactive application signal, upon receipt of a go-back channel signal from said remote control device, activating said mode switching means causing said interactive application signal to be displayed in said display device.

[0022] When said interactive application mode is being displayed and said last viewed item is a first channel, upon receipt of said go-back channel signal from said remote control device, it is preferable that the method comprise activating said mode switching means causing said television program mode to be active and said first channel to be tuned and displayed in said display device.

[0023] When a second channel of said television program signal is tuned and displayed and said last viewed item is a first channel, upon receipt of said go-back channel signal from said

remote control device, it is also preferable that the method comprise activating a channel switching means causing said first channel to be tuned and displayed in said display device.

[0024] In yet another embodiment, the method further comprises: upon receipt of a commercial skip enabling signal from said remote control device, enabling a commercial skip feature; and wherein when said commercial skip feature is enabled and said television program signal is being displayed, upon detecting a beginning of a commercial break, activating said mode switching means causing said interactive application signal to be displayed until either detection of an end of a commercial break or upon elapse of a selected period of time. In this embodiment, the commercial skip feature can be adapted to detect said beginning and said end of said commercial break.

[0025] It is preferred that the interactive application mode is a browser mode and said interactive application signal be a browser signal. When a browser is the interactive application, the method can further comprise: upon receipt of television-during-download enabling signal from said remote control device, enabling a television-during-download function; and wherein when said browser signal is being displayed and said television-during-download function is enabled, upon a download above a threshold time being detected, activating said mode switching means causing said television program signal to be displayed until detection of completion of said download.

Brief Description of Drawings

[0026] Figure 1 is a block diagram of an embodiment of an apparatus for switching between a television program mode and an interactive application mode operating in accordance with the present invention.

[0027] Figure 2 is a flowchart of the decision process undertaken by the apparatus of FIG. 1 in switching between television program mode and interactive application mode through the use of a go-back signal.

[0028] Figure 3 is a flowchart of the decision process undertaken by the apparatus of FIG. 1 in switching between television program mode and interactive application mode through the use of a mute signal according to the present invention.

[0030] Figure 4 is a flowchart of the decision process undertaken by the apparatus of FIG. 1 in automatically switching between television program mode and interactive application mode during a commercial break.

[0031] Figure 5 is a flowchart of the decision process undertaken by the apparatus of FIG. 1 in automatically switching between television program mode and browser mode during the downloading of data.

[0032] FIG. 6 is a perspective view of an infrared remote controller adapted to operate with the apparatus of FIGS. 1 and 6 according to the present invention.

Modes for Carrying Out the Invention

[0034] The preferred embodiments will be illustrated with reference to the drawings. Various other embodiments should become readily apparent from this description to those skilled in this art.

[0035] Referring to FIG. 1, receiver **110** capable of switching between a television program mode and an interactive application mode is illustrated. Receiver **110** comprises input command interface **150**, central processing unit ("CPU") **140**, memory source **190**, switching module **130**, signal monitoring module **180**, television program signal receiver **185**, interactive application signal receiver **195**, and data output interface **120**. Receiver **110** is operably connected to display device **100** and is further adapted to receive and process user command signals from remote control device **160**.

[0036] Television program signal receiver **185** is adapted to receive, and decode if necessary, television program signal **105**. Television program signal **105** can comprise both an image component and an audio component. Television program receiver **185** then transmits television program signal to **105** to signal monitoring module **180**. Signal monitoring module **180** is adapted to monitor television program signal **105** as it passes through and to identify certain indicators contained within television program signal **105**, such as a beginning or an end of a commercial break. The ability of signal monitoring module **180** to identify

commercial break beginning and ends will be discussed in more detail below. After being monitored by signal monitoring module **180**, television program signal **105** is transmitted to switching module **130**.

[0037] Interactive application receiver **195** is adapted to receive, and decode if necessary, incoming interactive application signal **115**. Interactive application signal **115** can comprise both an image component and an audio component. As used herein, an interactive application is any program the execution of which is controlled by choices made by a user. Common examples of interactive applications are video games, word processors, spreadsheet programs, and Internet browser programs. Depending on the type and use of the interactive application involved, interactive application can be used for an almost endless number of purposes, ranging from performing employment related tasks to serving purely recreational purposes. Interactive application receiver **195** then transmits interactive application signal **115** to signal monitoring module **180**. Signal monitoring module **180** is adapted to monitor interactive application signal **115** as it passes through and is further adapted to identify certain indicators contained within interactive application signal **115**, such as a beginning or an end of a downloading state and estimated download times. The ability of signal monitoring module **180** to identify downloading and estimated download times is well known in the art. After being monitored by signal monitoring module **180**, interactive application signal **115** is transmitted to switching module **130**.

[0038] Switching module **130** is controlled by switching commands **145** sent by CPU **140** and is adapted to alternate between a television program mode and an interactive application mode. When switching module **130** is in the television program mode, switching module **130** transmits television program signal **105** to tuner **175** as switching output signal **125**. When switching module **130** is in the interactive application mode, switching module **130** transmits interactive application signal **115** to tuner **175** as switching output signal **125**. Upon receipt of

a proper switching command **145** from CPU **140**, switching module **130** can be alternated between television program mode and interactive application mode.

[0039] Tuner **175** receives switching output signal **125** and transmits this signal to data output interface **120** as output signal **126**. When switching module **130** is in interactive application mode and switching output signal **125** is interactive application signal **115**, switching output signal **125** will pass through tuner **175** unaltered as output signal **126**. However, if switching module **130** is in television program mode and switching output signal **125** is television program signal **105**, tuner **175** will tune the incoming television program signal **105** so that output signal **126** is a tuned channel signal for displaying a specific program channel in display device **100**. The exact channel tuned in and displayed in display device **100** is controlled by tuning commands **141** from CPU **140**.

[0040] Output signal **126**, whether interactive application signal **115** or a tuned channel of television program signal **105**, is transmitted to data output interface **120**. Data output interface **120** can be any type of port connection capable of completing an electrical connection with display device **100** and receiver **110**. Output signal **126** passes through data output interface **120** and to display device **100** for display therein.

[0041] Display device **100**, which can be a television or computer monitor, is capable of presenting images and sounds according to the content of either television program signal **105** (now output signal **126**) or interactive application output data **115** (now output signal **126**). Although not shown in FIG 1., display device **100** has a display screen for displaying images and a means for outputting sounds, such as speakers. Whether the content of television program signal **105** or the content of interactive application signal **115** is presented by display device **100** depends on whether switching module **130** designates television program signal **105** or interactive application signal **115** as switching output signal **125**. It is also possible for display device **100** to be a television or computer monitor with picture-in-picture (PIP) capabilities. If display device **100** has PIP capabilities, the display screen (not shown) will

comprise a primary display area and a secondary display area. As such, two signals can be displayed simultaneously. In PIP display devices, the primary display area constitutes a majority of the display screen while the secondary display area constitutes a smaller area of the display screen and is often contained within the primary display area. When display device **100** has PIP capabilities, switching module **130** is modified so that it is capable of transmitting a second switching output signal.

[0042] As used herein and in the claims, when a particular mode is active or when a signal is displayed, it means that that the signal associated with that mode is being displayed in display device **100**. If the display device has PIP capabilities, it means that the signal is being displayed in the primary display area.

[0043] The available functions of receiver **110** are controlled by a user **170**. A user, through the use of remote control device **160** can send user input signals **161** to receiver **110**. Remote control device **160** can be a mouse, a keyboard, or a hand-held controller. User **170** causes remote control device **160** to generate user command signals **161** by entering choices into remote control device **160** by a variety of methods, including pressing buttons, moving a joystick, or manipulating any type of input sensor on remote control device **160**. Upon choices being entered into remote control device **160**, remote control device **160** converts choices to user command signals **161** and transmits user command signals **161** to input command interface **150**. Remote control device **160** communicates user command signals **161** to input command interface **150** via an electrical connection or via infrared signals. Where command signals **161** are communicated to input command interface **150** via infrared signal, input command interface **150** is an infrared sensor and remote control device **160** is a hand-held infrared remote control **600** (FIG. 6). In this embodiment, remote control device **160** will be capable of converting infrared signals to electrical signals. Upon receiving user command signals **161** from remote control device **160**, input command interface **150** transmits user command signals **161** to CPU **140** as corresponding electrical command signals **155**.

CPU **140** then executes commands corresponding to the electrical command signals **155** such as switching commands **145**, tuning commands **141**, or any other command that is entered by user **170**. Execution and generation of commands by CPU **140** can also be controlled by software stored in memory source **190** and signals received by signal monitoring module **180** alone or in combination with user command signals **161**.

[0044] Fig. 6 illustrates a hand-held infrared remote control **600** adapted to function according to the present invention. Infra-red remote control **600** comprises channel up key **601**, channel down key **602**, volume up key **603**, volume down key **604**, channel number keys **606-615**, mute key **616**, web key **617**, mute-to-browse key **618**, television-during-download key **619**, commercial skip key **620**, go-back key **621**, and a power key **622**. Infrared remote control **600** further comprises infrared signal generator **605**. When a user **170** presses any of the keys **601-604** and **606-622** on remote control **600** an appropriate user infra-red command signal **161** (FIG. 1) is generated by IR generator **605** and transmitted to input command interface **150** (FIG. 1). As discussed above, the user infrared command signal **161** is transmitted to properly programmed CPU **140**, which in turn executes the appropriate command.

[0045] FIGS. 2-5 illustrate flowcharts of the decision process undertaken by CPU **140** in carrying out the user input commands **161** according to one embodiment of the present invention. Such decision processes can be programmed directly into CPU **140** or stored in memory source **190** as conventional software programs that are executed by CPU **140**. The flowcharts of FIG. 2-5 will now be discussed in relation to the apparatus of FIGS. 1 and 6.

[0046] Referring to FIG. 2, a flowchart of the decision process undertaken by receiver **110** in switching between television program mode and browser mode through the use of a go-back signal is illustrated. At block **200**, CPU **140** checks to see if switching module **130** is in television program mode and whether a specific television channel is tuned by tuner **175** and displayed in display device **100**. If Yes, CPU **140** proceeds to decision block **205** and

monitors input signal **155** for a change channel signal from IR remote control **600**. A change channel signal will be generated by IR remote control **600** when user **170** presses channel keys **606-615** or channel up and down keys **601-602**. If a change channel signal has been received, the answer is YES and CPU **140** proceeds to process block **235**. At process block **235**, CPU **140** stores the current channel being displayed in display device **100** as a go-back channel before responding to the change channel signal because this current channel is the last viewed item. CPU **140** then proceeds to process block **240** and changes the channel being displayed in display device **100** according to the change channel signal. This is done by sending the appropriate tuning signal **141** to tuner **175**. CPU **140** then starts the decision process over at block **200**.

[0046] If at decision block **205**, a change channel signal was not received by CPU **140**, a NO answer is generated and CPU **140** will proceed to decision block **210**. At decision block **210**, CPU **140** will monitors input signal **155** for an activate browser from IR remote control **600**. An activate browser signal is generated by IR remote control **600** when user **170** presses web key **617**. If user **170** has pressed web key **617** and an activate browser signal is received by CPU **140**, the answer at decision block **210** is YES and CPU **140** proceeds to process block **245**. At process block **245**, CPU **140** stores the current channel being displayed in display device **100** as a go-back channel before responding to the activate browser signal because this current channel is the last viewed item. At process block **250**, CPU **140** responds to the activate browser signal and generates switching command **145** which is sent to switching module **130**. Switching module **130** responds to switching signal **145** by switching to browser mode (i.e. interactive application mode) and transmitting incoming browser signal **115** as switching output signal **125** for display in display device **100**, completing process block **255**. Next, CPU **140** proceeds to decision block **260** and monitors input signal **155** for a go-back signal or an activate television mode signal from IR remote control **600**. A go-back signal is generated by IR remote control **600** when user **170** presses go-back key **621**. An activate

television mode signal is generated by IR remote control **600** when user **170** presses web key **617**. If a go-back signal or an activate television mode signal is not received by CPU **140**, the answer at decision block **260** is NO and CPU **140** returns to process block **255**. However, if a go-back signal or an activate television mode signal is received by CPU **140**, the answer at decision block **260** is YES and CPU **140** proceeds to process block **265**. At process block **265**, CPU **140** responds to the go-back signal or the activate television mode signal and sends switching signal **145** to switching module causing said switching module **130** to switch to television program mode. CPU **140** then retrieves the go-back channel that was stored in memory source **190** at process block **245** and sends an appropriate tuning signal **141** to tuner **175** that will tune in the go-back channel for transmission as output signal **126** for display in display device **100**, completing process block **265**. CPU **140** then proceeds to process block **270** and stores the browser as the go-back channel in memory source **190** because the browser is now the last viewed item.

[0047] If at step **210**, a NO answer is generated, CPU **140** proceeds to decision block **215**. At decision block **215**, CPU **140** monitors for receipt of a go-back signal from IR remote control **600**. If a go-back signal is not received, the answer is NO and the process begins over at process block **200**. However, if a go-back signal is received, CPU **140** proceeds to decision block **220** and checks memory source **190** for the identity of the stored go-back channel. If the identity of the stored go-back channel is the browser, CPU **140** proceeds to process block **245**. If the identity of the stored go-back channel is not the browser, a NO answer is generated and CPU **140** proceeds to process block **225**. At process block **225**, CPU **140** retrieves the stored go-back channel from memory source **190**, which would be a previous channel tuned in by tuner **75**. CPU **140** then sends tuning signal **141** to tuner **75** and tunes in the go-back channel for display in display device **100**, completing process block **225**.

[0048] CPU **140** then moves to process block **230**. Upon tuning in the go-back channel, CPU **140** then stores the previously tuned channel as the new go-back channel in memory source **190**, completing process block **230**.

[0049] Referring now to FIG. 3, a flowchart of the decision process undertaken by CPU **140** of receiver **110** in switching between television program mode and interactive application mode through the use of a mute-to-browse feature is illustrated.

[0050] At decision block **305**, CPU **140** first checks to see if switching module **130** is in television program mode and whether a channel is tuned in by tuner **175** and displayed in display device **100**. If YES, CPU **140** proceeds to decision block **310**. CPU **140** then monitors input signal **155** for a mute signal from IR remote control **600**. A mute signal is generated by IR remote control **600** by user **170** pressing mute key **616**. If CPU **140** does not detect a mute signal, the answer is NO and CPU **140** proceeds to decision block **305**. However, if CPU **140** detects a mute signal, the answer is YES and CPU **140** proceeds to decision block **315**. CPU **140** then checks to see if a mute-to-interactive application feature was previously enabled by user **170**. The mute-to-interactive application feature is enabled by CPU **140** receiving a mute-to-interactive application enable signal from IR remote control **600**. The mute-to-interactive application enable signal is generated by IR remote control **600** by user **170** pressing mute-to-browse key **618**. Upon receiving the mute-to-interactive application enable signal, CPU **140** enables the mute-to-interactive application feature, which is stored as and controlled by software commands stored in memory source **190**. At decision block **315**, if CPU **140** detects that the mute-to-interactive application feature is enabled, then CPU **140** sends switching signal **145** to switching module **130** causing said interactive application mode to become active and displaying interactive application signal **115** in display device **100**.

[0051] However, if at decision block **315**, CPU **140** detects that the mute-to-interactive application feature is not enabled, CPU **140** then proceeds to decision block **330**. CPU **140**

then checks to see if the audio component of the tuned channel of television program signal **105** being displayed in display screen **100** is being outputted. If YES, CPU **140** proceeds to process block **340** and sends the appropriate signal to mute the audio component by procedures known in the art. If NO, CPU **140** proceeds to process block **335** and sends the appropriate signal to output the audio component by procedures known in the art.

[0052] If at decision step **305**, CPU **140** determines that switching module **130** is not in television program mode, the answer is NO and CPU **140** proceeds to decision block **345** where it checks to see if switching module **130** is in interactive application mode. If YES, CPU **140** proceeds to decision block **350**. CPU **140** then monitors input signal **155** for a mute signal from IR remote control **600**. A mute signal is generated by IR remote control **600** by user **170** pressing mute key **616**. If CPU **140** does not detect a mute signal, the answer is NO and CPU **140** proceeds to decision block **345**. However, if CPU **140** detects a mute signal, the answer is YES and CPU **140** proceeds to decision block **355**. CPU **140** then checks to see if a mute-to-interactive application feature was previously enabled by user **170**. The mute-to-interactive application feature is enabled by CPU **140** receiving a mute-to-interactive application enable signal from IR remote control **600**. The mute-to-interactive application enable signal is generated by IR remote control **600** by user **170** pressing mute-to-browse key **618**. Upon receiving the mute-to-interactive application enable signal, CPU **140** enables the mute-to-interactive application feature, which is stored as and controlled by software commands stored in memory source **190**. At decision block **355**, if CPU **140** detects that the mute-to-interactive application feature is enabled, then CPU **140** sends switching signal **145** to switching module **130** causing said television program mode to become active and displaying a tuned channel of television program signal **105** in display device **100**.

[0053] However, if at decision block **355**, CPU **140** detects that the mute-to-interactive application feature is not enabled, CPU **140** then proceeds to decision block **360**. CPU **140** then checks to see if the audio component of the interactive application signal **105** being

displayed in display screen **100** is being outputted. If YES, CPU **140** proceeds to process block **370** and sends the appropriate signal to mute the audio component by procedures known in the art. If NO, CPU **140** proceeds to process block **365** and sends the appropriate signal to output the audio component by procedures known in the art.

[0054] Referring now to FIG. 4, a flowchart of the decision process undertaken by CPU **140** of receiver **110** in switching between television program mode and interactive application mode through the use of a commercial skip feature is illustrated.

[0055] Block **400** is start. At decision block **405**, CPU **140** first checks to see if switching module **130** is in television program mode and whether a channel is tuned in by tuner **175** and displayed in display device **100**. IF NO, CPU **140** starts over. If YES, CPU **140** proceeds to decision block **410**. CPU **140** then checks to see if a commercial skip feature was previously enabled. The commercial skip feature is enabled by CPU **140** receiving a commercial skip enable signal from IR remote control **600.** The commercial skip enable signal is generated by IR remote control **600** by user **170** pressing commercial skip key **620**. Upon receiving the commercial skip enable signal, CPU **140** enables the commercial skip feature, which is stored as and controlled by software commands stored in memory source **190**. If at decision block **410,** CPU **140** detects that the commercial skip feature is not enabled, then CPU **140** returns to start **400**. However, if at decision block **410**, CPU **140** detects that the commercial skip feature is enabled, then CPU **140** proceeds to decision block **420** and monitors for a commercial break beginning signal **165** from signal monitoring module **180**. Signal monitoring module **180** monitors the incoming television program signal **115** and is adapted to detect the beginning of a commercial break. There are a number of ways known in the art for detecting the beginning of a commercial break.

[0056] The preferred method of detecting the beginning of a commercial break takes advantage of the fact that when the content of television program signal **105** switches to a commercial from an entertainment program, there is a detectable drop in the amplitude of

television program signal **105** (i.e. a blanking screen). Signal monitoring module **180** is programmed to constantly monitor the amplitude of television program signal **105** and detect drops in the amplitude. Upon detecting an initial drop in the amplitude of television program signal **105**, the internal circuitry of signal monitoring module **180** is programmed to generate and transmit commercial break beginning signal **165** to CPU **140**.

[0057] If signal monitoring module **180** does not detect the beginning of a commercial break, the answer at decision block **420** is NO and CPU **140** returns to start **400**. However, if signal monitoring module **180** detects the beginning of a commercial break and sends commercial break beginning signal **165** to CPU **140**, the answer at decision block **420** is YES and CPU **140** proceeds to program block **425**.

[0058] At program block **425**, CPU **140** sends switching signal **145** to switching module **130** causing said interactive application mode to become active and displaying interactive application signal **115** in display device **100**. CPU **140** then proceeds to decision blocks **430** and **431**. At decision block **430** and **431**, CPU **140** waits for either a commercial break end signal from signal monitoring module **180** or for a specified amount of time to elapse. User **170** specifies the amount of time that CPU **140** will wait by pressing commercial skip key **620** multiple times which will add or delete time. Signal monitoring module **180** is adapted to transmit a commercial break end signal to CPU **140** upon detecting the end of a commercial break. The preferred method of detecting or determining the end of commercial breaks takes advantage of the fact that commercials and commercial breaks often last a predictable amount of time depending on time of day, geographical location, and day of the week. Typical commercial break duration times can be reasonably estimated through statistical analysis. In order to take advantage of this fact, signal monitoring module **180** is programmed to have an internal timer that has a default setting or can be set by a user. The timer is activated and begins to count down upon signal monitoring module **180** detecting the beginning of a commercial break. Upon expiration of the set time, signal monitoring module **180** is

programmed to generate a commercial break end signal. Another method in which signal monitoring module **180** can detect the beginning and end of a commercial break is by "spooling" television program signal **105**.

[0059] If signal monitoring module **180** does not detect the end of a commercial break or the specified time has not expired, the answer at decision block **430** or **431** is NO and CPU **140** waits. When signal monitoring module **180** detects the end of a commercial break and sends a commercial break end signal to CPU **140**, or if the specified time expires, the answer at decision block **430** or **431** is YES and CPU **140** proceeds to program block **435**. CPU **140** then sends switching signal **145** to switching module **130** causing said television program mode to become active and displaying a tuned channel of television program signal **105** in display device **100**.

[0060] Referring now to FIG. 5, a flowchart of the decision process undertaken by CPU **140** of receiver **110** in switching between television program mode and interactive application mode through the use of a television-during-download feature is illustrated.

[0061] Block **500** is start. At decision block **505**, CPU **140** first checks to see if switching module **130** is in browser mode and whether a browser is displayed in display device **100**. IF NO, CPU **140** starts over. If YES, CPU **140** proceeds to decision block **510**. CPU **140** then checks to see if a download has been initiated. Signal monitoring module **180** monitors interactive application signal **115** and is programmed to detect when a download is initiated and will send an appropriate signal to CPU **140** upon detection. If a download is not detected, the answer is NO and CPU **140** returns to start **500**. If a download is detected, the answer is YES and CPU **140** proceeds to decision block **515**.

[0062] At decision block **515**, CPU **140** then checks to see if the download will take a threshold time to complete. This can be accomplished by signal monitoring module **180** being programmed to estimate the time that a download takes and sending this information to CPU **140** via an appropriate signal. If the signal sent by signal monitoring module **180** indicates

that the download time is below a threshold time, then the answer is NO and CPU **140** returns to start **500**. However, if the signal sent by signal monitoring module **180** indicates that the download time is above or equal to a threshold time, then the answer is YES and CPU **140** proceeds to decision block **520**.

[0063] At decision block **520**, CPU **140** checks to see if a television-during-download feature has been enabled. The television-during-download feature is enabled by CPU **140** receiving a television-during-download enable signal from IR remote control **600.** The television-during-download enable signal is generated by IR remote control **600** by user **170** pressing television-during-download key **619**. Upon receiving the television-during-download feature enable signal, CPU **140** enables the television-during-download feature, which is stored as and controlled by software commands stored in memory source **190**. If at decision block **520** CPU **140** detects that the television-during-download feature is not enabled, then CPU **140** returns to start **500**. However, if at decision block **410**, CPU **140** detects that the television-during-download feature is enabled, then CPU **140** proceeds to program block **525**.

[0064] At program block **525**, CPU **140** sends switching signal **145** to switching module **130** causing said television program mode to become active and displaying television program signal **115** in display device **100**. CPU **140** then proceeds to decision block **530**. At decision block **530**, CPU **140** waits for a signal from signal monitoring module **180** indicating that the download is complete. Signal monitoring module **180** is programmed to detect the end of a download and send a corresponding signal to CPU **140** by methods standard in the art. Upon receiving a signal from signal monitoring module **180** indicating that download is complete, CPU **140** proceeds to process step **535**, sending switching signal **145** to switching module **130** causing said browser mode to become active and displaying a browser in display device **100**.

[0065] While the invention and preferred embodiments have been described and illustrated in sufficient detail that those skilled in this art may readily make and use the invention, various

alternatives, modifications and improvements should become readily apparent to this skilled in this art without departing from the spirit and scope of the invention.

Claims

1. An apparatus for displaying at least two modes comprising an interactive application mode and a television program mode on a display device, the apparatus comprising:

a television program signal receiver;

an interactive application signal receiver;

means for switching between said television program mode and said interactive application mode being active in said display device;

means to receive remote control signals from a remote control device having a mute key for generating a mute signal;

means to enable a mute-to-interactive application feature; and

wherein when said mute-to-interactive application feature is enabled and said television program mode is active in said display device, upon receipt of said mute signal, said mode switching means is activated causing said interactive application mode to be active in said display device.

2. The apparatus of claim 1 wherein when said mute-to-interactive application feature is enabled and said interactive application mode is active in said display device, upon receipt of said mute signal, said mode switching means is activated causing said television program mode to be active in said display device.

3. The apparatus of claim 1 further comprising:

means to switch channels when said television program mode is active in said display device;

means to store a last viewed item as a go-back channel in a memory source;

said remote control device having a go-back channel key for generating a go-back channel signal;

wherein when said television program mode is active and said last viewed item is said interactive application mode, upon receipt of said go-back channel signal, said mode switching means is activated causing said interactive application mode to be active in said display device.

4. The apparatus of claim 3 wherein when said interactive application mode is active and said last viewed item is a first channel of said television program mode, upon receipt of said go-back channel signal, said mode switching means is activated causing said television program mode to be active and said first channel to be displayed in said display device.

5. The apparatus of claim 3 wherein when in television program mode and said last viewed item is a first channel, upon receipt of said go-back channel signal, said channel switching means is activated causing said first channel to be displayed in said display device.

6. The apparatus of claim 1 further comprising:

means to enable a commercial skip feature in response to a commercial skip signal;

said remote control device having a commercial skip key for generating a commercial skip signal;

wherein when said commercial skip feature is enabled and said television program mode is active, upon detecting a beginning of a commercial break, said mode switching means is activated causing said interactive application mode to be active until either detection of an end of a commercial break or upon elapse of a selected period of time.

7. The apparatus of claim 6 wherein said commercial skip feature is enabled, said apparatus is adapted to detect said beginning and said end of said commercial break.

8. The apparatus of claim 1 wherein said interactive application mode is a browser mode.

9. The apparatus of claim 8 further comprising:

means to enable a television during download function;

wherein when said browser mode is active and said television during download function is enabled, upon a download above a threshold time being detected, said mode switching means is activated causing said television program mode to be active until detection of completion of said download.

10. A method of switching between at least two modes comprising an interactive application mode and a television program mode, the method comprising the steps of:

receiving a television program signal;

receiving an interactive application signal;

displaying one of said television program signal or said interactive application signal in a display device;

upon receipt of a mute-to-interactive application enabling command, enabling a mute-to-interactive application feature; and

wherein when said mute-to-interactive application feature is enabled and said television program signal is being displayed in said display device, upon receipt of a mute signal from a remote control device, activating a mode switching mean causing said interactive application signal to be displayed in said display device.

11. The method of claim 10 wherein when said mute-to-interactive application feature is enabled and said interactive application signal is being displayed in said display device, upon receipt of said mute signal, activating said mode switching means causing said television program signal to be displayed in said display device.

12. The method of claim 10 further comprising:

tuning a channel of said television program signal for display in said display device;

storing a last viewed item as a go-back channel in a memory source in response to a channel change or a mode switch; and

wherein when said television program signal is being displayed and said last viewed item is said interactive application signal, upon receipt of a go-back channel signal from said remote control device, activating said mode switching means causing said interactive application signal to be displayed in said display device.

13. The method of claim 12 wherein when said interactive application mode is being displayed and said last viewed item is a first channel, upon receipt of said go-back channel signal from said remote control device, activating said mode switching means causing said television program mode to be active and said first channel to be tuned and displayed in said display device.

14. The method of claim 12 wherein when a second channel of said television program signal is tuned and displayed and said last viewed item is a first channel, upon receipt of said go-back channel signal from said remote control device, activating a channel switching means causing said first channel to be tuned and displayed in said display device.

15. The method of claim 10 further comprising:

upon receipt of a commercial skip enabling signal from said remote control device, enabling a commercial skip feature; and

wherein when said commercial skip feature is enabled and said television program signal is being displayed, upon detecting a beginning of a commercial break, activating said mode switching means causing said interactive application signal to be displayed until either detection of an end of a commercial break or upon elapse of a selected period of time.

16. The method of claim 15 wherein said commercial skip feature is adapted to detect said beginning and said end of said commercial break.

17. The method of claim 10 wherein said interactive application mode is a browser mode and said interactive application signal is a browser signal.

18. The method of claim 17 further comprising:

upon receipt of television-during-download enabling signal from said remote control device, enabling a television-during-download function; and

wherein when said browser signal is being displayed and said television-during-download function is enabled, upon a download above a threshold time being detected, activating said mode switching means causing said television program signal to be displayed until detection of completion of said download.

19. An apparatus for displaying at least two modes comprising an interactive application mode and a television program mode on a display device, the apparatus comprising:

a television program signal receiver;

an interactive application signal receiver;

means for switching between said television program mode and said television program mode being active in said display device;

means to receive remote control signals from a remote control device having a go-back key for generating a go-back signal; and

wherein when said display device was in the interactive application mode, upon receipt of said go-back signal, said mode switching means is activated causing said interactive application mode to be active in said display device.

20. The apparatus of claim 19 wherein said interactive application mode is a browser mode.

21. The apparatus of claim 20 wherein said remote control signals include a television-during-download signal generated by the remote control device; when said display device is in the browser mode, a download is initiated, and the download has not been completed, said mode switching means is activated causing said television program mode to be active in said display device; and when said download has been completed, said mode switching means is activated causing said browser mode to be active in said display device.

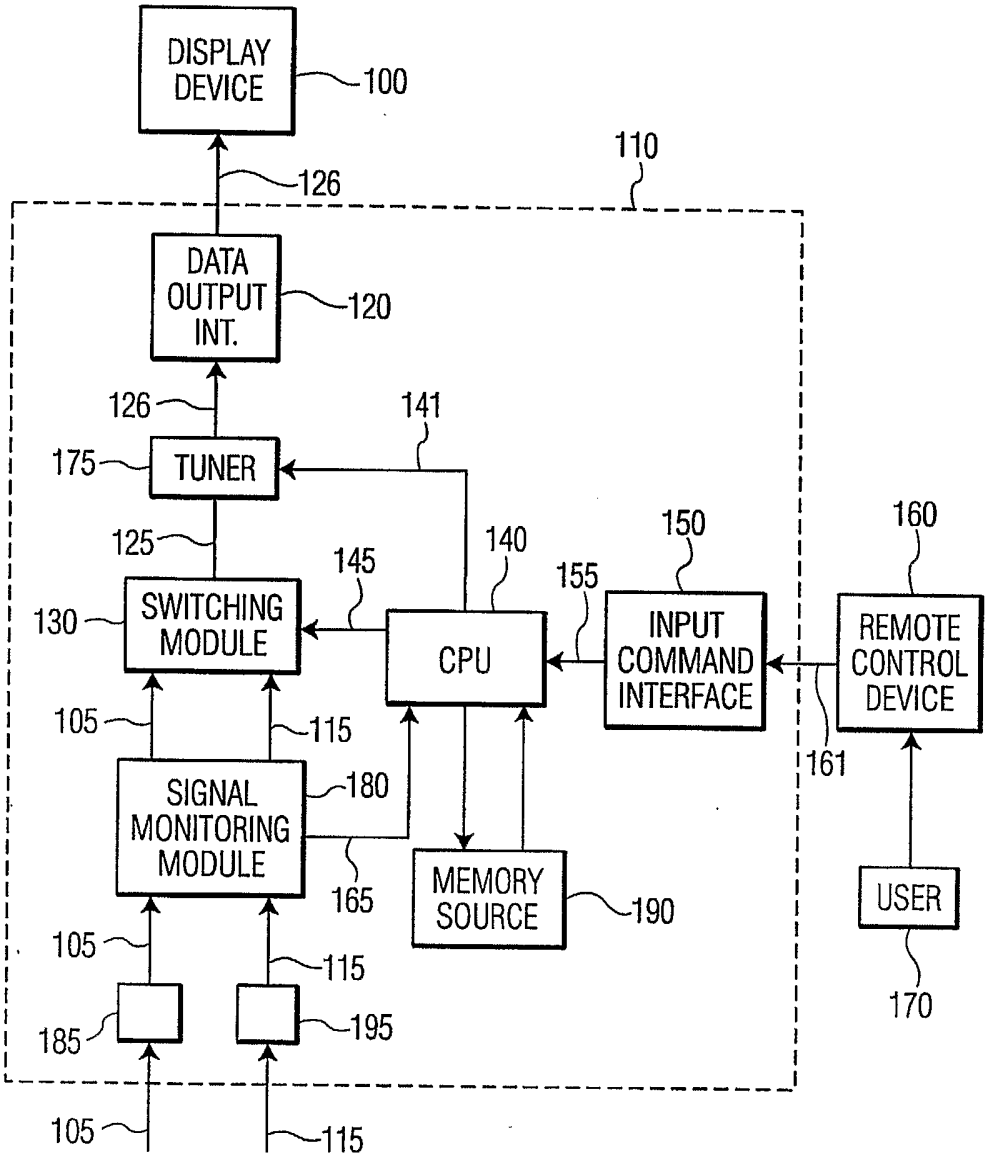
DISPLAY DEVICE
100
110
126
DATA OUTPUT INT.
120
126
141
175
TUNER
125
145
140
150
160
130
SWITCHING MODULE
CPU
155
INPUT COMMAND INTERFACE
REMOTE CONTROL DEVICE
105
115
161
SIGNAL MONITORING MODULE
180
165
MEMORY SOURCE
190
USER
105
115
185
195
170
105
115

FIG. 1

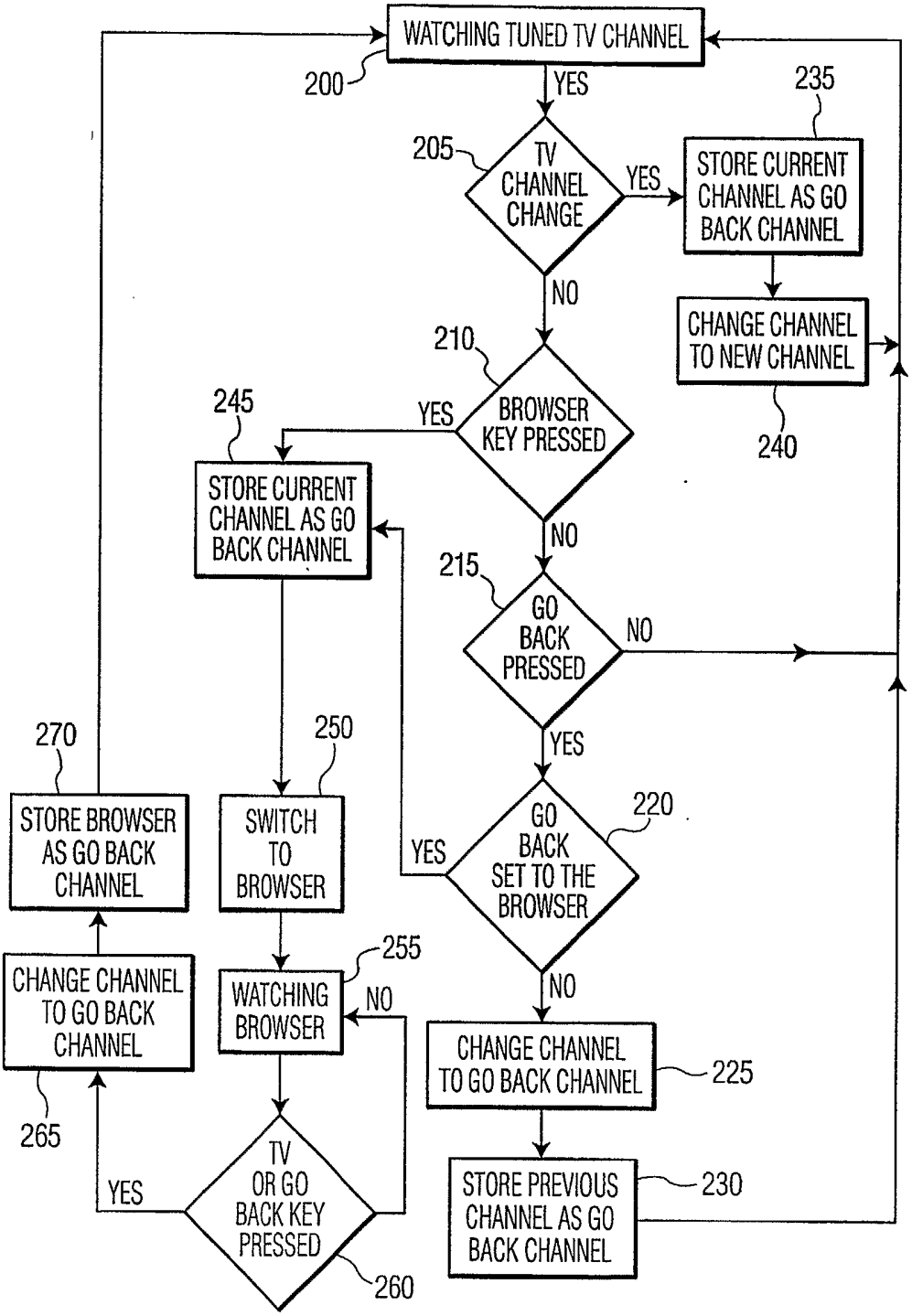
WATCHING TUNED TV CHANNEL
200
YES
235
205
TV CHANNEL CHANGE
YES
STORE CURRENT CHANNEL AS GO BACK CHANNEL
NO
CHANGE CHANNEL TO NEW CHANNEL
210
BROWSER KEY PRESSED
240
245
YES
STORE CURRENT CHANNEL AS GO BACK CHANNEL
NO
215
GO BACK PRESSED
NO
YES
270
250
220
STORE BROWSER AS GO BACK CHANNEL
SWITCH TO BROWSER
YES
GO BACK SET TO THE BROWSER
255
CHANGE CHANNEL TO GO BACK CHANNEL
WATCHING BROWSER
NO
NO
CHANGE CHANNEL TO GO BACK CHANNEL
225
265
TV OR GO BACK KEY PRESSED
YES
STORE PREVIOUS CHANNEL AS GO BACK CHANNEL
230
260

FIG. 2

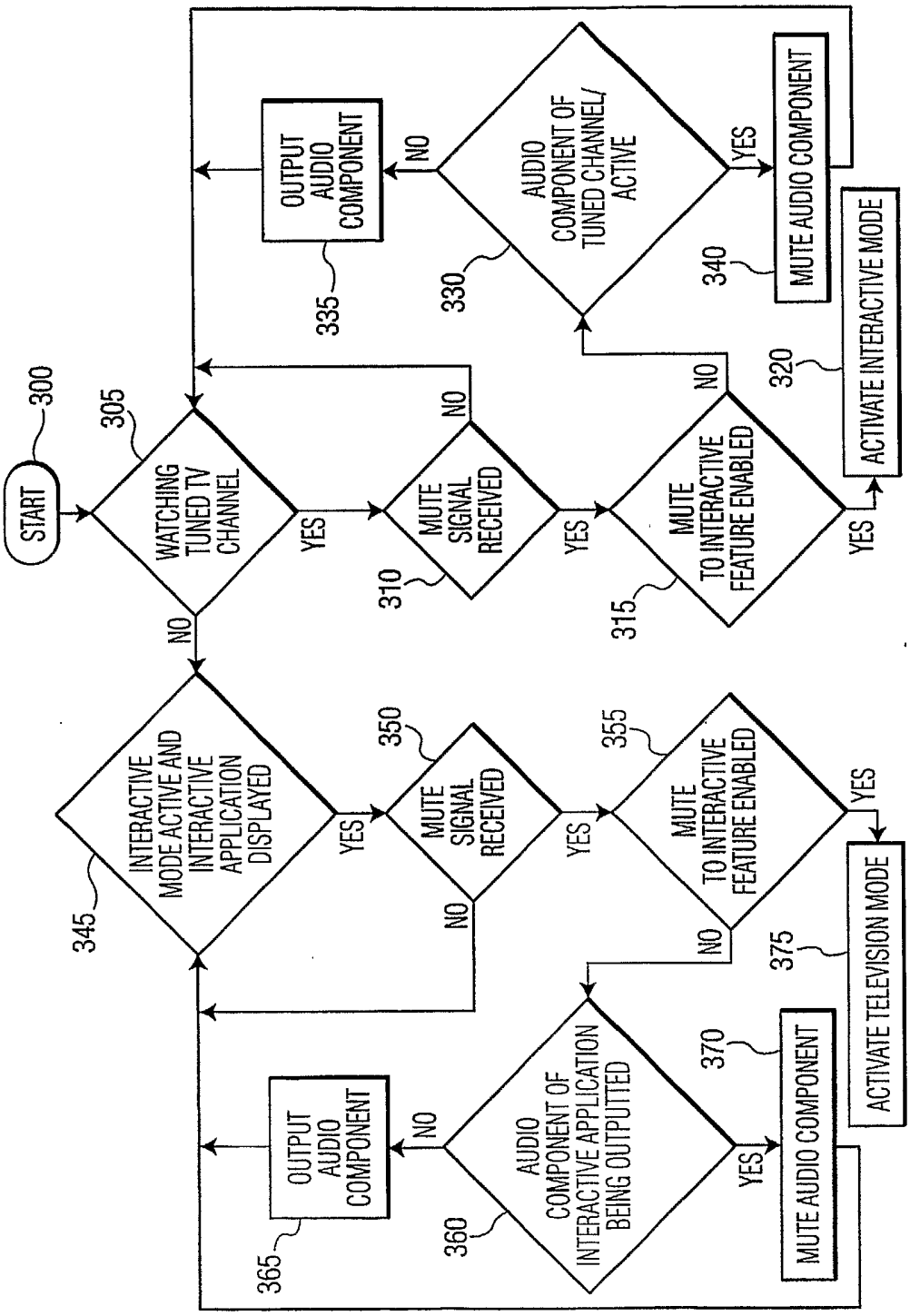
START
300
WATCHING TUNED TV CHANNEL
305
YES
NO
MUTE SIGNAL RECEIVED
310
YES
NO
MUTE TO INTERACTIVE FEATURE ENABLED
315
YES
NO
ACTIVATE INTERACTIVE MODE
320
AUDIO COMPONENT OF TUNED CHANNEL/ ACTIVE
330
YES
NO
MUTE AUDIO COMPONENT
340
OUTPUT AUDIO COMPONENT
335
INTERACTIVE MODE ACTIVE AND INTERACTIVE APPLICATION DISPLAYED
345
YES
NO
MUTE SIGNAL RECEIVED
350
YES
NO
MUTE TO INTERACTIVE FEATURE ENABLED
355
YES
NO
ACTIVATE TELEVISION MODE
375
AUDIO COMPONENT OF INTERACTIVE APPLICATION BEING OUTPUTTED
360
YES
NO
MUTE AUDIO COMPONENT
370
OUTPUT AUDIO COMPONENT
365

FIG. 3

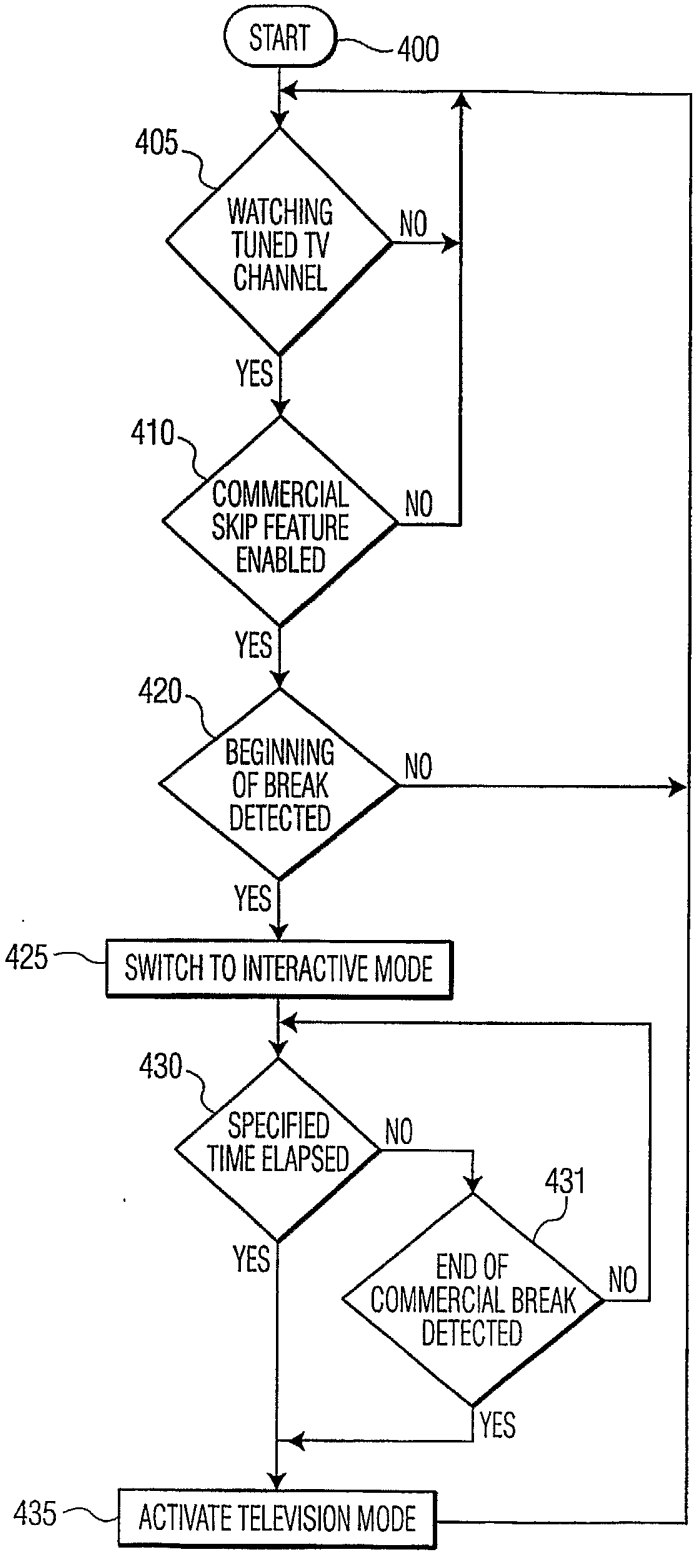
START
400
405
WATCHING TUNED TV CHANNEL
NO
YES
410
COMMERCIAL SKIP FEATURE ENABLED
NO
YES
420
BEGINNING OF BREAK DETECTED
NO
YES
425
SWITCH TO INTERACTIVE MODE
430
SPECIFIED TIME ELAPSED
NO
431
END OF COMMERCIAL BREAK DETECTED
NO
YES
YES
435
ACTIVATE TELEVISION MODE

FIG. 4

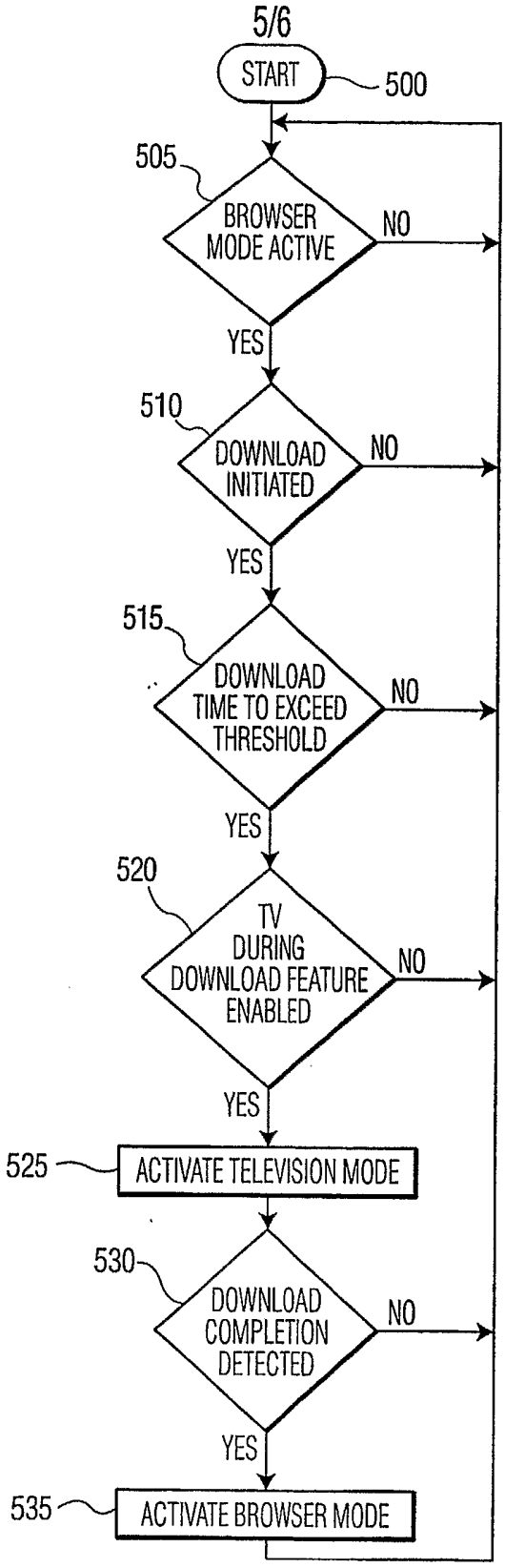
START
500
505
BROWSER MODE ACTIVE
NO
YES
510
DOWNLOAD INITIATED
NO
YES
515
DOWNLOAD TIME TO EXCEED THRESHOLD
NO
YES
520
TV DURING DOWNLOAD FEATURE ENABLED
NO
YES
525
ACTIVATE TELEVISION MODE
530
DOWNLOAD COMPLETION DETECTED
NO
YES
535
ACTIVATE BROWSER MODE

FIG. 5

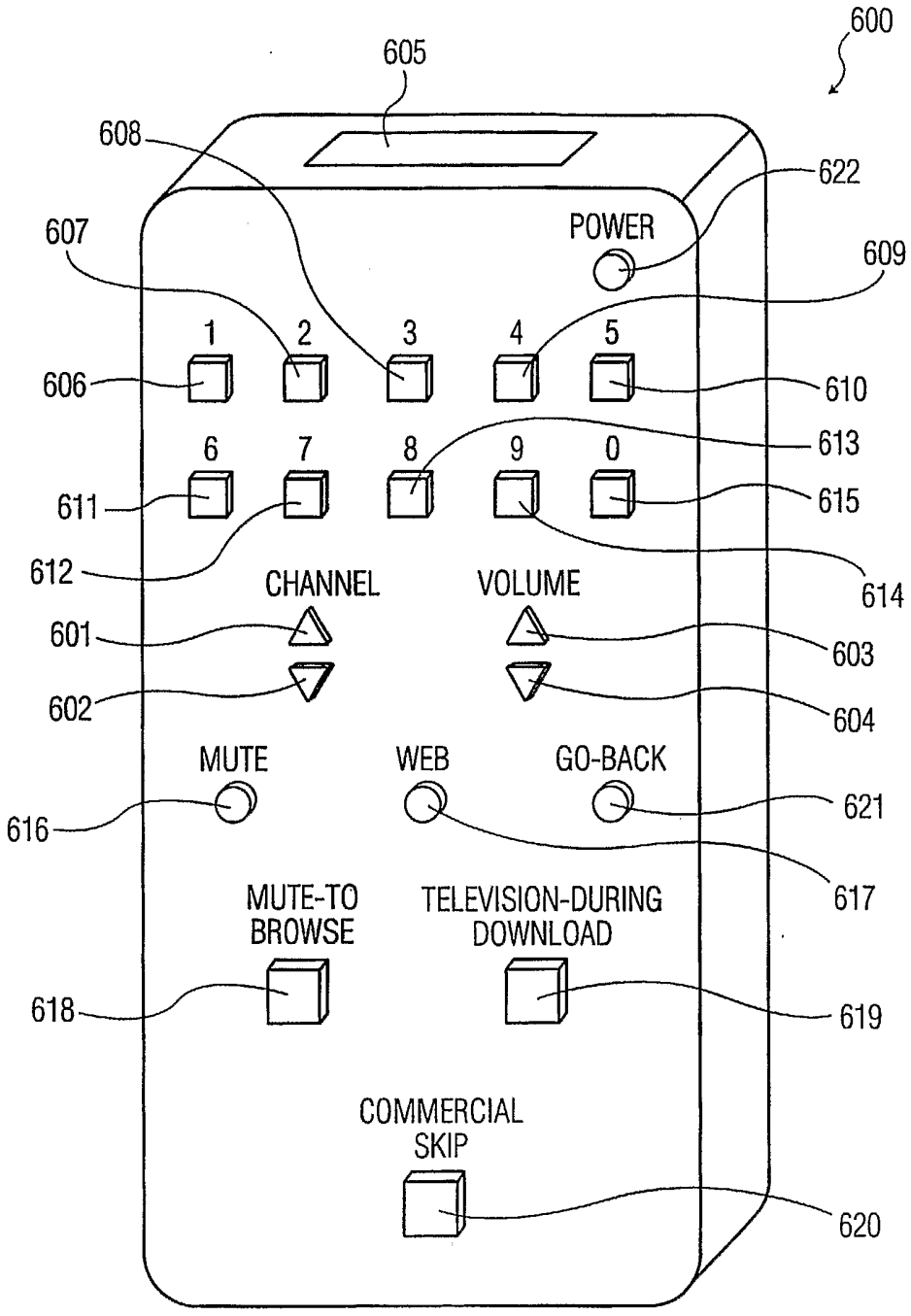
600
605
608
622
607
POWER
609
1
2
3
4
5
606
610
613
6
7
8
9
0
611
615
612
614
CHANNEL
VOLUME
601
603
602
604
MUTE
WEB
GO-BACK
616
621
617
MUTE-TO BROWSE
TELEVISION-DURING DOWNLOAD
618
619
COMMERCIAL SKIP
620

FIG. 6