

displayed by the touch screen 104 but are not physically present. Nevertheless, a user of the computing device 100 can interact with the media mixing controls to effectuate media mixing operations.

[0037] More particularly, as shown in FIG. 1, the media mixing controls displayed on the touch screen 104 can include a plurality of dials 106, a plurality of buttons 108, a plurality of status indicators 110, and sliders 112. Using the touch screen 104, a user could interact with one of the dials 106 so as to effectively rotate the dial to provide a media mixing operation. For example, the dial 106 being rotated could pertain to an equalizer level, a filter cut frequency, a trim amount, a pan amount, etc. Additionally, the user can interact with the touch screen 104 to select or deselect one of the buttons 108. For example, the buttons 108 can correspond to channel selection, mute, polarity, etc. The status indicators 110 can indicate status of an aspect of media mixing. For example, the status indicators 110 can indicate power-on, button selected, channel utilized, etc. The sliders 112 can be selected by the user and then slid up or down. For example, the sliders 112 can be used as faders, such as for volume or signal level control.

[0038] As the media mixing controls are manipulated by the user through interaction with the touch screen 104, the media mixing controls being displayed can be modified in real time. For example, as the user interacts with the dial 106 via the touch screen 104, the graphics associated with the dial 106 can be modified to indicate that the dial is effectively rotating. Similarly, by selection of one of the buttons 108, the graphics associated with the button 108 on the touch screen 104 can indicate its selection. As another example, the user manipulates the slider 112 and the graphics associated with the slider 112 can be modified as the slider 112 is manipulated. Hence, as the media mixing controls displayed by the touch screen 104 are manipulated a user, the user is essentially given immediate media feedback as to the manner by which the media mixing controls are being manipulated.

[0039] Still further, since the touch screen 104 is capable of multi-point touch sensing, a user (or a plurality of users) can simultaneously interact with more than one of the media mixing controls at any given point in time. For example, the user may concurrently manipulate one or more dials 108, buttons 108 or sliders 112, or any combination thereof. The multi-point touch screen 104 can simultaneously sense these different interactions with different media mixing controls so that the appropriate media mixing controls are able to not only be concurrently sensed but also have their graphical display modified.

[0040] FIG. 2A is a diagram of an electronic mixing console 200 according to one embodiment of the invention. The electronic mixing console 200 includes a computing device 202 that has a housing 204. The housing 204 contains the circuitry and components for the computing device 202. The housing 204 also includes a touch screen 206 that provides a screen for output information as well as a touch-sensitive area for data input. The touch screen 206 of the computing device 202 can display media mixing controls, such as sliders 208 (e.g., faders), buttons 210 and dials 212. These media mixing controls are not physically presented on the computing device 202 but are graphically depicted by the touch screen 206.

[0041] In addition, the electronic mixing console 200 includes an overlay 214. The overlay 214 is designed to be placed over the touch screen 206 of the computing device 202. The overlay 214 is provided on the computing device 202 so as to render the computing device 202 more applicable to use as a mixing console. In this regard, the overlay 214 includes various surface guides. For example, as shown in FIG. 2A, the surface guides can include slider guides 216, button guides 218 and dial guides 220. The slider guides 216 assist the user with interacting with the sliders 208. The button guides 218 assist the user with interaction with the buttons 210. The dial guides 220 assist the user with interacting with the dials 212.

[0042] The overlay 214 can be formed from a variety of different materials. In one embodiment, the overlay 214 is a translucent, thin plastic sheet having the surface guides on an upper surface thereof. A back surface of the overlay 214 can then be affixed adjacent to the touch screen 206 of the computing device. The overlay 214 can be attached or held against the computing device 202 in a variety of different ways. For example, the overlay 214 can be attached or held against the computing device 202 by clips, pins, tabs, adhesive, static attraction, vacuum (e.g., suction cups). As other examples, the computing device 202 could include grooves or slots for receiving the overlay 214 and holding the same in position. In another embodiment, the overlay 214 can be permanently affixed to the touch screen 206 of the computing device 202.

[0043] The user's interaction with the touch screen 206 via the overlay 214 can be such that a user performs a gesture. For example, the user could utilize the dial guide 220 and perform a rotate gesture. The touch screen 206 of the computing device 202 would understand the touch gesture and cause the corresponding dial control 212 to be manipulated as well as to provide input data for processing by the computing device 202. Additional details on gesture recognition are provided in U.S. patent application Ser. No. 10/840,862, which has been incorporated herein by reference.

[0044] FIGS. 2B-2D are diagrams illustrating operations of a slider according to one embodiment of the invention. The slider is, for example, suitable for use as one of the sliders shown in FIG. 1 or FIG. 2A. In FIG. 2B, a slider includes a slider bar 250 depicted on a touch screen 252. A slider control 254 is provided on the slider bar 250. The user can interact and manipulate the position of the slider control 254 with respect to the slider bar 250. FIG. 2C illustrates the slider control 254 towards the top of the slider bar 250. FIG. 2D illustrates a portion of an overlay 256 having a guide groove 258 aligned over the slider bar 250. The guide groove 258 assists a user with interacting with the slider bar 250 by maintaining alignment with respect to the slider bar 250. Hence, the user can manipulate the slider bar 250 without having to visually coordinate one's finger or stylus position over the slider bar 250.

[0045] FIGS. 2E-2G are diagrams illustrating operations of a dial 270 according to one embodiment of the invention. The dial 270 is, for example, suitable for use as one of the dials shown in FIG. 1 or FIG. 2A. In FIG. 2E, the dial 270 is depicted on a touch screen 272. A position indicator 274 is provided on the dial 270. The user can interact and manipulate the position of the position indicator 274 with