

second LED 374B turned off. And in a second mode, the second LED 374B may be turned on and the first LED 374A turned off.

[0160] Although only a single graphics panel 360 is shown, it should be appreciated that this is not a limitation and that additional graphics panels may be used. For example, one or more graphics panels may be further positioned underneath the first graphics panel described above.

[0161] Referring now to the light panel 358, the light panel 358 is configured to generate light for highlighting the light activated symbols 372 that are being touched. The light panel 358 includes a light distribution panel 380 disposed over the graphics panel 360 and one or more side mounted light emitting diodes 382 disposed around the periphery of the light distribution panel 380. The side mounted light emitting diodes 382 are configured to direct light into a different portion of the light distribution panel 380. Alternatively, a light pipe may be used to direct light from an LED located away from the light distribution panel. The light distribution panel 380 is configured to redirect the light made incident thereon via the light emitting diodes 382 to an upper surface of the light distribution panel 380 thereby illuminating the touch pad surface. The light distribution panel 380 is also configured to serve as a dielectric layer that covers the electrode layer 362 in order to help form the capacitance sensing circuit of the touch pad.

[0162] As shown, the LEDs 382 are attached to the printed circuit board 364 and operatively coupled to the controller 368 located on the backside of the printed circuit board 364. During operation, the controller 368 selectively adjusts the intensity of each of the LEDs to illuminate portions of or all of the light distribution panel 380 in a controlled manner.

[0163] The light distribution panel 380 can be widely varied. In the illustrated embodiment, the light distribution panel 380 typically includes a portion that extends below the inner surface of the frame. This portion provides a light receiving area at the sides of the light distribution panel 380 for receiving light emitted by the side mounted LED's 382. Furthermore, the light distribution panel 380, which can be formed from a single or multiple layers, is typically formed from translucent or semi-translucent dielectric materials including for example plastic materials such as polycarbonate, acrylic or ABS plastic. It should be appreciated, however, that these materials are not a limitation and that any optically transmittable dielectric material may be used (the same materials can be used for the graphic panel).

[0164] Further, the light distribution panel 380 is broken up into plurality of distinct nodes 384, each of which includes its own dedicated light emitting diode 382 for individual illumination thereof. During operation, when light is released by a light emitting diode 382, the light is made incident on the side of the light distribution panel 380 at the node 384. The node 384 redirects and transmits the light from its side to an upper surface of the node 384. In order to prevent light bleeding between adjacent nodes 384, each node 384 may be optically separated by a reflecting or masking region disposed therebetween.

[0165] Each of the nodes 384 may be formed from a solid piece of material or it may be formed from a combination of elements. In one embodiment, each of the nodes 384 is formed from a translucent or semi-translucent plastic insert that when combined with the other inserts forms the light

distribution panel 380. In another embodiment, each of the nodes is formed from a bundle of fiber optic strands.

[0166] The configuration of the nodes 384 including layout, shape and size may be widely varied. Because the touch pad 354 is circular in the illustrated embodiment, the nodes 384 are embodied as distinct angular segments (e.g., pie shaped). Furthermore, the number of nodes 384 is typically based on the symbol set 372 with the largest number of symbols. For example, in the illustrated embodiment, this would be twelve, one for each symbol of the phone mode. In one configuration, in order to highlight a phone number, the node corresponding to the phone number (disposed directly above) is illuminated, and in order to highlight a music symbol, multiple nodes corresponding to the music symbol are illuminated (in the example provided, three nodes would be illuminated for each music symbol)

[0167] In one embodiment, all the LEDs 382 are powered at the same time to produce a fully illuminated touch pad 354. This may be analogous to backlighting. In another embodiment, the LEDs 382 are powered in accordance with the capacitance changes measured by each of the electrodes. For example, the node 384 above the detected region may be illuminated while the segments above the undetected regions may be turned off. This provides indication to the user as to their exact location on the touch surface, i.e., which symbol and thus which function will be implemented. In yet another embodiment, selected segments may be illuminated to encourage a user to place their finger in a particular area of the touch pad.

[0168] Although only a single light panel 358 is shown, it should be appreciated that this is not a limitation and that additional light panels may be used. For example, one or more light panels may be further positioned underneath the first light panel described above. In one embodiment, each light panel in a group of light panels is configured to distribute a different color. For example, three light panels including a red, green and blue light panel may be used. Using this arrangement, different colored segments may be produced. By controlling their intensity, almost any color can be produced (mixed) at the touch surface. In another embodiment, each light panel in the group of light panels may have a different orientation. For example, the angularly segmented nodes of the light distribution panel may be rotated relative to the other light panels so that they are placed at different positions about an axis (e.g., partially overlapping and angularly offset). Using this arrangement, leading and trailing illumination can be produced.

[0169] In most cases, some component of the touch pad 354 includes light diffusing elements to diffuse the light produced therefrom in order to normalize the light intensity, to produce a characteristic glow, and/or to hide the physical parts of the touch pad 354 located underneath the input surface. By way of example, the component may be the light distribution panel 380 of the light panel or the cover 356 disposed thereover. The light diffusing elements may be provided on an inner surface, outer surface of the component or they may be embedded inside the component. In one embodiment, the light diffusing element is an additive disposed inside the light distribution panel. In another embodiment, the light diffusing element is a layer, coating and/or texture that is applied to the inner, side or outer surfaces of the panel.

[0170] In the illustrated embodiment, the light diffusing element is disposed in the cover 356. The cover 356 may for