

of the channel has a shape that generally coincides with the shape of the housing 254. During assembly, the circuit board 266 of the touch pad assembly 256 is aligned with the opening 262 and a cosmetic disc 268 and button cap 270 are mounted onto the top side of the circuit board 266. As shown, the cosmetic disc 268 has a shape that generally coincides with the opening 262. The input device may be held within the channel via a retaining mechanism such as screws, snaps, adhesives, press fit mechanisms, crush ribs and the like.

[0090] FIG. 19 is a simplified block diagram of a remote control 280 incorporating an input device 282 therein, in accordance with one embodiment of the present invention. By way of example, the input device 282 may correspond to any of the previously described input devices. In this particular embodiment, the input device 282 corresponds to the input device shown in FIGS. 7-11, thus the input device includes a touch pad 284 and a plurality of switches 286. The touch pad 284 and switches 286 are operatively coupled to a wireless transmitter 288. The wireless transmitter 288 is configured to transmit information over a wireless communication link so that an electronic device having receiving capabilities may receive the information over the wireless communication link. The wireless transmitter 288 may be widely varied. For example, it may be based on wireless technologies such as FM, RF, Bluetooth, 802.11 UWB (ultra wide band), IR, magnetic link (induction) and/or the like. In the illustrated embodiment, the wireless transmitter 288 is based on IR. IR generally refers wireless technologies that convey data through infrared radiation. As such, the wireless transmitter 288 generally includes an IR controller 290. The IR controller 290 takes the information reported from the touch pad 284 and switches 286 and converts this information into infrared radiation as for example using a light emitting diode 292.

[0091] FIGS. 20A and 20B are diagrams of an input device 300, in accordance with an alternate embodiment of the present invention. This embodiment is similar to those shown in FIGS. 5-12, however instead of relying on a spring component of a switch, the input device 300 utilizes a separate spring component 306. As shown, the input device 300 includes a touch pad 302 containing all of its various layers. The touch pad 302 is coupled to a frame 304 or housing of the input device 300 via the spring component 306. The spring component 306 (or flexure) allows the touch pad 302 to pivot in multiple directions when a force is applied to the touch pad 302 thereby allowing a plurality of button zones to be created. The spring component 306 also urges the touch pad 302 into an upright position similar to the previous embodiments. When the touch pad 302 is depressed at a particular button zone (overcoming the spring force), the touch pad 302 moves into contact with a switch 308 positioned underneath the button zone of the touch pad 302. Upon contact, the switch 308 generates a button signal. The switch 308 may be attached to the touch pad 302 or the housing 304. In this embodiment, the switch 308 is attached to the housing 304. In some cases, a seal 310 may be provided to eliminate crack and gaps found between the touch pad 302 and the housing 304. The spring component 306 may be widely varied. For example, it may be formed from one or more conventional springs, pistons, magnets or compliant members. In the illustrated embodiment, the spring component 306 takes the form of a compliant bumper formed from rubber or foam.

[0092] While this invention has been described in terms of several preferred embodiments, there are alterations, permutations, and equivalents, which fall within the scope of this invention. It should also be noted that there are many alternative ways of implementing the methods and apparatuses of the present invention. It is therefore intended that the following appended claims be interpreted as including all such alterations, permutations, and equivalents as fall within the true spirit and scope of the present invention.

What is claimed is:

1. An input device, comprising:

a movable touch pad configured to generate a first control signal when the movable touchpad is moved and a second control signal when an object is positioned over the movable touchpad.

2. The input device as recited in claim 1 wherein the touchpad moves between an upright position and a depressed position, the movable touch pad generating the first control signal when moved to the depressed position.

3. The input device as recited in claim 1 wherein the first control signal is a button signal and the second control signal is a tracking signal.

4. The input device as recited in claim 1A further including a frame component, the movable touchpad being configured to move relative to the frame component.

5. The input device as recited in claim 4 wherein the movable touch pad gimbals relative to the frame component.

6. The input device as recited in claim 4 wherein the movable touch pad rotates, pivots, slides, translates or flexes relative to the frame component.

7. The input device as recited in claim 4 further including a movement indicator contained within the frame component, the movement indicator being configured to sense movements of the movable touchpad, the first control signal being based on the sensed movements of the movement indicator

8. The input device as recited in claim 7 wherein the movement indicators are switches or sensors.

9. The input device as recited in claim 1 wherein the movable touch pad includes a sensor arrangement configured to sense an object positioned over the movable touch pad, the second control signal being based on the position of the sensed object relative to the movable touchpad.

10. The input device as recited in claim 1 wherein the sensor arrangement is based on resistive sensing, surface acoustic wave sensing, pressure sensing, optical sensing or capacitive sensing.

11. An input device, comprising:

a frame;

a rigid touch pad movably restrained to the frame, the rigid touch pad being configured to generate tracking signals when an object is positioned over the rigid touchpad;

one or more movement indicators contained within the housing, the movement indicators being configured to generate one or more button signals when the rigid touch pad is moved relative to the frame.

12. The input device as recited in claim 1 wherein the touch pad is divided into a plurality of spatially distinct button zones, each of the button zones having a correspond-