ing to the number 2 on the keypad) is capable of resolving four levels of pressure placed on the button 10b (the first level being no pressure placed on the button). Like button 10i, the levels resolved by button 10b in the alternative embodiment are each associated with a distinct input signal, and are each associated with a distinct letter of the alphabet, A-C.

[0028] The pre-assigned function buttons 11a-c of the apparatus 1 are keypad push buttons. Each of the buttons 11a-c is capable of resolving three levels of pressure placed on the buttons 11a-c no pressure, a first magnitude of pressure (greater than none), and a second magnitude of pressure (greater than the first magnitude). Examples of functions carried out by such pre-assigned function buttons 11 a-c include "Send"11a, "Power" 11b, and "End Call"11c.

[0029] In the embodiment shown, each of the pre-assigned function buttons 11 a-c is configured such that the first magnitude of pressure is an amount of pressure that signifies that a user"s finger is "hovering" over, or touching with more than passing force, the button. Each is also configured such that the second magnitude of pressure is an amount of pressure that signifies that a user"s finger applies when the user wishes to activate the button.

[0030] Thus, in the embodiment shown, when a user"s finger "hovers"over the "Send"button 11c, a first signal is transmitted by the button 11c to the controller. And, when a user"s finger activates the "Send" button 11c, a second signal is transmitted by the button 11c to the controller.

[0031] The assignable-function buttons 12a, 12b, 12c are buttons whose function depends upon the mode of operation of the device with which the apparatus 1 is associated. For example, when such an apparatus 1 is associated with a mobile telephone, such buttons 12a, 12b, 12c may be used to navigate the menus displayed to carry out various functions, such as scrolling through an address book, selecting a number to dial, editing a number, re-setting the time displayed, and similar functions.

[0032] In addition, the assignable-function buttons 12a-c are configured similarly to the pre-assigned buttons 11a, 11b, 11c, in that the buttons 12a, 12b are configured such that the first magnitude of pressure is an amount of pressure that signifies that a user"s finger is "hovering" over, or touching with more than passing force, the button, and such that the second magnitude of pressure is an amount of pressure that signifies that a user"s finger applies when the user wishes to activate the button. Preferably, the buttons 11a, 11b, 11c, 12a, 12b, 12c are configured such that they receive and analyze other data in determining whether the user is merely hovering or, instead, wishes to activate the button (such as type of, and duration of, contact with the button). Any suitable input-device may be used an an assignable-function input device. Examples of such input-devices include rocker-switches and scroll wheels.

[0033] In an alternative embodiment (not shown), the middle assignable-function button 12c, includes the input device of **Fig. 1**. It is in communication with the actuator 6 (not shown) shown in **Fig. 1** as well, and operates in the manner described with reference to **Fig. 1**. In such an embodiment, the PCB 62 is separated at line 62a, such that the PCB4 of **Fig. 1** is not in contact with PCB62.

[0034] Referring again to **Fig. 2**, although in the embodiment shown there the alphanumeric keys have four or five available states (embodying an alphanumeric-character selection), and the pre-assigned buttons 11a, 11b, 11c, and the assignable-function buttons 12a, 12b, 12c are configured to indicate hover / activation signals, in other embodiments, other configurations may be used. Moreover, although the alphanumeric keys 10 have four or five available states, thus allowing them to be associated with three or four (or more) input signals, such keys 10 may be configured to provide input signals at, for example, only two of the states. In this way, such keys 10 may be configured to provide hover / activation signals similar to that which is provided in the pre-assigned buttons 11a, 11b, 11c, and assignable-function buttons 12a, 12b, 12c in the embodiment shown in Fig. 2.

[0035] Moreover, in the embodiment shown, the levels for the alphanumeric input devices 10 correspond to magnitudes of pressure, but in other embodiments the levels resolved can be type of touch, magnitude, physical position of the switch and other attributes of contact with the button, or some combination thereof. The input signals provided by such input devices may be configured accordingly.

[0036] In the embodiment shown in **Fig. 1**, the input signals that are transmitted by the input devices are transmitted to a controller 9. In the embodiment shown, the controller is in communication with storage memory (not shown). Examples of such memory includes Read Only Memory (ROM). The storage memory includes a table in which input signals are associated with various haptic feedback signals. This is explained more fully in relation to Figures 9-10.

[0037] The apparatus 1 shown in **Fig. 2** also includes an actuator 61. The actuator 61 is shown in representative fashion in **Fig. 2**, and not to scale or in physical placement. An alternate actuator 61 and physical placement of the actuator 61 is shown in **Fig. 4**. The actuator 61 is in communication with the various input devices, and is configured to provide vibrations of varying frequencies, magnitudes, and wave-forms to the input devices. The actuator 61 is also in communication with the controller 9. Further description of embodiments of such communication and configuration is provided below.

[0038] In the embodiment shown, the controller 9 receives an input signal from one of the input devices. The controller 9 then analyzes the input signal received to determine a signal to transmit to the actuator 61.

[0039] For example, the controller 9 of **Fig. 2** is configured such that when the controller 9 receives a signal associated with the second level from button 10i (the "9" key), the controller 9 sends a first control output signal to the actuator, and when the controller receives a signal associated with the third level from the button 10i, the controller sends a second control output signal to the actuator 61, and so on. The first control output signal is one that causes the actuator to provide a vibration of a certain, first frequency. The second control output signal is one that causes the actuator to provide a vibration of a certain, higher frequency, and so on. In other embodiments, the vibrations provided may be of the same frequency.

[0040] **Fig. 3** shows another embodiment of the present invention, in the form of a mobile telephone 14 having the apparatus of **Fig. 2**. The controller 9, actuator 61, and the PCB 62 of the apparatus 60 of **Fig. 2** are encased in a case