

telephone keys has been emulated by 16 adjacent sensory feedback elements that form a square key corresponding to each of the telephone keys. For example, the telephone key with numeral "7" has been emulated by activating a 4x4 array of adjacent sensory feedback elements **817**.

[0074] **FIG. 8C** shows a cross-sectional view of keypad **800**. Keypad **800** includes an array **200** of sensory feedback elements and a display screen **850** overlaying array **200**.

[0075] In this exemplary embodiment, the surface of keypad **800** is flat. When the user places his or her finger upon the label "7" of display screen **850**, sensory feedback elements **817** located under the label "7" provide a vibration to indicate the presence of an emulated hard key. When the user increases the pressure applied by his or her finger to operate the key, sensory feedback elements **817** provide a second vibration to indicate key operation. Alternatively, sensory feedback elements **817** may provide a sensation of heat when the user operates the key.

[0076] On the other hand, sensory feedback elements **818** that correspond to an inactive surface of keypad **800** will not provide a sensory feedback when the user places his or her fingertips upon this inactive surface even if a label is present upon this inactive surface. For example, such a label may correspond to a brand name or a model number of the product and does not have an emulated hard key located under the label. Display screen **850** typically comprises a flexible sheet of material that may be similar to the one described above using **FIG. 3B**.

[0077] Embodiments may further include other sensory feedback indicators such as, a variation in the texture of the keypad surface, a "stickiness" of the keypad surface, and a variation in the stiffness of the keypad surface. These embodiments may also incorporate audible and visual feedback indicators.

[0078] **FIG. 9** shows a flowchart of one exemplary method of keyboard emulation using a reconfigurable keyboard such as the keyboard shown in **FIG. 1**. In block **905**, a reconfigurable keyboard and a selector for selecting a first emulated keyboard or a second emulated keyboard are provided. For example, the first emulated keyboard may be a telephone keypad, while the second emulated keyboard corresponds to a PDA.

[0079] Query block **910** determines whether the first emulated keyboard has been selected.

[0080] When the first emulated keyboard is selected, a first key of the first emulated keyboard is emulated by configuring at least a portion of the reconfigurable keyboard to emulate a first hard key. The action of block **915** pertains to generating an emulated hard key of the first emulated keyboard by, for example, raising the height of a portion of the reconfigurable keyboard. Consequently, if the first emulated keyboard is a telephone keypad, the emulated hard key corresponds to a raised numerical key, for example, numeral "7."

[0081] When the first emulated keyboard is not selected, query block **920** determines whether the second emulated keyboard has been selected. When the second keyboard has been selected, a first key of the second emulated keyboard is emulated by configuring at least a portion of the reconfigurable keyboard to emulate a second hard key. The action

of block **925** pertains to generating an emulated hard key of the second emulated keyboard by, for example, raising the height of a portion of the reconfigurable keyboard. Therefore, if the second emulated keyboard is a PDA keypad, the generated emulated hard key is a raised key corresponding to a text alphabet, for example, the alphabet "A."

[0082] The above-described embodiments are merely set forth for a clear understanding of the principles of the disclosure. Many variations and modifications may be made without departing substantially from the disclosure. All such modifications and variations are included herein within the scope of this disclosure.

We claim:

1. A reconfigurable interface, comprising:

a reconfigurable keyboard configurable to emulate a first user-selected keyboard; and

a keyboard emulator controller operable to generate upon the reconfigurable keyboard a first emulated hard key that emulates a first key of the first user-selected keyboard.

2. The reconfigurable interface of claim 1, wherein:

the reconfigurable keyboard comprises an array of microchambers, each microchamber being operable to change from a first height to a second height; and

the keyboard emulator controller is operable to set a first group of the microchambers in the array to the second height, the first group of microchambers collectively constituting the first emulated hard key.

3. The reconfigurable interface of claim 2, wherein the keyboard emulator controller is further operable to set a second group of microchambers to the second height, the second group of microchambers collectively constituting a second emulated hard key that emulates a second key of the first user-selected keyboard.

4. The reconfigurable interface of claim 2, wherein the keyboard emulator controller is further operable to set the first group of microchambers to the first height, the first group of microchambers emulating an inactive portion of the first user-selected keyboard.

5. The reconfigurable interface of claim 4, wherein the keyboard emulator controller is further operable to set a second group of microchambers to the second height, the second group of microchambers collectively constituting a second emulated hard key that emulates a first key of a second user-selected keyboard.

6. The reconfigurable interface of claim 5, wherein at least one of the microchambers is common to the first group of microchambers and the second group of microchambers.

7. The reconfigurable interface of claim 5, wherein the second group of microchambers is the same as the first group of microchambers.

8. The reconfigurable interface of claim 2, in which the keyboard emulator controller comprises:

a microchamber controller operable to provide to a microchamber a first volume of fluid corresponding to the first height of the microchamber, and a second volume of fluid corresponding to the second height of the microchamber.

9. The reconfigurable interface of claim 8, wherein the fluid comprises one of air, a liquid, a gas, and a gel.