

## KEYPAD WITH TACTILE TOUCH GLASS

### BACKGROUND OF THE INVENTION

[0001] Implementations described herein relate generally to input devices, and more particularly, to handheld input devices that may provide tactile feedback in response to key entries.

[0002] Devices, such as handheld mobile communication devices, conventionally include input devices that provide some form of tactile feedback to a user indicating that a keystroke has been detected by the communication device. These conventional keypads are formed of physically distinct keys. Currently, there are no adequate solutions of providing tactile feedback to keypads formed of a single physical device or surface.

### SUMMARY OF THE INVENTION

[0003] According to one aspect, a mobile communication device is provided. The mobile communication device may comprise a keypad assembly comprising: a glass cover that covers a plurality of keys; and an actuator for detecting downward displacement of the glass cover; and logic configured to: sense an input position within the keypad assembly, and determine an input key based on the sensed input position when the actuator detects downward displacement of the glass cover layout.

[0004] Additionally, the plurality of keys may be printed on a bottom surface of the glass cover.

[0005] Additionally, the mobile communication device may further comprise a silicon mat located between the glass cover and the actuator, wherein the silicon mat includes a protrusion that is configured to contact the actuator when the glass cover is pressed.

[0006] Additionally, the mobile communication device may further include a display, wherein the logic may be further configured to: control the display to display information associated with the determined key.

[0007] Additionally, the logic may be further configured to: determine a scrolling input by sensing input positions within the keypad assembly when a menu is displayed via the display.

[0008] According to another aspect, a method may be provided. The method may comprise sensing a position of input relative to a plurality of keys, wherein the plurality of keys are printed on a surface; detecting a displacement of the surface; and determining an input key based on a sensed position of input when displacement of the surface is detected.

[0009] Additionally, the sensing a position of input relative to a plurality of keys may be sensed by a capacitive film on the surface.

[0010] Additionally, the position of input may be determined by detecting a finger of a user.

[0011] Additionally, the detecting a displacement of the surface may be detected by an actuator that produces an electrical signal when deformed.

[0012] Additionally, the method may further comprise determining scrolling input by sensing positions of input relative to a plurality of keys when no displacement of the glass surface is detected and a menu is displayed on a display.

[0013] According to yet another aspect, a mobile communications device may comprise means for providing a plurality of keys; means for sensing a position of input relative to the plurality of keys; means for detecting displacement of the

means for providing a plurality of keys; means for determining an input key, wherein the input key is determined by the sensed position of input when displacement of the means for providing the plurality of keys is detected using pressure or presence to detect the input and means for providing tactile feedback to a user.

[0014] Additionally, the means for providing a plurality of keys includes at least one of a glass surface with key information or a liquid crystal display (LCD).

[0015] Additionally, the means for sensing a position of input relative to the plurality of keys includes a capacitive film.

[0016] Additionally, the means for detecting displacement of the means for providing a plurality of keys includes an actuator, wherein the actuator produces an electrical signal when deformed.

[0017] Additionally, the mobile communications device may comprise means for displaying information associated with the determined input key.

[0018] According to yet another aspect, a device may comprise a keypad assembly comprising: a surface that covers a plurality of keys; and an actuator for detecting downward displacement of the surface; and logic configured to: sense an input position within the keypad assembly, and determine an input key based on the sensed input position when the actuator detects downward displacement of the surface.

[0019] Additionally, the surface is glass and the plurality of keys are printed on a bottom surface of the glass surface.

[0020] Additionally, the surface is plastic and the plurality of keys are printed on a bottom surface of the plastic surface.

[0021] Additionally, the surface is an LCD and the plurality of keys are displayed on the LCD.

[0022] Additionally, the downward displacement of the surface provides tactile feedback to a user.

### BRIEF DESCRIPTION OF THE DRAWINGS

[0023] The accompanying drawings, which are incorporated in and constitute a part of this specification, illustrate an embodiment of the invention and, together with the description, explain the invention. In the drawings,

[0024] FIG. 1 is a diagram of an exemplary implementation of a mobile terminal;

[0025] FIG. 2 illustrates an exemplary functional diagram of a mobile terminal;

[0026] FIG. 3 illustrates an exemplary functional diagram of the keypad logic of FIG. 2;

[0027] FIGS. 4A-4B illustrate an exemplary keypad assembly; and

[0028] FIGS. 5 is a flowchart of exemplary processing.

### DETAILED DESCRIPTION OF THE INVENTION

[0029] The following detailed description of the invention refers to the accompanying drawings. The same reference numbers in different drawings may identify the same or similar elements. Also, the following detailed description does not limit the embodiments.

[0030] Exemplary implementations of the embodiments will be described in the context of a mobile communications terminal. It should be understood that a mobile communication terminal is an example of a device that can employ a keypad consistent with the principles of the embodiments and should not be construed as limiting the types or sizes of devices or applications that can use implementations of key-