

**[0038]** The electroactive polymer may be an ionic electroactive polymer such as an Ionic Polymer Gel. However it may also be an Ionomeric Polymer-Metal Composite or a Carbon Nanotube.

**[0039]** In order to provide an example of use of the electroactive polymer, according to one embodiment, reference is now being made to FIG. 5, which shows a block schematic of exemplary units in the portable electronic device that may be provided in order to raise or lower a key in the data input device.

**[0040]** Here there is shown a control unit 34, which may be connected to the touch input sensing combination 24 via detecting elements 36 and 38 as well as to the cavities, here indicated by the single key 27 mentioned above.

**[0041]** As a user presses a key on the keypad, for instance key 27, the electroactive polymer and surrounding electrolyte may be forced down on an area of the underlying touch input sensing layer combination 24 that is aligned with the cavity through user pressure applied on the shielding layer above a cavity. This may cause the electroactive polymer and surrounding electrolyte in the cavity to exert pressure on the touch input sensing layer combination 24, where in the case of a resistive touch panel, the two electrically conducting layers may make contact with each other. The position in a structure, often a matrix provided in the layer may be detected by the detection elements 36 and 38. These elements 36 and 38 may be arranged to detect the position according to columns and rows. Location detection data regarding the position in the structure may be provided to the control unit 34. It may be possible that the selection is made in relation to a music playing function of the device. The control unit 34 may recognize the position and may determine which selection has been made. In relation to this selection it may decide to raise one or more of the keys associated with the selected function, for instance a key that is to provide a PLAY button. The control unit 34 therefore may locate the key that is to be a PLAY button and provides a voltage signal to be provided to the electrodes of the electroactive polymer in the cavity which is to act as the key 27. This may in turn raise the key 27 and now it may be used more easily by the user of the device, since it has been raised in relation to the environment, i.e. in relation to the surface of the phone as well as in relation to at least some of the keys of the keypad.

**[0042]** The data input device need not be provided in relation to a display, but can be provided on its own. Naturally it is then not necessary with transparent layers, which may be the case if the device of one embodiment would be provided for use in a touch screen.

**[0043]** It is furthermore possible that there may be different modes, where some keys in a keypad may be raised while others are not. In one mode no keys may be raised. It is also possible to lower keys that should not be used. It is also possible to combine the raising of keys with illumination so that a user can more easily determine which keys he/she should use. There may also be provided domes between touch input combination and cavities, where the electroactive polymer acts on the dome, which in turn acts on the key sensing mechanism. In this case it should also be realised that the key sensing mechanism need not be provided through a touch input sensing layer combination, but other mechanisms may be used.

**[0044]** It is furthermore possible with flexible walls of the cavity so that expansion can take place sideways. In this way it may be possible to enlarge the size of a key sideways.

Depending on the nature of the electroactive polymer the cavity may furthermore only be filled with electroactive polymer without any surrounding electrolyte.

**[0045]** One embodiment may allow the shape of keys to be changed, which may enable a user to more easily locate and use a key that is of interest for him/her to use. This may also provide him/her with tactile feedback of the key.

**[0046]** In the data input device there may be spacer layers provided between the solid material layer and the key sensing mechanism as well as between the key sensing mechanism and the display layer. Therefore, it should be realized that the present invention is only to be limited by the following claims.

1. Data input device comprising:
  - a key sensing mechanism,
  - a solid material layer provided above said key sensing mechanism, wherein said solid material layer includes a least one cavity going through the whole of said solid material layer, and
  - wherein said cavity comprises an electroactive polymer and two electrodes for providing a key that can be changed in shape based on an applied voltage and register inputs in the key sensing mechanism based on a user pressing down the electroactive polymer on the key sensing mechanism.
2. Data input device according to claim 1, wherein the electroactive polymer and the key sensing mechanism are transparent.
3. Data input device according to claim 2, further comprising a display below said key sensing mechanism.
4. Data input device according to claim 1, wherein said solid material layer comprises a number of cavities, each having electroactive polymer and electrodes.
5. Data input device according to claim 4, wherein the cavities are provided in a structure and the key sensing mechanism is arranged to detect a key press through providing data indicating a position in the structure based on pressure applied by the electroactive polymer of a cavity on an area in the key sensing mechanism.
6. Data input device according to claim 1, wherein the electroactive polymer is an ionic electroactive polymer.
7. Data input device according to claim 1, further comprising an elastic shielding layer above said solid material layer and covering said cavity.
8. Data input device according to claim 1, wherein the electroactive polymer is surrounded by a gel formed electrolyte.
9. Data input device according to claim 1, wherein the electrodes are provided opposite each other on the walls of the cavity.
10. Portable electronic device comprising:
  - a data input device having
  - a key sensing mechanism,
  - a solid material layer provided above said key sensing mechanism, wherein said solid material layer includes a least one cavity going through the whole of said solid material layer, and
  - wherein said cavity comprises an electroactive polymer and two electrodes for providing a key that can be changed in shape based on an applied voltage and register inputs in the key sensing mechanism based on a user pressing down the electroactive polymer on the key sensing mechanism.