virtually undetectable effects in the signal spread, since the operational resistance range is so comparatively large.

[0058] In some embodiments, however, it is advantageous to have portions of the conductive layer **4** with increased conductivity, as compared to other lower conductivity portions, in order to exert some degree of control over how the capacitive signal is spread. The variations in conductivity may preferably be achieved by altering the chemical composition of the conductive layer **4**, by having variations in the thickness of the layer, or by using a combination of these techniques.

[0059] The conductive layer **4** may comprise portions of different conductivity, including portions of no conductivity (i.e. portions having a resistance so high that they are essentially electrically insulating), low conductivity, medium conductivity and high conductivity.

[0060] It is preferred that the conductive layer **4** has a resistivity less than 100,000,000 ohms per square, or more preferably, less than 10,000,000 ohms per square. Otherwise, any induced capacitive signal may be so heavily attenuated that any advantages in signal detection are substantially reduced.

[0061] In preferred embodiments, the conductive layer **4** may be touched directly, as shown in the embodiment of **FIG. 3**. The sensitivity of the touchpad in this arrangement is sufficiently high to allow a user to perform touching actions whilst wearing thin gloves, which can be advantageous if the device is to be used in environments which require the user to have some form of hand protection e.g. in chemical laboratories or surgical theatres, or if it is desired to keep the device grease and dirt free.

[0062] In other preferred embodiments, the touchpad may include a non-conductive layer **5** proximate to the conductive layer **4**. Preferably, the non-conductive layer **5** is in the form of a thin coating which is deposited onto the conductive layer **4** as shown in **FIG. 6**, which prevents direct user contact with the conductive layer **4**. This can be used to protect the conductive layer **4** from damage and/or provide an anti-reflective finish to the device. The non-conducting layer may also be purely decorative, or in the case of the device being used as a keypad for instance, the layer may be printed with icons or symbols, indicating the position of keys etc. In this arrangement, a finger **1** touches the non-conductive layer **5** and induces a variation in capacitance which is spread by the conductive layer **4**, and is thereby detected by the underlying sensing conductors **2**.

[0063] In other embodiments, the conductive layer **4** may be deposited on the underside of the membrane **3**, as shown in **FIG. 4**, and a finger **1** may be brought into contact, or proximity, with the side of the membrane **3** opposite to the conductive layer **4**. In this arrangement, the conductive layer **4** is still operable to alter the capacitive environment of the sensing conductors **2**, by concentrating the electric field passing therebetween towards the membrane **3**, so that a touching action or proximity of a finger **1** can be detected on, or near to, the membrane surface. However, since the conductive layer **4** is not touched directly, the induced capacitive signal is not as strong as in the previous embodiment.

[0064] The embodiment of **FIG. 4** can be advantageous, since the conductive layer **4** is protected from direct contact with a user's finger **1** and therefore is not susceptible to damage and/or wear and tear during normal use.

[0065] In an alternative embodiment, the membrane **3** and conductive medium **4** may be combined into a single conductive support and sensing layer **4**A, as shown in **FIG. 5**. In this arrangement the support and sensing layer **4**A is preferably formed from a bulk doped medium having a bulk conductivity, which gives rise to a very strong capacitive signal at the time of a touching action. Preferably, the bulk doped medium is glass or plastic, comprising a dopant of conductive material.

[0066] Conventional clear conductive plastics have a very high resistance, typically 1,000,000,000 ohms per square, but this may be reduced by adding small quantities of conductive particles, platelets or fibres to the plastic. These particles or fibres are generally not transparent, but may be selected to be preferably sufficiently small so as to not be visible. The particles may be metal such as copper, gold and silver for instance, or may be a metal oxide. Alternatively, graphite or other conductive substances, can be used. If it is intended for these particles to remain invisible to the eye, then the particles are typically about 10 microns wide, or less. The fibres may be carbon fibres or nanotubes. These fibres may be short (up to about 10 mm in length) and randomly oriented throughout the plastic. Alternatively, the fibres may be longer and can be loosely woven into a sheet and then encased in the plastic.

[0067] It is to be appreciated that non-conductive plastics can also be doped with conductive material, in the same manner, in order to produce a medium with a bulk conductivity, or altered capacitive coupling.

[0068] By selecting the required amount of particulate and/or fibrous dopant, a conductive plastic sheet can be fabricated with the required range of resistivity, in which the particles and fibres within the plastic are electrically or capacitively linked by the supporting matrix of the plastic.

[0069] The doped plastics can be shaped using any conventional technique, such as, but not limited to, lamination, vacuum forming and injection moulding.

[0070] In the embodiment as shown in **FIG. 5**, the sensing conductors **2** are preferably completely contained within the support and sensing layer **4**A. However, since the conductors **2** are preferably electrically insulated, short circuiting of the conductors **2**, due to the bulk conductivity of the layer, is prevented.

[0071] The support and sensing layer **4**A may be touched directly, as shown in **FIG. 5**, and the induced variation in capacitance of the conductors **2** is propagated as a capacitive signal throughout the layer. In this arrangement a large capacitive signal is induced by virtue of the conductors **2** residing within the support and sensing layer **4**A. The spread of the capacitive signal can be controlled by pre-selecting the resistivity, or internal capacitive coupling, of the doped medium, since a highly doped medium will have an intrinsic high conductivity, which will propagate the signal throughout a larger volume of the layer, as compared to a weakly doped medium which will propagate the signal throughout a comparatively smaller volume of the layer.

[0072] Herein, throughout the specification use of the term 'proximal' is to be taken to include arrangements in which