CAPACITIVE SENSING DEVICE

BACKGROUND

[0001] Computing devices have become integral tools used in a wide variety of different applications, such as in finance and commercial transactions, computer-aided design and manufacturing, health care, telecommunication, education, etc. Computing devices are finding new applications as a result of advances in hardware technology and rapid development in software technology. Furthermore, the functionality of a computing device is dramatically enhanced by coupling these types of stand-alone devices together in order to form a networking environment. Within a networking environment, computing device users may readily exchange files, share information stored on a common database, pool resources, and communicate via electronic mail (e-mail) and video teleconferencing.

[0002] Conventional computing devices provide several ways for enabling a user to input a choice or a selection. For example, a user can use one or more keys of an alphanumeric keyboard communicatively connected to the computing device in order to indicate a choice or selection. Additionally, a user can use a cursor control device communicatively connected to the computing device to indicate a choice. Also, a user can use a microphone communicatively connected to the computing device to audibly indicate a particular selection. Moreover, touch sensing technology can be used to provide an input selection to a computing device or other electronic device.

[0003] Within the broad category of touch sensing technology there exist capacitive sensing touch screens. Among commercially available capacitive sensing touch screens, there are different sensing technologies. For example, one sensing technology involves the use of a uniform resistive sheet as part of the capacitive sensing touch screen. However, there are disadvantages associated with this commercially available uniform resistive sheet sensing technology. For instance, one of the disadvantages is that when an image is shown through the uniform resistive sheet, the reduced transmittance due to the optically absorbing resistive sheet optically degrades the image. If the image is shown on a display, the display has to be operated at higher brightness to compensate, which requires more power and reduces battery life.

[0004] Another commercially available sensing technology involves using rolled out wires attached to glass as part of a capacitive sensing touch screen. However, there are also disadvantages associated with this commercially available sensing technology. For example, one of the disadvantages is that the wires of the capacitive sensing touch screen are very visible when a displayed image is viewed through it. As such, the wires can be distracting to a user. Another disadvantage is that the wires tend to reflect unwanted ambient light towards the user, thereby obscuring the display. Consequently, the degraded image due to the obscured display can be distracting to the user.

[0005] The present invention may address one or more of the above issues.

SUMMARY

[0006] One embodiment in accordance with the present invention includes a capacitive sensing device. The capacitive sensing device comprises a substantially transparent substrate and a set of patterned conductive traces formed above the substantially transparent substrate. Each of the set of patterned conductive traces has a width such that the capacitive sensing device does not have to be arranged with respect to an underlying image in order to avoid deleterious obstruction of the underlying image by the set of patterned conductive traces. The underlying image is separate from the capacitive sensing device. The capacitive sensing device is separate from active components used to comprise an information display device.

BRIEF DESCRIPTION OF THE DRAWINGS

[0007] **FIG. 1** is a flowchart of operations performed in accordance with an embodiment of the present invention for fabricating a capacitive sensing device.

[0008] **FIG. 2** is a flowchart of operations performed in accordance with another embodiment of the present invention for fabricating a capacitive sensing device.

[0009] **FIG. 3** is a flowchart of operations performed in accordance with an embodiment of the present invention for printing a material.

[0010] **FIG. 4** is a flowchart of operations performed in accordance with an embodiment of the present invention for a photolithography/etching process.

[0011] **FIG. 5** is a flowchart of operations performed in accordance with an embodiment of the present invention for a liftoff process.

[0012] **FIG. 6** is a flowchart of operations performed in accordance with an embodiment of the present invention for manufacturing a capacitive sensing device.

[0013] **FIG. 7** is a cross sectional view of an exemplary capacitive sensing device in accordance with an embodiment of the present invention.

[0014] **FIG. 8** is a plan view of an exemplary capacitive sensing device in accordance with an embodiment of the present invention.

[0015] **FIG. 9** is a cross sectional view of an exemplary capacitive sensing device in accordance with another embodiment of the present invention.

[0016] **FIG. 10** is a top view of the capacitive sensing device of **FIG. 9** in accordance with another embodiment of the present invention.

[0017] The drawings referred to in this description should not be understood as being drawn to scale except if specifically noted.

DESCRIPTION OF PREFERRED EMBODIMENTS

[0018] Reference will now be made in detail to embodiments of the invention, examples of which are illustrated in the accompanying drawings. While the invention will be described in conjunction with embodiments, it will be understood that they are not intended to limit the invention to these embodiments. On the contrary, the invention is intended to cover alternatives, modifications and equivalents, which may be included within the spirit and scope of the invention as defined by the appended claims. Further-