sensor panel assembly. The view shown is along the short edge of the exemplary third touch sensor panel assembly, as shown in the thumbnail. Clear optical fluid **330** can be used to fill in the fluid-tight gap **399** between the top and bottom layer sub assemblies. Fluid **330** can have dielectric properties which can enable the row and column traces formed in ITO layers **320** and **308** to experience a mutual capacitance between them at crossover points and act as touch sensors. If force-sensing is employed, the change in the distance between ITO layers **320** and **308** during a touch can change the mutual capacitance experienced by each of the touch sensors, effectively representing a measure of force. IC **332** and FPC **336** can then be bonded to the first exemplary upper layer subassembly, and conductive tape **333** can be adhered to shield **305** and FPC **336** to ground the bottom shield **305** to FPC **306**. IC **332**, FPC **336** and conductive tape **333** can then encapsulated, and the exemplary first upper layer subassembly can then be scribed and cut again to remove further excess material, and can be edge finished to form the exemplary third touch sensor panel assembly. The exemplary third touch sensor panel assembly can then be laminated to the exemplary LCD module. All of these steps can be performed as described above.

[0040] FIG. **3***ab* shows the exemplary third sensor panel assembly that can be laminated to the exemplary LCD module to form the exemplary third touchscreen. Note that FPC **336** was folded back at an angle in this embodiment.

[0041] FIG. **3***d* shows a side detail of the exemplary third touchscreen, including metal traces **312** in the border areas. The view has changed to along the long edge of the third exemplary touchscreen, as shown in the thumbnail.

[0042] FIGS. **4***a* through **4***j* illustrate an exemplary fourth touchscreen that can be formed by an exemplary second upper layer subassembly and the exemplary LCD module according to one embodiment of this invention.

[0043] FIGS. **4***a* through **4***h* illustrate the exemplary second upper layer subassembly according to embodiments of the invention. FIG. **4***a* shows top glass or motherglass **400**, which can be a large sheet (e.g. 2×3 feet), and from which a number of individual substrates may be generated. A chemical strengthening step can be performed on the top glass, which can involve applying a nitric acid bath at high heat to glass **400**, resulting in compressive forces or stresses in the surface layer of the glass and tensile stresses in the interior core of the glass that can make the surface of the glass less likely to crack apart. Anti-glare coating **402** can then be deposited on glass **400**. Anti-glare coating **402** can be particle-embedded silicon dioxide. Alternatively, AR coating or no coating can also be used. Black mask **404** can be applied to selected regions of glass **400**. Black mask **404** can be applied using printing techniques, roller coating, or sputtering followed by etching of unwanted areas, or by using photoimagable polymer. Or photoimagable polymer. Next, clear overcoat **406** can be applied over black mask **404** and glass **400**. Clear overcoat **406** can be a clear polymer curable with ultraviolet (UV) light that smoothes over the step between the black mask and non-black mask areas, and can form a substantially planar surface for subsequent Indium Tin Oxide (ITO) sputtering and metal patterning. ITO **408** of 10 to 200 ohms per square (max) and an optical index of $n=1.8$ can then be sputtered over clear overcoat **406**, although thicker layers of ITO can reduce this resistance and thinner layers can increase this resistance. ITO **408** can then be patterned. Insulator **409** can then be applied over patterned ITO **408**. Insulator **409** can have a dielectric constant $K<4.0$ and a thickness of between 10 and 25 microns. Insulator **409** can be applied so that a second layer of ITO can be added. Photoresist **411** can then be applied to insulator **409** and patterned for subsequent formation of vias **413**.

[0044] FIG. **4***b* shows the etching of insulator **409** using vias **413** in photoresist **411**.

[0045] FIG. **4***c* shows the step of removing photoresist **411**.

[0046] FIG. **4***d* shows the masking of the center region using photoresist **410** to protect it from metal sputtering, and the sputtering of metal **412** over insulator **409** and photoresist **410**, and into via **413** for connecting to traces in first ITO layer **408**.

[0047] FIG. **4***e* shows the removal of photoresist **410**.

[0048] FIG. **4***f* shows the sputtering a second ITO layer **415** of 10 ohms per square and an optical index of 1.8 over metal **412** and insulator **409**, and the patterning of the second ITO layer **415** and metal **412** using standard lithography processes to create row or column traces. The simultaneous patterning of the metal and the ITO layer can be done with a photoresist, a single photo-exposure and one or two etching steps (ITO and metal have different ideal etchants). Insulator **409** can have dielectric properties which enable the row and column traces formed in ITO layers **415** and **408** to experience a mutual capacitance between them at crossover points and act as touch sensors. Top glass **400** can then be scribed and separated into individual parts.

[0049] FIG. **4***g* shows IC **432** that can be bonded to the second layer of ITO **415** using ACF **434**, and FPC **436** that can be bonded to the second layer of ITO using ACF **438**. The view shown is along the short edge of the exemplary second upper layer subassembly, as shown in the thumbnail.

[0050] FIG. **4***h* shows encapsulent **442** formed around IC **432** and FPC **436** to lock them in place. The second upper layer subassembly can then be scribed and separated to form individual parts, and the final edges can be shaped, finished and cleaned using grinding and polishing techniques, as described above.

[0051] FIG. **4***i* shows the lamination of the exemplary second upper layer subassembly to exemplary LCD module **419** using optically clear adhesive **448** to form the exemplary fourth touchscreen. In FIG. **4***i*, LCD module **419** can include LCD polarizer **421** with conductive anti-reflective (AR) coating **423** on its top surface to serve as a shield for the touch panel.

[0052] FIG. **4***j* shows an alternative method of laminating LCD module **419** to the exemplary second upper layer assembly by leaving air gap **425** between the two. In FIG. **4***z*, substantially transparent PET film **427** with a conductive anti-reflective bottom **429** can be applied to the top glass assembly to provide the shielding for the touch panel. The anti-reflective coating **429** can be formed from alternating layers of ITO and titanium dioxide or the like.

[0053] It should be noted that the exemplary upper layer subassemblies of FIGS. **1-4** can act as both a cover and as a substrate for the formation of the sensor panel.

[0054] FIGS. **5***a* through **5***d* illustrate an exemplary fifth touchscreen that can be formed by an exemplary third upper layer subassembly and the exemplary LCD module according to one embodiment of this invention.

[0055] FIGS. **5***a* through **5***c* illustrate an exemplary third upper layer subassembly according to embodiments of the invention, in which a touch sensor panel can be formed by forming row and column traces on the same side of a single