of the touch sensor panel, in embodiments of the invention fluid **130** can be used in some areas instead of full lamination for the purpose of providing optical index matching with few or no bubbles.

[0025] FIG. **1***i* shows FPC **136** that can be folded away from the edge of top glass **100**, and a temporary mold, which is indicated by reference numbers **140** and **141** in FIG. **1***i*, can be positioned to enable encapsulent **142** to be poured and retained by the mold (note that FIG. **1***i* is oriented up-side down relative to the time at which the encapsulent is poured). Encapsulation can provide a physically robust touch screen and locks FPC **136** and IC **132** into place.

[0026] FIG. **1***j* shows the step of removing temporary molds **140** and **141** after encapsulent **142** has cured, exposing support ledge **144** which can be 0.8 wide and useful for mounting the touch screen into a bezel of a product.

[0027] FIG. **1***k* shows the step of final outline cutting using laser or wheel **146** to create the final perimeter.

[0028] FIG. **1***l* shows the step of edge finishing at edge **197**, where grinding and polishing can be used to create radii at the four corners for strength and safety.

[0029] FIG. **1***m* shows the first touch sensor panel assembly that can be bonded or laminated to LCD module **119** using optically substantially clear adhesive **148** to form the exemplary first touchscreen, where the LCD module can include LCD polarizer **121**, LCD top glass, liquid crystal, and LCD bottom glass. LCD frame **150** can mount to ledge **144**.

[0030] FIG. **1***n* shows a side detail of the exemplary first touchscreen, which can include metal traces **112** in the border areas. The view shown has now changed to along the long edge of the exemplary first touchscreen, as shown in the thumbnail.

[0031] FIGS. **2***a* through **2***c* illustrate an exemplary second touchscreen that can be formed by combining the exemplary first upper layer subassembly, an exemplary second lower layer subassembly, and the exemplary LCD module according to one embodiment of this invention. The exemplary second touchscreen of FIGS. **2***a* through **2***c* can also include force-sensitive touch screens.

[0032] FIG. **2***a* illustrates the exemplary second lower layer subassembly according to embodiments of the invention. FIG. **2***a* shows bottom glass or motherglass **216**, which can be a large sheet (e.g. 2×3 feet), and from which a number of individual substrates may be generated. Substantially clear overcoat **218** of silicon dioxide or polymer can then be applied over bottom glass **216** to prepare the surface for ITO. ITO **220** having a resistivity of 10 ohms per square and an optical index of 1.8 can then be sputtered over clear overcoat **218**. ITO **220** can then be patterned using photolithography. Compressible spacers or spheres **222** of 10±2 micron height can then be sprayed on. Spacers **200** can have a compression of 2 microns when the total assembly can be loaded with 100 grams and can have an optical index that matches the ITO and/or fluid around them. Unlike the exemplary first lower layer subassembly, no border spacers are used, and instead border sealing adhesive **224** can then be printed. Note that adhesive **224** is not immediately UV-cured so it can be used as an adhesive. Conductive vias **226** that can have a diameter of 500 microns and a resistivity of 10 ohms maximum can then be deposited between border sealing adhesive **224** using a silk-screening process or a robot needle dispenser. Vias **226** can be made of conductive epoxy or ink and can provide electrical connections between the top and bottom glass. Vias **226** can also allow the consolidation of all connections onto a single layer.

[0033] The first exemplary upper layer subassembly and the second exemplary lower layer subassembly can then be bonded together, and scribed and cut to remove excess material. An IC and/or FPC can then be bonded to the first exemplary upper layer subassembly, encapsulated, scribed and cut again to remove further excess material, and edge finished to form an exemplary second touch sensor panel assembly. The exemplary second touch sensor panel assembly can then be laminated to an LCD module. All of these steps can be performed as described above with regard to the exemplary first touchscreen.

[0034] FIG. **2***b* shows the exemplary second touch panel assembly that can be laminated to an LCD module with substantially optically clear adhesive **248** to form the exemplary second touchscreen. The view shown is along the short edge of the second exemplary touchscreen, as shown in the thumbnail. Note that FPC **236** was folded back at an angle prior to encapsulation in this embodiment.

[0035] FIG. **2***c* shows a side detail of the exemplary second touchscreen assembly, including metal traces **212** in the border areas. Note fluid **230** in fluid-tight gap **299**. The view has changed to along the long edge of the second exemplary touchscreen, as shown in the thumbnail.

[0036] FIGS. **3***a* through **3***e* illustrate an exemplary third touchscreen that can be formed by combining the exemplary first upper layer subassembly, an exemplary third lower layer subassembly, and the exemplary LCD module according to one embodiment of this invention. The exemplary third touchscreen of FIGS. **3***a* through **3***e* can also include force-sensitive touch screens.

[0037] FIGS. **3***a* through **3***c* illustrate the exemplary third lower layer subassembly according to embodiments of the invention. FIG. **3***a* shows bottom glass or motherglass **316**, which can be a large sheet (e.g. 2×3 feet), and from which a number of individual substrates may be generated. Substantially clear overcoat **318** of silicon dioxide or polymer can then be applied over bottom glass **316** to prepare the surface for ITO. ITO **320** having a resistivity of 10 ohms per square and an optical index of 1.8 can then be sputtered over clear overcoat **318**. ITO **320** can then be patterned using photolithography. A bottom shield of ITO **305** at a thickness of 100 to 1000 ohms per square, for example, can be applied to the bottom of bottom glass **316** to prevent LCD noise from corrupting the sensor panel. A mask of photoresist **307** can then be applied over bottom shield **300** to protect border areas of the touch screen from anti-reflective (AR) coating. AR coating **331** having an optical index that can be matched to that of the lamination adhesive or air, depending on the final attachment method to the LCD, can then be applied over photoresist **307** and bottom shield **305**.

[0038] FIG. **3***b* shows the step of removing mask **307** and exposing shield **305** so that conductive tape can be subsequently be adhered to the shield layer. Spacers, border sealing adhesive, and conductive vias can then be applied to the exemplary third lower layer subassembly. The exemplary first upper layer subassembly and the exemplary third lower layer subassembly can then be bonded together, and scribed and cut to remove excess material.

[0039] FIG. **3***c* shows the exemplary first upper layer subassembly and the exemplary third lower layer subassembly that can be bonded together to form an exemplary third touch