33 could be as simple as four highly conductive bus bars. For capacitive touchscreens, the required electrodes could be more complex, requiring several layers. The spacer and sensing electrode layers typically require specific patterning. This would encourage the use of a printing method, such as screen, inkjet, gravure, flexographic, or others to be used. If very high resolution is required, it is conceivable that layers could be vacuum deposited then patterned using photolithographic means. For most systems, the spacers can be relatively thick (10-20 microns), encouraging a thick film method of application such as screen printing to be used. However, the spacers can be thicker or thinner as appropriate for the specific system structure. The spacers can be formed on the first conductive layer, on a side of the second conductive layer to be adjacent the first conductive layer before application thereto, or a combination thereof.

[0052] According to one embodiment, the spacer layer serves a second duty as an adhesive layer. This allows the second touchscreen electrode **32** to be pre-coated as a continuous layer on the second touchscreen substrate **44**, which can then be laminated to the spacer layer **42**. If needed, sensing electrodes **33** can be applied to the second electrode and substrate assembly, the first electrode, one or more spacers, or a combination thereof. The sensing electrodes **33** can serve as an adhesive layer.

[0053] The system described in FIG. **5** is only one potential method of integrating the touchscreen with the display. As was stated previously, if a capacitive touchscreen is used, or if the second display electrode can be made to serve double duty, then it is conceivable that the insulation layer and first touchscreen electrode could be removed from the system. Additionally, if the second touchscreen electrode can be made sufficiently rigid to maintain the sensing gap between the touchscreen electrodes, then it can be conceived that the second touchscreen substrate could be likewise removed.

[0054] One area that has not been discussed in detail in this specification is the spacer. FIG. **6** is a front view of a typical spacer configuration on the touchscreen assembly **30** only. The display plane is not shown. In this embodiment the spacer **42** consists of an array of small, dots of a transparent, non-conductive material applied onto the first or second touchscreen electrode **31**, **32**, or both, depending on what type of touchscreen is used. The dots are typically as small and infrequent as possible, to minimize visual disruption of the display, in the traditional display-in-back assembly configuration. The spacers can be positioned throughout the display area, at the edges of the display area, outside the display area, or a combination thereof. The sensing electrodes **33** are typically arranged outside of the spacer **42** and viewing area perimeter, and can be inside or outside of the touchscreen seal **45**. The seal **45** is typically a more robust and thicker adhesive than the spacer **42**, and usually is the primary mechanism by which the system is held together, and may significantly contribute to maintaining a gap between the touchscreen electrodes. The dots typically cannot fulfill the mechanical bond portion of this function, as their small total area provides minimal bond strength. The seal **45** may also be required in certain environments to control the environment within the touchscreen gap. For example, in a high humidity environment, the seal may reduce humidity ingression and avoid fogging of the gap, which would reduce transmittance and could short the touchscreen.

[0055] There are several limitations to the dot-style spacer design. Aside from requiring the additional seal layer, the large gaps between dots can lead to touchscreen failure if the touchscreen is permanently or temporarily deformed, such as would happen if the material was folded, bent, or kinked. Additionally, if a high voltage touchscreen is used, then the electrostatic charge can cause the electrodes to become stuck to one another.

[0056] FIG. **7** is a front view of an alternative spacer design, which utilizes a grid instead of dots. This is possible in systems where the touchscreen is positioned behind the display, as it will not interfere optically with display viewing. In this embodiment, the spacer **42** is patterned to form a grid, which can be complementary to the patterns formed in the display electrodes. For example, it could be the perimeter of a single pixel, multiple pixels, or unrelated to the pixels. The advantage of the grid pattern is that it reduces the free span of the substrates, maintaining the touchscreen gap better than the dots when the assembly is bent or folded. Additionally, the increased surface area and complete perimeter may make the use of a touchscreen seal unnecessary. The grid also can be sized to overcome electrostatic forces in the high voltage system.

[0057] FIG. **8** is an isometric view of a potential final assembly utilizing many of the features described in this specification. The display **10** and touchscreen **30** can be connected along an interconnect edge **51** to drive electronics **61**, forming a partially flexible touch-sensing display assembly **60** with an active display area **52**. The pixel writing and sensing systems can be used to allow manual or automatic entry of data, and the grid spacer can maintain touchscreen gap regardless of assembly flexing. The final assembly can be flexible in space, application, or configuration, optimizing usefulness and cost for a multitude of systems.

[0058] The invention has been described in detail with particular reference to certain preferred embodiments thereof, but it will be understood that variations and modifications can be effected within the spirit and scope of the invention.

1. A method of manufacturing an electrically updatable touchscreen device comprising a flexible display, a first conductive layer, one or more spacer, and a second conductive layer, wherein the method of forming the electrically updatable touchscreen device comprises:

obtaining a flexible display;

forming the first conductive layer on the flexible display;

forming one or more spacer on the first conductive layer; and

forming the second conductive layer over the one or more spacer.

2. The method of claim 1, wherein the first conductive layer is formed as part of the flexible display.

3. The method of claim 2, wherein the display includes a substrate, a display conductive layer, and an imaging material, and wherein the first conductive layer is formed on the imaging material and cooperates with the display conductive layer to electronically update the imaging material.