gers. This avoids sequential operations necessary with single-touch sensors. Printed media could be overlaid on the sensor for this purpose or displayed on a video monitor with a transparent MultiTouch screen.

[0042] Still another interesting application of a Multi-Touch sensor would be to facilitate the input of data without unnecessary distraction. For example, the operation of auxiliary devices like radios, cell phones or other electronic aids while operating a vehicle can be dangerous. A MultiTouch sensor could allow operation of these devices using touches and gestures without requiring the operator to visually distracted. One specific contemporary application is text messaging. Thus the system would let the driver watch the driving environment outside the vehicle and never have to visually search for the control. This enhancement safety would be due to the fact that the screen can be operated by hand without concern of the actual position of the hand. An added feature is that the operator (or a passenger) can be trained on the use of self-determined gestures when not operating the vehicle. Computer-assisted teaching is greatly facilitated with a transparent multi-touch screen capable of presenting the gesture and its word description on the same monitor.

[0043] The MultiTouch screen based on the Digalog concept has enormous opportunity for applications in the domain of human-computer interface where all the fingers can be involved. In another embodiment, the Digalog concept can be used as a way to input properties of objects placed on the sensor. Since this will not require a human touch in the usual sense we call this device the TransTouch screen. The design of **FIG. 2** allows vertical digitization for a single touch along each vertical strip and is suitable for multiple-finger actuation. However in general, multiple touches that are directly vertically aligned will be recorded as an average. This is not a problem for fingers generally along the lateral direction, but there could be ambiguity in discerning certain object shapes. The design shown in **FIG. 8** would manage contact points to resolve possible ambiguities.

[0044] TransTouch is intended to make possible inputs of shape, size and other physical features of an object placed on the sensor. The touch sensor in **FIG. 8** is comprised of an insulating substrate **21**, and a set of conducting bands **23**, which are insulated from one another. An attached cover-sheet would have a set of insulating separator dots but would also have a set of smaller conducting dots **24** that are aligned over the conducting strips on the touch sensor. The conducting dots **24** would permit electrical contact to the conducting bands **23** only under direct pressure from an object **25** placed on the sensor. A simple layout would have one conducting dot **24** per strip, so that the lateral and vertical coordinates could be unambiguously determined for arbitrary shaped objects.

[0045] Some possible applications for TransTouch include drawing applications such as mechanical engineering, drafting, and graphic arts, such a sensor should save time as compared to other methods of determining and inputting the dimensions of both simple and complex objects. A number of applications come to mind for classifying and counting various types of objects. For example, TransTouch will be useful to robots that are picking up parts for assembly of products.

[0046] Although particular embodiments of the present invention have been shown and described, it should be understood that the above discussion is not intended to limit the present invention to these embodiments. Those of ordinary skill in the art will appreciate that various changes and modifications may be made without departing from the spirit and scope of the present invention. Thus, the present invention is intended to cover alternatives, modifications, and equivalents that may fall within the spirit and scope of the present invention as defined by the claims.

What is claimed is:

1. A touch sensor, comprising:

an electrically insulating substrate having two sides and a touch region on one of the two sides;

a plurality of electrically-conducting band segments coupled to and traversing the touch region and wherein the band segments are insulated from one another;

a cover layer overlying the touch region;

a controller providing an electrical means of sequentially energizing a plurality of the said segments and an electrical means for monitoring the electrical characteristics of the touch sensor and for identifying the location at which at least one touch position on the touch sensor is touched from the monitored electrical characteristics.

2. The touch sensor of claim 1 in which the cover is a sheet with an electrically-conductive surface that is able to contact the touch region under external pressure.

3. The touch sensor of claim 1, in which insulating spacers positioned between the cover and the touch region prevent electrical contact between the cover and the touch region unless external pressure is applied.

4. The touch sensor of claim 1, in which the substrate, the band segments, and the cover layer are transparent over the touch region.

5. The touch sensor of claim 1 in which the cover is an insulating film.

6. The touch sensor of claim 1, which further comprises a conductive guard layer on the electrically insulating substrate on the side opposite the side of the touch region.

7. The touch sensor of claim 1 in which the controller provides a means of monitoring the current delivered to each end of the band segments for identifying the location at which at least one touch position on the touch sensor is touched.

8. The touch sensor of claim 1 in which the controller provides a means of sequentially energizing a plurality of the said segments of the touch sensor with an oscillating voltage and monitoring the oscillating current at each end of the band segments for identifying the location at which at least one touch position on the touch sensor is touched.

9. The touch sensor of claim 1 in which the controller provides a means of monitoring the voltage delivered to the cover by each band or group of bands for identifying the location at which at least one touch position on the touch sensor is touched from the monitored voltage.

10. The touch sensor of claim 1 in which the controller provides an electrical means of sequentially energizing a plurality of the said segments of the touch sensor sequentially energizes band segments of the touch sensor and electrically determines the coordinates of a plurality of touch positions on the touch sensor.