



- [54] **OBJECT POSITION DETECTOR**
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- [73] Assignee: **Synaptics, Inc.**, San Jose, Calif.
- [*] Notice: The term of this patent shall not extend beyond the expiration date of Pat. No. 5,648,642.

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Related U.S. Application Data

- [63] Continuation of Ser. No. 329,809, Oct. 25, 1994, Pat. No. 5,648,642, which is a continuation of Ser. No. 895,934, Jun. 8, 1992, abandoned.
- [51] Int. Cl.⁶ **G08C 21/00; G09G 5/00**
- [52] U.S. Cl. **178/18.06; 178/18.01; 178/18.03; 345/173; 345/174**
- [58] Field of Search **345/173, 174; 341/33; 178/18.01, 18.03, 18.06, 19.03**

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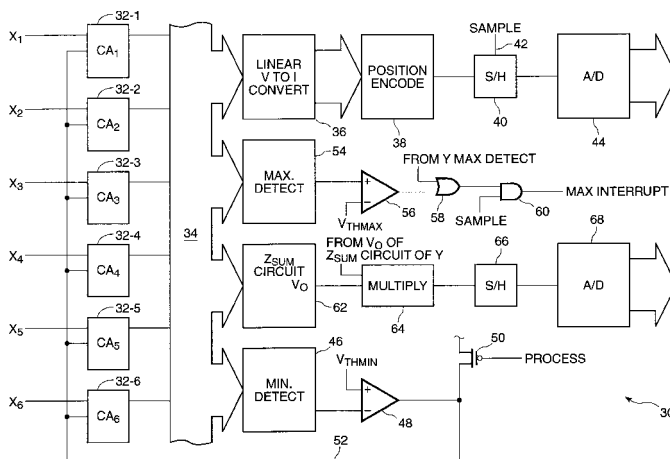
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[57] **ABSTRACT**

A proximity sensor system includes a sensor matrix array having a characteristic capacitance between horizontal and vertical conductors connected to sensor pads. The capacitance changes as a function of the proximity of an object or objects to the sensor matrix. The change in capacitance of each node in both the X and Y directions of the matrix due to the approach of an object is converted to a set of voltages in the X and Y directions. These voltages are processed by analog circuitry to develop electrical signals representative of the centroid of the profile of the object, i.e., its position in the X and Y dimensions. The profile of position may also be integrated to provide Z-axis (pressure) information.

6 Claims, 17 Drawing Sheets



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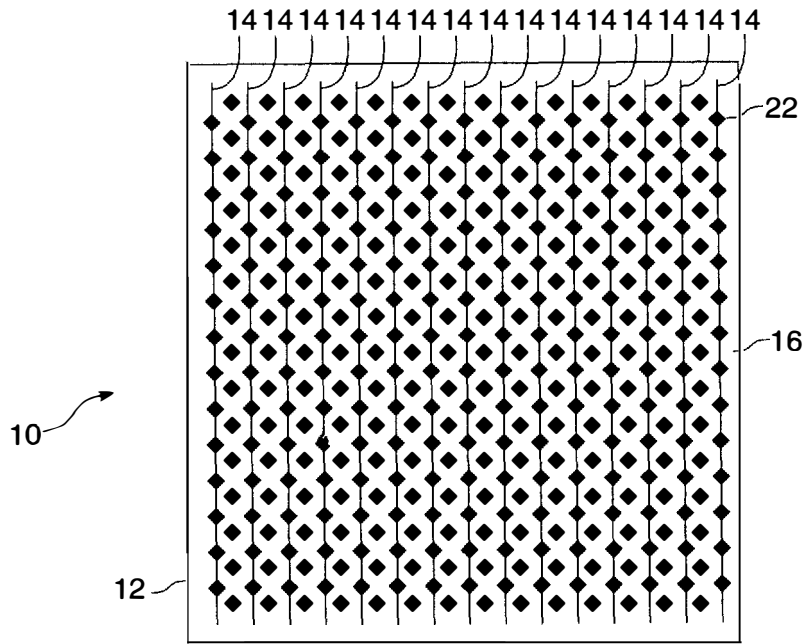


FIG. 1A

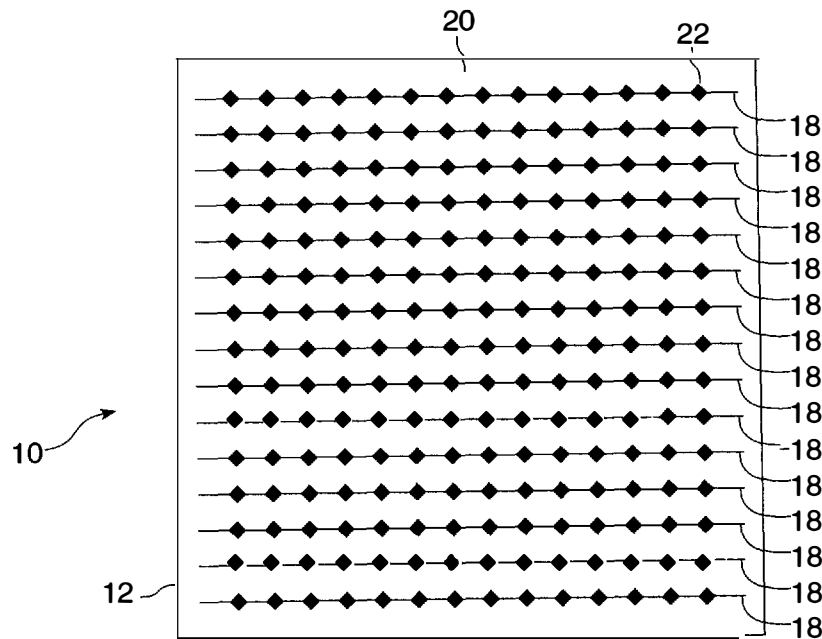


FIG. 1B

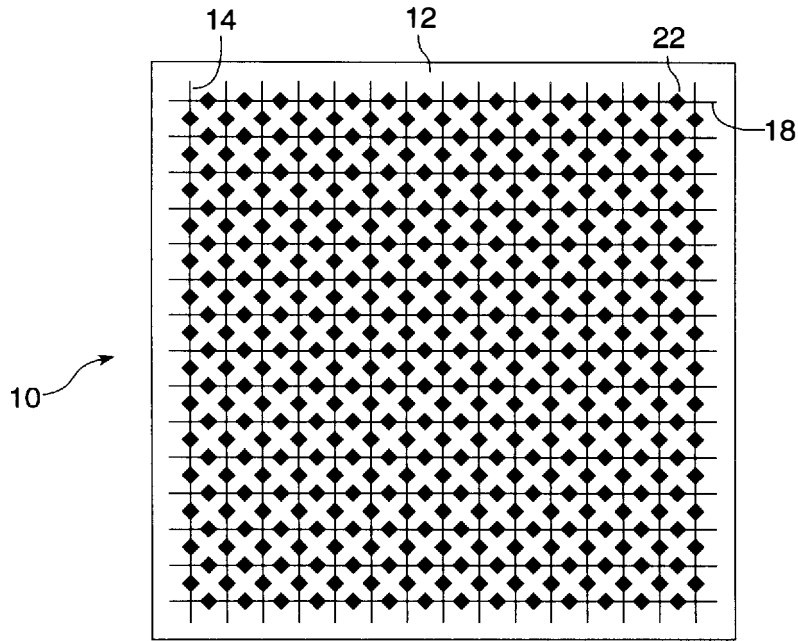


FIG. 1C

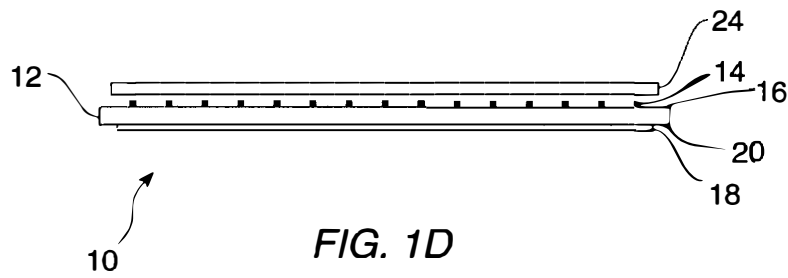


FIG. 1D

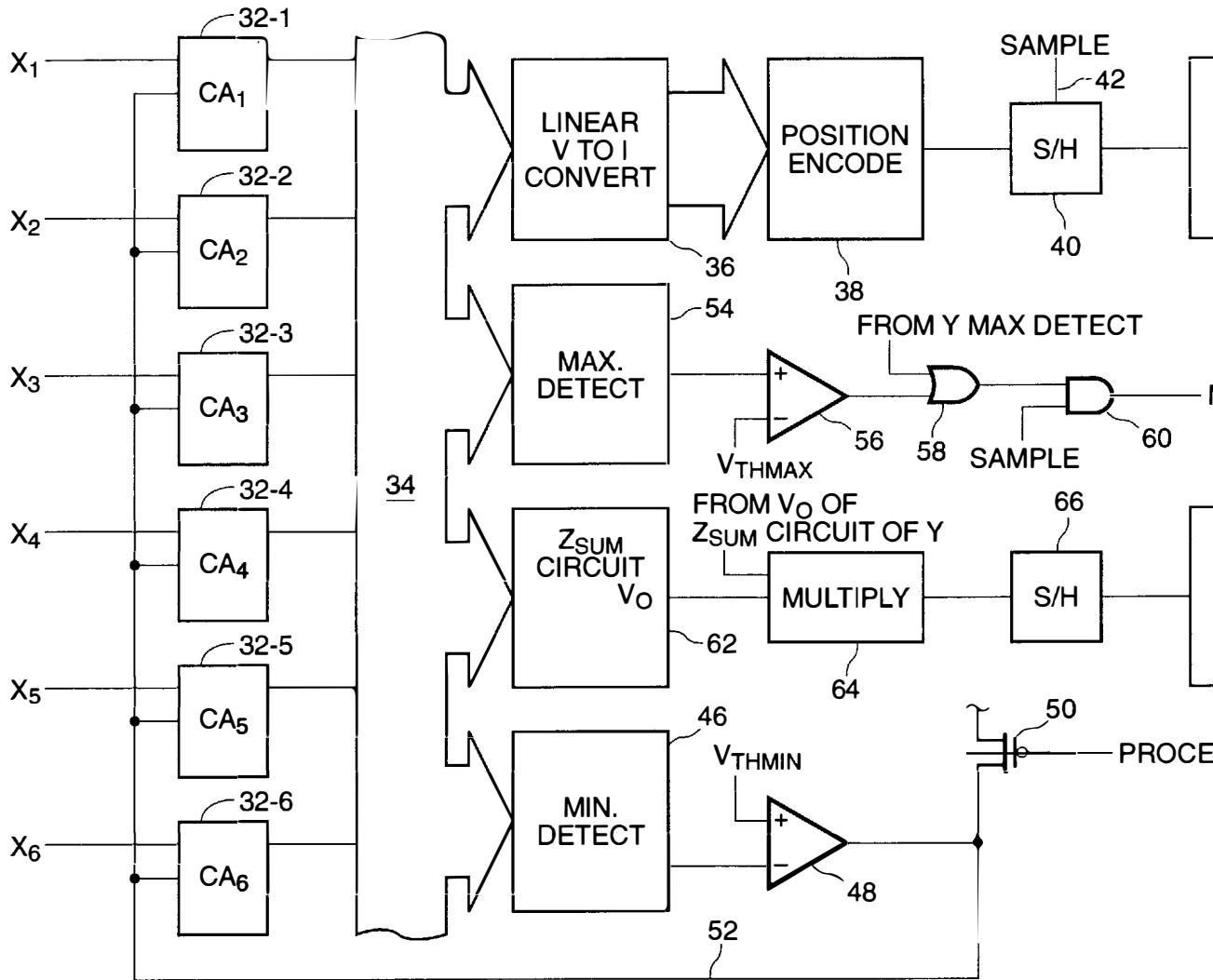


FIG. 2

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