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**JP60075927A** 1985-04-30 **COORDINATE INPUT DEVICE** (en)

**English Abstract:**

PURPOSE: To improve both the stability of detection and the image resolution by detecting the position of coordinates after scanning plural transparent conductor lines of a sensor panel and detecting the change of the output addition level.

CONSTITUTION: A sensor panel 10 is formed with X and Y transparent conductor lines 101 (101aW101m) and 102 (102aW102n) insulating and crossing to each other on a transparent substrate. Scanning circuits 11 and 13 consisting of shift registers and drive circuits 12 and 14 are provided at one side of both lines 101 and 102, respectively. Then the scanning is successively carried out with a clock pulse CL. While addition circuits 15 and 16 are set at the other side of the lines 101 and 102, respectively. The outputs of the circuits 15 and 16 are delivered to a position detecting circuit 17 for detection of the position of coordinates. In this case, the electrostatic capacity is applied to the conductor line at a position on the panel 10 where a finger, etc. has a touch. The applied drive signal is applied to the circuit 15 via each addition resistance to obtain X and Y coordinates of an intersecting point.

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# DESCRIPTION

## 1. Title of the Invention

COORDINATES INPUT DEVICE

## 2. Claims

(1) A coordinates input apparatus, comprising:

a sensor panel including a substrate, a plurality of X side transparent conductive lines, and a plurality of Y side transparent conductive lines, both being disposed on the substrate in an insulated manner relative to each other;

an X side drive circuit for sequentially driving the plurality of X side transparent conductive lines;

a Y side drive circuit for sequentially driving the plurality of Y side transparent conductive lines;

an X side adder circuit for adding outputs of the plurality of X side transparent conductive lines;

a Y side adder circuit for adding outputs of the plurality of Y side transparent conductive lines; and

a position detecting circuit for detecting an output level change of the X and Y side adder circuits and detecting a coordinate position indicated by a time position where the output level change is generated, wherein

the output level change is generated by a change of capacitance generated when a desired position on the sensor panel is instructed and an instructed coordinate position is detected.

(2) The coordinates input apparatus according to claim (1), wherein

an area of an intersection portion between the X side transparent conductive lines and the Y side transparent conductive lines on the sensor panel is configured to be smaller than other areas.

(3) The coordinates input apparatus according to any one of claims (1)-(2), wherein

in order to detect the output level change, the position detecting circuit is configured to delay an output of the adder circuit in synchronization with scanning of the transparent conductive lines and to obtain a difference between the delayed output and an output of the adder circuit.

(4) The coordinates input apparatus according to any one of claims (1)-(2), wherein

in order to detect the output level change, the position detecting circuit stores an output level of a state where a desired position of the sensor panel is not instructed and performs a relative comparison between an output level of the adder circuit and the stored output level.

3. Detailed Description of the Invention

[Technical Field of the Invention]

The present invention relates to a coordinates input device for detecting instructed coordinates using a change of capacitance and more particularly to a coordinates input device disposed on a surface of a screen of a display device and suitable for providing an input function to the display device.

[Background of the Technique]

With the spread of office automation (OA) in recent years, various types of terminal devices have been actively used. In particular, since a display device appeals to the human sense of sight and is easy to understand intuitively, it has been used as an important man-machine interface between a computer and a human for various types of use including personal computers, word processors, and online terminals. While such a display device is generally used as an output device, the display device is also used as an input device instead of a keyboard and in some cases, the display device further functions as an input/output device.

[Conventional Technique and the Problem]

Conventionally, a display has been used as input means in a light pen form. Specifically, when an electron beam of a Braun tube display illuminates a fluorescent substance on a surface of the Braun tube at a position of a light pen, the light pen senses this light, and detects, from a time position thereof, a position on a screen pointed by the light pen. From this, a computer detects which

display content on the display is pointed by the light pen and judges input contents. However, such a light pan form can be used only for a scan type display such as a Broun tube display and may provide uncomfortable feeling to a human because a special light pan is used as a tool. Accordingly, in recent years, touch sensor type displays in which a special coordinates input device is disposed on a display screen have been used. Such conventional coordinates input devices include a light beam matrix form shown in FIG. 1. In this form, a Y side luminous portion 1 including a number n of luminous sources DY1, DY2, ... and DYn is disposed to the left of a display surface 5. On the other hand, in a corresponding manner, a Y side light-receiving portion 4 including a number n of light-receiving units RY1, RY2, ... and RYn is disposed to the right of the display surface 5. In the same manner, an X side luminous portion 2 including a number m of luminous sources DX1, DX2, ... and DXm is disposed above the display surface 5 and an X side light-receiving portion 3 including a number m of light-receiving units RX1, RX2, ... and RXm is disposed below the display surface 5 in a corresponding manner. Then the luminous sources DX1, DX2, ... and DXm and DY1, DY2, ... and DYn are sequentially driven in terms of time to emit a light outside the visible range such as an infrared light beam and the light-receiving units disposed in an opposing manner relative to each luminous source are caused to receive the lights. In this state, when a human points at a P point on the display surface 5 by the finger, for example, the light beams from the luminous sources DX3 and DY3 do not reach the light-receiving units RX3 and RY3. An instructed position detecting unit 6 detects a level change resulting from this and detects a coordinate position on the display surface 5 pointed by the finger from a time position where the level change has occurred.

While this conventional light beam matrix form is simple in theory, it requires many luminous sources and light-receiving units which are relatively large in size. This poses a problem in that a device per se becomes large in size and that due to difficulty of integration, the display device gives an impression of being protruded, which is undesirable. In addition, there is another problem in that even if a thin stick rather than the human finger is used for pointing in order to improve resolution, this is impossible due to crosstalk between adjacent light beams because the light beams are spread.

[Object of the Invention]

It is an object of the present invention to provide a coordinates input device that can be downsized while obtaining high resolution.

[Structure of the Invention]

In order to achieve the above-mentioned object, the present invention includes: a sensor panel having a substrate, a plurality of X side transparent conductive lines, and a plurality of Y side transparent conductive lines, both being disposed on the substrate in an insulated manner relative to each other; an X side drive circuit for sequentially driving the plurality of X side transparent conductive lines; a Y side drive circuit for sequentially driving the plurality of Y side transparent conductive lines; an X side adder circuit for adding outputs of the plurality of X side transparent conductive lines; a Y side adder circuit for adding outputs of the plurality of Y side transparent conductive lines; and a position detecting circuit for detecting an output level change of the X and Y side adder circuits and detecting a coordinate position indicated by a time position where the output level change is generated, wherein the output level change is generated by a change of capacitance generated when a desired position on the sensor panel is instructed and an instructed coordinate position is detected.

According to an embodiment of the present invention, an area of an intersection portion between the X side transparent conductive lines and the Y side transparent conductive lines on the sensor panel may be configured to be smaller than other areas.

According to another embodiment of the present invention, in order to detect the output level change, the position detecting circuit may be configured to delay an output of the adder circuit in synchronization with scanning of the transparent conductive lines and to obtain a difference between the delayed output and an output of the adder circuit.

According to another embodiment of the present invention, in order to detect the output level change, the position detecting circuit may store an output level of a state where a desired position of the sensor panel is not instructed and perform a relative comparison between an output level of the adder circuit and the stored output level.

[Embodiment of the Invention]

In the following, the present invention will be described in detail based on embodiments thereof.

DOCKET ALARM

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