

**CAPACITIVE TOUCH SCREEN**

The present application is based on, and claims priority from, Korean Application Number 10-2008-0030902 and is a continuation of International Application Number PCT/KR2008/007394, respectively filed on Apr. 2, 2008 and Dec. 12, 2008, the disclosure of which is hereby incorporated by reference herein in its entirety.

**TECHNICAL FIELD**

The present invention relates, in general, to touch screens and, more particularly, to a capacitive touch screen which is able to detect not only a touch location but also the intensity of touch pressure and enhance the visibility of images displayed on a display disposed below the screen and has a simple structure.

**BACKGROUND ART**

Generally, touch screens are widely used as monitors in various kinds of devices, such as navigators, industrial terminals, notebook computers, automatic teller machines, game machines, etc., and as input units of various electric and electronic devices including not only mobile terminals, such as mobile phones, MP3 players, PDA (Personal Digital Assistant)s, PMP (Portable Multimedia Player)s, PSP (Play Station Portable)s, Portable Game Players, DMB (Digital multimedia Broadcasting) receivers, etc., but also electric home appliances, such as refrigerators, microwave ovens, washing machines, etc.

As is well known, touch screens are typically used along with displays which display images. When a user touches a portion of the touch screen placed on top of the display with his/her finger or the like, an input signal corresponding to the content displayed on the display below the touched portion is input. Touch screens are classified according to structure or operating principle into resistive overlay touch screens, infrared touch screens, ultrasonic touch screens and capacitive touch screens.

The traditional capacitive touch screen is constructed such that electrode plates are placed on a substrate and voltage is applied to the electrode plates.

The capacitive touch screen operates according to the principle wherein when a conductive substance touches an electrode plate, parasitic capacitance in response to permittivity between the conductive substance and the electrode plate is measured, and coordinates of a touch location are determined by the measured parasitic capacitance. Compared to the resistive overlay touch screen, the visibility (transparency) and the durability are enhanced. However, such a capacitive touch screen responds only to a conductive substance, such as the finger of a human, which can generate parasitic capacitance. In addition, the precision is relatively low.

Meanwhile, a keypad having several dome switches arranged in a predetermined shape has been widely used as an input unit of a mobile terminal. Recently, products having touch screens as input units in place of dome switches have been developed and marketed.

According to the recent trend towards smallness of mobile terminals, distances between buttons of a keypad are being reduced. Hence, this has increased the probability of an error in manipulating the keypad, for example, in which when pushing a button, an adjacent button may be undesirably pushed. The use of a capacitive touch screen as an input unit mitigates the problem of an error in input operation due to a reduction in size of the mobile terminal.

However, the conventional capacitive touch screen for mobile phones determines only which electrode plate (or electrode) was touched with a finger of a user and generates a corresponding input signal. Therefore, the number of input signals which can be input by a single electrode are limited. In an effort to overcome the problems of the conventional capacitive touch screen, the applicant of the present invention proposed 'Input unit for portable electronic device' disclosed in Korean Patent Registration No. 661,000 (issue date: Dec. 22, 2006).

The input unit of No. 661,000 can generate various input signals depending on the magnitude of capacitance which varies according to the intensity of touch pressure, rather than generating an input signal using parasitic capacitance generated by bringing a conductive substance such as a finger of the user into contact with electrode plates. Therefore, this input unit makes it possible to input various precise operations without causing an error.

As mentioned above, typically, touch screens are integrally used with displays. Various devices having touch screens and displays integrated with each other have been proposed. Representative examples were proposed in Korean Patent Registration No. 10-0493921, entitled 'Touch panel integrated with flat display' (issue date: Jun. 10, 2005), Korean Patent Registration No. 10-0487355, entitled 'Electro-optical display integrated with touch panel' (issue date: May. 3, 2005), and Korean Patent Laid-open Publication No. 10-2001-0091312, entitled 'Display assembly integrated with touch panel' (publication date: Oct. 23, 2001).

These devices integrated with the touch screens are basically constructed such that a touch screen (or a touch pad) is placed on the upper surface of a display. Therefore, because the display is covered with the touch screen, the light transmissivity of the display is reduced. In other words, the amount of light emitted from the display is reduced because of passing through the touch screen. As a result, the visibility of images displayed on the display is deteriorated.

**DISCLOSURE OF INVENTION****Technical Problem**

Accordingly, the present invention has been made keeping in mind the above problems occurring in the prior art, and an object of the present invention is to provide a capacitive touch screen which can detect not only a touch location but also the intensity of touch pressure when a substance comes into contact with it even though the substance is a nonconductor, rather than detecting a basic touch location in such a way as to check variation in parasitic capacitance when touched only by a conductive substance, so that various input signals which have not been implemented in the conventional touch screen can be created using the touch location and the intensity of touch pressure.

Another object of the present invention is to provide a capacitive touch screen which almost perfectly allows passage of light from a display provided under the touch screen, thus ensuring the high visibility of images displayed on the display, and which has a simple structure, thus reducing the production cost.

**Technical Solution**

In order to accomplish the above objects, the present invention provides a capacitive touch screen.