# INPUT DEVICE

## CROSS REFERENCE TO RELATED APPLICATIONS

[0001] This application claims priority of European application No. 05025246.9 EP filed Nov. 18, 2005, which is incorporated by reference herein in its entirety.

## FIELD OF INVENTION

[0002] The invention relates to an input device for acquiring inputs.

## BACKGROUND OF INVENTION

[0003] Known input devices are used either for acquiring digital inputs (e.g. touch screen, keyboard) or for acquiring analog inputs (e.g. joystick, mouse). The restriction to one of the two input types is disadvantageous for interactive investigations of 3D models (3D: three-dimensional) and/or for controllers of processes. It is not user-friendly for instance to influence speeds and processes or to adjust an object in three dimensions by means of a conventional touch screen.

## SUMMARY OF INVENTION

[0004] An object underlying the invention is to realize an input device for digital and analog inputs.

[0005] This object is achieved by an input device with a flexible display means and a three-dimensional sensitive layer for acquiring inputs, with the display means being arranged in front of the three-dimensional sensitive layer.

[0006] The idea underlying the invention is that a flexible display means is used as a display of an input device and a three-dimensional sensitive layer is used as a touch panel. Such a touch panel is a so-called 3D touch panel, since it is suitable for three-dimensional analog inputs. Since a three-dimensional sensitive layer is usually transparent, the display means is arranged in front of the three-dimensional sensitive layer. An input device of this type thus behaves like a touch screen, which is also suitable for analog inputs. The display options of an input device of this type can be changed without any great effort, as the display means can be easily exchanged.

[0007] According to an advantageous embodiment of the invention, the display means is a display which comprises organic light-emitting diodes. Organic light-emitting diodes, also known as OLEDs, are increasingly used as display means. An OLED display is generally made of pliable material. A modem OLED display can be as thin as a plastic film and thereby feature a correspondingly high maneuverability and/or deformability. It requires significantly less energy compared with liquid crystal displays (LCD), causes a background illumination to become redundant and has a large angle of view range and a high switching speed.

[0008] In order to improve the tactile feedback to a user, the three-dimensional sensitive layer can be deformed according to a further advantageous embodiment of the invention. Such a layer is made in particular of a soft deformable material (e.g. similar to rigid foam) which can be restored or restores itself into its original state after deformation.

[0009] According to a further advantageous embodiment of the invention, the three-dimensional sensitive layer is electrically conductive, with the conductivity of the layer depending on the pressure exerted on the layer. The material of the layer is thus electrically conductive, with its conductivity being changeable in a pressure-sensitive manner. When pressure is exerted on the three-dimensional sensitive layer, a conductive connection appears at this point.

[0010] Similarly to conventional touch screens, both matrix and also analog touch panels can be available. This not only allows the usual plan view-oriented 2D inputs, but also allows inputs in the third dimension (by a pressure towards the surface of the panel). This is advantageous in that a speed or a process can be controlled, i.e. analog inputs can be carried out.

[0011] As a rule, the necessary function keys, legends and graphics are projected or printed on the OLED display beforehand. Likewise, the corresponding configuration data of the display can be evaluated and stored. Inputs on the display of the input device can thus be identified on a three-dimensional basis and then implemented.

## BRIEF DESCRIPTION OF THE DRAWINGS

[0012] The invention is described in more detail below within the scope of an exemplary embodiment with reference to the figures, in which:

[0013] FIG. **1**: shows an OLED display,

[0014] FIG. **2**: shows a 3D touch panel,

[0015] FIG. **3**: shows an input device and

[0016] FIG. **4**: shows an exemplary application of the input device.

## DETAILED DESCRIPTION OF INVENTION

[0017] FIG. **1** shows an OLED display **1**, which is composed of a carbon layer and is thin and pliable like a plastic film or can be folded in different ways. It is normally arranged between two electrodes. These electrodes produce the electrical field for the light emission.

[0018] In addition, the display can be realized by means of a film, whereupon the display layout projects using a laser.

[0019] FIG. **2** shows a 3D touch panel **2**, which is suitable for 3D inputs. With this touch panel, thin lines (line bars) are etched into the front layer, so that a number of columns and likewise rows in the horizontal direction are generated, thereby finally resulting in a matrix touch panel. If pressure is exerted on the touch panel, e.g. using the input pen **6**, an electrical contact is recorded and a potential gradient is first generated in two dimensions in the front layer by way of a line bar, with the resistance and/or the capacity of the touch panel changing with the increasing pressure, which in turn triggers a specific voltage. This is dependent on where the contact takes place on the horizontal axis. A 3D touch panel of this type not only allows the position (X/Y dimensions) on the 3D touch panel, where an input is implemented, to be determined, but also allows the intensity of the pressure, which takes place when making the entry at the position, to be detected (Z-dimension).

[0020] As the 3D touch panel is opaque and an OLED display is thin and pliable, the OLED display is placed in