

via the wiring pattern group 58 of the bottom side of the above-mentioned intermediate layer film 29c and the electrode pattern 185.

[0406] The above-mentioned wiring pattern groups 57, 58 together with the electrode pattern 185 of the display unit 29 are connected to the driving power supply 55A, not shown, which applies the DC driving voltage to the electrode 52 and the electrode pattern 185 which is concurrently used by the liquid crystal display device, for every individual operation key. At that time, the DC driving voltage may be applied with the voltage-level thereof being changed. In this manner, the display device 629 that is applicable to the input device 800 is configured. With respect to the other members and functions, the members similar to those of the display device 129 are used and the functions similar to those of the display device 129 are included, so that the explanation thereof will be omitted.

[0407] The display device 629 thus configured having the touch-sensitive sheet member 180 on the liquid crystal display device may present the input operation accompanied with the concave and convex feeling when the icon images or the like displayed on the display unit 29 are touched with the operator's finger and the finger slides on the upper portion of the electrically conductive rubber 182 under the display screen if the wiring pattern group 58 is provided without concurrently using the wiring pattern group 57, even if the display surface is observed to be a flat shape. Thus, it becomes possible to provide the input device 800 with the programmable touch-sensitive input sheet for icon touch.

Embodiment 9

[0408] FIG. 47 shows a configuration of an input device 900 as a ninth embodiment. In this embodiment, the slide position and the pressing force of the operator's finger 30a or the like are detected by reading a pressing force change of the element muscle portion 54 (electrically conductive rubber 182) in the display device 129, which is different from a case where, as explained in the eighth embodiment, the input detection unit 45 is provided between the film portion 5 of the highest layer and the display device 129 with touch-sensitive variable sheet function.

[0409] The input device 900 shown in FIG. 47 includes a touch-sensitive variable sheet unit 190, a load resistance RL, a comparison circuit 450 and a driving power supply 505 in a constitution example in which a portion corresponding to one operation key element is extracted.

[0410] The touch-sensitive variable sheet unit 190 has the electrodes 51, 52 and the element muscle portion 54 (it is also allowed to employ the electrically conductive rubber 182). Also in this embodiment, the element muscle portion 54 corresponding to the operation key element are sandwiched between the electrodes 51 and 52. The electrode 51 is connected, for example, to a ground line GND and the electrode 52 is connected to the driving power supply 505 through the load resistance RL.

[0411] A connection point of the load resistance RL and the electrode 52 is connected with the comparison circuit 450 also constituting the detection unit, which detects the pressing force of the operation body by reading the pressing force change (displacement) of the element muscle portion 54. In this embodiment, a voltage drop (hereinafter, referred to as output voltage V0) corresponding to the pressing force F which is given to the element muscle portion 54 occurs in the load resistance RL. For the comparison circuit 450, two com-

parators 451, 452 are used. The respective comparators 451, 452 are connected to a power supply line VCC and the ground line GND. The connection point of the load resistance RL and the electrode 52 is connected to plus (+) terminals of the respective comparators 451, 452.

[0412] Minus (-) terminals of the comparators 451, 452 of each stage of the comparison circuit 450 are connected to the driving power supply 505, and a reference voltage VREF is applied to the minus (-) terminals of the comparators 451, 452. The comparator 451 for position detection is supplied with a threshold voltage Vth1 for position detection as the voltage VREF and the comparator 452 for pressing force judgment threshold is supplied with a threshold voltage Vth2 for pressing force judgment. The driving power supply 505 is connected to the power supply line VCC and the ground line GND. The threshold voltages Vth1, Vth2 and the driving voltage Vo are set by the instruction data D from the CPU 32. The comparator 451 compares the threshold voltage Vth1 with the output voltage V0 and outputs a position detection signal S1 to the CPU 32 when the output voltage V0 which exceeds the threshold voltage Vth1 is obtained. The comparator 452 compares the threshold voltage Vth2 with the output voltage V0 and outputs a press detection signal S2 to the CPU 32 when the output voltage V0 which exceeds the threshold voltage Vth2 is obtained.

[0413] The following will describe an input processing example of the input device 900. FIGS. 48 and 49 show an operation example (Nos. 1, 2) of one operation key element. FIG. 50 shows the input processing example thereof.

[0414] In this embodiment, the driving power supply 505 applies the driving voltage Vo of the voltage-level between the electrode 51 and the electrode 52 based on the instruction data D of the shape presentation which is inputted from the CPU 32. There is cited a case in which the threshold voltage Vth1 is set in the comparator 451 and the threshold voltage Vth2 is set in the comparator 452.

[0415] By setting these as the input condition, at step ST91 of the flowchart shown in FIG. 50, the position detection signal S1 and the press detection signal S2 are inputted to an A/D driver 31. According to the touch-sensitive variable sheet unit 190 shown in FIG. 48, the shape of the element muscle portion 54 is changed to a convex shape at a time of the shape presentation. This shape change is based on a fact that the element muscle portion 54 changes the shape thereof to the convex shape by inputting the instruction data D of the shape presentation to the driving power supply 505 from the CPU 32 and by applying the driving voltage Vo of the voltage-level based on the instruction data D to the electrode 51 and the electrode 52. In this state, the comparator 451 does not detect the output voltage V0 exceeding the threshold voltage Vth1, so that the position detection signal S1 is a low level=0. Also, the comparator 452 also does not detect the output voltage V0 exceeding the threshold voltage Vth2, so that the press detection signal S2 is also a low level=0.

[0416] Then, the position detection in step ST92 and the press detection in step ST95 are processed in parallel. According to the touch-sensitive variable sheet unit 190 shown in FIG. 49, the shape of the element muscle portion 54 is changed to the concave shape at a time of the shape presentation by pressing the element muscle portion 54 with the operator's finger 30a or the like. The operator's finger 30a or the like presses the element muscle portion 54, so that the electric current "i" flowing in the load resistance RL changes. For example, the electric current decreases or increases as