

[0064] The key depression detector, which is in electrical communication with the contact pads P1-1 and P1-2, periodically scans potentials which vary each time contacts are touched to or detached from contact pads on the printed circuit board 2. The depression detector detects the key depression on the basis of variations of the potentials at the contact pads p1-1 and p2-1. Specifically, the key depression detector detects the key depression on the basis of variations of the potentials which are scanned in two successive steps over a defined time duration. In other words, when the same result is obtained in these steps, the key depression detector detects the key depression. Conversely, if scanned results are not equal, a third step is carried out in order to scan the potentials. The result of the third scanning step is compared with that of the second scanning step. Thereafter, results of every two successive steps are repeatedly compared in order to confirm each key depression.

[0065] The results derived by each of the two steps are compared in order to prevent inaccurate data from being inputted by depressing wrong keys. According to the invention, each key is provided with at least two contacts C1-1 and C2-2 on a rear face, so that the logic values are generated on the basis of touching of the keys with the contact pads. Therefore, when the keys are small, wrong data may be inputted by depressing a very small key at a wrong part thereof.

[0066] Assuming for the sake of example that the user wishes to enter the letter "A" and is going to depress the key B1 in order to enter "A". However, if the user happens to depress the key B1 at the center thereof, the contacts C1-1 and C1-2 are touched to the contact pads P1-1 and P1-2. Thereafter, if the user depresses the key B1 at the left side thereof, the contact C1-1 is touched to the contact pad P1-1. In this state, logic values will be produced in response to the two key depressions, and a "B" and "A" will be entered.

[0067] If the user is going to depress the key B1 in order to enter "B" but happens to depress it at the right side thereof, the contact C1-2 is touched to the contact pad P1-2. Thereafter, even if the key B1 is re-depressed at the center thereof, the contacts C1-1 and C1-2 are touched to the contact pads P1-1 and P1-2. In this state, logic values will be produced in response to the two key depressions, and "C" and "B" will be entered.

[0068] The following describe how the key depression is detected on the basis of the results obtained by the two scanning steps, with reference to FIG. 3(a) to FIG. 9(b). In these drawing figures, V1-1 represents a potential produced between the contact C1-1 and the contact pad P1-1, and V1-2 represents a potential produced between the contact C1-2 and the contact pad P1-2. VH represents a potential which is present when no contact is touched to a contact pad, and VL represents a potential produced when at least a contact is touched to at least a contact pad. Further, T_{n-1} , T_n , T_{n+1} and T_{n+2} represent times at which the key depression detector scans the potentials V1-1 and V1-2 (i.e., $T_{n+2}-T_{n+1}=T_{n+1}-T_n=T_n-T_{n-1}$).

[0069] The character "A" is inputted by depressing the key B1 at the left side thereof, as described hereinafter. Referring to FIG. 3(a), it is assumed that the key B1 is depressed at the time T1 and is released at the time T2. (In an actual case, the potentials are unstable immediately after the depression or release of the key. In the present invention, the potential variations become stable at the times T1 and T2.)

[0070] Referring to FIG. 3(b), since the same potential is scanned at the times T_n and T_{n+1} , the key depression detector detects that the contact C1-1 is touched to the contact pad P1-1. The logic value generator produces a logic value for "A" on the basis of the detected result. Thereafter, "A" is indicated on the display 3, and thereafter the user hits an Enter key (not shown) in order to enter "A" and reset the depression detector. In this case, "A" may be indicated in a character window 4 of the display 3 in order that the user confirms the entered character.

[0071] The character "C" is inputted by depressing the key B1 at the right side thereof. Referring to FIG. 4(a), it is assumed that the key B1 is depressed at the time T_n and released at the time T_{n+1} , as described above. Since the same potential is scanned at the times T_n and T_{n+1} , the key depression detector judges that the contact C1-2 is touched to the contact pad P1-2, as shown in FIG. 4(b). The logic value generator produces a logic value for "C", so that "C" is indicated on the display 3. The user enters "C" by depressing the Enter key which again resets the depression detector. As shown in FIG. 4(c), "C" may be indicated in the character window 4.

[0072] The key B1 will be depressed at the center thereof in order to input "B". Referring to FIG. 5(a), it is assumed that the contact C1-1 and the contact pad P1-1 are touched to each other at the time T1 and are released from each other at the time T3, and that the contact C1-2 and the contact pad P1-2 are touched to each other at the time T2 and are released from each other at the time T4. Since the same potential is scanned at the times T_n and T_{n+1} , the key depression detector judges that the contact C1-1 is touched to the contact pad P1-1 and the contact C1-2 is touched to the contact pad P1-2, as shown in FIG. 5(b). The logic value generator in reaction to the scan produces a logic value for "B", so that "B" is indicated on the display 3. The user enters "B" by depressing the Enter key which will reset the depression detector. As shown in FIG. 5(c), "B" may be indicated in the character window 4.

[0073] The characters indicated on the display 3 are entered by the Enter key, or may be automatically entered after the lapse of a predetermined period of time. In other words, the user can correct an inputted character by re-depressing the same key within the predetermined period of time and before the enter key is pressed.

[0074] As described above, the key depression detector detects the key depression on the basis of the potentials scanned twice. Therefore, even when either the potential V1-1 or the potential V1-2 is scanned or even when both of these potentials are scanned, the key depression detector does not recognize the key depression until the scanned results are the same over the determined time duration.

[0075] When the key B1 is depressed once, the key depression detector recognizes the inputted character depending upon whether one or both of the contacts C1-1 and C1-2 is or are touched to one or both the contact pads P1-1 and P1-2. The logic value generator produces the logic value for the inputted character. Therefore, each character can be selectively entered by depressing any key once, which is effective in accelerating the character inputting.

[0076] Since the key depression is detected on the basis of the potentials scanned at a plurality of different times when