

provides a data inputting device for entering one character of data by hitting a key once to enter a plurality of different characters and data. Consequently, a cellular phone which uses the data inputting device, and a method of inputting characters for the cellular phone herein described and disclosed will more easily be able to enter the characters and other data required for both dialing the phone as well as sending messages and entering data.

SUMMARY OF THE INVENTION

[0017] Applicant's device and method yield an improved component and method of entering characters and data using a keypad which interfaces with a cellular phone or similar computing device with minimum area useable for the keypad due to its small size.

[0018] According to a first embodiment of the disclosed device, there is provided a data inputting device in the form of a keyboard. The keyboard features a plurality of keys biased upward and tiltable and with a plurality of individual contacts attached to the rear of the keys. In position for registered communication with the plurality of contacts on the individual keys are a plurality of contact pads each of which corresponds to each key and comes into contact with each contact positioned on the rear of that individual key. A key depression detector detects key depression when a key is depressed once and at least one contact thereof is touched to at least one corresponding contact pad. Communicating with the key depression detector is a logic value generator which produces a logic value on the basis of the one or plurality of contacts brought into contact with the registered contact pads, wherein data corresponding to the logic value is inputted to the cell phone or small computing device.

[0019] In a second embodiment of the disclosed device, there is provided a keyboard for a cellular phone or similar small computing device with limited space. This second embodiment provides a data inputting device featuring a plurality of keys. Each such key has a plurality of contacts attached at the rear surface of each key. Positioned for registered engagement with each such contact on the keys is a plurality of contact pads each of which corresponds to each key and comes into contact with each contact on the key respectively. During use., a key depression detector detects a key depression when a key is depressed once and at least one contact thereof is touched to at least one contact pad. The logic value generator which is in communication with the contact pads produces a logic value on the basis of which and how many of the contact pads are brought into contact with contacts on the individual key, wherein data corresponding to the logic value are inputted to the cellular phone or hand-held computer.

[0020] In another preferred embodiment of the device, there is provided a method of inputting data to a cellular phone or small computer from the depression of individual keys. First, a key depression is detected a key is depressed and at least one contact thereof is touched to at least one corresponding contact pad. Second, a logic value is produced for any one of three characters assigned to the depressed key, whereby data corresponding to the logic value is inputted.

[0021] In another preferred embodiment of the disclosed device, there is provided a method of inputting characters to a cellular phone or other device with limited space for a

keypad which follows the steps of depressing a key on the data inputting device which in this case is a keypad. Then a depression detector in communication with the contact pads detects a key depression when the key is depressed and at least one contact located on that key communicates to at least one corresponding contact pad. Then, a logic value generator in communication with the depression detector produces a log value for a character from a library of individual log values assigned to the keys and which was assigned to the depressed key and connecting contact and contact pad. Next, from a library of data corresponding to individual log values, the logic value generator inputs data corresponding to the log value generated by the depressed key. Finally, the inputted character is displayed on the data display of the cellular phone or small computing device.

[0022] It is an object of this invention to provide a keypad that while small in dimension, allows the user to easily input a plurality of characters or other data using only one stroke of one key.

[0023] Another objective of this invention is to provide such a device that will allow the user quicker input of data to a cellular phone or small computer by minimizing the number of keys and strokes needed to enter data.

[0024] An additional objective of this invention is to provide a method of detecting keystrokes on keys with a plurality of possible entries and determining the desired character of the user to be entered into the connected device.

[0025] Further objectives of this invention will be brought out in the following part of the specification, wherein detailed description is for the purpose of fully disclosing the invention without placing limitations thereon.

BRIEF DESCRIPTION OF THE DRAWINGS

[0026] FIG. 1(a) is a front elevation of a key pad of a cellular phone used as a data inputting device according to the invention.

[0027] FIG. 1(b) is a front elevation of a printed circuit board.

[0028] FIG. 2(a) is a side elevation of a plurality of contacts on the back side of the biased keys corresponding to contact pads on a printed circuit board, showing the key in an undepressed state.

[0029] FIG. 2(b) is similar to FIG. 2(a), showing that the key is depressed and rotated to one side thereof by pressing on a side edge of the key.

[0030] FIG. 2(c) is similar to FIG. 2(a), showing that the key is depressed at the center thereof.

[0031] FIG. 3(a) shows potentials generated between from communication between a contact and a contact pad on the printed circuit board when the key is depressed at its left side.

[0032] FIG. 3(b) is a graph showing scanned potentials.

[0033] FIG. 3(c) shows an example of data indicated on a display of the cellular phone.

[0034] FIG. 4(a) shows potentials generated between the contact and the contact pad when the key is depressed at its right side.