

INPUT DEVICE HAVING MULTIFUNCTIONAL KEYS

RELATED APPLICATION INFORMATION

[0001] This application claims priority to and the benefit of a United States Provisional Application entitled "Input Device Having Multifunctional Keys", filed Aug. 2, 2005, Application No. 60/595,744.

TECHNICAL FIELD OF THE INVENTION

[0002] The invention relates to an input device having multifunctional keys, wherein the different functions are triggered by varying the pressure on the keys or by varying the depth to which the key is depressed or the distance it is moved. The input device requires substantially fewer keys than a standard qwerty keyboard to input data and requires less physical space. In certain instances the keyboard can be operated with one hand.

BACKGROUND OF THE INVENTION

[0003] A standard keyboard has keys corresponding to the 26 letters of the alphabet, numbers 0-9, punctuation, and other various commonly used symbols. Including a shift key, a control key and an alt key, the total number of keys is approximately 50. A modern day computer keyboard can contain approximately 100 different key, including function keys, specialized programmable keys and pre-programmed computer function keys. Most of the keys will produce a capital letter or non-alphanumeric character when depressed simultaneously with the shift key. Most of the keys will also produce a second character, modify the font, perform an editing function or even launch a macro when depressed simultaneously with the alt key or control key.

[0004] The number of keys in a standard keyboard limits its use to locations and with devices that are sufficiently large to accommodate a size sufficiently large to fit all of the keys without sacrificing the ability of the user to tactilely distinguish the individual keys. The standard keyboard does not lend itself to use in hand-held devices, or other situations where a large keyboard would be awkward or inappropriate.

[0005] Other arrangements of keyboards exist beside the standard arrangement. For example, U.S. Pat. No. 4,891,777 to Lapeyre is directed to a single hand keyboard array that provides alphanumeric capabilities from twelve keys. The keyboard is intended to be operated using one hand. The system employs virtual keys that are selected by simultaneous action of two or more individual keys. The apparatus decodes the signals produced by activation of the switches to produce the alphanumeric symbol desired. U.S. Pat. No. 5,087,910 to Guyot-Sionnest pertains to an electronic keyboard for one-hand operation. The keyboard produces alphanumeric and analog characters upon the activation of one or more finger keys and a thumb key. The finger keys can each assume one of three states, and the thumb key can assume five different states. The keys can thereby, in combination, produce 134 different characters.

[0006] Another device is described in U.S. Pat. No. 5,543,818 to Scott which relates to a method and apparatus for entering text using an input device having a small number of keys. A display device, connected to a CPU, displays a character selection menu having sixteen groups of characters. An input device which includes four cursor movement keys and four selection keys to choose a desired character. The four

cursor movement keys move the cursor on the display from one character group to another. The four selection keys determine which of four characters in a group is desired.

[0007] U.S. Pat. No. 4,680,577 to Straayer et al teaches a multipurpose cursor control keyswitch. The switch has an ordinary function of producing an alphanumeric symbol when depressed vertically, and directs cursor movement when horizontal pressure is applied. The Straayer et al keyswitch is not intended to reduce the number of keys and is not designed to facilitate one hand operation.

[0008] A multiple switch assembly including a rockable control plate for selectively actuating multiple microswitches is disclosed in U.S. Pat. No. 5,504,286 to Tsai. The assembly is intended to reduce the number of keys on the keyboard of a portable computer by employing rockable keys which can produce two characters without reducing the size of the keys. The keys can be pressed to either one of two sides corresponding to two different characters. The primary reason for reducing the number of keys is to accommodate a cursor movement device.

[0009] U.S. Pat. No. 4,769,516 to Allen relates to a finger operated switching apparatus. The keyboard utilizes keys which can produce three different characters. The keyboard is intended to replace a conventional keyboard and requires two hands for use.

[0010] U.S. Pat. No. 5,504,286 to Blauer pertains to a keyboard with elongate keys associated with compact switch mechanisms. The keyboard is intended to be used with both hands and is intended for use in a desk-top configuration. The keyboard has a series of keys which produce two or three outputs depending upon how the keys are depressed. U.S. Pat. No. 5,861,823 relates to a data entry device having multifunction keys which each have a central primary numeric character and secondary alphabetic characters, where the numeric character is produced by applying a primarily vertical force to the key and the secondary alphabetic characters are produced by applying additional force in secondary directions.

[0011] U.S. Pat. No. 5,841,374 relates to a keyboard having six keys on the face of each keypad portion and a maximum of four keys along each edge, adjacent to the six face keys. Each key can have up to seven functions that are invoked by pressing the key in one of six different directions or pressing down to contact seven different switches underlying the key.

[0012] Multifunction keys where different characters are produced based on the number of times a key is depressed within a time interval are also known and are available on cell phones. Each depression of the key within a time interval causes the display to cycle to the next character producible by that particular key. Once the time interval expires, the cursor moves to the next position and depression of a key inputs a character in the adjacent position.

[0013] Touchscreens and touchpads are also well known. Touchscreens allow the user to input data by exerting pressure at different positions on the screen. Keyboards can be emulated on touchscreens so that when a position displaying a graphic of a character key is touched, that character key is outputted. Touchpads emulate a mouse, trackball or other such input device by detecting pressure or conductance from a user's finger making contact with the touchpad. Some touchpads can be programmed so that various positions on the touchpad correspond to different input functions and to detect tapping on the pad to mimic the functions of a mouse button. There is even a function on certain touchpads that can be