

selection or assigned to numerous control functions. Furthermore, as described herein, buttons can extend their specific function by adding significance to key action duration and frequency of the actuation and thereby minimize the number of buttons required. In the present invention a hybrid navigation means is presented whereas both the touch screen and the physical buttons are used in the selection of multiplexed character groupings. Additionally areas of the screen are dedicated to execute a global function and emulate the enter key and space bar function of a traditional keyboard.

[0096] It should be further appreciated that the present invention may be employed in association with conventional devices that require user input or selection. For example, in addition to the PDA and cellular telephone interfaces depicted in the figures, the one or more aspects of the present invention may be employed for command and similar functions. More specifically, the input methodology set forth above may be used by a user to input control functions or commands, particularly editing commands such as cut, paste, copy, etc. as would be found in conventional PDA and similar hand-held devices. Alternatively, it is further contemplated that the present invention may be employed, for example, in TV, VCR, and/or DVD remote control devices, thereby improving functionality (keeping buttons at a usable size by multiplexing their use. More specifically, the commands might include, but shall not be limited to, rewind, select, volume up, volume down, channel select, etc. This application may further be extended to handheld controllers used in home appliance applications, or handheld controllers used in remote, in-the-field, industrial applications.

[0097] In summary, the present invention provides a system for "multiplexing" a given display area to control the displaying of specific character groupings to facilitate user selection and entry or editing of characters into applications. In the first case each character is displayed in a segment of a logically defined grouping of characters within a character array. Character groups are selected by a variety of keys. Each segment can accept the entry or editing of characters therein via a touch screen overlay. The selected character is displayed within a text string for verification purposes. In the second case there is no reliance on a touch screen whereas the user is directed via the display to the required character entry key. The selection and constitution of character groups of a collection of characters can be optimized to maximize speed and accuracy of data entry by a user. The reason that this arrangement is especially advantageous is that it is an exceptionally good compromise between the opposing requirements of short character search times, fast error recovery, and a minimum number of keys.

[0098] It is, therefore, apparent that there has been provided, in accordance with the present invention, a method and apparatus for the entry of alphanumeric characters and symbols. While this invention has been described in conjunction with preferred embodiments thereof, it is evident that many alternatives, modifications, and variations will be apparent to those skilled in the art. Accordingly, it is intended to embrace all such alternatives, modifications and variations that fall within the spirit and broad scope of the appended claims.

1. A method of character entry through a user's sequential selection of characters, from a collection of characters, depicted on a display, comprising:

- a. dividing the characters of a collection of characters into a plurality of smaller, like-sized groups;
- b. providing at least one display window on a display screen;
- c. providing an action key for user selection of at least one of the plurality of smaller, like-sized groups of characters;
- d. selecting the action key to specify one of the plurality of smaller, like-sized groups of characters for display;
- e. displaying at least one of the characters in a specified character group in the display window;
- f. providing at least one selection button for at least one of the characters displayed;
- g. selecting a character from the characters displayed; and
- h. entering the selected character as input;

2. The method of claim 1, wherein the step of dividing the characters of a collection of characters into a plurality of smaller, like-sized groups further includes dividing characters from a plurality of categories of characters.

3. The method of claim 1, wherein the step of dividing the characters of a collection of characters into a plurality of smaller, like-sized groups further includes dividing characters from a single category of characters.

4. The method of claim 1 where the characters are selected from the collection consisting of: alphabetical characters, numerical characters, punctuation marks, symbols, acronyms, commands and user-specified sub-groups of characters.

5. The method of claim 1 wherein the user determines the number of character groups yielded from the collection of characters.

6. The method of claim 1 wherein the user determines the number of characters in a character group.

7. The method of claim 1 wherein the user determines the characters within at least one character group.

8. The method of claim 7 wherein the user further determines the position of a least two characters within at least one character group.

9. The method of claim 1 wherein the criteria for determining which characters are present in a character group is a function of a characters' frequency of use.

10. The method of claim 1 wherein the position of characters within a display window is intentionally determined to take advantage of commonly used sequences of characters.

11. The method of claim 9 where the frequency of character use is monitored and stored, and wherein the step of determining which characters go into a character group is determined as a function of the stored frequency of character use.

12. The method of claim 11 further including the step of continuously monitoring and updating the frequency of character use.

13. The method of claim 1 wherein the size of the display window is adjustable.

14. The method of claim 1 wherein the position of the display window on the display is adjustable.

15. The method of claim 1 wherein the shape of the display window is circular.

16. The method of claim 1 wherein the display window is divided into a plurality of segments.