

software code suitable for implementing the functionality of the present invention is loaded as a program into the operating system of the PDA 10 or other device of the types listed above. Thus, a user of any such programmable device as PDA 10 would load the program into the device memory or purchase the device having the program already installed and develop a personalized and portable keyboard as summarized above and described further herein.

[0039] The electronic display 14 depicts one of a possible plurality of character group graphic windows 40 containing a plurality of character selection segments 44 organized in a non-rectangular form. More specifically, the character selection segments 100₁, 100₂, . . . 100₁₀ are depicted on the display in a circular format, with a center, circular region "SP" allocated for the "space" character. FIG. 1 also is intended to illustrate that touch screen 18 overlays the graphic window 40, thereby having touch coordinates which directly coincide with the respective displayed character segment position within the graphic window. In response to such a selection, the stylus location (or hard button selection) is detected by the PDA controller, thereby providing means for detecting the user selected character or display feature within the window 40.

[0040] In order to enable the selection of more unique characters than there are character selection segments, the characters that the collection of segments represent can be changed. This can be accomplished using action keys 16, or other hard or soft keys. As used herein, hard keys are intended to represent physical keys or buttons wherein the action is controlled by an associated switch or equivalent electromechanical device. Soft keys are intended to be programmable elements that may be associated with a touch-sensitive display of similar component, where the size and/or location are adjustable. It is entirely possible that a soft key is transparent to a user and is simply sensitive to a user's touch or a stylus at an underlying display item. For each group of characters that can be inserted into the segments of character group display window 40, there is either a unique key, or unique key action, that allows the user to direct the device as to the character group that is desired for display. The user would typically learn over time which character groups are associated with which keys and key actions, however a legend could also be included on the device in order to help the user to remember.

[0041] The benefit of being able to change as a group what the collection of display segments and selection segments represent is that the user is able to quickly access a larger number of unique characters than there are unique selection segments on the device.

[0042] In the case of a round character display window, one special segment is the center segment. This special segment is a universal segment for which the character it represents does not change when the displayed character group is changed. A space is entered by selecting or pressing the center segment, designated by the letters "SP", regardless of the character group being displayed. Furthermore, the "SP" or space button may also function as a "Return" key, where a carriage return is entered by double-clicking or rapidly double-selecting this or a similarly designated position. There may also be other universal segments, similar to the space button, that do not change when the displayed character group changes. An embodiment of this would be

achieved by dividing the circular space button into halves, thirds, quarters, or more, and assigning characters to these segments.

[0043] Although other alternatively-shaped segments are contemplated, the pie-shaped selection and display segments or "keys" 44 of FIG. 1 will be used to describe the operation of one embodiment of the present invention.

[0044] An additional aspect of this embodiment is that the size of the space segment, and/or the size of the display window, may be altered by a user. More specifically, it is contemplated that the center circle for the "SP" segment may be resized by the user pressing on an edge of the segment with a stylus tip and dragging inward toward the center to make the segment smaller, or outward from the center to make the segment larger. Similarly, pressing and dragging on the outer edge of the circular display region, possibly at one or more designated control points 50 at the junction of the segments, will cause the entire circular display window to be resized. When the display is re-sized, the pie-shaped segments 100₁, 100₂, . . . 100₁₀ and SP segment expand or contract proportionally. However, when the space button is re-sized, the space button may expand or contract at the gain or expense of the surrounding segments. A further variation is one in which different character groups have a different number of segments, and where all the segments are not necessarily the same size. In this variation, the number of segments, or the size of each segment, can be varied by the user by dragging segment borders or boundaries closer or further apart, or by closing a segment entirely in order to remove that segment. Lastly, in addition to being resizable and where the shape may be adjusted by movement of boundaries, the display window(s) itself can also be repositioned on the display using a similar, well known select and drag technique.

[0045] This provides a user-friendly interface whereby you simply point to or touch the character to facilitate its selection and entry into the application. As will be appreciated from known PDA devices, the manual tapping, or scrolling of a selection cursor (not shown) to the desired display location (mapped to the desired character or symbol in this embodiment) results in the selection of the character or symbol for entry.

[0046] The program detects when the user has made a selection of a character within the group of characters displayed in a display window 40 and that character is entered into the data stream and shown within a character string in the text transcript window 120. In this particular application, the data stream comprises letters of text, and those letters and at least the most recent portion of the text are displayed in window 120 within the display 14. In this way, a user may validate the selected characters and if need be re-select and edit characters as they are displayed in the display window 120. Once verified the text can be saved, transmitted and/or printed. The display window 40 depicts, in accordance with the present invention, at least one character group shown in a spatial dimension in order to provide a user operable system for the multiplexed selection of characters.

[0047] FIG. 1 shows, for example, the formation of the text string, ". . . IGH T NOW I AM ENTERING DATA AS TEXT" where the letter have been selected by tapping the segment, or "button" 44, immediately over the desired char-