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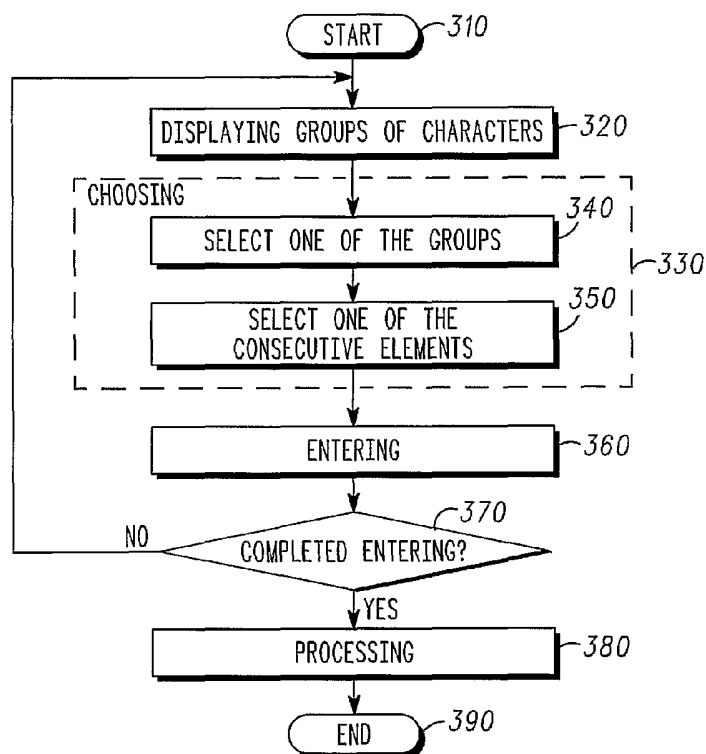
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(54) Title: ENTERING A CHARACTER INTO AN ELECTRONIC DEVICE



(57) Abstract: A device (100) and method (300) for choosing a character for entering into the electronic device (100) is described. The method (100) provides for displaying (320) groups of characters (213-216) on a display screen of the device, each one of the characters in a respective one of the groups being displayed as consecutive elements in a matrix (205). The is also a step of choosing (330) a desired character, displayed in an element of the matrix (205), by actuation of one of a set of user interface keys (106) and one of a set of keypad keys (130). The actuation of the one of a set of user interface keys (106) and one of a set of keypad keys (130) uniquely identifies the element displaying the desired character.



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ENTERING A CHARACTER INTO AN ELECTRONIC DEVICE

FIELD OF THE INVENTION

This invention relates to the field of character input into an electronic device. The invention is particularly useful for, but not necessarily limited to, entering phone numbers or short text messages into an electronic device.

BACKGROUND OF THE INVENTION

Portable handheld electronic devices such as handheld wireless communications devices (e.g. cellphones) that are easy to transport are becoming commonplace. Such handheld electronic devices come in a variety of different form factors and support many features and functions.

For purposes of convenience there is a general trend toward miniaturization of many types of handheld electronic devices, specifically handheld wireless communication devices. Miniaturization generally makes it easier to carry the device, including fitting the device into a user's pocket/purse or attaching the device to a user's belt. However, such miniaturization generally results in a limited number of keypad keys available for the entry of information such as short messaging or email text.

Touch screens have been used on handheld electronic devices in which the keypad keys are displayed on the touch screen and allow a user to enter text and commands by simply "touching" an area of the screen displaying a key associated with a desired letter or command. Although touch screens are useful and offer easy to use they are relatively expensive and therefore are usually only used on "high tier devices" that are focused for "high end"

users. Accordingly, today the majority of handheld electronic devices, specifically handheld wireless communication devices, use a standard telephone keypad having ten number keys, an asterisk or star (*) key, and a hash or pound (#) key. For English and many other alphabet languages, the numeric keypad of the device is overlaid with an alphabet keypad where three or more letters of the alphabet are associated with each number key. For example, the number five (5) key is associated with the letters j-k-l. In some reduced keypad electronic devices, upon entering an alphabet entry mode, a user employs multiple key presses to enter letters to make words and names for use by features such short messaging and address book name selection.

Currently, one common way to enter text messages using a conventional reduced keypad handheld electronic device is through the multi-tap method. The multi-tap method is a way of using the conventional keypad of a telephone to input text. The multi-tap method typically requires the user to press the TWO through NINE keys for writing letters, the ONE and ZERO keys for symbols and punctuation, and the asterisk (*) and pound (#) keys for moving the cursor to the left and right, however on some devices additional function keys can be used for cursor control. For any of the alphabet letters, the user is required to press the TWO through NINE keys to scroll through the letters and number choices associated with that key. For example, when the TWO key is pressed once, the character "a" is displayed. The second press of the same key (the TWO key) displays the character "b", the third press of the same key displays the character "c" and finally the fourth press of the TWO key displays the number "2".

As will be apparent to a person skilled in the art, there are various methods of entering alphanumeric text (e.g. English) and character-based languages (e.g. Chinese

characters) into a reduced keypad handheld electronic device. However it would be advantageous if an alternative reduced keypad entry method and device were provided to users.

5

In this specification, including the claims, the terms 'comprises', 'comprising' or similar terms are intended to mean a non-exclusive inclusion, such that a method or apparatus that comprises a list of elements does not include those elements solely, but may well include other elements not listed. Also, throughout this specification the term 'key' has the broad meaning of any key, button or actuator having a dedicated, variable or programmable function that is actuatable by a user.

15

SUMMARY OF THE INVENTION

According to one aspect of the invention there is provided a method for choosing a character for entering into an electronic device, the method including:

displaying groups of characters on a display screen of the device, each one of the characters in a respective one of the groups being displayed as consecutive elements in a matrix; and

25

choosing a desired character, displayed in an element of the matrix, by actuation of one of a set of user interface keys and one of a set of keypad keys, wherein the actuation of the one of a set of user interface keys and one of a set of keypad keys uniquely identifies the element displaying the desired character.

30

Suitably, the step of displaying is further characterised by each of the groups being displayed to have a visually distinctive representation compared to all other said groups.

35

Preferably, the step of choosing is further characterised by each of said interface keys being depicted in a manner that uniquely associates at least one of the user interface keys with a respective one of the groups and wherein each of the keypad keys uniquely identifies an element in each group.

Preferably, the actuation of one of a set of user interface keys selects the associated one of the groups. Preferably, actuation of one of the set of keypad keys selects one of the consecutive elements.

Suitably, there is a further step of automatically entering the desired character into the electronic device.

Preferably, after the choosing a user confirms that the desired character should be entered into the electronic device.

Suitably, the groups form lines in the matrix.

Preferably, the lines form rows of the matrix.

Suitably, the lines may form columns of the matrix.

Preferably, the keypad keys are depicted in one of the lines during the displaying groups of characters.

Preferably, the displaying groups is further characterised by the visually distinctive representation for each of the groups being a specific colour.

Suitably, each of said interface keys is depicted by the specific colour of an associated one of the groups of characters.

Preferably, the method may be repeated to enter a character sting into the electronic device.

5 The method may include the further step of processing the character string. The processing is characterised by inserting the character string in a display area of the display screen.

10 Suitably, processing is characterised by dialling a telephone number comprising the character string.

According to another aspect of the invention there is provided an electronic device comprising:

A processor;

15 A display coupled to the processor, the display displaying groups of characters each one of the characters in a respective one of the groups being displayed as consecutive elements in a matrix;

20 a set of user interface keys coupled to the processor; and

a set of keypad keys coupled to the processor, wherein, in use, the actuation of one of a set of user interface keys and one of a set of keypad keys uniquely identifies the element displaying a character to be entered
25 into the devices.

Suitably, said interface keys are depicted in a manner that uniquely associates at least one of the user interface keys with a respective one of the groups.

30 Preferably, each of the keypad keys uniquely identifies an element in each group.

BRIEF DESCRIPTION OF THE DRAWINGS

35 In order that the invention may be readily understood and put into practical effect, reference will now be made

to a preferred embodiment as illustrated with reference to the accompanying drawings in which:

Fig. 1 is a block diagram illustrating circuitry of an electronic device in accordance with the invention;

Fig. 2 illustrates an embodiment of a character entry mode showing elements of a matrix displayed on a display screen of the electronic device of Fig. 1;

Fig. 3 is a flow diagram illustrating a method for choosing a character for entering into the electronic device of Fig. 1;

Fig. 4 illustrates an example of elements of a matrix identifying a chosen character referenced on the display screen as shown in Fig 2;

Fig. 5 is a flow diagram illustrating an alternative step of choosing comprising part of the method of Fig. 3;

Fig. 6 illustrates another example of elements of the matrix identifying a chosen character referenced on the display screen as shown in Fig 2; and

Fig. 7 illustrates an alternative embodiment of elements of a matrix displayed on the display screen of the electronic device of Fig. 1.

DETAILED DESCRIPTION OF THE PREFERRED EMBODIMENT OF THE INVENTION

In the drawings, like numerals on different Figs are used to indicate like elements throughout. With reference to Fig. 1, there is illustrated an electronic device in the form of a handheld wireless communications device 100 comprising a radio frequency communications unit 102 coupled to be in communication with a processor 103. The handheld wireless communications device 100 also has a set of user interface keys 106 and a display screen 105 coupled to be in communication with the processor 103. There are also

a keypad 130 and auxiliary keys 131 operatively coupled to the processor 103.

5 The processor 103 includes an encoder/decoder 111 with an associated Code Read Only Memory (ROM) 112 storing data for encoding and decoding voice or other signals that may be transmitted or received by the radio-telephone 100. The processor 103 also includes a micro-processor 113 coupled, by a common data and address bus 117, to the
10 encoder/decoder 111, a character Read Only Memory (ROM) 114, a Random Access Memory (RAM) 104, static programmable memory 116 and a Subscriber Identity Module (SIM) interface 118. The static programmable memory 116 and a SIM (often called a SIM card) operatively coupled to the SIM interface
15 118 each can store, amongst other things, selected incoming text messages and a Telephone Number Database TND (phonebook) comprising a number field for telephone numbers and name field for identifiers associated with one the numbers in the name field. For instance, one entry in the
20 Telephone Number Database TND may be 91999111111 (entered in the number field) with an associated identifier ``Steven C at work'' in the name field. The SIM card and static memory 116 may also store passwords for allowing accessibility to password protected functions on the
25 handheld wireless communications device 100.

The micro-processor 113 has ports for coupling to the set of user interface keys 106 screen 105 and an alert module 115 that typically contains an alert speaker,
30 vibrator motor and associated drivers. Also, micro-processor 113 has ports for coupling to a microphone 135 and communications speaker 140. The character Read only memory 114 stores code for decoding or encoding text messages that may be received by the communication unit
35 102. In this embodiment the character Read Only Memory 114 also stores operating code (OC) for micro-processor 113 and

code for performing functions associated with the handheld wireless communications device 100.

5 The radio frequency communications unit 102 is a combined receiver and transmitter having a common antenna 107. The communications unit 102 has a transceiver 108 coupled to antenna 107 via a radio frequency amplifier 109. The transceiver 108 is also coupled to a combined modulator/demodulator 110 that couples the communications
10 unit 102 to the processor 103.

Referring to Fig 2 there is illustrated a text or character entry mode displayed on the display screen 105 of the electronic device in the form of handheld wireless
15 communications device 100. In this mode there are displayed groups of characters (or indicia) 211, 212, 213, 214, 215 & 216 a display screen 105 of the device 100. Each one of the characters in a respective one of the groups of characters 211-216 is displayed as
20 consecutive elements $M[i,j]$ in a matrix 205 where $i = 1$ to 12 and $j = 1$ to 6. Each one of the groups of characters 211-216 is displayed such that they have a visually distinctive representation compared to all other groups. For instance, one of the groups 211 comprises characters
25 including numbers 0 to 9, * and #, that are displayed in a visually distinctive representation compared to all other groups 212-216. Another of the groups 213 comprises characters a b c d e f g h I j k l that are displayed in a visually distinctive representation compared to all other
30 groups 211, 212, 214-216. Similarly, another of the groups 214 comprises characters m n o p q r s t u v w x that are displayed in a visually distinctive representation compared to all other groups. Another of the groups 216 comprises characters { } [] < > % \$ () \ ! that are displayed in a
35 visually distinctive representation compared to all other groups.

In this embodiment, one feature is that one of the groups, specifically group 212, is initially a group of null or blank characters (null group) forming a row of the matrix 205. This group 212 is a user feedback row that illustrates a selected group (described below).

As illustrated, the set of user interface keys 106 includes a down key 226, an up key 223, a left key 224, a right key 225 and an enter or ``OK'' key 227. Some of the user interface keys 106 are depicted in a manner that uniquely associates each one of the set of user interface keys 223- 226 with a respective one of the groups 213-216 (note groups 211 and 212 are not associated with any of the interface keys 106). For instance, key 223 is associated to select the group of indicia 213, key 224 is associated to select the group of indicia 214, key 225 is associated to select the group of indicia 215, key 226 is associated to select the group of indicia 216. Also, the keypad 130 comprises keys for selecting characters 0 to 9, * and #. Further, keys 0 to 9 * and # form the group 211 displayed as a row in the matrix 205.

The display screen 105 also has an input entry region 150 that can display characters selected or entered by a method 300 described below. In this embodiment, the auxiliary keys 131 comprise a power key for switching the device 100 on or off and a send key for sending, answering and terminating telephone calls. Also as illustrated, the groups 211-216 form lines in the matrix 205. These lines are rows of the matrix 205 and the keypad keys 130 are also depicted in one of the lines during the displaying step 320.

Referring to Fig 3 there is illustrated the method 300 for choosing a character for entering into the device 100. The method 300 is invoked at a start step 310 by a user actuating the ``OK'' key 227 that forms part of the set of

user interface keys 106. In this regard, the ``OK'' key 227 is actuated when the device 100 is a menu selection mode (not illustrated).

5 After the start step 310, a displaying step 320 provides for displaying the groups of characters 211- 216 on the display screen 105 of the device 100. As described above, each one of the characters in a respective one of the groups of characters 211- 216 are displayed as
10 consecutive elements $M[i,j]$ in the matrix 205. Further, each of the groups of characters is displayed to have a visually distinctive representation compared to all other groups. The visually distinctive representation for each of the groups 211- 216 is typically a grey scale shading or
15 specific colours or specific patterns or shapes. This grey scale shading or specific colours or specific patterns or shapes for each of the groups 211- 216 is applied to a respective one of the interface keys 106. Hence, each of each interface keys 106 is depicted by the specific colour
20 that is identical to an associated one of the groups of characters 211- 216, for instance key 225 could be blue and group 215 could be displayed in blue to provide for visual guidance to a user in which key 225 must be actuated to select group 215.

25 After the displaying step 320 there is a step of choosing 330 that provides for choosing a desired character (DCR), displayed in an element $M[i,j]$ of the matrix 205, by actuation of one of the set of the user interface keys 106
30 and one of the set of keypad keys 130. Also, the actuation of the one of a set of user interface keys 106 and one of a set of keypad keys 130 uniquely identifies the element $M[i,j]$ displaying the desired character DCR. The step of choosing 330 is further characterised by each of the
35 interface keys 106 is depicted in a manner that uniquely associates each one of the user interface keys 106 with a respective one of the groups 213-216 and wherein each of

the keypad keys 130 uniquely identifies an element $M[i,j]$ in each group (i.e. a chosen group).

In this embodiment, the step of choosing 330 comprises two selecting steps 340 and 350. Firstly, the selecting step 340 is performed in response to actuation of one of a set of user interface keys 106 to thereby select the associated respective one of the groups 213-216. For instance, if a user wishes to choose the letter ``h'' as the desired character DCR then this character is in group 213 and its element in the matrix 205 is element $M[8,3]$. The user therefore selects group 213 by actuating the corresponding and associated one of the one of the user interface keys 106, this key being 223 for the selection of group 213. The user is then provided visual feedback by the group 213 being displayed in the user feedback row 212 and if the user changes their mind (regarding character selection) or if he selected an incorrect group then he can simply actuate another one the user interface keys 106 and again the selected group will be displayed in the user feedback row 212.

Assuming that group 213 has been selected ($j=3$) and is displayed in the user feedback row 212, then the second selecting step 350 is performed in response to actuation of one of the set of keypad keys 130 and thereby selects one of the consecutive elements $M[i,j]$ of the matrix 205. To select the character ``h'' from group 213, the user needs to select the key on keypad 130 designated with the number 8, hence element  $M[8,3]$  is highlighted as shown in Fig. 4, as the element chosen and this corresponds to the letter ``h''. If the user wishes to change their mind (or if they pressed the wrong key on the keypad 130) they can simply press another one of the keys on the keypad 130. For example, by pressing the key on keypad 130 designated with the number 4 then the letter ``d'' at element $M[4,3]$ is selected and highlighted. If a user wishes to select a character 0 to 9,

* or #, they simply actuate any of the keys on the keypad 130 to select group 211. The user then actuates the key depicting the desired character DRC. For instance, if the desired character DRC is ``5'', then the user can actuate
5 key 5 on the keypad 130 to select group 211 and then actuate key 5 again to select character ``5''.

After the step of choosing 330, an entering step 360 is effected in which the user actuates the ``ok'' key 227 to
10 confirm that the desired character DRC should be entered into the electronic device. This desired character DCR is displayed in the input entry region 150 at an entering step 360. If the user wishes to cancel the chosen/selected desired character DRC they simply actuate one of keys 223-
15 226. It should be noted that the entering step 360 may automatically enter the desired character DRC into the electronic device, for instance after the expiry of a timer or immediately after one of the keys 130 have been actuated in during the step of choosing 330.

20 After performing the step of entering 330 a completed entering step 370 determines by actuation of the send key 131, or by any other means apparent to a person skilled in the art, if a user has completed entering characters. If
25 for example the send key 131 is actuated then no more entering is required, however, if more entering is required then the user actuates the ``ok'' key 227 and the method 300 returns to step 320. Hence, the method 300 is repeated to
30 provide a character string comprising the desired character DCR (chosen character) plus other chosen or desired characters sequentially, the chosen characters being displayed in the input entry region 150. Any character (number, symbol or letter) selected by the method 300 is
35 displayed in the input entry region 150 and text or character strings displayed in this region 150 can be edited by use of the group of interface keys 106 and

keypad 130 as will be apparent to a person skilled in the art.

If no more entering is required then a processing step 380 provides for either allowing editing of the chosen characters or character strings that are displayed in the input entry region 150 that is essentially a text display area; or storing the chosen characters in the static memory 116 or SIM card inserted into the SIM interface 118; or sending the chosen characters in a message by actuation of the send key comprising one of the auxiliary keys 131; or dialling a telephone number comprising the numbers in the character string by actuation of a send key comprising one of the auxiliary keys 131.

After the processing step 380 the method terminates at an end step 390 and can be invoked again by actuation of the "ok" key 227.

Referring to Fig. 5 there is shown a flow diagram illustrating an alternative step of choosing 330 comprising part of the method 300. Firstly a selecting step 540 is performed in response to actuation of one of the set of the keys of keypad 130 and thereby selects a line of the matrix 205 orthogonal to the groups 211 - 216. For instance, if key 1 of the keypad is actuated then $j = 1$ thereby identifying character "a" from group 213, character "m" from group 214, character "y" from group 215, character "[" from group 216 and character "1" from group 211'.

A selecting step 550 is then performed in response to actuation of one of a set of user interface keys 106 to thereby select the associated respective one of the groups 213-216. For instance, if a user wishes to choose the letter "y" as the desired character DCR then this character is in group 215 and its element in the matrix 205

is element M[5,1]. The user therefore selects group 215 by actuating the corresponding and associated one of the one of the user interface keys 106, this key being 225 for the selection of group 215. Also, if the user wishes to select any one of characters 0 - 9, * or # they simply actuate the required key on keypad 130 corresponding to the desired character.

Referring to Fig. 7, there is illustrated an alternative embodiment of elements of a matrix displayed on the display screen of the electronic device 100. As shown, the groups of characters are lines, more specifically, columns 712-716 of a matrix 705 and each one of the groups of characters are displayed such that they have a visually distinctive representation compared to all other groups. Also, as described above, user interface keys 106 are depicted in a manner that uniquely associates each one of the set of user interface keys 223- 226 with a respective one of the groups 713-716 and thus selection of a character can be effected by the method described, for instance, in Fig. 3. It will also be apparent that the keypad keys 130 are depicted in one of the lines (line 712) during the displaying groups of characters. If the user wishes to select any one of characters 0 - 9, * or # they simply actuate the required key twice on keypad 130 corresponding to the desired character.

The detailed description provides preferred exemplary embodiments only, and is not intended to limit the scope, applicability, or configuration of the invention. Rather, the detailed description of the preferred exemplary embodiments provides those skilled in the art with an enabling description for implementing preferred exemplary embodiments of the invention. It should be understood that various changes may be made in the function and arrangement of elements without departing from the spirit and scope of the invention as set forth in the appended claims. For

instance, although alphanumeric text has been described, ideographic or Asian characters can be input in a similar fashion. One example is pinyin based Chinese character entry.

WE CLAIM:

1. A method for choosing a character for entering into an electronic device, the method including:

5 displaying groups of characters on a display screen of the device, each one of the characters in a respective one of the groups being displayed as consecutive elements in a matrix; and

10 choosing a desired character, displayed in an element of the matrix, by actuation of one of a set of user interface keys and one of a set of keypad keys, wherein the actuation of the one of a set of user interface keys and one of a set of keypad keys uniquely identifies the element displaying the desired character.

15 2. A method for as claimed in claim 1, wherein the step of displaying is further characterised by each of the groups being displayed to have a visually distinctive representation compared to all other said groups.

20 3. A method for as claimed in claim 2, wherein the step of choosing is further characterised by each of said interface keys being depicted in a manner that uniquely associates at least one of the user interface keys with a
25 respective one of the groups and wherein each of the keypad keys uniquely identifies an element in each group.

30 4. A method for as claimed in claim 3, wherein the actuation of one of a set of user interface keys selects the associated one of the groups.

35 5. A method for as claimed in claim 4, wherein actuation of one of the set of keypad keys selects one of the consecutive elements.

6. A method for as claimed in claim 1, wherein, there is a further step of automatically entering the desired character into the electronic device.

5 7. A method for as claimed in claim 1, wherein, after the choosing a user confirms that the desired character should be entered into the electronic device.

10 8. A method for as claimed in claim 1, wherein, the groups form lines in the matrix.

9. A method for as claimed in claim 8, wherein, the lines form rows of the matrix.

15 10. A method for as claimed in claim 8, wherein, the lines may form columns of the matrix.

20 11. A method for as claimed in claim 8, wherein the keypad keys are depicted in one of the lines during the displaying groups of characters.

25 12. A method for as claimed in claim 4, wherein the displaying groups is further characterised by the visually distinctive representation for each of the groups being a specific colour.

30 13. A method for as claimed in claim 4, wherein each of said interface keys is depicted by the specific colour of an associated one of the groups of characters.

35 14. A method for as claimed in claim 1, wherein the method is repeated to enter a character sting into the electronic device.

15. An electronic device comprising:

A processor;

A display coupled to the processor, the display displaying groups of characters each one of the characters in a respective one of the groups being displayed as consecutive elements in a matrix;

a set of user interface keys coupled to the processor; and

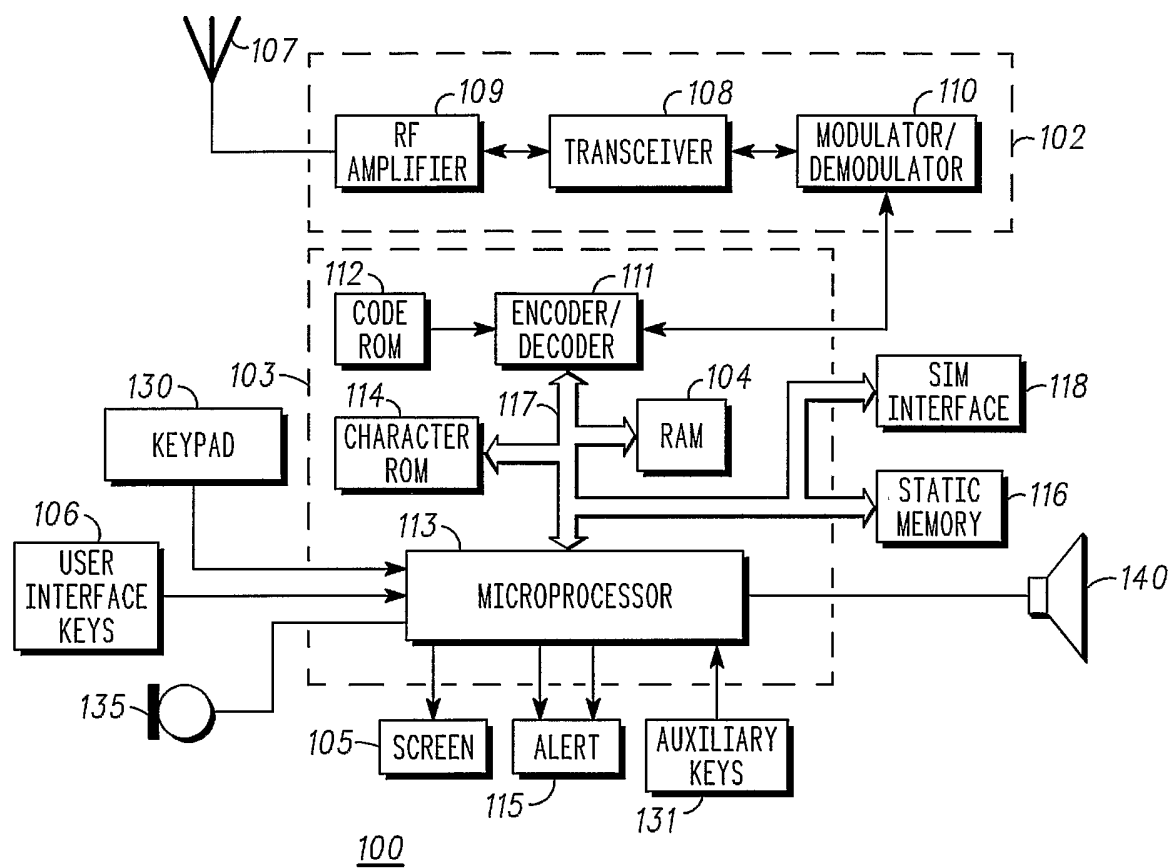
a set of keypad keys coupled to the processor,

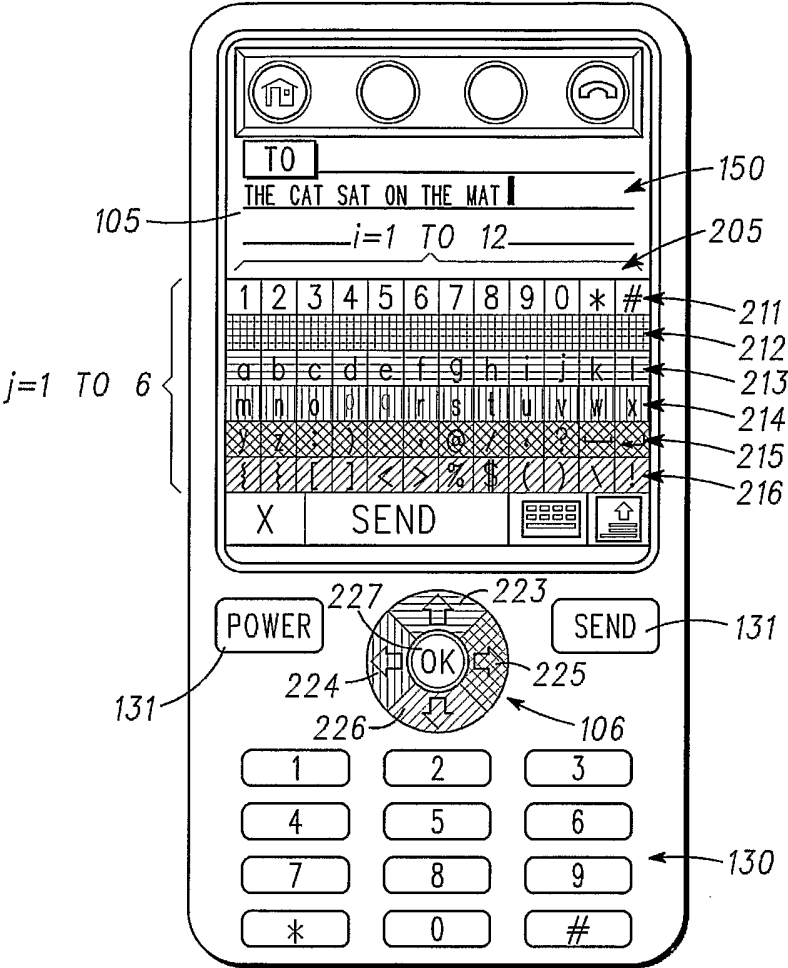
wherein, in use, the actuation of one of a set of user interface keys and one of a set of keypad keys uniquely identifies the element displaying a character to be entered into the devices.

16. An electronic device as claimed in claim 15, wherein said interface keys are depicted in a manner that uniquely associates at least one of the user interface keys with a respective one of the groups.

17. An electronic device as claimed in claim 16, wherein each of the keypad keys uniquely identifies an element in each group.

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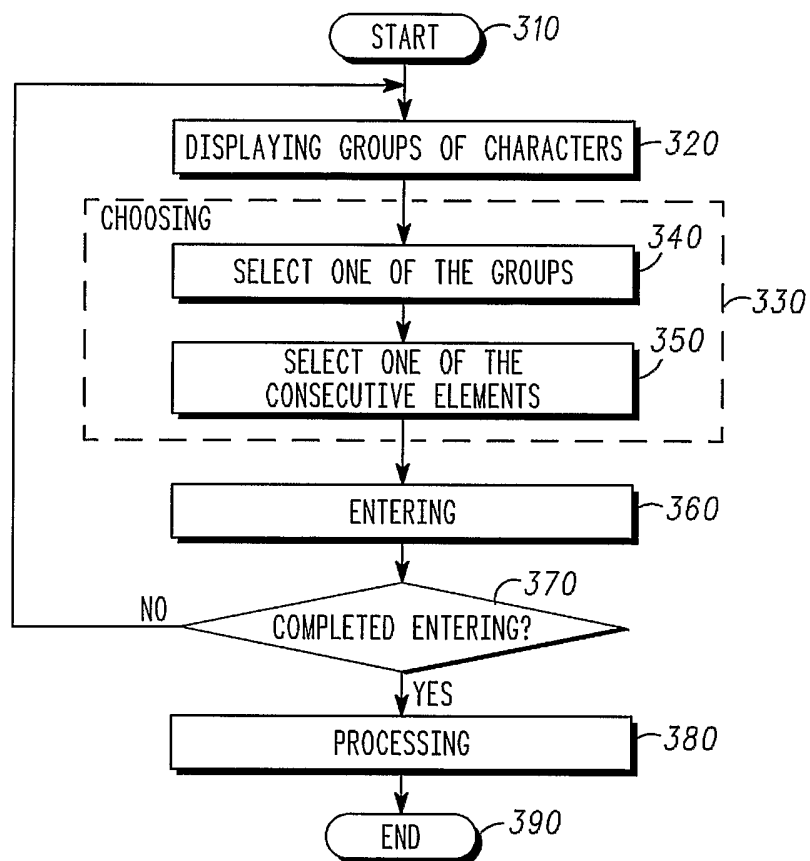
*FIG. 1*



100

FIG. 2

3/5

300**FIG. 3**

4/5

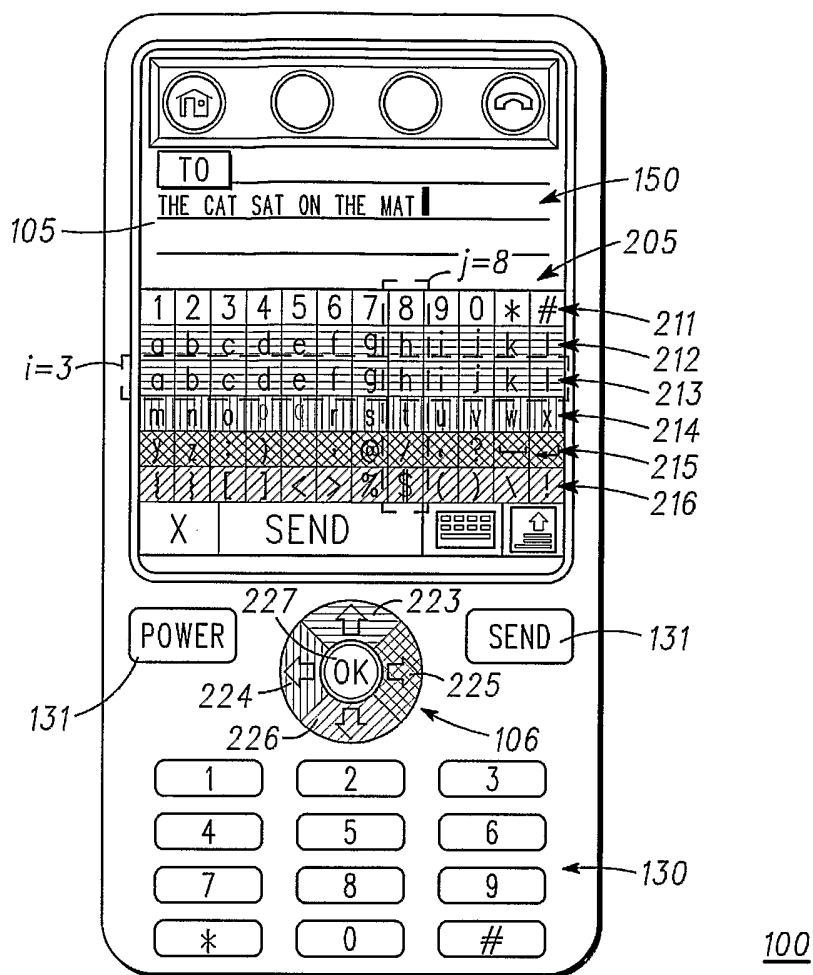


FIG. 4

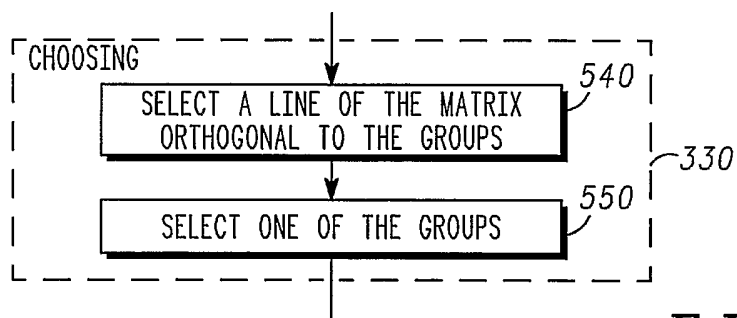


FIG. 5

5/5

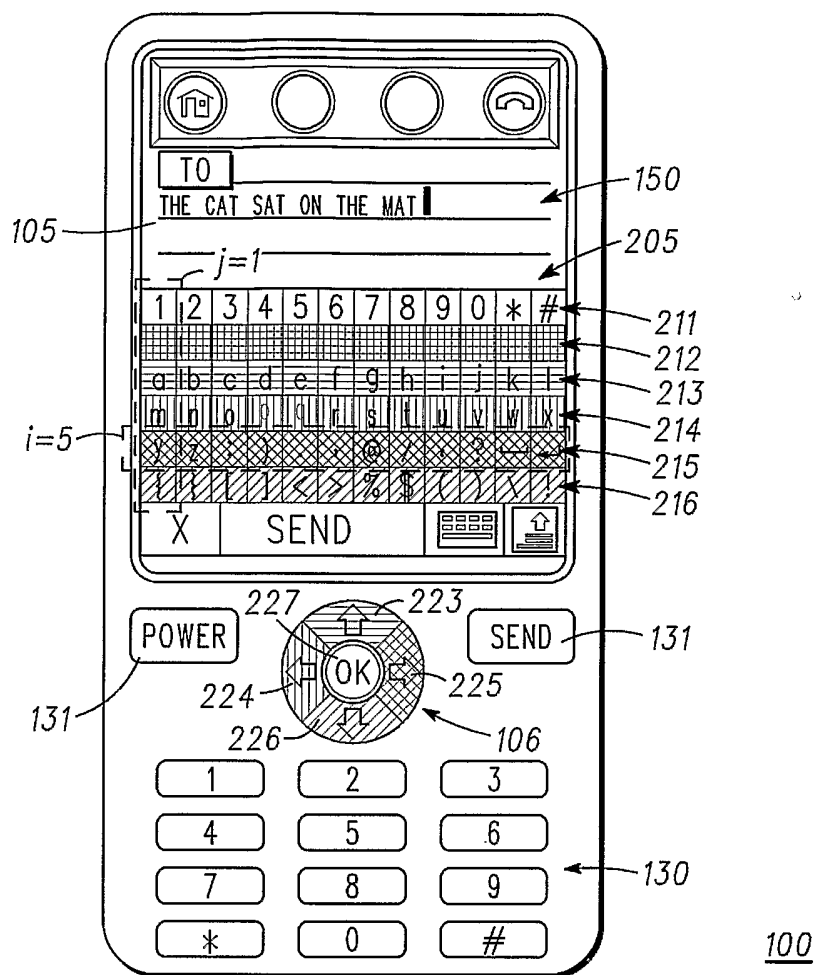


FIG. 6

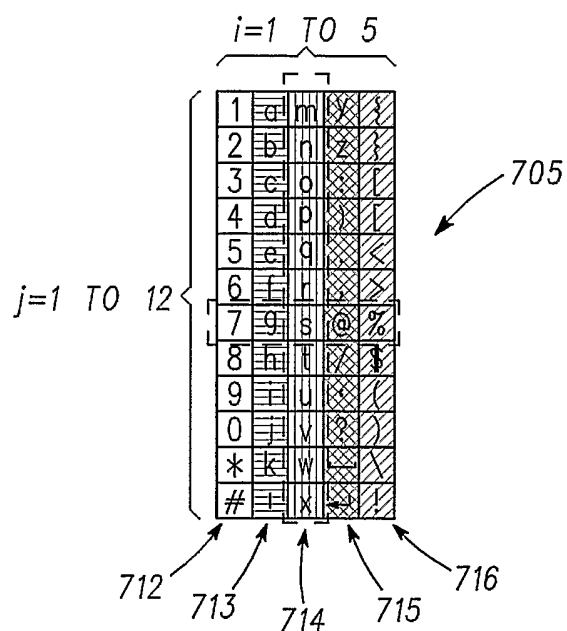


FIG. 7