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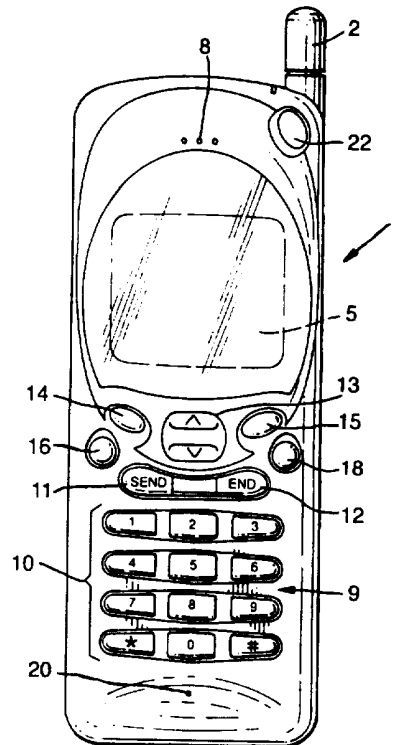
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GB 2285897 A **EP 0365200 A2**

(58) Field of Search
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INT CL⁶ **H04B 1/38 , H04M 1/00 1/02 1/30 1/50 , H04Q**
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(54) **Radiotelephone with user selectable default modes**

(57) The radiotelephone has soft keys 14,15 and various functions associated with them. The function associated with a key 14, 15 in a particular mode is displayed adjacent the respective key on display 5. The telephone has means whereby the user can define the default mode functions. The radiotelephone enters the default mode, for example, on powering up, completion of a call or the exiting of a mode of operation.

Fig.1.



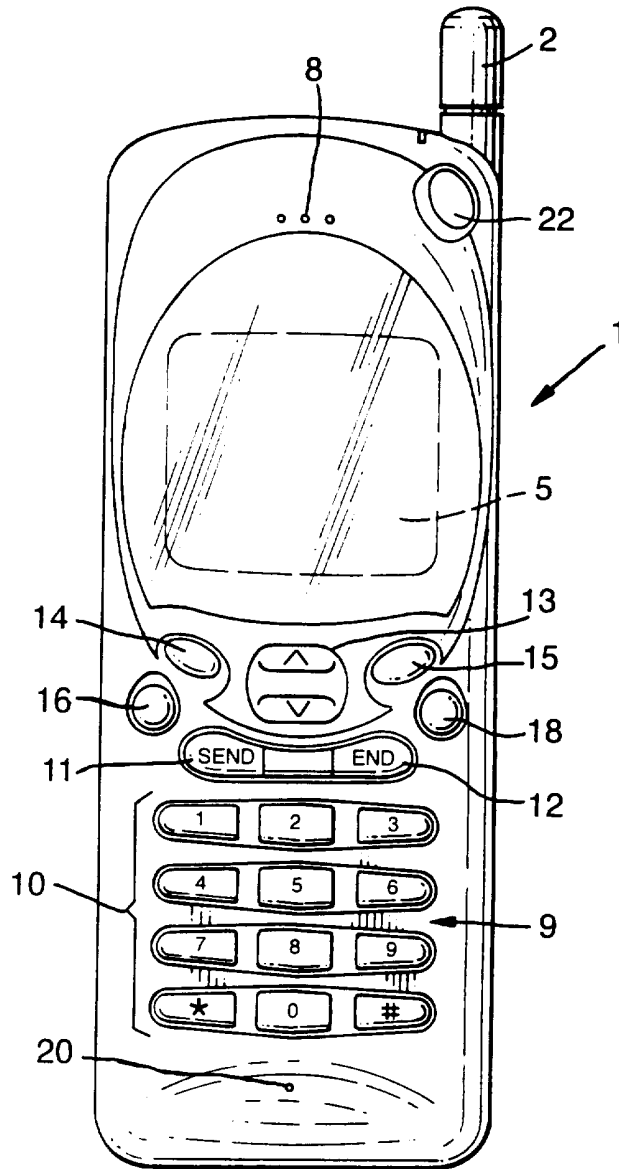
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At least one drawing originally filed was informal and the print reproduced here is taken from a later filed formal copy.

This print takes account of replacement documents submitted after the date of filing to enable the application to comply with the formal requirements of the Patents Rules 1995

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Fig.1.



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Fig.2.

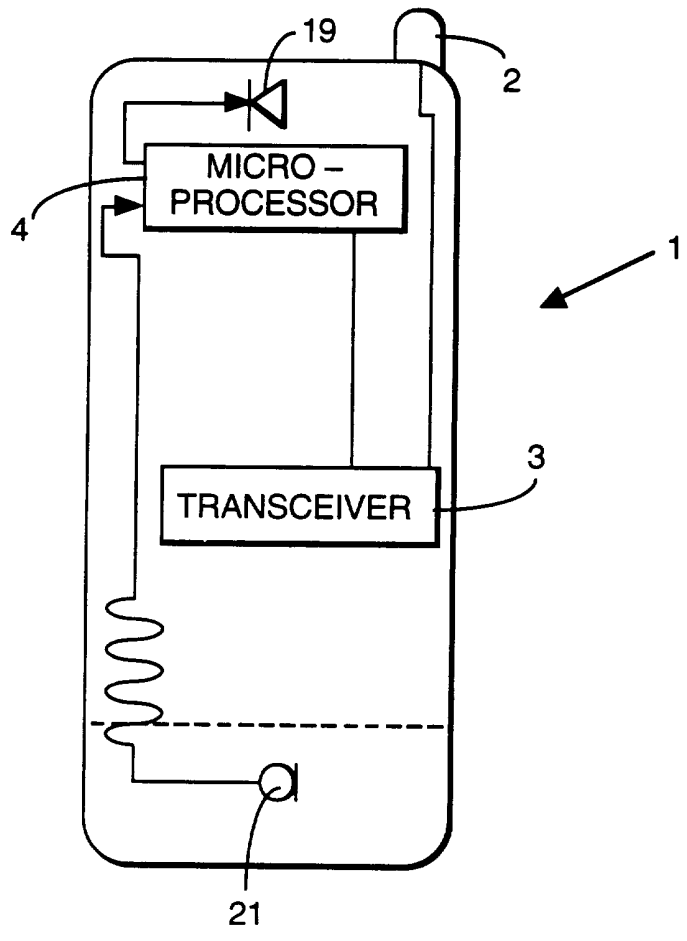


Fig.3.

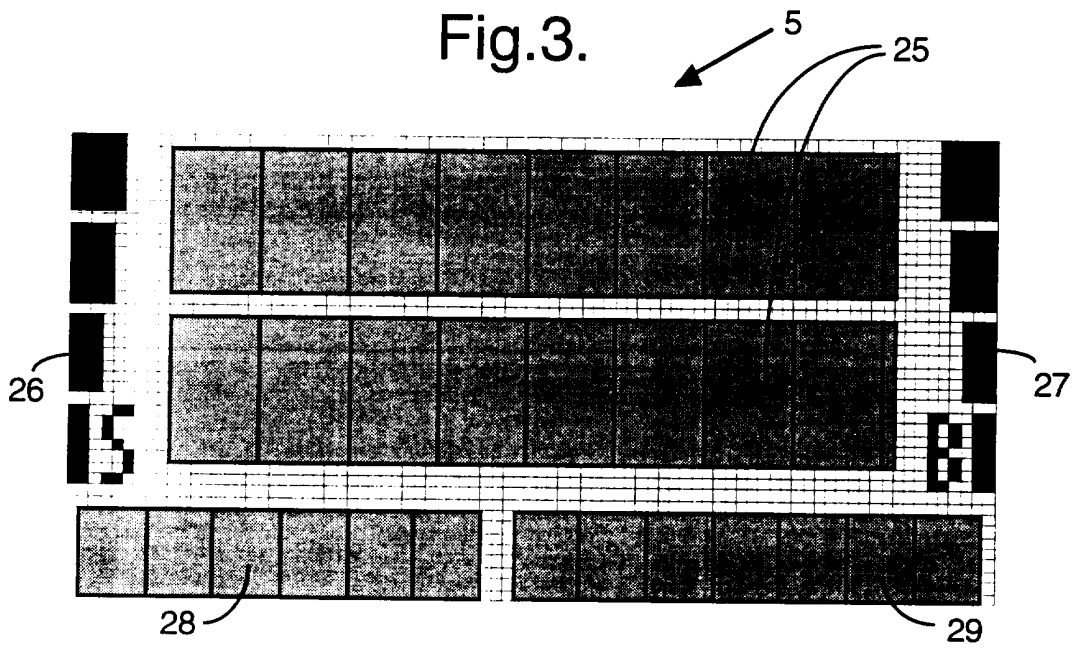
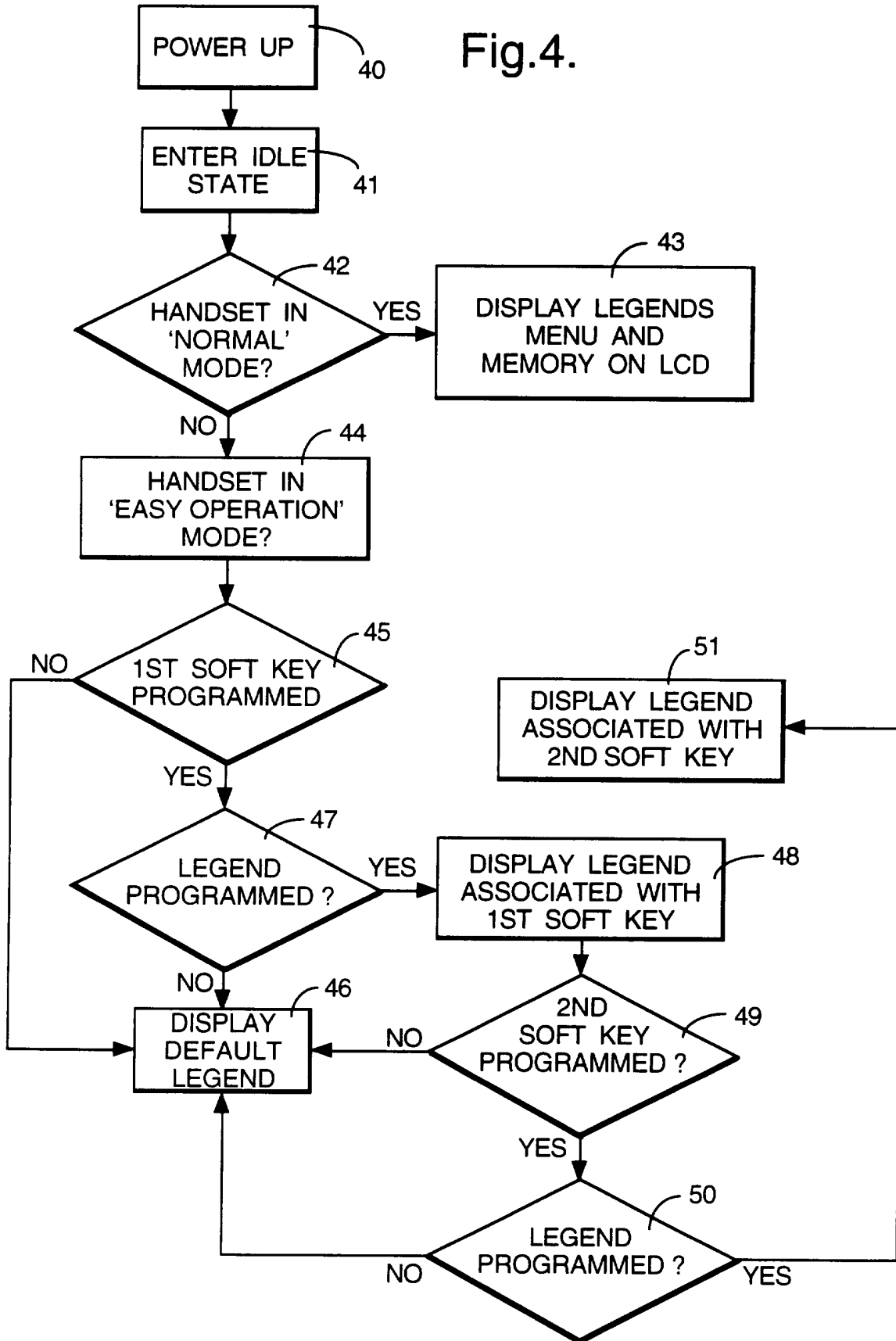


Fig.4.



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Fig.5.

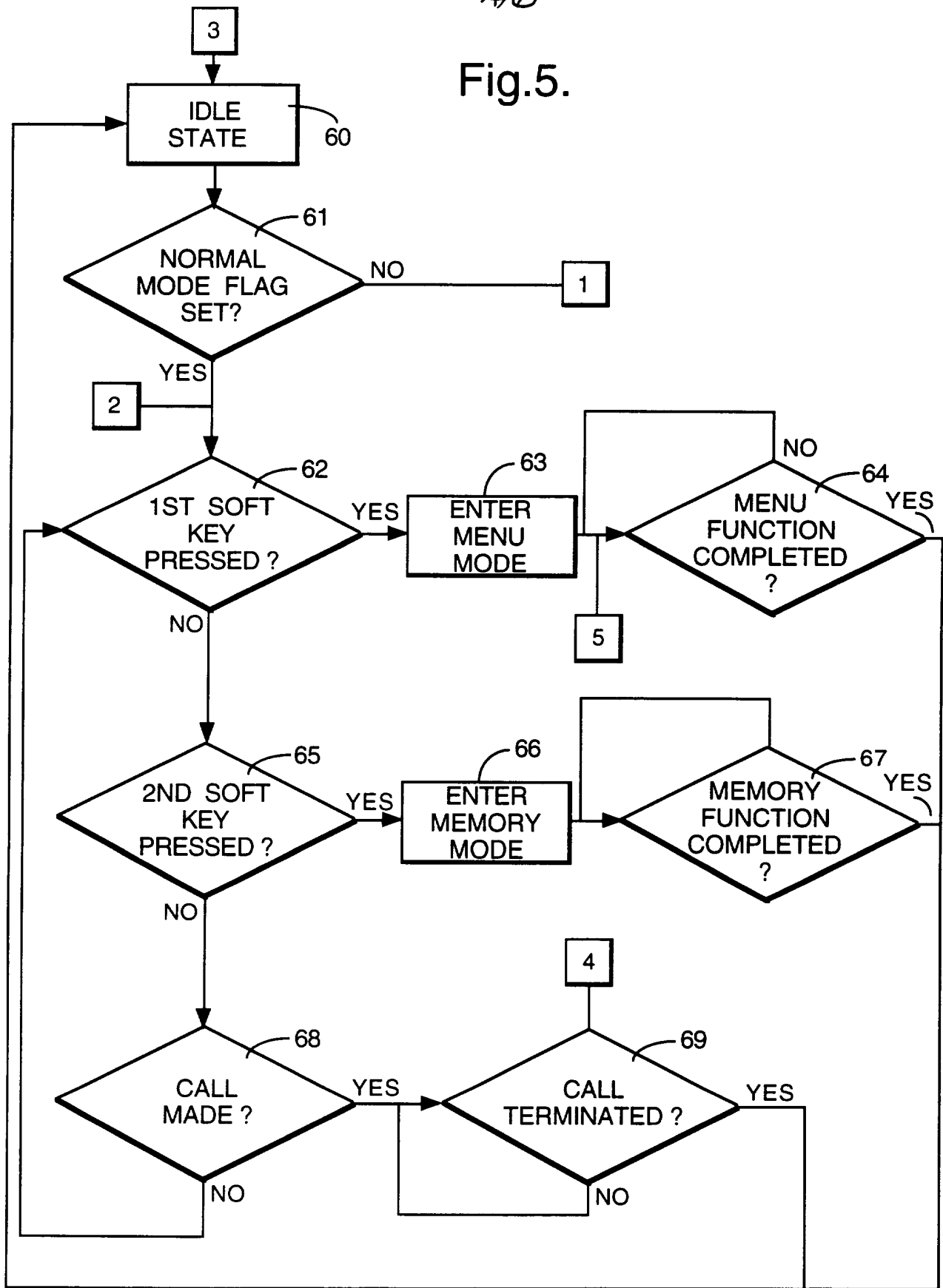


Fig.6.

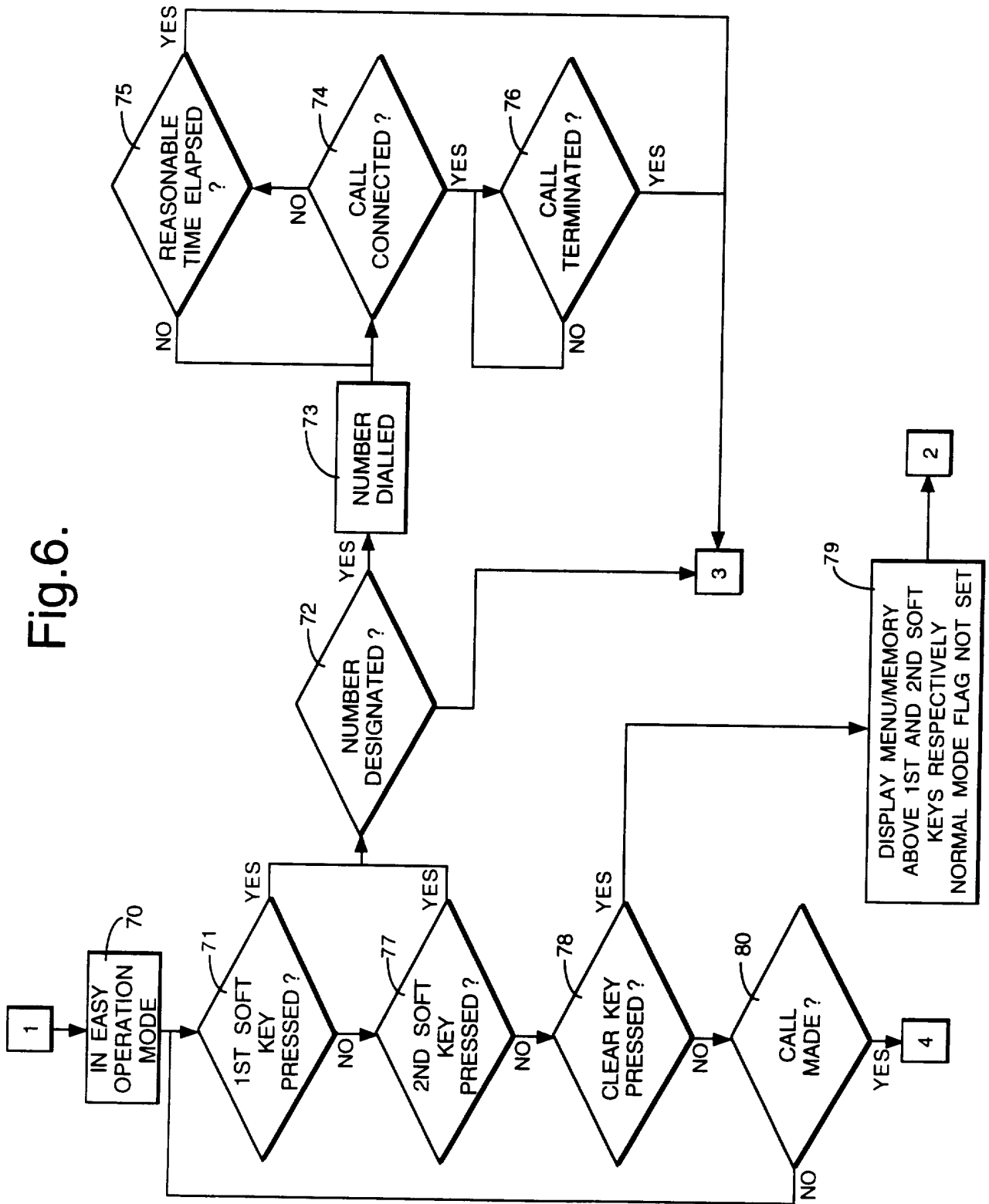
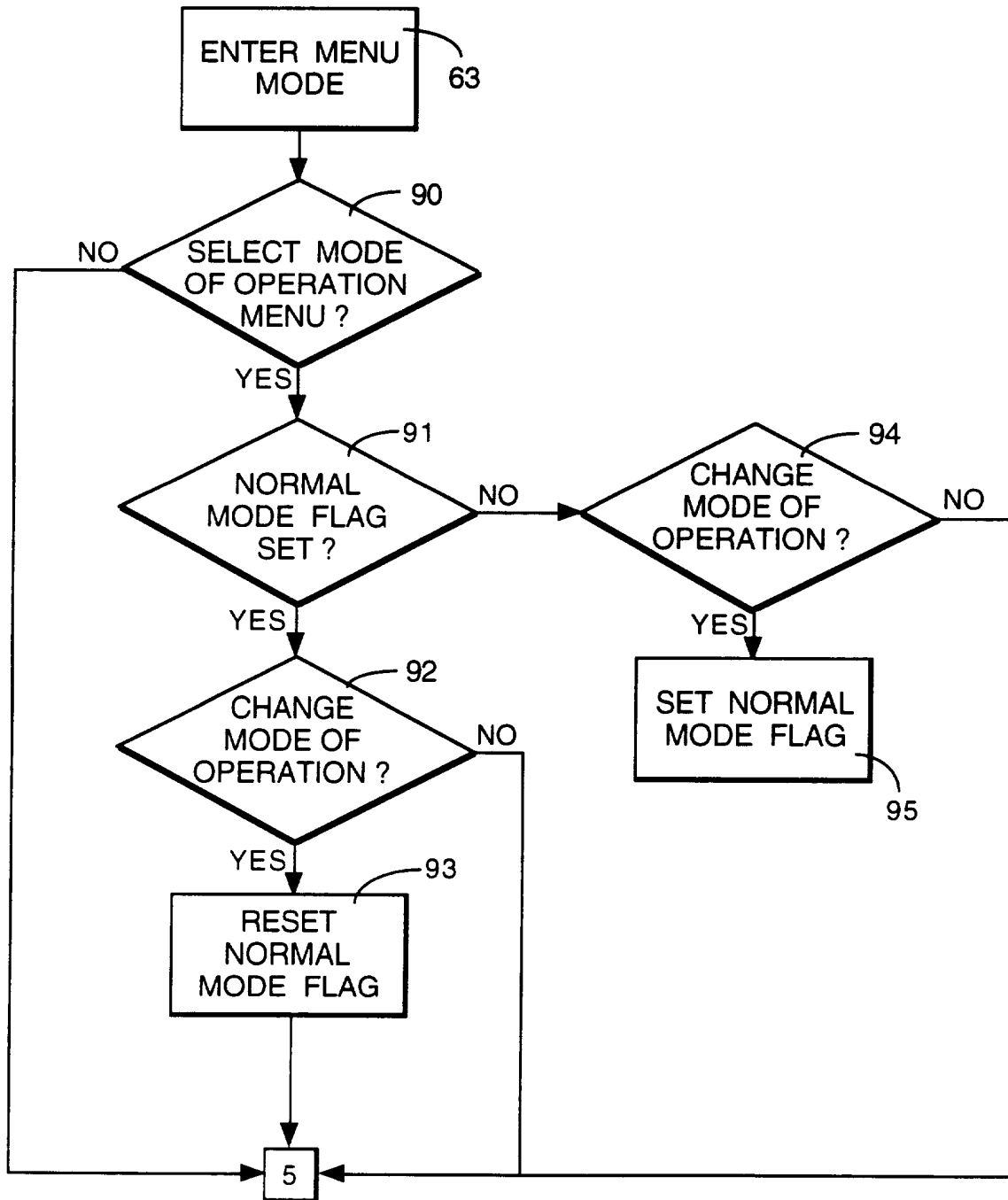


Fig.7.



A Radio Telephone

The invention relates to radio telephones sometimes referred to as radio handsets, in particular to radio telephones having user input means including a key with an associated legend for indicating the prevailing associated function thereof, and a processor responsive to actuation of the key to perform the respective associated functions.

Radio telephones have become complex technological devices, that can be off putting to users who are wary of technological advances. One of the concerns of designers of radio telephones is how to simply the phone to comply with the needs of a basic user who wants to use to use the radio telephone in the same way as he or she would use a typical landline phone ie to make and receive calls with minimum effort without alienating the more advanced user who enjoys the abundant features available on many of today's radio telephones or vice versa.

Telephones are already known which include a speed dialling function allowing the user to call a telephone number stored at a predetermined location in a special abbreviated dialling memory, using a minimum number of keystrokes. This enables simplified operation of the radio telephone which, for private users who as a result of high tariffs will typically use the phone to call relatively few numbers under a relatively restricted set of circumstances.

Other commercially available radio telephones have a number of dedicated keys for so-called super-speed dialling. These dedicated keys can be programmed by the user for storing selected numbers which can then be dialled using only a single keystroke. In other words, pressing one of the dedicated super-speed dialling keys will initiate a call to the pre-programmed telephone number associated therewith.

Although super-speed dialling has the advantage that only a single key stroke is required to initiate a call, it has the disadvantage that special additional keys are

required on the telephone keypad. This tends to make the keypad look more complicated and less user-friendly. Also the use of dedicated keys requires a larger keypad area, which is not compatible with smaller, more compact telephone handsets.

In accordance with the present invention there is provided a radio telephone operable in respective user selectable default modes to which the radio telephone returns under predetermined conditions comprising a processor, and user input means having a key with an associated legend for indicating the prevailing function associated therewith, the processor being operable to respond to actuation of the key to perform the respective associated function in the respective default modes.

The invention has the advantage of allowing different users to have a default mode tailored to their needs. The default modes may allow respectively simplified and complex use.

The the user is preferably able to select the function associated with the programmable key in a default mode. This allows any feature that might otherwise be difficult to perform because a large number of keystrokes are required to reach the function in a menu environment to be performed with a single key stroke. As the function is selectable by the user, the user can customise the telephone to cater for his or her individual needs and priorities. For example, if the user frequently wishes to change the default mode of operation of the handset, the user could select entry to the change of default mode menu setting on actuation of the programmable key.

Providing a programmable key for which the user can select a particular function in a particular default mode allows the user to set the telephone to a mode in which the particular function is performed by actuating the programmable key. A function given a high priority to an individual user is accessible without necessitating a large number of key presses or providing an

additional button that adds to the size, weight, cost, cluttered appearance and intimidation produced by the user interface; all of which radio telephone designers are striving to avoid.

The default mode is the mode that the handset enters on exit from other modes of operation of the telephone. The default mode will suitably be entered on powering up the telephone, and on termination of a telephone call.

In one particular embodiment of the invention the user selectable function associated with programmable key in the at least one of the respective default mode is an instant dial feature. The user can select a telephone number, suitably the most commonly used number, to be associated with the programmable key. In this embodiment, when the telephone the relevant default mode is selected, by pressing the programmable key the associated telephone number is dialled immediately. This allows the telephone to be set up to be used to make calls to frequently used numbers without it being necessary to use any of the more complicated features typically available on radio telephones. The same telephone can accordingly be used in the most appropriate fashion by both a basic and an advanced user.

In order to allow a simplified mode of operation of the telephone to be overridden in a straightforward fashion, suitably the processor is operable to change the function associated with the programmable key when in that default mode by user generation of a predefined cancellation signal. The function associated with the programmable key may only be temporarily be changed in response to the cancellation signal. Under these circumstances, it is possible for the function associated with the programmable key to revert to the function defined in the default mode on exiting the mode selected following generation of the cancellation signal.

The radio telephone suitably comprises a display to which the programmable key is adjacent and on which the associated legend is displayed.

The user input means may comprise a plurality of programmable keys each having a respective function associated therewith for each of the default modes.

The invention will be described in more detail with reference to the accompanying drawings of which:

Figure 1 is a front view of a radio handset in accordance with an embodiment of the present invention;

Figure 2 is a schematic representation of the radio handset of Figure 1;

Figure 3 is a schematic representation of the liquid crystal display of the radio handset of Figures 1 and 2;

Figure 4 is a flow chart illustrating operation of the radio handset of Figures 1 and 2;

Figure 5 is a flow chart illustrating operation of the radio handset of Figures 1 and 2;

Figure 6 is a flow chart illustrating operation of the radio handset of Figures 1 and 2; and

Figure 7 is a flow chart illustrating operation of the radio telephone of Figures 1 and 2.

A radio telephone in accordance with an embodiment of this invention shown in Figures 1 and 2 comprises a housing 1 enclosing substantially the whole of the electronic circuitry of the radio telephone. The radio telephone has an antenna 2, a transceiver 3 and processing means 4 programmed with an algorithm which is

operative to select a communication channel with a base station (Figure 2). Information is displayed on a Liquid Crystal Display 5 (LCD).

Included on the housing is a key pad 9 which comprises a first group of keys or buttons 10 labelled 0 - 9, * and # arranged in an array of three rows and four columns, as is usual. The numeric digits 0,1,...9 and the characters "*" and "#" are especially for dialling telephone numbers, but also for entering alphanumeric data into the telephone number store. A second group of control keys or buttons for selecting various functions such as a call start key (eg labelled SEND) 11 a call terminate key 12 (eg labelled END), a scroll key 13, first 14 and second 15 soft keys that have a different associated function dependent upon the operating state of the radio telephone, a clear key 16, and a alphanumeric key 17 that toggles the input from the first group of keys between digits and alpha keys. For the purposes of this specification the term 'key' is taken to mean key or button or any similar element for user input to the microprocessor 4. The display panel, LCD 5 is located on the housing 1 above the two groups of keys. Above the display 5 is located a series of holes 8 behind which is an earphone 19 or speaker for transmitting speech or other sounds to the user of the radio telephone. The housing 1 also has a hole 20 at its lower end behind which is mounted a microphone 21 (Figure 2). The power is controlled by power key 22.

The user interface of the handset is shown in more detail in Figure 3. The visual display comprises the liquid crystal display 5 having regions 25 for displaying text to the user, a signal strength side bar 26 indicating signal strength and a battery capacity side bar 27 indicating battery capacity and first and second regions 28, 29 situated adjacent the soft keys 14,15 for displaying a legend indicating the prevailing function of the associated soft key.

In a NORMAL mode of operation, the soft keys 14, 15 may be used to access a variety of pre-set menus. In this mode one of the keys will have the legend 'MENU' displayed above it in the first region 28 on the LCD 5. Depression or actuation of this soft key 16 with the legend MENU enables the variety of pre-set

menus, the related instructions of which are stored in memory, to be viewed by depressing the scroll key 13 an appropriate number of times in one direction until a desired menu is reached. When the user is scrolling through the list of menus, the legend above the soft-key changes to 'select'. Actuation of the soft 14 key with this legend then allows the displayed menu to be selectively enabled. Once the relevant sub-menu is selected, the user is prompted to use the scroll key 13 to view each menu item in turn. The legends for the soft key 14,15 are then 'Select' and 'Quit' respectively to allow the user either to select a particular menu item or return to the previous screen as required. This is one way in which the soft keys can be utilised in a NORMAL mode of operation.

The radio telephone of this embodiment of the invention has an 'idle' state. This is the state adopted by the radio telephone when powered up and to which it reverts when not in use either because a call is terminated or other operations have been completed.

The functions of the soft keys in the idle state are dictated by the mode of operation adopted in the idle state, the default mode. For example, in a second mode of operation, termed the EASY OPERATION mode, the soft keys are arranged to function as speed-dial keys. The legend associated with the soft keys in this mode will indicate telephone numbers the user may wish to dial, for example, 'Peter' and 'Jack' respectively. Depressing or actuating one of the soft keys results in the telephone number associated with that soft key being dialled. The user need do no more than press the key and the call is made. There is no need even to press the SEND key following dialling the telephone number as is ordinarily the case.

Operation of the handset will now be described with reference to the two modes of operation possible in the idle state for this embodiment of the invention. These are the NORMAL mode in which the two soft keys perform the functions respectively of selecting the menu and accessing the radio telephone's memories and an EASY OPERATION mode in which the two soft keys perform the functions of speed

dialling two numbers selected by the user. In the EASY OPERATION mode, the legends above the soft keys are programmable by the user to label the numbers to be dialled when the keys are depressed so that the user remembers the numbers stored that are associated with the soft keys. The soft keys themselves are programmable with the numbers to be dialled.

Figure 4 is a flow chart illustrating operation of the radio telephone on powering up and entering the idle state. When the handset powers up 40, it enters an idle state immediately 41. The microprocessor checks to see if the handset is operating in NORMAL mode 42. If it is, the legends associated with the soft keys in the NORMAL mode are displayed 43 on the LCD 5 in the first and second regions 28,29. In the present example these legends are MENU and MEMORY respectively.

If it is determined that the handset is not in the NORMAL mode 42, as there are only two modes of operation in this embodiment, the handset is determined to be in the EASY OPERATION mode 44. The microprocessor 4 then checks to see if the 1st soft key has been programmed 45. If not a default legend is displayed on the LCD 46 and no function is performed on depression of the 1st soft key. If the 1st soft key has been programmed to hold a speed-dial number, the microprocessor checks if the legend has been programmed 47. If it has, the associated legend is displayed in the first region of the LCD display 48. If not, the default legend will be displayed 46. Depression of the 1st soft key, if suitably programmed, will in any case result in the number being called directly. If the legend has also been entered it will be clear to the user which telephone number the 1st soft key will dial if pressed. The default legend may be a standard character string indicating that no name is associated with the speed-dial number, or more practically, the previous legend used to identify the number to be dialled by depressing the 1st soft key.

The same process occurs for the 2nd soft key. The microprocessor checks to see if the second soft key is programmed 49. If it is, it also checks to see if the legend

is programmed 50 and if it is displays the legend associated with the 2nd soft key 51. If not, the default legend is displayed instead 46. In this way the LCD 5 is configured appropriately for the selected idle operating mode of the radio telephone when powered up. Figures 5, 6 and 7 illustrate operation of the radio telephone in the respective modes.

Beginning with Figure 5, when the radio telephone is in the idle state 60, the display will reflect the mode of operation. If the selected idle mode is NORMAL, the legend above the first soft key in this example will be MENU and the legend above the second soft key will be MEMORY. If the current idle mode is determined to be NORMAL 61, if the 1st soft key is pressed 62, the handset will enter a menu mode 63. In this mode, as discussed briefly above, the user is able to scroll through the available functions and change the operation state of the phone. One of the functions the user can perform in the memory mode is to change the mode of operation in the idle state. The user can scroll through the available options until a selection of NORMAL or EASY OPERATION is found. By scrolling between the options and pressing the soft key with the legend 'select' when the appropriate mode is highlighted, the user can change the idle operating mode if desired. When the user has completed any desired menu functions 64, the handset returns to the idle state 60. The processor then determines whether the handset is still in NORMAL mode 64 and the process continues.

Figure 7 shows the process of changing the mode of operation in the idle state in more detail. One of the menu mode operations that can be performed is changing the operating state of the radio telephone in idle. When the menu mode is entered 63 the processor determines if the mode of operation in idle state function has been selected 90. If it has the NORMAL mode flag is checked once more 91. The user is then able to toggle between selection of the NORMAL and EASY OPERATION modes by pressing the scroll key. A desired mode of operation will be selectable by depressing the soft keys that will be appropriately labelled 'select'. The prevailing mode will remain selected if the soft key with a legend 'Quit' is actuated. If the selection involves a change of mode of operation 92 ie the user

decides to change to the EASY OPERATION mode from the NORMAL mode, the NORMAL mode flag will be reset 93. If this does not involve a change of mode of operation ie the user decides to stay in the NORMAL mode, the flag will not be reset. In either case the radio telephone will remain in the menu mode until any operations are completed 64 at which point it returns to the idle state 60.

If the normal flag is not set at block 91 ie the handset is in the EASY OPERATION mode, the same process takes place. The microprocessor determines if the user has selected a new mode of operation 94. If it has, the NORMAL mode flag is set 95. If not, the handset will remain in the menu mode until the any menu functions are completed 64 and the handset returns to the idle state 60.

Returning to Figure 5, if the handset remains in NORMAL mode and the 1st soft key 14 is not pressed 62, the processor determines if the 2nd soft key 15 is pressed 65. If it is, the handset enters a MEMORY mode 66 and the user is able to perform memory functions. Once these have been completed 67, the handset returns to the idle state 61 and the processor determines the mode of operation 61. In this instance the handset will remain in NORMAL mode as the idle state mode cannot be changed in the memory mode. In the memory mode numbers can be stored and/or amended in the memory locations available.

If neither the 1st or 2nd soft key are actuated, the processor checks to see if a call is being made 68. If not, the process continues to poll the 1st and 2nd keys and the other keys of the key pad until the handset is again in use. If the processor determines that a call has been made 68, the call is monitored until the call has terminated 69. When the call has terminated 69 the handset reverts to the idle state 60 and the process continues.

Operation in EASY OPERATION mode will now be described with reference to Figure 6. If the handset is not in NORMAL mode 61 (Figure 5), it is determined to be in EASY OPERATION mode 70 as in this particular embodiment there are only two possible modes of operation in the idle state. In the EASY OPERATION mode

70 if the 1st soft key 14 is pressed 71, the processor 4 checks to see if there is a telephone number associated with the soft key 72. If there is, the number is dialled 73. The processor 4 checks to determine if the call has been connected 74. If not, after a reasonable period of time has elapsed 75, for example 30 seconds, the radio telephone reverts to the idle state 60. If the call is connected 74, the microprocessor 4 monitors the call to determine if it has terminated 76. When it has terminated, the radio telephone again reverts to the idle state 60.

The same steps are taken if instead of the 1st soft key being pressed 7 it is the 2nd soft key that is pressed 77. The difference being that another designated number will be dialled 73 instead. If neither of the soft keys are pressed the processor checks if the clear key 16 has been actuated 78. The clear key 16 in this embodiment is used to temporarily change the operation mode when in the idle state from the EASY OPERATION mode to the NORMAL mode of operation. Alternatively this can be viewed as temporarily changing the functions associated with the soft keys in EASY OPERATION mode to mimic those associated with them in the NORMAL mode.

When the NORMAL mode of operation has been entered temporarily by pressing the clear key 16 the legends associated with the soft keys 14, 15 in the NORMAL mode are displayed 79 in the first and second regions 28, 29 above the respective keys. These legends indicate the functions currently associated with the soft keys. The mode of operation in the idle state is not changed at this point. By actuating the menu or memory keys at this stage, the handset will operate as if in the NORMAL mode, however, when the handset next enters the idle state 61 the handset will still be in the EASY OPERATION mode as the NORMAL mode flag has not been set 61.

If the clear key 16 has not been pressed, the processor determines if a call has been made 80. If not the key pad continues to be polled 71,77,78,80, until an action is taken by the user. If a call is made 80, the processor monitors the call and when it is terminated 69 (Figure 5) the radio telephone returns to the idle state.

In other embodiments of the invention consecutive actuations of the clear key 16 could be used to cause the handset to toggle between displaying the legends of the EASY OPERATION mode and the NORMAL mode on the LCD with the corresponding changes in the functionality of the soft keys 14,15. In yet other embodiments of the invention the NORMAL mode flag could be set when the clear key 16 is depressed to change the mode of the idle state permanently ie until the user chooses to change the mode by entering the menu mode, or perhaps semi permanently, for example, until the next time the handset is powered down.

In the embodiment described, there are only two operational states the handset can adopt in the idle state ie NORMAL and EASY OPERATION. In other embodiments of the invention there could be more than two modes available in the idle state. In this case the functionality of the soft keys would depend on which of the more than two modes, is the prevailing or current mode.

The functionality of the soft keys is not restricted to MENU, MEMORY or SPEED DIALING. The soft keys could, in other embodiments of the invention, be programmed to adopt any of the functionalities available to the handset. Suitably these would be functions a particular user uses predominantly and would be programmable by the user to suit particular needs. For example, the user may wish to have the handset operate in a particular fashion when at work and in a different fashion at home. In embodiments of the present invention, the user could programme the soft keys to enter the 'work' and 'home' modes on depression of the associated soft key in the idle state.

The present invention includes any novel feature or combination of features disclosed herein either explicitly or any generalisation thereof irrespective of whether or not it relates to the claimed invention or mitigates any or all of the problems addressed.

In view of the foregoing description it will be evident to a person skilled in the art that various modifications may be made within the scope of the invention.

Claims

1. A radio telephone operable in respective user selectable default modes to which the radio telephone returns under predetermined conditions comprising a processor, and user input means having a key with an associated legend for indicating the prevailing function associated therewith, the processor being operable to respond to actuation of the key to perform the respective associated function in the respective default modes.
2. A radio telephone according to claim 1 wherein the function associated with the key is user selectable for at least one of the respective default modes
3. A radio telephone according to claim 1 or 2 wherein the predetermined conditions comprise powering up the radio telephone.
4. A radio telephone according to any preceding claim wherein the predetermined conditions comprise termination of a telephone call.
5. A radio telephone according to any preceding claim wherein the predetermined conditions comprise exiting a selected mode of operation.
6. A radio telephone according to any preceding claim wherein the predetermined function comprises dialling a user selected telephone number associated with the key.
7. A radio telephone according to any preceding claim wherein the processor is operable to change the function associated with the key by user generation of a predefined cancellation signal.
8. A radio telephone according to claim 7 wherein the radio telephone subsequently reverts to the selected default mode.

9. A radio telephone according to any preceding claim wherein radio telephone comprises a display to which the programmable key is adjacent and on which the associated legend is displayed.

10. A radio telephone according to any preceding claim wherein the user input means comprises a plurality of keys each having a respective function associated therewith for each of the respective default modes.

11. A radio telephone substantially as hereinbefore described with reference to Figure 1 to 7 of the drawings.



Application No: GB 9603926.8
Claims searched: 1-10

Examiner: Paul Derry
Date of search: 22 May 1996

**Patents Act 1977
Search Report under Section 17**

Databases searched:

UK Patent Office collections, including GB, EP, WO & US patent specifications, in:
UK CI (Ed.O): H4K - (KFH, KBKQ, KBHX), H4L - (LECX)
Int CI (Ed.6): H04M - (1/00, 1/02, 1/30, 1/50), H04B - (1/38), H04Q - (7/32)
Other: On-line : WPI, JAPIO

Documents considered to be relevant:

Category	Identity of document and relevant passage	Relevant to claims
A	GB 2285897 A (NORTHERN TELECOM) See especially lines 12-17 of page 7.	
X	EP 0365200 A2 (AT&T) See the whole document.	1, 2 at least

X	Document indicating lack of novelty or inventive step	A	Document indicating technological background and/or state of the art.
Y	Document indicating lack of inventive step if combined with one or more other documents of same category.	P	Document published on or after the declared priority date but before the filing date of this invention.
&	Member of the same patent family	E	Patent document published on or after, but with priority date earlier than, the filing date of this application.