



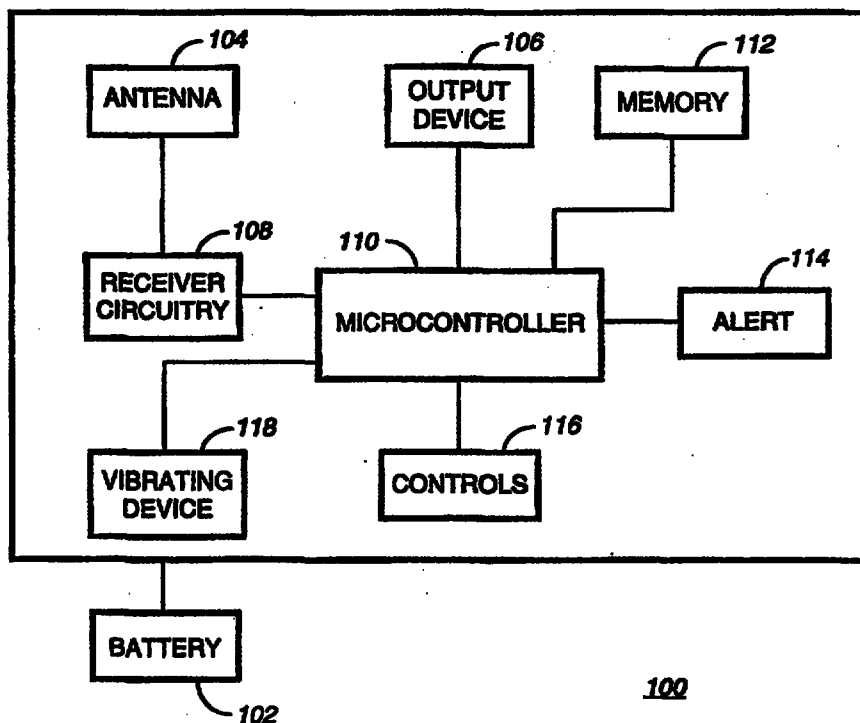
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(54) Title: METHOD AND APPARATUS FOR DISPLAYING A MESSAGE WHICH HAS BEEN RECEIVED

(57) Abstract

A communication device such as a pager (100) includes a controller (110) which helps decode an incoming high priority message and stores it in memory (112). A user control (116) such as a "Read" control switch is then used to display at least a portion of the high priority message on the display (106). Once the high priority message has been read, it is persistently displayed on display (106) until the user decides to erase the message. Depending on the size of the display screen (106) a portion or all of the high priority message may be displayed. Alternatively, in situations where the display screen (106) is too small to accommodate all the information which needs to be displayed at one time, a portion of the high priority message or an icon is displayed on a periodic basis.



METHOD AND APPARATUS FOR DISPLAYING A MESSAGE WHICH HAS BEEN RECEIVED

Field of the Invention

This invention relates in general to electronic devices and in particular to communication devices which have a display.

Background of the Invention

Communication devices such as pagers using present day technology have the capability of giving an alert if a priority or emergency message is received by the pager. For example, a paging feature such as, Priority Override Page, will prioritize an incoming priority page by informing an individual with an audible alert, regardless if his/her pager is set on vibrate or silent mode of operation. For a specific and illustrative example of pagers that provide such priority page override capability, one may refer to United States Patent No. 4,438,433, granted to Smoot et al., entitled "Multiaddress Pager with a Call Storage and Priority Page Option", and assigned to the present assignee.

Once a high priority message is received at the pager, even when using a feature such as the priority override page, the high priority message is displayed, if the pager is equipped with a display, using the same technique used for a normal or non-priority message. Messages are retrieved by pressing the "Read" key on the pager and scrolling through the received messages that are stored in the pager's message buffer. Normally, once a message has been read, the message stored in the pager can be deleted in order to make room for new messages.

There is currently however no way to maintain the importance of a high priority message after an individual has recalled the stored message(s) from the pager's memory message buffer using the "READ" key (or some other pager control switch used for such functions). In situations where an important or high priority page is received and can't be acted upon by an individual for some time (e.g., a few hours) after the message has been read (e.g., individual is preoccupied with some important matter at the time, etc.), he may forget about the message over time. A need thus exists in the art for a method and apparatus which

can provide an enhanced alert feature for users of communication devices such as pagers when a priority message is received.

Brief Description of the Drawings

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FIG. 1 shows a block diagram of a pager in accordance with the preferred embodiment of the invention.

FIG. 2 shows a front of a pager showing the pager's display and controls in accordance with the preferred embodiment of the invention.

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FIG. 3 shows a prior art standby screen pager display.

FIG. 4 shows a persistent message display on a pager standby screen in accordance with the preferred embodiment of the invention.

FIG. 5 shows a continuation display screen of the persistent message shown in FIG. 4.

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FIG. 6 shows a persistent message display on a typical function screen of a pager in accordance with the invention.

FIG. 7 shows an icon or display symbol which can be used in accordance with one of the preferred embodiments of the invention.

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Description of the Preferred Embodiment

Referring now to the drawings and in particular to FIG. 1, a simplified block diagram of a selective call receiver 100 such as a pager in accordance with the invention is shown. Pager 100 includes a primary power supply 102 which can preferably take the form of a nonrechargeable battery, such as an alkaline battery, or a rechargeable battery, such as a nickel-cadmium (NiCd) battery. Battery 102 provides power to all of the pager's circuitry. The pager 100 further comprises an antenna 104 that receives a radio frequency (RF) modulated selective call signal and provides the signal to a conventional receiver circuitry 108 for demodulation thereby. A microcontroller or microprocessor 110 processes the demodulated signal to decode an address and optional message data contain therein.

Once recovered, the message data may be stored in the memory or storage area 112 (message buffer) for subsequent presentation by an output device 106, such as a liquid crystal display 106 or an audio

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transducer 114. In normal operation, the pager's controller 110 compares a decoded address contained in the received signal with a predetermined addresses stored in memory to determine if the message is for that particular pager. The user is alerted by an alert mechanism 114 that a message has been received if the decoded address correlates with one of the predetermined address or addresses. The alert mechanism 114 typically takes the form of an audio transducer, etc. If the pager 100 is set to Silent mode, no audible alert will be given upon receipt of the message unless a Priority Override Page is received as mentioned previously. Alternatively, the pager 100 can vibrate instead of sounding an audible alarm upon receipt of an incoming message if equipped with a vibrating device 118. If the received signal contains optional message data, the display 106 will present the message automatically on the display or when manually selected, by user actuated controls 116 which comprise switches, etc.

In FIG. 2, a front view of pager 100 is shown. In the particular pager shown, the user controls 116 include left/right directional buttons 208, up/down directional buttons 202, a read/reset/power on button 204, and a function/select button. The user controls 116 allows the pager user to set all of the pager's user selectable features and functions, and allows the user to review and delete the messages which have been received. Referring now to FIG. 3, a standard standby display for pager 100 is highlighted. LCD display screen 106 in the standard standby mode displays the time and date and a "power on" icon 302.

Priority messages such as important or emergency messages which are received by the communication devices of the present invention can be transmitted using conventional methods for designating priority messages as known in the art. For example, in paging systems, a priority page may be sent using the previously mentioned Priority Override Page feature. The designation of the importance of the message can be attached to a transmitted message by the sender of the message using one of many techniques known in the art. For example, the importance of a message can be tagged by the sender of the message by calling a special phone number in order to send the page via the paging system, by performing a certain keypress sequence when entering the page via a telephone handset, by notifying the paging terminal operator entering

the page into the paging system that the message is important so that it may be tagged accordingly, etc. That which determines whether a message is an emergency (priority) message or non-emergency message in one preferred implementation of the invention may be what is stored in the pager's code plug or read-only memory (ROM), which in pager 100, is located "on-chip" to microcontroller 110. As an example, a controller such as the MC68HC05L16 manufactured by Motorola, Inc. includes 16 Kilobytes of user ROM and 512 bytes of RAM on board the microcontroller. The ROM may have several addresses, for example, 739-3444, may be reserved for priority messages, and two other addresses, for example, 739-3445 and 739-3446, may be reserved for non-priority messages. Besides using multi-addresses to determine which messages are priority messages and which are not, one could use one or more bits which are part of the incoming message (paging protocol) to notify the pager 100 that the message should be treated as a priority message, etc.

In accordance with the present invention once a message is decoded as an important or priority message by the pager, and read by the user, the message will remain persistently on the display to remind the user of the message whenever he looks at his pager's display. As one example, on a pager with an eight line display, a portion of a received message or an entire page message designated as high priority may occupy the bottom line of the display at least periodically as shown in FIG. 4 until the message is deleted from the pager by the user. Preferably, the persistent page message 402 would be visible even when the remainder of the display screen is in standby mode as shown in FIG. 4., or when the display is used for other functions (e.g., setting the pager's real-time clock, selecting the pager's audio tone, etc.) as shown in FIG. 6. In FIG. 6, a persistent message is shown occurring during a function display screen which sets the alert functions on pager 100. Since the high priority message shown in FIG. 4 is too long to be displayed in one line, in FIG. 5, the remainder of the message as provided to the user is shown. The high priority message shown on the display screens in FIG. 4 and 5 are preferably shown in alternating fashion so the user can read the whole message. Alternatively, only the first portion of a message could be displayed as shown in FIG. 4 with the user being required to press a control switch to view the balance of the message.

On pagers with smaller display screens, or in cases where more "persistent" pages exist in the pager's memory than the pager's display area can handle, the persistent page messages would be preferably presented on the display screen on a rotating basis or in some other alternating fashion. Preferably, in the situation where the display can't handle the presentation of all of the important messages, each of the persistent messages would be displayed for a predetermined period of time, and so on, in a periodic fashion along with the pager's standby or other display screens. This would allow pagers with limited display resources, such as pagers with one line display screens, to still use the persistent display feature of the present invention.

On a pager having a one line display screen for example, the persistent page message could be alternated on the display with the time of day which is normally shown on the one line pager's standby screen. As a further enhancement to the present invention, a further type of notification can be given to the user that a persistent message is being displayed. As an example, a special icon or display symbol can be displayed on the screen which notifies the pager user that a persistent message is being displayed. This is particularly useful in the case of a one line display pager. In this particular case, some type of notification (e.g., icon) would be necessary to distinguish between a persistent message being displayed and a conventional reading from the pager's message buffer of a normal or non-priority message. In FIG. 7, an icon or display symbol "IM" 702 (which equates in this example to "Important Message") is used to alert the user that the message being displayed is an important message. In alternating display situations, as referred to previously above in which the priority message or a portion of the message can not be displayed on a full-time basis, icon 602 can be useful in letting the communication device user know that an important or priority message has been received.

Due to the limitations of pager's having smaller displays (e.g., one line display areas), the pager's user interface routine may need to temporarily override the persistent display of an important message as provided by the present invention during operations requiring the full display of the pager. For example, it may be preferable to only display the persistent message on the standby screen of the pager, and not when a

user of a one line display pager is reading from the pager's message buffer other received messages (e.g., non-priority messages, etc.). As mentioned above, in this situation the icon 702 could be used to indicate the presence of a persistent page message when the display on a one line pager is being used to read other received messages.

In the present invention, high priority messages (e.g., important or emergency pages) sent to a communication device such as pager 100 will be persistently displayed in a designated area of the pager's display screen 106. This allows the user of a communication device such as a pager, cellular telephone, etc. a chance to recall an important message that may need to be acted upon latter in the day. By looking at the communication device's screen, which is typically done by most users several times during the day, the important message is easily remembered. As mentioned above, the term "persistently" as used in the present invention does not mean that the important message or a portion of the message is displayed at all times on the display. The important message may be displayed on a periodic basis as for example discussed above in association with one line display pagers, etc. Of course, if the communication device's display can accommodate one or more important message, these can be displayed on a continuous basis if so desired.

Preferably, the persistent display feature of the present invention can be turned on or off by the user of the communication device by activating a predetermined set of user controls 116. As for example done to set the pager's real-time clock or other pager features (e.g., alert tones, etc.). Alternatively, the persistent display feature can be set in ROM. The software algorithm required to perform the persistent message display feature of the present invention is preferably stored in the on-chip ROM found in controller 110. In other designs, the software algorithm can be stored in external storage areas as known in the art (e.g., external ROM, etc.).

While the preferred embodiments of the invention have been illustrated and described, it will be clear that changes, variations, substitutions and equivalents will occur to those skilled in the art without departing from the spirit and scope of the present invention as defined by the appended claims.



What is claimed is:



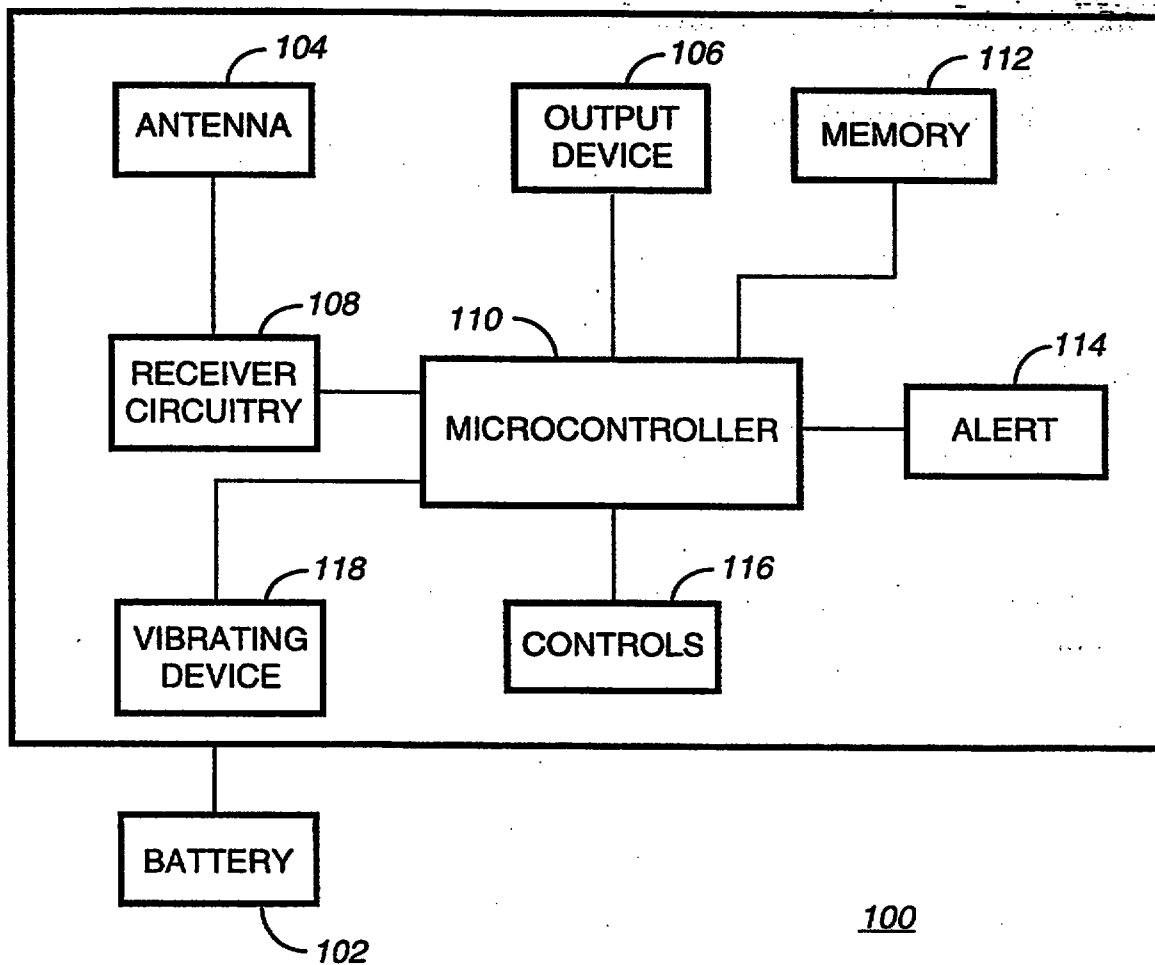
CLAIMS

1. A method for displaying the reception of a high priority message by a communication device having a display, comprising the steps at the
5 communication device of:
 - receiving the high priority message;
 - storing the high priority message in memory;
 - retrieving the high priority message from memory by
 - activating a communication device control; and
 - 10 displaying at least a portion of the high priority message onthe communication device's display in a persistent matter after the high priority message has been retrieved from memory.
2. A method as defined in claim 1, further comprising the step of:
15 displaying a display symbol (icon) which indicates that a high priority message has been received after the high priority message has been received by the communication device.
3. A method as defined in claim 1, wherein the step of displaying
20 comprises periodically displaying at least a portion of the high priority message on the communication's device display.
4. A method as defined in claim 1, wherein the step of displaying
25 comprises displaying the high priority message and a second display screen used by the communication device in an alternating fashion.
5. A method as defined in claim 1, further comprising the step of:
 - deleting the persistent displaying of the high priority message
 - upon the activation of a specific communication device control.



6. A communication device, comprising:
 - a receiver for receiving a high priority message;
 - a storage area;
 - a controller in response to the reception of the high priority
 - 5 message stores said high priority message in the storage area;
 - a display;
 - a user control, said user control when activated retrieves the high
 - priority message which is stored in the storage area and presents at least a
 - portion of the high priority message on the display; and
 - 10 the controller in response to the user control presenting the high
 - priority message on the display, causes the high priority message to be
 - persistently presented on the display.
7. A communication device as defined in claim 6, wherein the
- 15 communication device comprises a pager.
8. A communication device as defined in claim 6, wherein the
- communication device comprises a cellular telephone.
9. A communication device as defined in claim 6, wherein the controller
- 20 causes a display symbol (icon) to be presented on the display after the
- high priority message has been received by the receiver.
10. A communication device as defined in claim 6, wherein the
- 25 controller causes the high priority message to be shown on a periodic
- basis on the display.
11. A communication device as defined in claim 6, wherein the
- controller alternates the displaying of the high priority message with
- 30 another display screen.

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**FIG. 1**

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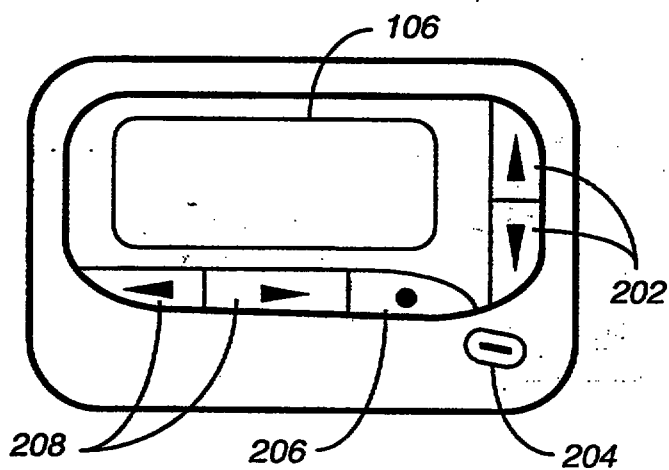


FIG. 2

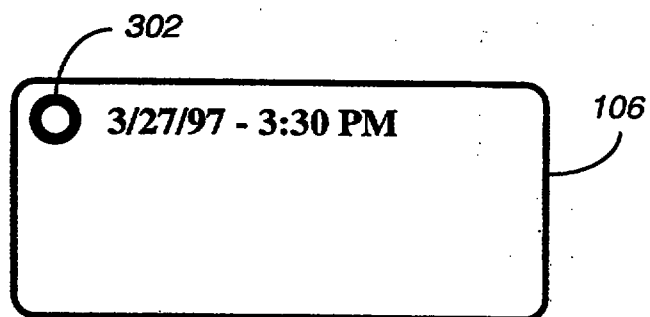


FIG. 3

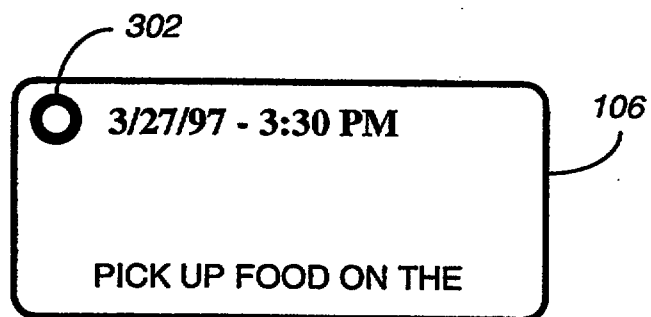


FIG. 4

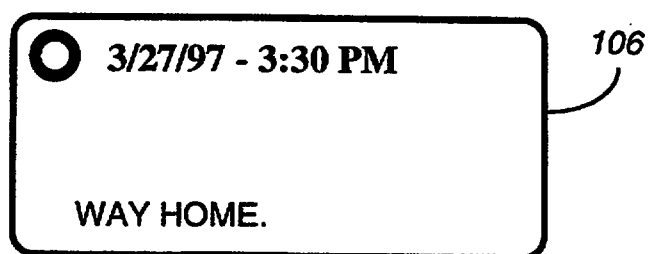


FIG. 5

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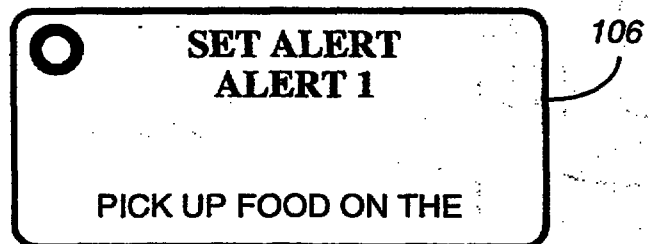


FIG. 6

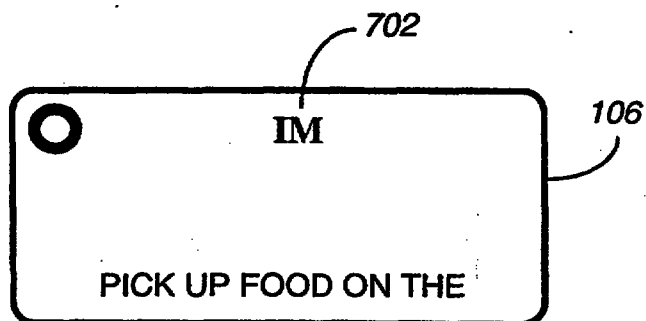


FIG. 7