

"A Paging System"

THIS INVENTION relates to a paging system and more particularly to a paging system for acknowledging receipt of a page message.

Current paging systems suffer from a serious drawback in that the sender of a page message does not receive any feedback as to whether or not the page message has been received at its destination. The main problem with providing such an acknowledgement to the sender of a page message is that a separate communication channel from the pager to the sender is required. The pager would therefore need to include a transmitter which would shorten the battery life of the pager. However, to minimise the drain on battery power, the transmitter should be of a very low power which means that the transmitter will have a very limited range. Such a low power transmitter would therefore define a small cell size within which a receiver would need to be located to ensure adequate coverage. Clearly, if a paging system is to include such an acknowledgement facility, then the infrastructure required to implement enough cells to cover a predetermined area would be greater than the number of cells for a conventional paging system without acknowledgement facilities. There would, therefore, be a significant extra cost involved in the implementation of an acknowledgement facility in a paging system.

It is an object of the present invention to provide a paging system with an acknowledgement facility. Accordingly, one aspect of the present invention provides a paging system for acknowledging receipt of a page message by a pager, the paging system comprising: a page message transmitter operable to transmit a page message from a sender to a specific pager within a cell area of the page message transmitter; a pager operable to receive the page

message and incorporating a low power transmitter operable to provide an acknowledge signal in response to receipt of the page message, the range of the low power transmitter being smaller than the cell area of the page message transmitter; a repeater located within range of the low power transmitter and being operable to receive the acknowledge signal and relay the acknowledge signal; and a gateway operable to receive the relayed acknowledge signal and route the acknowledge signal back to the sender of the page message.

In order that the present invention may be more readily understood, embodiments thereof will now be described, by way of example, with reference to the accompanying drawings in which:

FIGURE 1 is a schematic representation of a paging system embodying the present invention; and

FIGURE 2 is a signal flow diagram in accordance with one embodiment of the present invention.

Referring to Figure 1, a paging system 1 embodying the present invention comprises a conventional paging network 2, an acknowledgement pager 3, a repeater 4 and an acknowledgement gateway 5.

The acknowledgement pager 3 comprises a conventional pager 6 fitted with a low power transmitter 7.

The normal cell structure of a mobile data or telephone network within which the system operates is subdivided into a number of microcells each of which contains a repeater 4. The size of the microcell is dictated by the range of the low power transmitter 7 in the acknowledgement

pager 3. The repeaters are extremely low cost unidirectional repeaters and serve to relay signals from the low power transmitter 7 in the acknowledgement pager 3. The repeaters relay signals from the low power transmitter of the acknowledgement pager to the existing network.

The acknowledgement gateway 5 comprises a computer which serves to process any acknowledgement signals received from the mobile data service and to direct such signals back to the sender of the original page message.

The mobile data service is preferably an existing mobile data service such as Mobitex, Ardis, CDPD, or the like. The cost of exploiting this infrastructure is minimal.

Referring to Figure 2, in use, a sender calls a pager using a standard telephone terminal through the public switched telephone network and sends a page message to the paging system. In a conventional paging system, the sender would then simply receive a signal indicating that the page message has been sent by the paging system. However, in accordance with one embodiment of the present invention, the paging system sends the page message to the pager 3 causing the pager to indicate to the user that a page message has been received. When the user of the pager presses a display button or the like, the acknowledgement pager 3 sends an acknowledge signal by the low power transmitter 7 to a repeater 4 in a microcell of the neighbouring mobile data service. The repeater 4 relays the acknowledgement signal to the acknowledge gateway 5 which feeds the acknowledged signal to the paging system and thence back to the sender of the page message who receives a message acknowledged signal such as a confirmatory beep or the like.

The above described system indicates to the sender of the page message that the person to whom the page message has been sent has actually picked-up the message. However, the system can be configured such that an acknowledge signal is sent by the acknowledgement pager 3 when the page message has been received by the pager 3 and before the user of the pager has an opportunity to retrieve the page message from the pager.

The channel used for transmission from the low power transmitter 7 to the repeater 4 and thence from the repeater 4 to the acknowledge gateway is preferably a spread spectrum unidirectional multiple access radio channel operating in one of the ISM bands.

The repeater consists of a mobile data terminal and a spread spectrum receiver and can therefore be implemented at very low cost.

CLAIMS:

1. A paging system for acknowledging receipt of a page message by a pager, the paging system comprising: a page message transmitter operable to transmit a page message from a sender to a specific pager within a cell area of the page message transmitter; a pager operable to receive the page message and incorporating a low power transmitter operable to provide an acknowledge signal in response to receipt of the page message, the range of the low power transmitter being smaller than the cell area of the page message transmitter; a repeater located within range of the low power transmitter and being operable to receive the acknowledge signal and relay the acknowledge signal; and a gateway operable to receive the relayed acknowledge signal and route the acknowledge signal back to the sender of the page message.
2. A paging system according to Claim 1, wherein a plurality of repeaters are provided each defining a microcell within the cell area of the page message transmitter to ensure complete coverage of the cell area by the repeaters.
3. A paging system according to Claim 1 or 2, wherein the page message transmitter is also operable to generate a page message sent signal and route the page message sent signal back to the sender of the page message.
4. A paging system according to any preceding claim, wherein the page message transmitter is also operable to generate a further signal in response to receipt of the acknowledge signal from the gateway and to transmit the further signal to the pager to acknowledge receipt of the acknowledge signal by the page message transmitter.



5. A paging system according to any preceding claim, wherein the pager comprises a conventional pager fitted with a low power transmitter.

6. A paging system according to any preceding claim, wherein the pager incorporates display means operable by a user to display a received page message, actuation of the display means triggering the low power transmitter to send the acknowledge signal.

7. A paging system according to any one of Claims 1 to 5, wherein the receipt of the page message at the pager triggers the low power transmitter to send the acknowledge signal.

8. A paging system according to any preceding claim, wherein the gateway comprises a computer operable to process incoming acknowledge signals and to generate and send an acknowledge tone back to the sender of each page message.

9. A paging system according to any preceding claim, wherein the communication channel used for the transmission of the acknowledge signal is a spread spectrum based unidirectional multiple access radio channel operating in one of the ISM bands.

10. A paging system according to any preceding claim, wherein the acknowledge signal includes information concerning the identity of the sender of the page message.

11. A paging system substantially as hereinbefore described with reference to and as shown in the accompanying drawings.

