

Description

The invention relates to a miniature portable selective paging receiver that can selectively receive a paging message by radio from a base station, and more particularly to such a receiver equipped with a message display.

Radio paging services that simply signal a subscriber carrying a paging receiver or "beeper" that he should get in touch with a specific place, such as his office or home, have been popular for some time. More recently, new services using advanced equipment to transmit actual message information to subscribers have appeared.

Such new services are not limited to paging, or sending information to, subscribers individually. These services also provide such things as sending a particular message to several subscribers at once, or sending information of general interest to all subscribers who have asked to receive it.

A selective paging receiver having a display panel for displaying messages to the user is called a "display pager". One type of conventional display pager is provided with two different identification or paging numbers, an individual ID paging number and a group paging number. When a group of subscribers have arranged for a common group paging number for their pagers, each member receives any paging message sent out under the group paging number. It is also possible to send a message to all members of a particular group without members of the other groups knowing, if a common paging number is assigned to only the receivers in the particular group. To reach any member of the group individually, the paging message is sent out under the individual ID paging number of that member's pager.

In this type of group/individual display pager, two modes of battery saving operation are used to decrease the power consumption of the display pager and to reduce the number of data bits in the identification number.

Before sending any paging messages, the base transmitter sends a preamble signal of alternating 1's and 0's. Therefore, in the first battery saving mode (BS1) the power to the receiver circuits is normally turned off except during a certain time interval necessary for a detection of a preamble signal sent from the base transmitter.

When the pager detects a preamble signal, it moves to the second battery saving mode of operation (BS2). For this mode the display pagers of a particular paging service are divided into certain groups of their individual ID paging numbers. The British Post Office has established a public standard for this called the POCSAG (Post Office Code Standard Advisory Group) transmission protocol. In a POCSAG system the ID paging numbers are divided into eight groups.

Following a detection of the preamble signal, paging transmission occurs in a batch. Each batch includes seventeen data words, the first word of which is a 32-bit frame sync signal. The remaining sixteen data words are grouped in pairs into eight successive frames, one frame to each group.

In the second battery saving mode, the power to the receiver circuits is on during a time interval corresponding to the frame of the one group to which the pager in question belongs and off during the seven frames of the other groups.

Each pager is given a unique binary ID paging number, the three least significant bits (3 LSB's) of which (000 through 111) indicate to which of the eight groups of pagers it belongs. But since the transmissions for pagers of different groups are sent in different frames, to identify a pager the three least significant bits of its ID paging number need not be transmitted.

Therefore, eight groups have the same ID paging numbers which are written in binary. If written in decimal, these ID paging numbers appears as follows, where $n = 0, 1, 2, \dots, N$:

GROUP	GROUP	GROUP	GROUP	GROUP	GROUP	GROUP	GROUP
I	II	III	IV	V	VI	VII	VIII
$8n$	$8n + 1$	$8n + 2$	$8n + 3$	$8n + 4$	$8n + 5$	$8n + 6$	$8n + 7$

For example, the individual ID paging numbers of the receivers in Group I are 0, 8, 16, 24, etc. When expressed in binary using five bits, these ID paging numbers are 00000, 01000, 10000, 11000, etc. This illustrates the general rule that all the individual ID paging numbers of receivers in Group I have "000" as

the three least significant bits.

Similarly, the individual ID paging numbers of the receivers in Group II are 1, 9, 17, 25, etc. When expressed in binary using five bits, these ID paging numbers are 00001, 01001, 10001, 11001, etc. Thus, all the individual ID paging numbers of receivers in Group II has "001" as the three least significant bits.

As previously mentioned, the three least significant bits "000" in Group I and "001" in Group II are not transmitted. Instead, other bits "00", "01", "10", "11", etc, which are binary expressions of $8n$ are transmitted for Groups I and II. Thus, Groups I and II have the same ID paging numbers, such as "00", "01", "10", "11", etc. The other Groups II to VIII also have the same ID paging numbers $8n$.

Each group is distinguished by its own time for transmission or transmission frame. While each pager has its own unique ID paging number, within each group the individual pagers can be distinguished by just the value of the integer n .

In this arrangement receivers of different groups cannot be given a common group paging number, since they belong to different frames. A paging service using the POCSAG protocol will find that the ID numbers divide the pagers into eight convenient groups. All of the receivers within the POCSAG group can easily receive a common paging message because their receivers are "ON" during the same frame of the transmission signal.

Because of the battery saving operation, this type of conventional display receiver only is turned on to receive ID number during the frame provided for the group to which it belongs. Therefore, if the subscribers who wish to receive the same message following the common paging number are in more than one group, the base transmitter must use the appropriate frames to repeat the message for each group in which there are such subscribers. With the POCSAG protocol, in the worst case the message will have to be repeated as many as eight times, reducing the efficiency of the base transmitter.

As the number of subscribers in different groups grows, the transmitting burden on the base station for such general messages increases, lowering the overall efficiency of the paging system. Therefore, the conventional system has the disadvantage of limiting the number of different subscribers that can be easily accommodated.

In an article entitled "Information display pager" in NEC Research and Development, No. 77, April 1985, published in Tokyo, Japan, there is described by T. Mori et al on pages 70-79 a display pager which merely has one or more paging numbers, but no common paging number for a group call.

In the specification of a UK patent application, which was published on March 16 1983 under the number 2,105,077, there is described a radio paging receiver that is capable of receiving simply an individual paging address and a test signal.

A feature of an embodiment to be described is the provision of a paging receiver that can receive common messages transmitted for any similar receiver in the system as well as individual messages transmitted only for the individual receiver concerned.

Yet another feature is the provision of a paging receiver for a system protocol that divides a plurality of paging receivers into receiving groups, each of which has a corresponding dedicated time frame for receiving paging signals, without limiting the availability of a common message transmission to one group at a time.

In a particular embodiment to be described, a selective paging receiver with message display has a receiver section, a paging number setting circuit, a paging number detector, and a display panel. The receiver section receives paging signals sent to the paging receiver. It recovers a paging number data signal and a message data signal from the paging signals. The message data signal includes individual message data for the paging receiver. It also includes common message data for the paging receiver in common with a preselected group of similar receivers.

The paging number setting circuit assigns both a preselected individual paging number and a preselected common paging number to the receiver. The individual paging number also designates a preselected group to which the paging receiver is assigned. The paging number detector is adapted to search for the individual paging number in a particular group time frame of the paging number signal. This group time frame is one dedicated to the designated paging receiver group of the paging receiver. The paging number detector also conducts a parallel search for the common paging number without regard for the particular group time frame.

Upon detecting the individual paging number, the paging number detector outputs an individual detection signal. Upon detecting the common paging number, the paging number detector outputs a common detection signal. The display responds to the individual detection signal by displaying the contents of the individual message data and responds to the common detection signal by displaying the contents of the common message data.

Embodiments of the invention will now be described, by way of example, with reference to the accompanying drawings, in which:-

Fig. 1 is a block diagram of an embodiment of a selective paging receiver with message display incorporating the principles of the invention;

Fig. 2 is a more detailed block diagram of a decoder shown in Fig. 1, together with circuits that interact with it;

Fig. 3 is a more detailed block diagram of a paging number detector shown in Fig. 2, together with circuits that interact with it;

Fig. 4 is a timing chart for explaining the operation of the paging number detector of Fig. 3;

Fig. 5A is a chart of the format of a standardized signal used in selective paging receivers;

Fig. 5B is a chart of a standardized encoding format for sending receiver ID paging number information and message data used in the selective paging receivers;

Fig. 6 is a timing chart for explaining the operation of a prior art battery saving technique for a paging receiver; and

Fig. 7 is a timing chart for explaining the operations of a battery saving technique and a paging number detector employed in the receiver of Fig. 1.

A prior art battery saving technique for a paging receiver uses different signal frames for a base transmitter to communicate with paging receivers of different groups. The typical signal received at the paging receiver, shown in Fig. 6, follows the POCSAG standardized signal format shown in Fig. 5A. In this format the POCSAG receiver ID paging number data and message data are encoded into 32-bit receiver ID words and message words as shown in Fig. 5 B.

The received signal has a preamble portion composed of at least 576 alternating bits of 1 and 0. When the prior art receiver detects the preamble signal, it exits the first battery saving mode. This enables the receiver to receive the 32-bit frame sync signal SC which follows the preamble signal. Having synchronized itself with the incoming signal, the receiver enters the second battery saving mode, in which it is enabled to receive further signals only during the frame interval for the POCSAG group to which the receiver belongs. Upon detecting its individual ID paging number during the frame for its group, the receiver remains on in order to continuously receive the message which follows its ID paging number until the message terminates.

The battery saving technique employed in the inventive receiver of Fig. 1 has first and second battery saving modes as shown in Fig. 7. The second battery saving mode distinguishes between a search for a common paging number and a search for the pager's individual paging number.

The first battery saving mode is similar to that used in the prior art technique of Fig. 6. When the preamble signal is detected, the receiver remains on to look for a 32-bit frame sync signal SC. However, after synchronizing itself, the inventive receiver does not enter a conventional second battery saving mode. Instead, ignoring the three least significant binary bits of its individual ID paging number, a portion of its circuitry continues to receive the transmitted signal and searches among all the frames for a group paging number. If such a group paging number is found, the receiver loads in the corresponding group message.

In addition to group messages, the receiver can also receive an individual message if its individual ID paging number is sent. However, the receiver's individual ID paging number can only be distinguished in the frame of its group. This is because the same individual ID paging number appears in the frames of the other groups. Therefore, to detect the individual ID paging number, the receiver has to search only the signals received in the frame of the group to which it belongs, much as the prior art receiver does.

Fig. 1 shows a block diagram of an embodiment of a selective paging receiver with message display incorporating the principles of the invention. Radio signals from the base transmitter are picked up by an antenna 1 and fed to a radio receiver section 2. The receiver section 2 recovers a digital paging signal having a shape which is adjusted by a wave shape adjusting circuit 3 before being input to a decoder 4. A programmable read only memory (PROM) 5 stores information for the decoder, such as the receiver's individual ID paging number. To produce clock pulses, the decoder has an internal oscillator (not shown in Fig. 1) controlled by a frequency regulating crystal 10.

The decoder output is fed to message processor 6 which displays message information to the user by controlling a liquid crystal display 9. The decoder can also generate an audio output by means of a speaker 8, driven by a buffer amplifier 7.

Fig. 2 shows a more detailed block diagram of decoder 4 of Fig. 1, together with circuits that interact with it. Decoder 4 sequentially reads in the digital DATA signal from the wave shape adjusting circuit. An oscillator 105, controlled by the frequency regulating crystal 10, generates clock pulses which are frequency divided by a frequency divider 106 before being used as clock pulses for a bit synchronizing circuit 102.

Bit synchronizing circuit 102 gets into sync with the bits of the DATA signal and generates data read clock pulses for reading in the DATA signal. A sync code detector 103 uses the read clock pulses from synchronizing circuit 102 to act as both a sync detector for the frame sync signal SC and a preamble detector for the preamble signal.

The receiver's preselected individual receiver ID paging number is stored in a receiver number designating circuit (PROM 5). A paging number detector 104 compares this preselected number with the bits of the received DATA signal.

The output of frequency divider 106 is also used as a frequency input for an alarm sound generator circuit 107.

Fig. 3 shows a more detailed block diagram of the paging number detector 104 of Fig. 2, together with circuits that interact with it. The frame sync signal SC is detected by sync code detector 103, which sends out a synchronizing RESET pulse on line a to a bit counter 108 and a word counter 109.

An important feature of the invention is the battery saving (BS) operation of radio receiver section 2 and wave shape adjusting circuit 3. In Fig. 1, the decoder 4 controls the power supply of radio receiver section 2 and wave shape adjusting circuit, as shown in Fig. 7. In Fig. 2, BS controller 113 turns on and off the receiver section 2 and the adjusting circuit 3, at an interval of seventeen words during the first battery saving mode, in response to a BS timing signal which is received from a paging number detector 104. When sync code detector 103 detects a preamble and an SC signal, the BS controller 113 turns on the section 2 and the circuit 3. Then it keeps them turned-on until the sync code detector 103 finds no sync code word on two successive occasions, as shown in Fig. 7. In Fig. 3, the word counter 109 provides the BS timing signal to the BS controller 113.

As shown in Figs. 5A and 5B there are 32 bits in a ID paging number data word or message data word. As shown in Fig. 5A, following the preamble signal, paging transmission occurs in a batch of seventeen words. Therefore, bit counter 108 of Fig. 3, which receives the data read clock pulses from bit synchronizing circuit 102, is arranged to count 32 clock pulses and then output a word pulse to word counter 109. Word counter 109 is arranged to count the seventeen word pulses which make up a transmission batch.

As shown in Fig. 5A, the first word of a transmission batch is the frame sync signal SC. The remaining sixteen data words are grouped in pairs into eight successive frames, one frame for each group. As word counter 109 counts through the sixteen words associated with the eight frames, it correspondingly outputs pager group timing pulses PG1, PG2, ..., PG8 to indicate the group to which the current frame belongs.

The particular pager's individual ID paging number is stored as a binary number in PROM 5. A frame selecting circuit 110 reads in the three least significant bits of this number as the pager's group paging number. Then, in accordance with the group paging number, circuit 110 selects the appropriate timing pulse from among PG1, PG2, ..., PG8 to indicate by an output signal c when the frame for the pager's group appears in the transmission batch. This normally low signal c goes high when the frame appears. Signal c is output to an individual ID paging number detector 112.

Fig. 3 shows an example in which the particular pager belongs to pager group #4. Therefore, in Fig. 4 signal c is only high in the time interval after the frame sync signal SC corresponding to frame F4, the fourth frame.

A common paging number detector 111 receives the digital DATA signal as input and searches for a match, in the frame of any group, with a common paging number stored in PROM 5.

At the same time, the individual ID paging number detector 112 receives the digital DATA signal as input and searches, during the frame for the pager's group as indicated by signal c, for a match with the pager's individual ID paging number (the least three significant bits) as stored in PROM 5.

The receiver proceeds as follows. As previously mentioned, sync code detector 103 acts as both a sync detector for the frame sync signal SC and a preamble detector for the preamble signal. When the preamble signal is detected, the receiver exits the first battery saving mode in which only the preamble signals are received. The receiver remains on to look for frame sync signal SC.

As shown in Fig. 4, when sync code detector 103 detects frame sync signal SC, its output signal a goes high, resetting bit counter 108 and word counter 109. In accordance with clock timing pulses from bit synchronizing circuit 102, bit counter 108 reads in the DATA signal output by wave shape adjusting circuit 3. When bit counter 108 has counted that 32 bits of the DATA signal have been received, it sends a word pulse to word counter 109 and at the same time sends a timing pulse d to common paging number detector 111 and individual ID paging number detector 112.

If either a common paging number or the pager's individual ID paging number is detected, a pulse appears thereafter in output signal f to message processor 6. In the example of Fig. 4, a common paging number appears in the second word of frame F2 and an individual ID paging number appears in the second word of frame F4. However, both of them can also appear in the first word of the frame, if desired. The

detection of these paging numbers is shown in signal f, which has a pulse corresponding to each detection. In each case, immediately thereafter, a corresponding pulse in signal e from bit counter 108 is used to reset detectors 111 and 112.

When sync code detector 103 detects frame sync signal SC, a reset pulse is output in signal a to reset word counter 109. This causes an output control signal b of counter 109 to go high, enabling common paging number detector 111. Counter 109 also then begins outputting, in order, pager group timing pulses PG1 - PG8, each of which is high for a corresponding frame interval of the DATA signal.

Frame selecting circuit 110 reads in the particular receiver's group number from PROM 5. Selecting circuit 110 uses the group number to select the corresponding timing pulse for that group's frame from among the group timing pulses PG1 - PG8. The selected group timing pulse is output to individual ID paging number detector 112 as a corresponding enable pulse in an output signal c.

In the example of Fig. 3, the group number in PROM 5 is for receiver group #4. Therefore, common paging number detector 111 and individual ID paging number detector 112 are respectively activated by timing control signals b and c shown in Fig. 4. Detectors 111 and 112 act in parallel to compare the DATA signal with a common paging number and the pager's individual ID paging number, both of which are stored in PROM 5.

If either of these paging numbers is detected, a corresponding pulse is output in signal f to message processor 6, at a time as determined by a corresponding timing pulse which is produced in output signal d by bit counter 108. This enables message processor 6 to process the message data which follows the paging number of display to the user.

In the inventive receiver, once a preamble pulse is detected, battery power is continuously provided to those receiver circuits monitoring successive batches for a common paging number.

Therefore, if sync code detector 103 is unable to detect frame sync signal SC on two successive occasions when it should have appeared, the receiver can be set to automatically return to the first battery saving mode. In this mode the receiver circuits are on only during the time which is necessary to receive and detect preamble signals.

The inventive pager has a paging number detector circuit that searches in parallel for both a common paging number and an individual ID paging number. It searches for the common paging number in the frames of all the groups, but searches for the individual ID paging number only in the frame of the group to which the pager belongs.

The paging number detector circuit detects the common paging number regardless of the pager's individual ID paging number, thus enabling the pager to receive the corresponding common message in the frame of any group. However, it only detects the individual ID paging number when it appears in the frame of the group to which the pager belongs.

This reduces the transmission burden on the base transmitting station and increases the paging system's overall efficiency.

These improvements are of great benefit since they enable the number of subscribers to be greatly increased.

It will be understood that, although the invention has been described, by way of example, with reference to particular embodiments, variations and modifications thereof, as well as other embodiments may be made within the scope of the appended claims.

Claims

1. A selective paging receiver with message display, including a receiver section (2) for receiving paging signals sent to the paging receiver and for recovering from the paging signals a paging number data signal and a message data signal, number setting means (5) for assigning to the receiver a preselected individual paging number which includes the designation of a preselected paging receiver group, paging number detector means (4;104) for searching out the paging number signal for the individual paging number, and for outputting an individual detection signal in response to the detection of the individual paging number, and display means (9) responsive to the individual detection signals for displaying the contents of the individual message data, characterised in that the message data signal includes individual message data for the paging receiver and common message data for the paging receiver in common with a preselected group of similar receivers, the group of receivers being identified by a group time frame, in that the number setting means (5) assigns a preselected common paging number to the receiver, in that the paging number detector means (4;104) simultaneously searches out the paging number signal both for the individual paging number in a particular group time frame corresponding to the designated group of the paging receiver and the common paging number in



detection of these paging numbers is shown in signal f, which has a pulse corresponding to each detection. In each case, immediately thereafter, a corresponding pulse in signal e from bit counter 108 is used to reset detectors 111 and 112.

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In the example of Fig. 3, the group number in PROM 5 is for receiver group #4. Therefore, common paging number detector 111 and individual ID paging number detector 112 are respectively activated by timing control signals b and c shown in Fig. 4. Detectors 111 and 112 act in parallel to compare the DATA signal with a common paging number and the pager's individual ID paging number, both of which are stored in PROM 5.

If either of these paging numbers is detected, a corresponding pulse is output in signal f to message processor 6, at a time as determined by a corresponding timing pulse which is produced in output signal d by bit counter 108. This enables message processor 6 to process the message data which follows the paging number of display to the user.

In the inventive receiver, once a preamble pulse is detected, battery power is continuously provided to those receiver circuits monitoring successive batches for a common paging number.

Therefore, if sync code detector 103 is unable to detect frame sync signal SC on two successive occasions when it should have appeared, the receiver can be set to automatically return to the first battery saving mode. In this mode the receiver circuits are on only during the time which is necessary to receive and detect preamble signals.

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The paging number detector circuit detects the common paging number regardless of the pager's individual ID paging number, thus enabling the pager to receive the corresponding common message in the frame of any group. However, it only detects the individual ID paging number when it appears in the frame of the group to which the pager belongs.

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1. A selective paging receiver with message display, including a receiver section (2) for receiving paging signals sent to the paging receiver and for recovering from the paging signals a paging number data signal and a message data signal, number setting means (5) for assigning to the receiver a preselected individual paging number which includes the designation of a preselected paging receiver group, paging number detector means (4;104) for searching out the paging number signal for the individual paging number, and for outputting an individual detection signal in response to the detection of the individual paging number, and display means (9) responsive to the individual detection signals for displaying the contents of the individual message data, characterised in that the message data signal includes individual message data for the paging receiver and common message data for the paging receiver in common with a preselected group of similar receivers, the group of receivers being identified by a group time frame, in that the number setting means (5) assigns a preselected common paging number to the receiver, in that the paging number detector means (4;104) simultaneously searches out the paging number signal both for the individual paging number in a particular group time frame corresponding to the designated group of the paging receiver and the common paging number in



a time interval not limited to the particular group time frame, outputs an individual paging number and outputs a common detection signal upon the detection of the common paging number, and in that the display means (9) displays the content of the common message data in response to the common detection signal.

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2. A paging receiver as claimed in claim 1 wherein the paging number data identifying paging receivers include at least one bit of lesser significance for identifying the group, wherein the number setting means (5) includes means for storing the paging number data identifying the individual receiver in a memory, and wherein the paging number detector means (4;104) includes means (111, 112) for comparing received signals with the stored data means (109) for counting the data words in the signal as it is received, and means (110) responsive to the word count for identifying the group of paging receivers to which the individual message data is directed.

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3. A paging receiver as claimed in claim 2 including means (110) associated with the paging number detector means (4;104) for reading the three least significant bits for identifying the individual paging receiver in the group which is being signalled.

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4. A paging receiver as claimed in claim 3 including means (112) responsive to the identification of the group for searching for a numerical match within the time frame dedicated to that identified group.

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5. A paging receiver as claimed in claim 4 wherein the frames are identified by frame sync signals, including means (102, 108, 109) responsive to a succeeding frame sync for cancelling the search for a numerical match.

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6. A paging receiver as claimed in claim 4 wherein the signals include a sync signal and a preamble signal there being at least two modes for energizing the paging receiver, including means (102) for detecting both a sync signal and the preamble signal, means (108, 109) responsive to the detection of the preamble signal for switching an energization mode for the receiver section and means for entering into a search for the sync signal mode.

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7. A paging receiver as claimed in claim 6 including means (108, 109) responsive to a failure to detect two successive frame sync signals for cancelling the switched energization mode.

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8. A method of receiving individual and common paging numbers by a paging receiver, including the steps of:-

- (a) receiving a paging signal including an individual paging number which is assigned to the receiver, the paging signal being transmitted in cyclically recurring time frames,
- (b) searching the received paging signal for the individual paging number to output an individual detection signal, and

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- (c) indicating the reception of the individual paging number,

characterised in that the paging signal includes a common paging number which is assigned at least to the receiver, and in that the method further includes the steps of:-

- (d) simultaneously searching the received paging signal both for the individual paging number in a particular group time frame corresponding to the designated group of the paging receiver and the common paging number in a time interval not limited to the particular group time frame, and for outputting an individual detection signal in response to the detection of the individual paging number and for outputting a common detection signal in response to the detection of the common paging number, and

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- (e) responsive to one of the individual and common detection signals, indicating the reception of either the individual or the common paging numbers.

Patentansprüche

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1. Selektiver Personenrufempfänger mit Nachrichtenanzeige, der aufweist: ein Empfängerteil (2), um Personenrufsignale zu empfangen, die zu dem Personenrufempfänger gesandt wurden, und um aus den Personenrufsignalen ein Personenrufzahlдатенсигнал und ein Nachrichtендатенсигнал zu gewinnen; eine Zahleinstelleinrichtung (5), um dem Empfänger eine vorgewählte, individuelle Personenrufzahl zuzuweisen, die die Bestimmung einer vorgewählten Personenrufempfängergruppe einschließt; eine



Personenrufzahldetektoreinrichtung (4; 104), um das Personenrufzahlsignal für die individuelle Personenrufzahl herauszufinden und ein individuelles Detektorsignal als Reaktion auf die Feststellung der individuellen Personenrufzahl auszugeben; und eine Anzeigeeinrichtung (9), die auf die individuellen Detektorsignale anspricht, um die Inhalte der individuellen Nachrichtendaten anzuzeigen; dadurch gekennzeichnet, daß das Nachrichtendatensignal individuelle Nachrichtendaten für den Personenrufempfänger und gemeinsame Nachrichtendaten für den Personenrufempfänger und eine vorgewählte Gruppe von ähnlichen Empfängern einschließt, wobei die Gruppe der Empfänger durch einen Gruppenzeitrahmen gekennzeichnet ist; daß die Zahleinstelleinrichtung (5) dem Empfänger eine vorgewählte gemeinsame Personenrufzahl zuweist; daß die Personenrufzahldetektoreinrichtung (4; 104) gleichzeitig das Personenrufzahlsignal sowohl für die individuelle Personenrufzahl in einem besonderen Gruppenzeitrahmen entsprechend der Bestimmungsgruppe des Personenrufempfängers als auch die gemeinsame Personenrufzahl in einem Zeitintervall herausfindet, das nicht auf dem besonderen Gruppenzeitrahmen beschränkt ist, und eine individuelle Personenrufzahl und ein gemeinsames Detektorsignal auf die Feststellung der gemeinsamen Personenrufzahl ausgibt; und dadurch, daß die Anzeigeeinrichtung (9) den Inhalt der gemeinsamen Nachrichtendaten als Reaktion auf das gemeinsame Detektorsignal anzeigt.

2. Personenrufempfänger nach Anspruch 1, wobei die Personenrufzahldaten, die die Personenrufempfänger kennzeichnen, wenigstens ein Bit von geringerer Bedeutung für die Kennzeichnung der Gruppe aufweisen; wobei die Zahleinstelleinrichtung (5) eine Einrichtung zum Speichern der Personenrufzahldaten aufweist, die die individuellen Empfänger in einem Speicher kennzeichnen; und wobei die Personenrufzahldetektoreinrichtung (4; 104) aufweist: Einrichtungen (111, 112) zum Vergleichen der empfangenen Signale mit den gespeicherten Daten in einer Einrichtung (109), um die Datenwörter in dem Signal, wie es empfangen ist, zu zählen; und eine Einrichtung (110), die auf den Wortzahlenwert anspricht, um die Gruppe der Personenrufempfänger zu kennzeichnen, an die die individuellen Nachrichtendaten gerichtet sind.
3. Personenrufempfänger nach Anspruch 2, mit einer Einrichtung (110), die mit der Personenrufzahldetektoreinrichtung (4; 104) verbunden ist, um die drei am wenigsten bedeutenden Bits zu lesen und den individuellen Personenrufempfänger in der Gruppe, die signalisiert ist, zu identifizieren.
4. Personenrufempfänger nach Anspruch 3, mit einer Einrichtung (112), die auf die Kennzeichnung der Gruppe anspricht, um eine Zahlenübereinstimmung in dem Zeitrahmen, der der gekennzeichneten Gruppe zugewiesen ist, zu suchen.
5. Personenrufempfänger nach Anspruch 4, wobei die Rahmen durch Rahmensynchronsignale gekennzeichnet sind, mit Einrichtungen (102, 108, 109), die auf ein nachfolgendes Rahmensynchronsignal ansprechen, um die Suche nach einer Zahlenübereinstimmung zu unterdrücken.
6. Personenrufempfänger nach Anspruch 4, wobei die Signale ein Synchronsignal und ein Präambelsignal aufweisen und wenigstens zwei Moden zum Betreiben des Personenrufempfängers vorhanden sind, der aufweist: eine Einrichtung (102) zum Feststellen sowohl eines Synchronsignals als auch eines Präambelsignals; Einrichtungen (108, 109), die auf die Feststellung des Präambelsignals ansprechen, um einen Betreibermodus für den Empfängerteil zu schalten; und eine Einrichtung, um ein Suchen nach dem Synchronsignalmodus zu beginnen.
7. Personenrufempfänger nach Anspruch 6, mit Einrichtungen (108, 109) die auf einen Fehler ansprechen, um zwei aufeinanderfolgende Rahmensynchronsignale festzustellen und den geschalteten Betreibermodus abzustellen.
8. Verfahren zum Empfangen von individuellen und gemeinsamen Personenrufzahlen durch einen Personenrufempfänger mit den Schritten:
 - (a) Empfangen eines Personenrufsignals mit einer individuellen Personenrufzahl, die dem Empfänger zugeordnet ist, wobei das Personenrufsignal in zyklisch sich wiederholenden Zeitrahmen übertragen wird,
 - (b) Suchen des empfangenen Personenrufsignals für die individuelle Personenrufzahl, um ein individuelles Detektorsignal auszugeben, und



(c) Anzeigen des Empfangs der individuellen Personenrufzahl, dadurch gekennzeichnet, daß das Personenrufsignal eine gemeinsame Personenrufzahl aufweist, die wenigstens dem Empfänger zugewiesen ist, und dadurch daß das Verfahren ferner die Schritte aufweist:

- 5 (d) gleichzeitiges Untersuchen des empfangenen Personenrufsignal sowohl nach der individuellen Personenrufzahl in einem besonderen Gruppenzeitrahmen, der der Bestimmungsgruppe des Personenrufempfängers entspricht; als auch nach der gemeinsamen Personenrufzahl in einem Zeitintervall, das nicht durch den besonderen Gruppenzeitrahmen begrenzt ist, und um ein individuelles Detektorsignal als Reaktion auf die Feststellung der individuellen Personenrufzahl und ein gemeinsames Detektorsignal als Reaktion auf die Feststellung der gemeinsamen Personenrufzahl auszugeben; und
- 10 (e) Anzeigen des Empfangs entweder der individuellen oder der gemeinsamen Personenrufzahlen, als Reaktion auf eines der individuellen und gemeinsamen Detektorsignale.

15 Revendications

1. Récepteur sélectif de recherche de personnes avec affichage de messages, comportant une section récepteur (2) pour recevoir des signaux de recherche de personnes envoyés au récepteur de recherche de personnes et pour récupérer dans les signaux de recherche de personnes un signal de données de numéro de recherche de personnes et un signal de données de message, un moyen (5) d'établissement de numéro pour affecter au récepteur un numéro individuel présélectionné de recherche de personnes qui comprend la désignation d'un groupe pré-sélectionné de récepteurs de recherche de personnes, un moyen de détecteur de numéro de recherche de personnes (4; 104) pour rechercher le signal de numéro de recherche de personnes pour le numéro individuel de recherche de personnes, et pour sortir un signal individuel de détection en réponse à la détection du numéro individuel de recherche de personnes, et un moyen d'affichage (9) répondant aux signaux individuels de détection pour afficher les contenus des données du message individuel, caractérisé en ce que le signal de données de message comprend des données de message individuel pour le récepteur de recherche de personnes et des données de message commun pour le récepteur de recherche de personnes en commun avec un groupe présélectionné de récepteurs similaires, le groupe de récepteurs étant identifié par une trame temporelle de groupe, en ce que le moyen (5) d'établissement de numéro affecte au récepteur un numéro commun présélectionné de recherche de personnes, en ce que le moyen de détecteur de numéro de recherche de personnes (4; 104) recherche simultanément le signal de numéro de recherche de personnes tant pour le numéro individuel de recherche de personnes dans une trame temporelle particulière de groupe correspondant au groupe désigné du récepteur de recherche de personnes que pour le numéro commun de recherche de personnes dans un intervalle de temps non limité à la trame temporelle particulière de groupe, sort un numéro individuel de recherche de personnes et sort un signal de détection commun lors de la détection du numéro commun de recherche de personnes, et en ce que le moyen d'affichage (9) affiche le contenu des données de message commun en réponse au signal commun de détection.
- 20 2. Récepteur de recherche de personnes selon la revendication 1, dans lequel les données de numéro de recherche de personnes qui identifient les récepteurs de recherche de personnes comprennent au moins un bit de poids faible pour identifier le groupe, où le moyen (5) d'établissement de numéro comprend un moyen pour stocker les données de numéro de recherche de personnes qui identifient le récepteur individuel dans une mémoire, et où le moyen de détecteur de numéro de recherche de personnes (4; 104) comprend un moyen (111, 112) pour comparer des signaux reçus avec les moyens (109) de données stockées pour compter les mots de données dans le signal tel qu'il est reçu, et un moyen (110) répondant au comptage de mots pour identifier le groupe des récepteurs de recherche de personnes vers lequel la donnée individuelle de message est dirigée.
- 30 3. Récepteur de recherche de personnes selon la revendication 2, comprenant un moyen (110) associé au moyen de détecteur de numéro de recherche de personnes (4; 104) pour lire les trois bits de poids faible pour identifier le récepteur individuel de recherche de personnes dans le groupe qui est signalé.
- 40 4. Récepteur de recherche de personnes selon la revendication 3 comprenant un moyen (112) répondant à l'identification du groupe pour rechercher un pendant numérique dans la trame temporelle affectée à ce groupe identifié.
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5. Récepteur de recherche de personnes selon la revendication 4, dans lequel les trames sont identifiées par des signaux de synchronisation de trame, comprenant un moyen (102, 108, 109) répondant à une synchronisation de trame suivante pour annuler la recherche d'un pendant numérique.
6. Récepteur de recherche de personnes selon la revendication 4, dans lequel les signaux comprennent un signal de synchronisation et un signal de préambule, deux modes au moins étant présents pour exciter le récepteur de recherche de personnes, comprenant un moyen (102) pour détecter tant un signal de synchronisation que le signal de préambule, un moyen (108, 109) répondant à la détection du signal de préambule pour établir par commutation un mode d'excitation pour la section récepteur et un moyen pour entrer dans une recherche du mode à signal de synchronisation.
7. Récepteur de recherche de personnes selon la revendication 6, comprenant un moyen (108, 109) répondant à une défaillance de détection de deux signaux successifs de synchronisation de trame afin d'annuler le mode d'excitation établi par commutation.
8. Procédé pour recevoir des numéros individuels et communs de recherche de personnes par un récepteur de recherche de personnes, comprenant les étapes consistant à :
- (a) recevoir un signal de recherche de personnes comportant un numéro individuel de recherche de personnes qui est affecté au récepteur, le signal de recherche de personnes étant transmis dans des trames temporelles à récurrence cyclique,
 - (b) rechercher le signal reçu de recherche de personnes pour le numéro individuel de recherche de personnes afin de sortir un signal individuel de détection, et
 - (c) indiquer la réception du numéro individuel de recherche de personnes, caractérisé en ce que le signal de recherche de personnes comporte un numéro commun de recherche de personnes qui est affecté au moins au récepteur, et en ce que le procédé comporte en outre les étapes consistant à :
 - (d) rechercher simultanément le signal reçu de recherche de personnes tant en ce qui concerne le numéro individuel de recherche de personnes dans une trame temporelle particulière de groupe qui correspond au groupe désigné du récepteur de recherche de personnes, que le numéro commun de recherche de personnes dans un intervalle de temps non limité à la trame temporelle particulière de groupe, et pour sortir un signal individuel de détection en réponse la détection du numéro individuel de recherche de personnes et pour sortir un signal commun de détection en réponse à la détection du numéro commun de recherche de personnes, et
 - (e) en réponse à l'un des signaux individuels et communs de détection, indiquer la réception soit du numéro individuel soit du numéro commun de recherche de personnes.