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Selective Pager Receiver

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The present invention relates to a selective pager receiver and, more particularly, to a selective pager receiver for informing reception by using, e.g., an audible tone, light emission, vibration, and display.

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Upon receiving a call, a conventional radio selective pager receiver of this type performs a reception informing function by using, e.g., an audible tone, light emission, vibration, and display. In order to reset these reception informing functions, the

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receiver has an auto reset function for automatically performing resetting and a manual reset function by which a user performs resetting by depressing a reset button. Although a user can arbitrarily select either of the two reset functions, a selected reset function is unconditionally set up all of the various reception informing functions described above.

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Fig. 1 is a block diagram showing a conventional selective pager receiver. Referring to Fig. 1, a radio signal received by an antenna 1 is amplified and demodulated by a radio unit 2. This demodulated signal is shaped by a waveform shaper 3 into a waveform which can be read by a decoder 4. The

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decoder 4 produces reference clocks by means of a quartz oscillator 5 and compares a receiver call number stored in a memory unit 6 with the signal from the waveform shaper 3 in synchronism with the received signal. If
5 the two numbers coincide with each other as a result of this comparison, the decoder 4 determines that the pager receiver is called and sends a signal to a call informing function control unit 7 and an auto reset timer 8. The auto reset timer 8 is activated by the
10 signal from the decoder 4 and supplies a signal to the control unit 7 if a predetermined duration has elapsed. The timer 8 is activated by a signal from the control unit 7 as well as that from the decoder 4. The call informing function control unit 7 is connected to an
15 auto reset timer 8, a mode switch 9 for performing switching between an auto reset mode and a manual reset mode of call informing functions, a reset switch 10 for manual reset which operates upon depression of a reset button, and a call informing function unit 19. The call
20 informing function unit 19 is constituted by an audible tone amplifier 12, a loudspeaker 13, an LCD driver 14, a display device 15, a vibrator driver 16, a vibrator 17, and an LED 18.

The call informing function control unit 7
25 receives the signal from the decoder 4 and sends an audible tone signal to the audible tone amplifier 12 to drive the loudspeaker 13. At the same time, the call



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informing function control unit 7 drives the LCD 15 via the LCD driver 14 to display information indicating that this receiver is called, drives the vibrator 17 via the vibrator driver 16, and causes the LED 18 to emit light, thereby informing a user of the call for his or her receiver. The call informing function control unit 7 may drive some of the informing function set by a switch as not shown as well as all of them.

As shown in a flow chart of Fig. 2, the call informing function control unit 7 checks the state of the mode switch 9 (step S301). When the auto reset mode is set, the call informing function control unit 7 drives the informing function and simultaneously activates the auto reset timer 8. When a predetermined duration has elapsed, the call informing function control unit 7 stops the informing functions in response to a signal from the auto reset timer 8 (step S302). When the reset switch 10 is depressed during execution of the call informing functions, the call informing functions are stopped regardless of whether the manual reset mode or the auto reset mode is set (steps S303 and S304).

The conventional selective pager receiver described above has the following problems. That is, setting of the manual reset and the auto reset of the reception informing function cannot be independently performed for individual reception informing functions.

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Therefore, when a reception informing function which consumes a large amount of current, such as a vibration reception informing operation using the vibrator or a display reception informing operation using the LCD is performed in case that the manual reset function is set, this informing operation continues until a user depresses the reset switch to stop the informing operation. For this reason, if a user is unaware of the operation of the reception informing function or if he or she is not present near the pager receiver, a current is wastefully consumed to shorten the service life of a battery. In addition, the reset function cannot be selected in accordance with the degree of emergency of a call. Therefore, even in the event of an emergency call, the call is reset when a predetermined duration has elapsed if the auto reset function is set.

Summary of the Invention

It is an object of the present invention to provide a selective pager receiver which presents unnecessary current consumption upon a reception informing operation even if a user is unaware of the reception informing operation.

It is another object of the present invention to provide a selective pager receiver which prolongs the service life of a battery.

It is still another object of the present invention to provide a selective pager receiver which



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can reliably call a user in the even of an emergency call.

In order to achieve the above objects of the present invention, there is provided a selective pager receiver comprising a plurality of call informing means for informing a user of a call, detecting means for comparing information included in a received radio signal with a preassigned selective call number of the receiver to detect a call for the receiver, mode switching means for performing switching between a manual reset mode for manually stopping an operation of each of the call informing means and an auto reset mode for automatically stopping the operation, setting means for performing selection for automatically stopping the operation of each call informing means in the manual reset mode, and timer means for automatically stopping any of the call informing means selected by the setting means when a predetermined duration has elapsed from start of calling in the manual mode.

Brief Description of the Drawings

Fig. 1 is a block diagram showing a conventional selective pager receiver;

Fig. 2 is a flow chart for explaining the operation of a call informing function control unit shown in Fig. 1.

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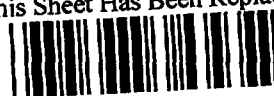


Fig. 3 is a block diagram showing an embodiment of a selective pager receiver of the present invention;

Fig. 4 is a flow chart for explaining the operation of a call informing function control unit shown in Fig. 3;

Fig. 5 is another flow chart for explaining the operation of a call informing function control unit in Fig. 3;

Fig. 6 is a block diagram showing another embodiment of the selective pager receiver of the present invention;

Fig. 7 is a flow chart for explaining the operation of a call informing function control unit shown in Fig. 6; and

Fig. 8 is another flow chart for explaining the operation of a call informing function control unit shown in Fig. 6.

Detailed Description of the Preferred Embodiments

Fig. 3 shows an embodiment of a selective pager receiver of the present invention. Referring to Fig. 3, a radio signal received by an antenna 1 is amplified and demodulated by a radio unit 2. This demodulated signal is shaped by a waveform shaper 3 into a waveform which can be read by a decoder 4. The decoder 4 produces reference clocks by means of a quartz oscillator 5 and compares a receiver call number stored



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in a memory unit 6 with the signal from the waveform shaper 3. If the two numbers coincide with each other, the decoder 4 determines that the pager receiver is called and sends a signal to a call informing function control unit 7 and an auto reset timer 8. The auto reset timer 8 is activated by the signal from the decoder 4 and supplies a signal to the control unit 7 if a predetermined duration has elapsed. The timer 8 is activated by a signal from the control unit 7 as well as the signal from the decoder 4. The call informing function control unit 7 is connected to an auto reset timer 8, a mode switch 9 for performing switching between an auto reset mode and a manual reset mode of call informing functions, a reset switch 10 for manual reset, an auto reset setting switch 11 for selecting auto reset or manual reset for each informing function when a manual reset mode is set, and a call informing function unit 19 similar to that shown in Fig. 1. The auto reset setting switch 11 is constituted by set switches SW1 to SW4 for an audible tone, display, vibration, and light emission.

The call informing function control unit 7 receives the signal from the decoder 4 and sends an audible tone to an audible amplifier 12 to drive a loudspeaker 13. At the same time, the call informing function control unit 7 drives an LCD 15 via an LCD driver 14 to display information indicating that this

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receiver is called, drives a vibrator 17 via a vibrator driver 16, and causes an LED 18 to emit light, thereby informing a user of the call for his or her receiver. The call informing function control unit 7 may drive
5 some of the informing function set by a switch as not shown as well as all of them.

As shown in a flow chart of Fig. 4, the call informing function control unit 7 checks the state of the mode switch 9 (step S101). If the auto reset mode
10 is set, the call informing function control unit 7 stops all of the informing functions or selected informing functions in response to a signal from the auto reset timer 8 when a predetermined duration has elapsed (step S102). If the manual reset mode is set and the reset
15 switch 10 is turned on during a predetermined period over which no signal comes from the reset timer 8, the call informing function control unit 7 unconditionally stops all of the informing functions (step S105). If a predetermined duration has elapsed with no input from
20 the reset switch 10 (step S104), the call informing function control unit 7 checks the state of the auto reset setting switch 11 for selecting auto reset or manual reset for each informing function (step S106). The call informing function control unit 7 stops the
25 operation of an informing function to be automatically reset and continues the operation of an informing function to be manually reset (steps S106 and S107).



When the reset switch 10 is depressed during execution of the call informing functions, all of the call informing functions are stopped regardless of whether the manual reset mode or the auto reset mode is set (steps S103 and S107).

Fig. 5 shows another flow chart of operation of the control unit 7 in Fig. 3.

Referring to Fig. 5, if an auto reset mode is set (step S101), the call informing function control unit 7 stops informing functions by using a signal from the auto reset timer 8 when a predetermined duration has elapsed (step S102). If a manual reset mode is set (step S101), the call informing function control unit 7 checks the state of the auto reset setting switch 11 for selecting auto reset or manual reset for each informing function (step S108). If the auto reset state is set (step S108), it decides the predetermined duration elapses or not (Step S102). If the manual reset state is set (step S108), it goes to step S107. When the reset switch 10 is depressed during execution of the call informing functions, all of the call informing functions are stopped regardless of whether the manual reset mode or the auto reset mode is set (steps S103 and S107).

As a result, even if a user is unaware of the operations of the reception informing functions and does not depress the reset button when the reception



informing functions are set in the manual reset mode,
the operations of reception informing functions which
consume a large amount of current, such as the vibrator
and the LCD, can be stopped in a predetermined duration
5 by setting the auto reset mode for these functions.

Therefore, it is possible to suppress wasteful
consumption of a battery due to these reception
informing functions and consequently prolong the service
life of the battery.

10 The auto reset setting switch 11 may be
constituted by a ROM, and informing means to be
automatically reset in the manual reset mode may be
predetermined.

In this embodiment, 20 seconds and 8 seconds
15 can be set as the predetermined durations in the auto
reset mode.

Note that the reset timer 8 is used in both
the auto reset mode and the manual reset mode in the
above embodiment, but independent timers may be provided
20 for the respective modes to define different
predetermined durations.

Figs. 6 to 8 are a block diagram and flow
charts showing another embodiment of the present
invention in which an emergency call is set in a manual
25 reset mode and an ordinary call is set in an auto reset
mode.



Referring to Fig. 6, a memory unit 6 stores two call numbers respectively for an emergency call and an ordinary call. A decoder 4 compares the call numbers of this receiver with a signal from a waveform shaper 3.

5 If either of the two numbers coincides with the signal, the decoder 4 determines that the receiver is called by an emergency call or an ordinary call and sends a signal to a call informing function control unit 7 and an auto reset timer 8. The call informing function control unit

10 7 is connected to an auto reset timer 8, a reset switch 10 for manual reset, an emergency call auto reset setting switch 21 for selecting the auto or manual reset mode for each informing function for an emergency call, and a call informing function unit 19.

15 Referring to Fig. 7, if a call for the receiver is an ordinary call (step S201), the call informing function control unit 7 stops informing functions by using a signal from the auto reset timer 8 when a predetermined duration has elapsed (step S202).

20 If the call is an emergency call, when a predetermined duration has elapsed (step S204), the call informing function control unit 7 checks the state of the emergency auto reset setting switch 21 for selecting the auto or manual reset state for each informing function

25 (step S206). The call informing function control unit 7 stops the operation of an informing function to be automatically reset and continues the operation of an



informing function to be manually reset (step S207).
When the reset switch 10 is depressed during execution
of the call informing functions, all of the call
informing functions or selected call informing functions
5 are stopped regardless of whether manual reset mode for
an emergency call or auto reset mode for an ordinary
call is set or whether a predetermined duration has
elapsed (steps S203, S205, and S207).

Referring to another flow char Fig. 8, if a
10 call for the receiver is an ordinary call (step S201),
the call informing function control unit 7 stops
informing functions by using a signal from the auto
reset timer 8 when a predetermined duration has elapsed
(step S202). If the call is an emergency call (step
15 S201), the call informing function control unit 7 checks
the state of the emergency auto reset setting switch 21
for selecting the auto or manual reset state for each
informing function (step S208). If the auto reset state
is set (step S208), it goes to step S202. If the manual
20 reset state is set (step S208), it goes to step S207.
When the reset switch 10 is depressed during execution
of the call informing functions, all of the call
informing functions are stopped regardless of whether
manual reset mode for an emergency call or auto reset
25 mode for an ordinary call is set or whether a
predetermined duration has elapsed (steps S203 and
S207).



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According to the present invention, as has been described above, even when various reception informing functions are switched to a manual reset state, reception informing functions set by the auto
5 reset setting switch can be automatically reset when a predetermined duration measured by a timer has elapsed. Therefore, even if a user forgets to depress the reset button, the operation of a reception informing function, such as display or vibration, which consumes a large
10 amount of current can be stopped when a predetermined duration has elapsed. As a result, since unnecessary current consumption can be prevented, the service life of a battery can be prolonged. In addition, since manual reset mode is automatically selected in the event
15 of an emergency call, a user can be surely called.

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Claims:

1. A selective pager receiver characterized by
2 comprising:
3 a plurality of call informing means (13, 15,
4 17, 18) for informing a user of a call;
5 detecting means (4) for comparing information
6 included in a received radio signal with a preassigned
7 selective call number of said receiver to detect a call
8 for said receiver;
9 mode switching means (9) for performing
10 switching between a manual reset mode for manually
11 stopping an operation of each of said call informing
12 means (13, 15, 17, 18) and an auto reset mode for
13 automatically stopping the operation;
14 setting means (11) for performing selection
15 for automatically stopping the operation of each call
16 informing means (13, 15, 17, 18) in the manual reset
17 mode; and
18 timer means (8) for automatically stopping any
19 of said call informing means (13, 15, 17, 18) selected
20 by said setting means (11) when a predetermined duration
21 has elapsed from start of calling in the manual mode.
2. A receiver according to claim 1, wherein said
2 setting means (11) comprises a plurality of setting
3 switches (SW1 - SW4) provided in a one-to-one

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4 correspondence with said plurality of call informing
5 means (13, 15, 17, 18).

3. A receiver according to claim 1 or 2, wherein said
2 call informing means (13, 15, 17, 18) perform call
3 informing operations by using an audible tone, light
4 emission, vibration, and display.

4. A receiver according to claim 1, 2, or 3, further
2 comprising call informing control means (7) for starting
3 the operation of each call informing means (13, 15, 17,
4 18) and operating said timer means (8) upon detecting a
5 call for said receiver in accordance with an output from
6 said detecting means (4), checking a state of said mode
7 switching means (9) in accordance with an output from
8 said timer means (8) when a predetermined duration has
9 elapsed, checking a state of said setting means (11)
10 when said mode switching means (9) is in a manual mode,
11 and stopping an operation of said call informing means
12 (13, 15, 17, 18) selected by said setting means (11).

5. A receiver according to any one of claims 1 to 4, wherein said
2 timer means (8) is an auto reset timer for automatically
3 stopping each call informing means (13, 15, 17, 18) when
4 a predetermined duration has elapsed after start of
5 calling in the auto reset mode, and the predetermined

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6 duration from the start of calling to the automatic stop
7 is the same in the manual mode and the auto reset mode.

6. A receiver according to any one of claims 1 to 4, wherein said
2 timer means (8) is provided independently of an auto
3 reset timer for automatically stopping each call
4 informing means (13, 15, 17, 18) when a predetermined
5 duration has elapsed from start of calling in the auto
6 reset mode, and the predetermined duration from the
7 start of calling to the automatic stop in the manual
8 mode is different from that in the auto reset mode.

7. A selective pager receiver characterized by
2 comprising:
3 a plurality of call informing means (13, 15,
4 17, 18) for informing a user of a call;
5 call informing detecting means (4) for
6 comparing information included in a received radio
7 signal with preassigned selective call numbers for an
8 ordinary call and an emergency call of said receiver to
9 perform detection of a call for said receiver and
10 identification of a type of the call;
11 setting means (21) for performing selection
12 for automatically stopping an operation of each of said
13 call informing means (13, 15, 17, 18) upon calling by
14 the emergency call; and

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15 timer means (8) for automatically stopping any
16 of said call informing means (13, 15, 17, 18) selected
17 by said setting means (21) when a predetermined duration
18 has elapsed from start of calling if the calling is
19 performed by the emergency call.

8. A receiver according to claim 7, wherein said
2 setting means (21) comprises a plurality of setting
3 switches (SW1 - SW4) provided in a one-to-one
4 correspondence with said plurality of call informing
5 means.

9. A receiver according to claim 7 or 8, wherein said
2 call informing means (13, 15, 17, 18) perform call
3 informing operations by using an audible tone, light
4 emission, vibration, and display.

10. A selective pager receiver characterized by
2 comprising:
3 a plurality of call informing means (13, 15,
4 17, 18) for informing a user of a call; and
5 means (11) for selecting either an auto reset
6 state for automatically stopping an operation of each
7 call informing means when a predetermined duration has
8 elapsed or a manual reset state for manually stopping
9 the operation to each of said call informing means (13,
10 15, 17, 18).

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