

Description

Background of the invention

The present invention relates to a pager with a display and, more particularly, to a display pager of the type using liquid crystal or like display elements which themselves are not radiant as a display and being capable of automatically illuminating the display as the external luminance becomes low.

Some modern pages are furnished with a function of displaying data in numerals and messages to convey them to the user. The prerequisite in this type of pager is that it be small in size and portable and, to meet this requisite, non-radiant liquid crystal elements which consume a minimum of power are widely used. Because those display elements are non-radiant as mentioned, such a pager is provided with a lamp for illumination and a switch associated with the lamp.

One approach to a smaller-size configuration is to replace the switch with a phototransistor for sensing light which features a desirable mounting efficiency, as disclosed in EP—A—0 135 928. An example of the phototransistor scheme is shown in Fig. 1.

In the prior art pager shown in Fig. 1, a phototransistor 10a is sensitive to external luminance and, when it is low, turns on a lamp 10b. While the lamp 10b is turned on, light issuing from the lamp 10b is diffused inside a diffuser plate 12 and transmitted sequentially through liquid crystal 14 and an acryl plate 16 as indicated by arrows, thereby allowing displayed data to be read by the user. A partition plate 18 serves to intercept a part of the light from the lamp 10b which is directed toward the phototransistor 10a.

However, although the partition plate 18 successfully prevents the light from the lamp 10b from becoming directly incident to the phototransistor 10a, it fails to intercept the light reflected by the acryl plate 16 as well as externally derived light. Therefore, when the external luminance is not definite or in a dim situation, the display cannot function in a positive manner. Specifically, when the luminance is indefinite, the output signal of the photosensor which is implemented with the phototransistor 10a is approximate to a predetermined threshold level for turning on the lamp 10b. In this particular condition, the output signal of the photosensor is susceptible to even insignificant changes in the ambient conditions and leakage of light issuing from the lamp 10b (as is indicated by phantom lines in Fig. 1) to cause the lamp 10b to repeatedly turn on and off at short intervals, rendering the displayed information difficult to see.

DE—A—31 47 619 describes a circuit for illuminating an LCD-display in automobiles; the lamp is automatically switched on for a short period of time after each data transfer received from a traffic information service. DE—A—26 31 329 describes a device for illuminating an LCD-display which does, how-

ever, deal only with the relative positioning of the lamp and the display rather than a control of the lamp. US—A—4 009 535 describes a self-contained housenumber sign with a lamp connected to a battery via a phototransistor for energizing the lamp at night.

Summary of the invention

It is therefore an object of the present invention to provide a pager with a display which eliminates the above-discussed drawback and allows displayed information to be read with ease even in a dim ambience.

It is another object of the present invention to provide a generally improved pager with a display.

A pager with a display which automatically illuminates the display responsive to an external luminance of the present invention comprises a data processing circuit for processing a received signal to generate an information signal to be displayed and a control signal, a display circuit for optically displaying on the display the information signal which is outputted from the data processing circuit, a light sensor for sensing an external luminance surrounding the display circuit which is lower than a first predetermined value to apply a first sense signal to the data processing circuit, and an illuminating circuit for illuminating the display responsive to the control signal which is outputted from the data processing circuit, the illuminating circuit including a lamp.

The data processing circuit is constructed to generate the control signal when the external luminance sensed by the light sensor is lower than the first predetermined value and the display of the display circuit is maintained.

In accordance with the present invention, a pager has a display implemented with, for example, liquid crystal and senses an external luminance so that the display is automatically illuminated when the luminance has decreased.

The above and other objects, features and advantages of the present invention will become more apparent from the following detailed description taken with the accompanying drawings.

Brief description of the drawings

Fig. 1 is a schematic view of a prior art display pager;

Fig. 2 is a block diagram of a display pager embodying the present invention;

Fig. 3 is a flowchart demonstrating the operation of the pager of Fig. 2 for illuminating a display;

Fig. 4 is a diagram showing a specific construction of a light sensing circuit;

Figs. 5A—5D show signals appearing in the light sensing circuit and on-off conditions of a lamp;

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

Fig. 7 is a flowchart representative of the oper-

ation of the pager of Fig. 6 for illuminating a display;

Fig. 8 is a block diagram showing another embodiment of the present invention; and

Fig. 9 is a flowchart representative of the operation of the pager of Fig. 8 for illuminating a display.

Description of the preferred embodiments

While the pager with a display of the present invention is susceptible of numerous physical embodiments, depending upon the environment and requirements of use, substantial numbers of the herein shown and described embodiments have been made, tested and used, and all have performed in an eminently satisfactory manner.

Referring to Fig. 2 of the drawings, a display pager in accordance with a preferred embodiment of the present invention is shown and generally designated by the reference numeral 20. A signal coming in through an antenna 22 is applied to a radio section 24 which is interconnected to a waveform-shaper 26. The waveform-shaper 26 is interconnected to a decoder 28 which in turn is interconnected to a read only memory (ROM) 30, a speaker 32, and a microprocessor (CPU) 34. A power source 36 has a negative terminal interconnecting to a common potential point and to one terminal of a switch 38, and a positive terminal interconnecting to the decoder 28 and one input terminal of a DC-DC converter 40. The other terminal of the switch 38 is interconnected to the other input of the DC-DC converter 40 and to the CPU 34. An output terminal of the DC-DC converter 40 is interconnected to the CPU 34. Power from the power source 36 is routed via the decoder 28 to the radio section 24 and waveform-shaper 26. The output of the DC-DC converter 40 is applied to an illuminating circuit 42, a display 44 and a light sensing circuit 46 by way of the CPU 34. The CPU 34 is interconnected to the illuminating circuit 42, display 44 and light sensing circuit 46. The output of the light sensing circuit, or light sensor, 46 is fed to the CPU 34.

The radio section 24 amplifies and demodulates the signal coming in through the antenna 22. The waveform-shaper 26 converts the demodulated signal to a digital signal having a format which the decoder 28 can decode. The ROM 30 is adapted to store a call number assigned to the pager 20. The decoder 28 compares an output of the waveform-shaper 26 and the call number stored in the ROM 30 and, when they coincide with each other, applies a signal to the speaker 32 to cause it to sound, thereby alerting the user. The DC-DC converter 40 boosts the voltage applied thereto from the power source 36 so as to supply the CPU 34 with power. The switch 38 is a power switch which is manually actuated. Once the switch 38 is closed, the DC-DC converter 40 is activated to feed power to the CPU 34. As the pager 20 is called, the decoder 28 reads message data which follows the call number data and applies the message data to the CPU 34. Then, the

CPU 34 which includes a circuit for driving liquid crystal display segments causes the display 44, which comprises the liquid crystal display segments, to display the message. The illuminating circuit 42 is equipped with a lamp for illuminating the display 44 and controlled by power which is applied from the CPU 34. The light sensor 46 converts an external luminance to an electrical signal which is applied to the CPU 34.

A characteristic feature of this particular embodiment is that the light sensor 46 is responsive to a first predetermined reference value associated with relatively dark ambience and a second predetermined reference value associated with relatively light ambience. Specifically, the output of the light sensor 46 becomes (logical) 0 when the external luminance is lower than the first reference value (dark) and maintains the 0 level until the luminance increases beyond the second reference value (light). Conversely, the light sensor 46 produces a 1 output when the external luminance is higher than the second reference level and maintains it until the luminance decreases beyond the second reference level.

Referring to Fig. 3, the display illuminating operation of the pager 20 in accordance with the illustrative embodiment is demonstrated. The operation begins when the switch 38 is closed by the user as previously mentioned. As a message is displayed on the display 44, the CPU 34 supplies power to the light sensor 46 to cause it to start measuring external luminance. (S_1 & S_2). If the measured luminance is higher than the first reference value, the illuminating circuit 42 is not supplied with power and, therefore, the lamp is not turned on. If it is lower than the first reference value, the CPU 34 supplies power to the illuminating circuit 42 to turn on the lamp for thereby illuminating the display 44. (S_1 & S_4). In this condition, as the luminance increases beyond the second reference level, the power supply to the illuminating circuit 42 is interrupted to turn off the lamp. (S_5 & S_6). This procedure continues until the display of the message on the display 44 is terminated. ($S_2 \sim S_7$). When the display is cancelled, the power supply to the illuminating circuit and light sensor 46 is inhibited. (S_7 & S_8).

A specific example of the light sensor 46 is shown in Fig. 4. In this example, a phototransistor 48 has a collector interconnecting to the CPU 34 and an emitter interconnecting to a common potential point via a resistor 50. The emitter of the phototransistor 48 is also connected to one terminal of a resistor 52 the other terminal of which is interconnected to an input terminal of an inverter 54. An output terminal of the inverter 54 is interconnected to an input terminal of another inverter 56 an output terminal of which is interconnected via a resistor 58 to the input terminal of the inverter 54. The resistors 52 and 58 and the inverters 54 and 56 constitute a Schmitt circuit.

Referring to Figs. 5A-5D, signals appearing in the light sensor 46 and on-off conditions of the lamp are shown. Fig. 5A represents an output

signal or voltage of the phototransistor 48, higher voltages corresponding to higher external luminance. In Fig. 5A, the vertical axis of the signal is shown in a doubled scale compared to the other signals for the convenience of description. When such an output signal of the phototransistor 48 is binarized with an intermediate level L as a threshold, it will appear as shown in Fig. 5B. Heretofore, the output signal of the phototransistor 48 has been directly read by the CPU 34 so as to control the illuminating circuit 42, that is, the binary signal shown in Fig. 5B has been used to on-off control the lamp. Such has brought about a problem that the lamp repeatedly turns on and off at short intervals in a dim situation in which the output of the phototransistor 48 is approximate to the intermediate level L.

The output signal of the inverter 56 is shown in Fig. 5C. A Schmitt circuit has two different threshold voltages M_1 and M_2 ($M_1 < M_2$) and operates with hysteresis. Specifically, the output voltage of the inverter 56 becomes low when the output voltage of the phototransistor 48 has dropped below the threshold level M_1 and remains low until it rises above the threshold level M_2 . Conversely, as the output voltage of the phototransistor 48 rises beyond the threshold level M_2 , the inverter 56 produces a high voltage; the high voltage output of the inverter 56 is maintained until the phototransistor output drops beyond the threshold level M_1 . Fig. 5D shows on-off conditions of the lamp in accordance with the illustrative embodiment, the high level representing an "on" condition. The CPU 34 turns on the lamp when the output voltage of the light sensor 46 is low when a message is being displayed on the display 44. In this particular embodiment, the lamp does not turn on and off at short intervals even in a dim ambience.

While the light sensor 46 in the above embodiment has been implemented by a Schmitt circuit, the equivalent control over the illuminating circuit may be accomplished based on program control by applying the output of the phototransistor 48 to a microprocessor via an analog-to-digital converter to cause the microprocessor to decide the input signal referencing two threshold levels.

Referring to Fig. 6, another embodiment of the display pager in accordance with the present invention is shown. In Fig. 6, the same or similar structural elements as shown in Fig. 2 are designated by like reference numerals. The major difference between a pager, generally 60, of this embodiment and the previously discussed pager 20 is that in the former the CPU 34 has an output terminal for display illumination connecting to the illuminating circuit 42, an output terminal for message display interconnecting to the display 44, and an output terminal for light sensing interconnecting to a light sensor 64 via a switch 62. The output of the light sensor 64 is coupled to the CPU 34. The switch 62 is controlled by the CPU 34.

The second illustrative embodiment is characterized in that once power is applied to the

illuminating circuit 42 to turn on the lamp, the power supply to the circuit 42 is maintained until the display of a message on the display 44 is cancelled. Specifically, the switch 62 in an initial condition is closed to cause the light sensor 64 to measure external luminance. While the external luminance is low, the output voltage of the light sensor 64 remains lower than a predetermined value so that the CPU 34 supplies power to the illuminating circuit 42 and, at the same time, opens the switch 62. This interrupts the power supply to the light sensor 64 the output of which is then "0". While the light sensor output is "0", the CPU 34 applies power to the illuminating circuit 42 to turn on the lamp. The switch 62 remains open unless the message appearing on the display 44 is cancelled either automatically or manually. The light sensor 64 shown in Fig. 6 may be implemented with the circuit made up of the phototransistor 48 and resistor 50 as shown in Fig. 4.

The operation of the pager 60 associated with illumination is shown in a flowchart in Fig. 7. As a message is provided on the display 44, the CPU 34 supplies power to the light sensor 64 to cause the latter to start measuring external luminance. (S_{11} & S_{12} . If the luminance has measured lower than a predetermined value, power is fed to the illuminating circuit 42 to turn on the lamp. (S_{13} & S_{14}). Once turned on, the lamp remains in that state until the message on the display 42 is cancelled. (S_{15}). If the luminance has measured higher than the predetermined value, the measurement is repeated until the end of display. (S_{12} , S_{13} & S_{16}). Upon termination of the display of the message, the power supply to the illuminating circuit 42 and light sensor 64 is inhibited. (S_{17}).

In this particular embodiment, the control is effected in a specific mode, i.e., "turn on the lamp when the light sensor output is lower than a predetermined value", in order to reduce modification of the control program. However, the illustrative embodiment can be practiced even if the control program is so modified as to maintain the lamp turned on with no regard to the light sensor output after the lamp has been turned on.

In addition, since the pager 60 shown in Fig. 6 is constructed to interrupt the power supply to the light sensor 64 when the lamp has been turned on, it reduces power which is consumed by the light sensor 64.

Referring to Fig. 8, another embodiment of the display pager in accordance with the present invention is shown. In Fig. 8, the same or similar structural elements as those shown in Fig. 6 are designated by like reference numerals. A pager, generally 80, shown in Fig. 8 differs from the pager 60 of Fig. 6 in that it includes a timer 82 between the CPU 34 and the switch 62. The CPU 34 has an output terminal for display illumination interconnecting to a trigger input terminal T of the timer 82. An output Q of the timer 82 is adapted to open and close the switch 62.

What characterizes this particular embodiment is that once power is supplied to the illuminating

circuit 42, it is not interrupted until a predetermined period of time expires. Specifically, when power is applied to the circuit 42, it triggers the timer 82 so that the output Q of the timer 82 is maintained 1 for a predetermined period of time. The 1 output of the timer 82 opens the switch 62 to cut off the power supply from the CPU 34 to the light sensor 64, resulting in a 0 light sense signal. While the light sense signal is maintained 0, the CPU 34 applies power to the illuminating circuit 42 to turn on the lamp. Upon the lapse of the predetermined period of time, the timer 82 turns its output Q from 1 to 0 to close the switch 62, thereby reactivating the light sensor 64.

The operation of the pager 80 associated with the display illumination is shown in a flowchart in Fig. 9. Upon appearance of a message on the display 44, the CPU 34 applies power to the light sensor 64, which then starts measuring external luminance. (S_{21} & S_{22}). If the luminance has measured lower than a predetermined value, power is supplied to the illuminating circuit 42 and timer 82 with the result that a predetermined period of time expires with the lamp maintained glowing. (S_{23} ~ S_{25}). If the luminance has measured higher than the predetermined value, the lamp if then glowing is turned off. (S_{23} & S_{26}). Such a sequence of events continues until the message on the display 44 is cancelled. (S_{22} , S_{23} , S_{26} ~ S_{28}). After the message display has been cancelled, the power supply to the illuminating circuit 42, light sensor 64 and timer 82 is inhibited. (S_{29}).

In the illustrative embodiment, the output signal of the light sensor 64 is turned to 0 to control the duration of the "on" condition of the lamp. Alternatively, an arrangement may be made such that the output Q of the timer 82 is applied to the CPU 34 in order to continuously turn on the lamp while the output Q of the timer 82 is 1.

Further, if the duration of the "on" state of the lamp is long enough to read a message on the display 44, the lamp may be turned off without performing any more light sensing step after the lamp has been turned on.

The embodiment shown in Fig. 8 reduces power which is consumed by the illuminating circuit 42, compared to the embodiment of Fig. 6.

Again, the embodiment shown in Fig. 6 or 8 may be implemented using program control, instead of the switch 62 and timer 82.

In summary, it will be seen that the present invention provides a display pager which prevents a lamp from repeatedly turning on and off at short intervals in a dim situation or due to leakage of light issuing from the lamp. The pager, therefore, accomplishes an automatic illuminating function responsive to any external luminance without degrading displayed information, thereby accurately conveying a message meant for the pager to the user.

Claims for the Contracting States: DE, FR, GB

1. A pager with a display (44) which automatically illuminates the display (44) responsive to an external luminance, comprising:

data processing means (34) for processing a received signal to generate an information signal to be displayed and a control signal;

display means for optically displaying on the display (44) the information signal which is outputted from said data processing means (34);

light sensor means (46, 64) for sensing an external luminance surrounding said display means which is lower than a first predetermined value to apply a first sense signal to the data processing means (34);

illuminating means (42) for illuminating the display means responsive to the control signal which is outputted from the data processing means (34), said illuminating means (42) including a lamp;

the data processing means (34) constructed to generate the control signal when the external luminance sensed by the light sensor means (46, 64) is lower than the first predetermined value and the display of the display means is maintained; wherein the light sensor

means (46, 64) is constructed to apply a second sense signal to the data processing means (34) when sensed that the external luminance is above a second predetermined value which is higher than the first predetermined value.

2. A pager as claimed in claim 1, further comprising means for turning off the lamp in response to the second sense signal from the light sensor means (46, 64).

3. A pager as claimed in claim 1 or 2, further comprising means for, after the lamp has been turned on, maintaining the lamp turned on until the display of the display means is terminated.

4. A pager with a display which automatically illuminates the display responsive to an external luminance, comprising:

data processing means for processing a received signal to generate an information signal to be displayed and a control signal;

display means for optically displaying on the display the information signal which is outputted from said data processing means;

light sensor means for sensing an external luminance surrounding said display means which is lower than a first predetermined value to apply a first sense signal to the data processing means;

illuminating means for illuminating the display means responsive to the control signal which is outputted from the data processing means, said illuminating means including a lamp; and

timer means (82) which is triggered when the lamp has been turned on and inhibits the operation of the light sensor means (64) until a predetermined period of time expires,

the data processing means being constructed to generate the control signal when the external luminance sensed by the light sensor means is lower than the first predetermined value.



circuit 42, it is not interrupted until a predetermined period of time expires. Specifically, when power is applied to the circuit 42, it triggers the timer 82 so that the output Q of the timer 82 is maintained 1 for a predetermined period of time. The 1 output of the timer 82 opens the switch 62 to cut off the power supply from the CPU 34 to the light sensor 64, resulting in a 0 light sense signal. While the light sense signal is maintained 0, the CPU 34 applies power to the illuminating circuit 42 to turn on the lamp. Upon the lapse of the predetermined period of time, the timer 82 turns its output Q from 1 to 0 to close the switch 62, thereby reactivating the light sensor 64.

The operation of the pager 80 associated with the display illumination is shown in a flowchart in Fig. 9. Upon appearance of a message on the display 44, the CPU 34 applies power to the light sensor 64 which then starts measuring external luminance. (S_{21} & S_{22}). If the luminance has measured lower than a predetermined value, power is supplied to the illuminating circuit 42 and timer 82 with the result that a predetermined period of time expires with the lamp maintained glowing. (S_{23} ~ S_{25}). If the luminance has measured higher than the predetermined value, the lamp if then glowing is turned off. (S_{23} & S_{25}). Such a sequence of events continues until the message on the display 44 is cancelled. (S_{22} , S_{23} , S_{26} ~ S_{28}). After the message display has been cancelled, the power supply to the illuminating circuit 42, light sensor 64 and timer 82 is inhibited. (S_{29}).

In the illustrative embodiment, the output signal of the light sensor 64 is turned to 0 to control the duration of the "on" condition of the lamp. Alternatively, an arrangement may be made such that the output Q of the timer 82 is applied to the CPU 34 in order to continuously turn on the lamp while the output Q of the timer 82 is 1.

Further, if the duration of the "on" state of the lamp is long enough to read a message on the display 44, the lamp may be turned off without performing any more light sensing step after the lamp has been turned on.

The embodiment shown in Fig. 8 reduces power which is consumed by the illuminating circuit 42, compared to the embodiment of Fig. 6.

Again, the embodiment shown in Fig. 6 or 8 may be implemented using program control, instead of the switch 62 and timer 82.

In summary, it will be seen that the present invention provides a display pager which prevents a lamp from repeatedly turning on and off at short intervals in a dim situation or due to leakage of light issuing from the lamp. The pager, therefore, accomplishes an automatic illuminating function responsive to any external luminance without degrading displayed information, thereby accurately conveying a message meant for the pager to the user.

Claims for the Contracting States: DE, FR, GB

1. A pager with a display (44) which automatically illuminates the display (44) responsive to an external luminance, comprising:

data processing means (34) for processing a received signal to generate an information signal to be displayed and a control signal;

display means for optically displaying on the display (44) the information signal which is outputted from said data processing means (34);

light sensor means (46, 64) for sensing an external luminance surrounding said display means which is lower than a first predetermined value to apply a first sense signal to the data processing means (34);

illuminating means (42) for illuminating the display means responsive to the control signal which is outputted from the data processing means (34), said illuminating means (42) including a lamp;

the data processing means (34) constructed to generate the control signal when the external luminance sensed by the light sensor means (46, 64) is lower than the first predetermined value and the display of the display means is maintained; wherein the light sensor

means (46, 64) is constructed to apply a second sense signal to the data processing means (34) when sensed that the external luminance is above a second predetermined value which is higher than the first predetermined value.

2. A pager as claimed in claim 1, further comprising means for turning off the lamp in response to the second sense signal from the light sensor means (46, 64).

3. A pager as claimed in claim 1 or 2, further comprising means for, after the lamp has been turned on, maintaining the lamp turned on until the display of the display means is terminated.

4. A pager with a display which automatically illuminates the display responsive to an external luminance, comprising:

data processing means for processing a received signal to generate an information signal to be displayed and a control signal;

display means for optically displaying on the display the information signal which is outputted from said data processing means;

light sensor means for sensing an external luminance surrounding said display means which is lower than a first predetermined value to apply a first sense signal to the data processing means;

illuminating means for illuminating the display means responsive to the control signal which is outputted from the data processing means, said illuminating means including a lamp; and

timer means (82) which is triggered when the lamp has been turned on and inhibits the operation of the light sensor means (64) until a predetermined period of time expires,

the data processing means being constructed to generate the control signal when the external luminance sensed by the light sensor means is lower than the first predetermined value.



5. A pager as claimed in claim 4, further comprising means for turning off the lamp after the predetermined period of time has expired.

Claims for the Contracting States: NL, SE

1. A pager with a display (44) which automatically illuminates the display (44) responsive to an external luminance, comprising:

data processing means (34) for processing a received signal to generate an information signal to be displayed and a control signal;

display means for optically displaying on the display (44) the information signal which is outputted from said data processing means (34);

light sensor means (46, 64) for sensing an external luminance surrounding said display means which is lower than a first predetermined value to apply a first sense signal to the data processing means (34); and

illuminating means (42) for illuminating the display means responsive to the control signal which is outputted from the data processing means (34), said illuminating means (42) including a lamp;

the data processing means (34) constructed to generate the control signal when the external luminance sensed by the light sensor means (46, 64) is lower than the first predetermined value and the display of the display means is maintained.

2. A pager as claimed in claim 1, wherein the light sensor means (46, 64) is constructed to apply a second sense signal to the data processing means (34) when sensed that the external luminance is above a second predetermined value which is higher than the first predetermined value.

3. A pager as claimed in claim 2, further comprising means for turning off the lamp in response to the second sense signal from the light sensor means (46, 64).

4. A pager as claimed in claim 1 or 2, further comprising means for, after the lamp has been turned on, maintaining the lamp turned on until the display of the display means is terminated.

5. A pager with a display which automatically illuminates the display responsive to an external luminance, comprising:

data processing means for processing a received signal to generate an information signal to be displayed and a control signal;

display means for optically displaying on the display the information signal which is outputted from said data processing means;

light sensor means for sensing an external luminance surrounding said display means which is lower than a first predetermined value to apply a first sense signal to the data processing means;

illuminating means for illuminating the display means responsive to the control signal which is outputted from the data processing means, said illuminating means including a lamp; and

timer means (82) which is triggered when the lamp has been turned on and inhibits the operation of the light sensor means (64) until a predetermined period of time expires,

the data processing means being constructed to generate the control signal when the external luminance sensed by the light sensor means is lower than the first predetermined value.

6. A pager as claimed in claim 5, further comprising means for turning off the lamp after the predetermined period of time has expired.

Patentansprüche für die Vertragsstaaten: DE, FR, GB

1. Personenrufgerät mit einer Anzeigeeinrichtung (44), die in Abhängigkeit von der äußeren Helligkeit automatisch beleuchtet wird, mit einer Datenverarbeitungseinrichtung (34) zum Verarbeiten eines Empfangssignals und Erzeugen eines anzuzeigenden Informationssignals und eines Steuersignals,

einer Anzeige zum optischen Anzeigen des Informationssignals auf der Anzeigeeinrichtung (44), die von der Datenverarbeitungseinrichtung (34) abgegeben wird,

einem Lichtsensor (46, 64) zum Ermitteln der äußeren Helligkeit in der Umgebung der Anzeige, wobei die äußere Helligkeit geringer ist als ein erster vorgegebener Wert, um ein erstes Meßsignal der Datenverarbeitungseinrichtung (34) zuzuführen, und

einer Beleuchtungseinrichtung (42) zum Beleuchten der Anzeige in Abhängigkeit vom Steuersignal, das von der Datenverarbeitungseinrichtung (34) abgegeben wird, wobei die Beleuchtungseinrichtung (42) eine Lampe aufweist,

wobei die Datenverarbeitungseinrichtung (34) das Steuersignal erzeugt, wenn die von dem Lichtsensor (46, 64) ermittelte äußere Helligkeit geringer ist als der erste vorgegebene Wert und die Anzeige eingeschaltet ist, und

wobei der Lichtsensor (46, 64) ein zweites Meßsignal der Datenverarbeitungseinrichtung (34) zuführt, wenn festgestellt wird, daß die äußere Helligkeit über einem zweiten vorgegebenen Wert liegt, der größer ist als der erste vorgegebene Wert.

2. Personenrufgerät nach Anspruch 1, gekennzeichnet durch eine Einrichtung zum Abschalten der Lampe in Abhängigkeit vom zweiten Meßsignal des Lichtsensors (46, 64).

3. Personenrufgerät nach Anspruch 1 oder 2, gekennzeichnet durch eine Einrichtung zum Betrieb der Lampe nachdem diese eingeschaltet worden ist, bis die Anzeige auf der Anzeigeeinrichtung beendet wird.

4. Personenrufgerät mit einer Anzeigeeinrichtung, die in Abhängigkeit von der äußeren Helligkeit automatisch beleuchtet wird, mit

einer Datenverarbeitungseinrichtung zum Verarbeiten eines Empfangssignals und Erzeugen eines anzuzeigenden Informationssignals und eines Steuersignals,

einer Anzeige zum optischen Anzeigen des Informationssignals auf der Anzeigeeinrichtung, das von der Datenverarbeitungseinrichtung abgegeben wird,



einem Lichtsensor zum Ermitteln der äußeren Helligkeit im Bereich der Anzeige, wobei die Helligkeit geringer ist als ein erster vorgegebener Wert, um ein erstes Meßsignal der Datenverarbeitungseinrichtung zuzuführen,

einer Beleuchtungseinrichtung zum Beleuchten der Anzeige in Abhängigkeit vom Steuersignal, das von der Datenverarbeitungseinrichtung abgegeben wird, wobei die Beleuchtungseinrichtung eine Lampe aufweist, und

einer Zeitschalteneinrichtung (82), die betätigt wird, wenn die Lampe eingeschaltet worden ist, und den Betrieb des Lichtsensors (64) bis zum Anlauf eines vorgegebenen Zeitraums verhindert,

wobei die Datenverarbeitungseinrichtung das Steuersignal erzeugt, wenn die von dem Lichtsensor ermittelte äußere Helligkeit geringer ist als der erste vorgegebene Wert.

5. Personenrufgerät nach Anspruch 4, gekennzeichnet durch eine Einrichtung zum Abschalten der Lampe nach Ablauf des vorgegebenen Zeitraums.

Patentansprüche für die Vertragsstaaten: NL, SE

1. Personenrufgerät mit einer Anzeigeeinrichtung (44), die in Abhängigkeit von der äußeren Helligkeit automatisch beleuchtet wird, mit

einer Datenverarbeitungseinrichtung (34) zum Verarbeiten eines Empfangssignals und Erzeugen eines anzuzeigenden Informationssignals und eines Steuersignals,

einer Anzeige zum optischen Anzeigen des Informationssignals auf der Anzeigeeinrichtung (44), das von der Datenverarbeitungseinrichtung (34) abgegeben wird,

einem Lichtsensor (46, 64) zum Ermitteln der äußeren Helligkeit in der Umgebung der Anzeige, wobei die äußere Helligkeit geringer ist als ein erster vorgegebener Wert, um ein erstes Meßsignal der Datenverarbeitungseinrichtung (34) zuzuführen, und

einer Beleuchtungseinrichtung (42) zum Beleuchten der Anzeige in Abhängigkeit vom Steuersignal, das von der Datenverarbeitungseinrichtung (34) abgegeben wird, wobei die Beleuchtungseinrichtung (42) eine Lampe aufweist,

wobei die Datenverarbeitungseinrichtung (34) das Steuersignal erzeugt, wenn die von dem Lichtsensor (46, 64) ermittelte äußere Helligkeit geringer ist als der erste vorgegebene Wert und die Anzeige eingeschaltet ist.

2. Personenrufgerät nach Anspruch 1, dadurch gekennzeichnet, daß der Lichtsensor (46, 64) ein zweites Meßsignal der Datenverarbeitungseinrichtung (34) zuführt, wenn festgestellt wird, daß die äußere Helligkeit über einem zweiten vorgegebenen Wert liegt, der größer ist als der erste vorgegebene Wert.

3. Personenrufgerät nach Anspruch 2, gekennzeichnet durch eine Einrichtung zum Abschalten der Lampe in Abhängigkeit vom zweiten Meßsignal des Lichtsensors (46, 64).

4. Personenrufgerät nach Anspruch 1 oder 2, gekennzeichnet durch eine Einrichtung zum

Betrieb der Lampe nachdem diese eingeschaltet worden ist, bis die Anzeige auf der Anzeigeeinrichtung beendet wird.

5. Personenrufgerät mit einer Anzeigeeinrichtung, die in Abhängigkeit von der äußeren Helligkeit automatisch beleuchtet wird, mit

einer Datenverarbeitungseinrichtung zum Verarbeiten eines Empfangssignals und Erzeugen eines anzuzeigenden Informationssignals und eines Steuersignals,

einer Anzeige zum optischen Anzeigen des Informationssignals auf der Anzeigeeinrichtung, das von der Datenverarbeitungseinrichtung abgegeben wird,

einem Lichtsensor zum Ermitteln der äußeren Helligkeit im Bereich der Anzeige, wobei die Helligkeit geringer ist als ein erster vorgegebener Wert, um ein erstes Meßsignal der Datenverarbeitungseinrichtung zuzuführen,

einer Beleuchtungseinrichtung zum Beleuchten der Anzeige in Abhängigkeit vom Steuersignal, das von der Datenverarbeitungseinrichtung abgegeben wird, wobei die Beleuchtungseinrichtung eine Lampe aufweist, und

einer Zeitschalteneinrichtung (82), die betätigt wird, wenn die Lampe eingeschaltet worden ist, und den Betrieb des Lichtsensors (64) bis zum Anlauf eines vorgegebenen Zeitraums verhindert,

wobei die Datenverarbeitungseinrichtung das Steuersignal erzeugt, wenn die von dem Lichtsensor ermittelte äußere Helligkeit geringer ist als der erste vorgegebene Wert.

6. Personenrufgerät nach Anspruch 5, gekennzeichnet durch eine Einrichtung zum Abschalten der Lampe nach Ablauf des vorgegebenen Zeitraums.

Revendications pour les Etats Contractants: DE, FR, GB

1. Dispositif de recherche de personnes avec un affichage (44) qui éclaire automatiquement l'affichage (44) en réponse à une luminance extérieure, comprenant:

—un moyen de traitement des données (34) pour traiter un signal reçu afin de produire un signal d'information devant être affiché et un signal de commande;

—un moyen de visualisation pour afficher optiquement sur l'affichage (44) le signal d'information qui est sorti par le moyen de traitement des données (34);

—un moyen détecteur de lumière (46, 64) pour détecter une luminance extérieure entourant le moyen de visualisation qui est inférieure à une première valeur prédéterminée afin d'appliquer un premier signal de détection au moyen de traitement des données (34);

—un moyen d'éclairage (42) pour éclairer le moyen de visualisation en réponse au signal de commande qui sort du moyen de traitement des données (34), le moyen d'éclairage (42) comportant une lampe;

—le moyen de traitement des données (34)



étant construit pour produire le signal de commande lorsque la luminance extérieure détectée par le moyen détecteur de lumière (46, 64) est inférieure à la première valeur prédéterminée et l'affichage du moyen de visualisation est maintenu;

dans lequel le moyen détecteur de lumière (46, 64) est construit de façon à appliquer un second signal de détection au moyen de traitement des données (34) lors de la détection du fait que la luminance extérieure est supérieure à une seconde valeur prédéterminée qui est plus grande que la première valeur prédéterminée.

2. Dispositif de recherche de personnes selon la revendication 1, comprenant en outre un moyen pour mettre la lampe hors tension en réponse au second signal de détection en provenance du moyen détecteur de lumière (46, 64).

3. Dispositif de recherche de personnes selon la revendication 1 ou la revendication 2, comprenant en outre un moyen pour, après mise sous tension de la lampe, maintenir la mise sous tension de la lampe jusqu'à ce que l'affichage du moyen de visualisation soit achevé.

4. Dispositif de recherche de personnes avec un affichage qui éclaire automatiquement l'affichage en réponse à une luminance extérieure, comprenant:

- un moyen de traitement des données pour traiter un signal reçu afin de produire un signal d'information devant être affiché, et un signal de commande,

- un moyen de visualisation pour afficher optiquement sur l'affichage le signal d'information qui sort du moyen de traitement des données,

- un moyen détecteur de lumière pour détecter une luminance extérieure entourant le moyen de visualisation qui est inférieure à une première valeur prédéterminée afin d'appliquer un premier signal de détection au moyen de traitement des données,

- un moyen d'éclairage pour éclairer le moyen de visualisation en réponse au signal de commande qui sort du moyen de traitement des données, le moyen d'éclairage comprenant une lampe; et

- un moyen de minuterie (82) qui est déclenché lorsque la lampe a été mise sous tension et inhibe le fonctionnement du moyen détecteur de lumière (64) jusqu'à expiration d'une durée prédéterminée,

- le moyen de traitement des données étant construit de façon à produire le signal de commande lorsque la luminance extérieure détectée par le moyen détecteur de lumière est inférieure à la première valeur prédéterminée.

5. Dispositif de recherche de personnes selon la revendication 4, comprenant en outre un moyen pour mettre la lampe hors tension après l'expiration de la durée prédéterminée.

Revendications pour l'Etat Contractant: SE, NL

1. Dispositif de recherche de personnes avec un affichage (44) qui éclaire automatiquement l'affi-

chage (44) en réponse à une luminance extérieure, comprenant:

- un moyen de traitement des données (34) pour traiter un signal reçu afin de produire un signal d'information devant être affiché et un signal de commande;

- un moyen de visualisation pour afficher optiquement sur l'affichage (44) le signal d'information qui est sorti par le moyen de traitement des données (34),

- un moyen détecteur de lumière (46, 64) pour détecter une luminance extérieure entourant le moyen de visualisation qui est inférieure à une première valeur prédéterminée afin d'appliquer un premier signal de détection au moyen de traitement des données (34); et

- un moyen d'éclairage (42) pour éclairer le moyen de visualisation en réponse au signal de commande qui sort du moyen de traitement des données (34), le moyen d'éclairage (42) comportant une lampe;

- le moyen de traitement des données (34) étant construit pour produire le signal de commande lorsque la luminance extérieure détectée par le moyen détecteur de lumière (46, 64) est inférieure à la première valeur prédéterminée et l'affichage du moyen de visualisation est maintenu.

2. Dispositif de recherche de personnes selon la revendication 1, dans lequel le moyen détecteur de lumière (46, 64) est construit de façon à appliquer un second signal de détection au moyen de traitement des données (34) lors de la détection du fait que la luminance extérieure est supérieure à une seconde valeur prédéterminée qui est plus grande que la première valeur prédéterminée.

3. Dispositif de recherche de personnes selon la revendication 2, comprenant en outre un moyen pour mettre la lampe hors tension en réponse au second signal de détection en provenance du moyen détecteur de lumière (46, 64).

4. Dispositif de recherche de personnes selon la revendication 1 ou la revendication 2, comprenant en outre un moyen pour, après mise sous tension de la lampe, maintenir la mise sous tension de la lampe jusqu'à ce que l'affichage du moyen de visualisation soit achevé.

5. Dispositif de recherche de personnes avec un affichage qui éclaire automatiquement l'affichage en réponse à une luminance extérieure, comprenant:

- un moyen de traitement des données pour traiter un signal reçu afin de produire un signal d'information devant être affiché, et un signal de commande,

- un moyen de visualisation pour afficher optiquement sur l'affichage le signal d'information qui sort du moyen de traitement des données;

- un moyen détecteur de lumière pour détecter une luminance extérieure entourant le moyen de visualisation qui est inférieure à une première valeur prédéterminée afin d'appliquer un premier signal de détection au moyen de traitement des données;



—un moyen d'éclairage pour éclairer le moyen de visualisation en réponse au signal de commande qui sort du moyen de traitement des données, le moyen d'éclairage comprenant une lampe; et

—un moyen de minuterie (82) qui est déclenché lorsque la lampe a été mise sous tension et inhibe le fonctionnement du moyen détecteur de lumière (64) jusqu'à expiration d'une durée prédéterminée,

—le moyen de traitement des données étant construit de façon à produire le signal de commande lorsque la luminance extérieure détectée par le moyen détecteur de lumière est inférieure à la première valeur prédéterminée.

6. Dispositif de recherche de personnes selon la revendication 5, comprenant en outre un moyen pour mettre la lampe hors tension après l'expiration de la durée prédéterminée.

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