

## Description

### BACKGROUND OF THE INVENTION

The present invention relates to the structure of a housing of a paging receiver and, more particularly, to the housing structure of a paging receiver of the type having a storage device and an exclusive write terminal for writing code in the storage device.

There is an increasing demand for a paging receiver which is miniature, inexpensive, reliable and easy to maintain. Especially, in the aspect of structure, the demand for easy maintenance and high reliability is keen. A prior art paging receiver usually includes a chamber for accommodating a printed circuit board on which an electrically erasable programmable read only memory (EEPROM) or like storage device for storing a paging number is loaded. Another chamber adjoins the above-mentioned chamber to receive a battery therein. The EEPROM on the printed circuit board is connected by leads to a write terminal for writing the paging number in the EEPROM. The write terminal is provided on the printed circuit board or fitted to a part of a housing of the receiver to show itself for easy access from the outside.

A drawback with the arrangement wherein the write terminal is mounted on the printed circuit board is that the code cannot be written in the EEPROM without disassembling the housing in which the printed circuit board is accommodated and then connecting a writing apparatus to the write terminal. This not only needs troublesome operations but also contradicts to the demand for easy maintenance. On the other hand, the write terminal fitted to a part of the housing brings about a problem that static electricity is apt to be conducted to the EEPROM and various integrated circuits via the write terminal. Such static electricity would destroy the code stored in the EEPROM, cause the receiver to malfunction, and even destroy the whole circuitry in the receiver, critically lowering the reliability of the receiver.

### SUMMARY OF THE INVENTION

It is therefore an object of the present invention to provide a housing structure for a paging receiver which facilitates maintenance, promotes easy writing of code, and has high reliability of operation.

It is another object of the present invention to provide a generally improved housing structure for a paging receiver

A structure of a housing for a paging receiver of the present invention comprises a chamber for accommodating a printed circuit board on which at least storage device for storing code and a write terminal for writing the code in the storage device are mounted, a battery case provided in a space which adjoins the chamber and having an opening which is exposed to

the outside, and a window which is formed through a part of the battery case which adjoins the chamber and which communicates with the chamber. The write terminal is located on the printed circuit board to face the window such that the write terminal is connectible to a connector of a writing apparatus which is inserted through the window as needed.

### BRIEF DESCRIPTION OF THE DRAWINGS

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 in which:

Figs. 1 and 2 are perspective views each showing a different prior art housing structure for a paging receiver;

Fig. 3 is a perspective view showing a housing structure embodying the present invention;

Fig. 4 is a fragmentary section along line IV-IV of Fig. 3;

Fig. 5 is a perspective view demonstrating how to write a paging number with the embodiment of Fig. 3;

Fig. 6 is a fragmentary section associated with Fig. 5;

Fig. 7 is a perspective view showing another embodiment of the present invention; and

Fig. 8 is a fragmentary section associated with Fig. 7.

### DESCRIPTION OF THE PREFERRED EMBODIMENTS

To better understand the present invention, a brief reference will be made to prior art housing structures for a paging receiver which are shown in Figs. 1 and 2.

Referring to Fig. 1, a prior art housing 10 for a paging receiver accommodates therein an EEPROM or similar storage device 12 for storing desired code which is assigned to the paging receiver. A battery case 14 for receiving a battery therein is built in the housing 10 so that a chamber 16 is defined by the battery case 14 and the housing 10. A printed circuit board 18 is disposed in the chamber 16. The battery case 14 has an opening 20 which is usually closed by a lid 22 which forms a part of the housing 10. The EEPROM 12 is mounted on the printed circuit board 18 and connected by leads 26 and 28 to a write terminal 24 so that the code may be written in the EEPROM 12 via the terminal 24. While the write terminal 24 shown in Fig. 1 is directly mounted on the printed circuit board 18, it may be mounted in a part 10a of the housing 10 shown in Fig. 2.

Each of the prior art housing structures shown and described has a problem left unsolved, as previously stated. Specifically, with the arrangement of

Fig. 1, it is necessary to write code in the EEPROM 12 by disassembling the housing 10 in which the printed circuit board 18 is accommodated and then connecting a writing apparatus (not shown) to the write terminal 24. This is not only troublesome but also objectionable from the easy maintenance standpoint. On the other hand, the structure of Fig. 2 suffers from a drawback that static electricity is apt to be conducted to the EEPROM 12 and various integrated circuits via the write terminal 24 which is exposed to the outside through the housing 10a. Such static electricity would destroy the data stored in the EEPROM 12, cause the receiver to malfunction, and even destroy the whole circuitry stored in the receiver, critically lowering the reliability of the receiver.

Referring to Figs. 3 to 8, there are shown preferred embodiments of the present invention which are free from the drawbacks particular to the prior art housing structures as discussed above. In Figs. 3 to 8, the same or similar structural elements as those shown in Figs. 1 and 2 are designated by like reference numerals.

In Figs. 3 and 4, a housing 10 in accordance with the present invention is generally configured in a rectangular parallelepiped. A battery case 14 is built in the housing 10 adjacent to an opening 20 of the housing 10 and defines a chamber 16 in cooperation with the housing 10. A lid 22 is removably mounted on the housing 10 to close the opening 20 while forming a part of the housing 10, whereby a chamber for receiving a battery (not shown) is defined. The housing 10, battery case 14 and lid 22 are each made of a non-conductive material such as polycarbonate. A printed circuit board 18 is disposed in the chamber 16 while an EEPROM 12 is mounted on the circuit board 18 together with various kinds of circuit parts. A write terminal is loaded in one end portion of the printed circuit board 18 and electrically connected to the EEPROM 12 by leads 26 and 28. That part of the battery case 14 which faces the write terminal 24 is provided with an opening or window 14a. This window 14a allows a connector 32 of a writing apparatus 30 which will be described later with reference to Figs. 5 and 6 to be inserted through the window 14a into electrical connection with the write terminal 24.

Figs. 5 and 6 show how a desired code is written in the EEPROM 12. Specifically, the lid 22 (Fig. 3) is removed to expose the battery case 14 to the outside, and then the connector 32 connected to the writing apparatus 30 by a wiring 34 is inserted into the housing 10 via the window 14a to be connected to the write terminal 24. In this condition, a code may be written in the EEPROM 12 which is connected to the writing apparatus 30 via the write terminal 24 and leads 26 and 28. In Fig. 6, the reference numeral 36 designates a resilient contact for connection.

In this particular embodiment, although the write terminal 24 is entirely accommodated in the housing

10, a code can be written in the EEPROM 12 merely by removing the lid 22 and inserting the connector 32 through the window 14a of the battery case 14 into connection with the write terminal 24. This facilitates writing operation and promotes easy maintenance.

As shown in Fig. 4, assume that the distance between the write terminal 24 and the inner surface of the battery case 14 is  $a$ , the thickness of the battery case 14 is  $b$ , the inside dimension of the battery case 14 is  $c$ , and the thickness of the lid 22 is  $d$ . then, the write terminal 24 which is not exposed to the outside is spaced apart from the outer surface of the battery case 14 by a distance  $a + b$  and, when the lid 22 is attached to the housing 10, it is spaced apart from the outer surface of the lid 22 by a distance  $a + b + c + d$ . The influence of static electricity developed outside the housing 10 on the interior of the housing 10 is reduced in proportion to the distance  $a + b$  or  $a + b + c + d$  to protect the EEPROM 12 and other various circuit parts from destruction. Such a structure, therefore, enhances reliable operations of the paging receiver.

Referring to Figs. 7 and 8, another embodiment of the present invention is shown. This embodiment is essentially similar to the previous embodiment except that a non-conductive label 38 is adhered to the battery case 14 to close the window 14a, the label 38 showing the code which is stored in the EEPROM 12. This alternative embodiment has an advantage that a person can see the label 38 and therefore the content stored in the EEPROM 12 simply by removing the lid 22, not to speak of the various advantages described in relation to the first embodiment. In addition, the label 38 which closes the window 14a further enhances the resistivity of the EEPROM 12 and others to static electricity and prevents dust, water and other impurities from reaching the write terminal 24 and printed circuit board 18 through the window 14a.

In summary, a housing for a paging receiver in accordance with the present invention includes a battery case which forms a part of the housing and communicates with the interior of the housing through a window. A connector of a writing apparatus may be inserted into the housing through the window into connection with a write terminal which is electrically connected to a storage device. Hence, a code can be written in the storage device simply by removing a lid which is adapted to close the battery case. This promotes easy writing operation as well as easy maintenance. Since the write terminal is not exposed to the outside of the housing, resistivity to static electricity and hermetic sealing against impurities are enhanced to offer unprecedented reliability of operation.

Various modifications of the arrangements described herein, by way of example, as well as other embodiments will be apparent to those skilled in the art after receiving the teachings of the present disclosure without departing from the scope of the protec-

tion conferred by the terms of the accompanying claims.

### Claims

1. A structure of a housing (10) for a paging receiver, including a chamber (16) for accommodating a printed circuit board (18) on which there are mounted a storage device (12) for storing code and a write terminal (24) for writing the code into the storage device (12), a battery case (14) provided in a space which adjoins the chamber (16) and having an opening (20) which is exposed to the outside, characterised in that there is provided a window (14a) which is formed through a part of the battery case (14) which adjoins the chamber (16), and which communicates with the chamber (16), the write terminal (24) being located on the printed circuit board (18) to face the window (14a) such that the write terminal (24) is connectible to a connector of a writing apparatus (30) which is inserted through the window (14a) as needed.
2. A structure as claimed in claim 1, further comprising a label (38) which closes the window (14a).
3. A structure as claimed in claim 2, wherein the label (38) is adhesive and non-conductive.
4. A structure as claimed in claim 2, wherein the label (38) shows the code which is stored in the storage device (12).
5. A structure as claimed in claim 1, further including a lid (22) for closing the opening (20) of the battery case (14).
6. A structure as claimed in claim 5, wherein the housing (10), the battery case (14) and the lid (22) each made of a non-conductive material.

### Patentansprüche

1. Gehäuseanordnung (10) für einen Rufempfänger mit einer Kammer (16) zur Aufnahme einer gedruckten Schaltungsplatine (18), auf der eine Speichervorrichtung (12) zum Speichern eines Codes und ein Schreibanschluß (24) zum Schreiben des Codes in die Speichervorrichtung (12) angeordnet sind, einem Batteriefach (14), das in einem sich an die Kammer (16) anschließenden Raum vorgesehen ist, und eine Öffnung (20) hat, die zur Außenseite gerichtet ist, dadurch gekennzeichnet, daß ein Fenster (14a) vorgesehen ist,

das durch einen Teil des sich an die Kammer (16) anschließenden Batteriefachs (14) ausgebildet ist, und das mit der Kammer (16) in Verbindung steht, wobei der Schreibanschluß (24) so auf der gedruckten Schaltungsplatine (18) positioniert ist, daß dieser dem Fenster (14a) gegenüberliegt, so daß der Schreibanschluß (24) mit einem Verbinder einer Schreibvorrichtung (30), der durch das Fenster (14a) eingesetzt wird, nach Bedarf verbindbar ist.

2. Anordnung nach Anspruch 1, ferner mit einem Schild (38), das das Fenster (14a) verschließt.
3. Anordnung nach Anspruch 2, wobei das Schild (38) klebend und nicht-leitend ist.
4. Anordnung nach Anspruch 2, wobei das Schild (38) den Code anzeigt, der in der Speichervorrichtung (12) gespeichert ist.
5. Anordnung nach Anspruch 1, ferner mit einem Deckel (22) zum Verschließen der Öffnung (20) des Batteriefachs (14).
6. Anordnung nach Anspruch 5, wobei das Gehäuse (10), das Batteriefach (14) und der Deckel (22) jeweils aus einem nicht-leitenden Material hergestellt sind.

### Revendications

1. Structure de boîtier (10) destinée à un récepteur d'appel, comportant une chambre (16) pour recevoir une carte de circuit imprimé (18) sur laquelle sont montés un dispositif mémoire (12) pour mémoriser un code et une borne d'écriture (24) pour écrire le code dans ledit dispositif mémoire (12), un protège batterie (14) prévu dans un espace qui est contigu à la chambre (16) et ayant une ouverture (20) qui est exposé à l'extérieur, caractérisée en ce qu'il est prévu une fenêtre (14a) qui est formée à travers une partie du protège batterie (14) qui est contigu à la chambre (16) et qui communique avec la chambre (16), la borne d'écriture (24) étant placée sur la carte de circuit imprimé (18) pour être en regard de la fenêtre (14a), de sorte que la borne d'écriture (24) puisse être connectée à un connecteur d'un dispositif d'écriture (30) qui est introduit à travers la fenêtre (14a) comme nécessaire.
2. Structure selon la revendication 1, comprenant de plus une étiquette (38) qui ferme la fenêtre (14a).
3. Structure selon la revendication 2, dans laquelle

tion conferred by the terms of the accompanying claims.

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5. Anordnung nach Anspruch 1, ferner mit einem Deckel (22) zum Verschließen der Öffnung (20) des Batteriefachs (14).
6. Anordnung nach Anspruch 5, wobei das Gehäuse (10), das Batteriefach (14) und der Deckel (22) jeweils aus einem nicht-leitenden Material hergestellt sind.

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1. Structure de boîtier (10) destinée à un récepteur d'appel, comportant une chambre (16) pour recevoir une carte de circuit imprimé (18) sur laquelle sont montés un dispositif mémoire (12) pour mémoriser un code et une borne d'écriture (24) pour écrire le code dans ledit dispositif mémoire (12), un protège batterie (14) prévu dans un espace qui est contigu à la chambre (16) et ayant une ouverture (20) qui est exposée à l'extérieur, caractérisée en ce qu'il est prévu une fenêtre (14a) qui est formée à travers une partie du protège batterie (14) qui est contigu à la chambre (16) et qui communique avec la chambre (16), la borne d'écriture (24) étant placée sur la carte de circuit imprimé (18) pour être en regard de la fenêtre (14a), de sorte que la borne d'écriture (24) puisse être connectée à un connecteur d'un dispositif d'écriture (30) qui est introduit à travers la fenêtre (14a) comme nécessaire.
2. Structure selon la revendication 1, comprenant de plus une étiquette (38) qui ferme la fenêtre (14a).
3. Structure selon la revendication 2, dans laquelle





**l'étiquette (38) est adhésive et non conductrice.**

- 4. Structure selon la revendication 2, dans laquelle l'étiquette (38) montre le code qui est mémorisé dans le dispositif mémoire (12).** **5**
  - 5. Structure selon la revendication 1, comportant de plus un couvercle (22) pour fermer l'ouverture (20) du protège batterie (14).** **10**
  - 6. Structure selon la revendication 5, dans laquelle, le boîtier (10), le protège batterie (14) et le couvercle (22) sont chacun constitués d'un matériau non conducteur.** **15**
- 20**
- 25**
- 30**
- 35**
- 40**
- 45**
- 50**
- 55**
- 5**