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Information card and back connector
Informationskarte und Randverbinder
Carte d’information et connecteur de bord

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• PATENT ABSTRACTS OF JAPAN vol. 013, no. 473 (M-884), 26 October 1989 & JP 01 186391 A (NEC CORP; OTHERS: 01), 25 July 1989,
• PATENT ABSTRACTS OF JAPAN vol. 010, no. 022 (P-424), 28 January 1986 & JP 60 173791 A (MATSUSHITA DENKI SANGYO KK), 7 September 1985,

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Description

[0001] The present invention relates to information cards, such as IC cards or PC cards, from which information is retrieved or in which information is stored, and back connectors and card blanks for such information cards.

[0002] Information cards, such as IC cards or PC cards, are widely used as external memories for electronic equipment. Information cards include a card-like insulating housing and a printed circuit board on which semiconductor memories (RAM, ROM, etc.), a microcomputer, and/or a back-up battery are mounted. Back connectors are provided in the PC cards for connection to other electronic equipment. A pair of parallel metallic panels are provided on a back connector for noise suppression and/or structural reinforcement.

[0003] The metallic panels of a conventional PC card have cut edges on the side of a plug opening, frequently causing cut injury in the hand during operation. The plug opening of a connector is used for connection to other electronic equipment and handled more frequently than other parts of the connector, increasing the frequency of injury.

[0004] In the conventional PC cards, the ground connection to a mating connector plug is made via a shield shell of the back connector and the printed circuit board, making indirect connection to the metallic panel of a PC card.

[0005] For example, Japanese utility model patent application Kokai No. 115581/89 discloses an IC card having a metallic panel with an edge extended and folded so that it is disposed in front of the plug opening. In such a structure, the cut faces of a metallic panel are not exposed, and the ground terminal of a mating connector is brought into direct contact with the metallic panel of an IC card. However, the edge of the metallic panel is extended forwardly to a large extent so that the entire IC card becomes large by that much.

[0006] Japanese patent application Kokai Nos. 186391/89 and 186392/89 disclose an IC card having a metallic cover with its edge folded inwardly toward the plug opening of a mating connector. The folded edge reinforces the metallic cover and/or prevents malfunction or breakdown of the internal IC elements by electrostatic charge but does not make direct contact with the ground of a mating connector. Consequently, the ground connection for the conventional IC card is made indirectly via the receptacle of the IC card and then the card body.

[0007] Accordingly, it is an object of the invention to provide an information card, and a back connector and card blank for the information card, in which these disadvantages are mitigated.

[0008] This object is achieved by the invention claimed in claim 1.

[0009] Embodiments of the invention will now be described by way of example with reference to the accompanying drawings, in which:

Fig. 1 is an exploded perspective view of a part of a PC card according to an embodiment of the invention;

Fig. 2 is a sectional view of a part of the PC card in front of a mating connector plug;

Fig. 3 is a sectional view of a part of the PC card plugged into the mating connector plug;

Fig. 4 is an exploded perspective view of a part of a PC card according to another embodiment of the invention;

Fig. 5 is a sectional view of a part of the PC card of Fig. 4 in front of a mating connector plug; and

Fig. 6 is a sectional view of a part of the PC card of Fig. 5 plugged to the mating connector plug.

[0011] In Fig. 1, the card-like insulating housing 41 (Figs. 2, 3) of the PC card is not shown. The card-like insulating housing accommodates a printed circuit board on which IC devices, such as semiconductor memories and a microcomputer, and a backup battery are mounted. However, this is conventional, and its detailed description is omitted.

[0012] The PC card includes a card-like insulating housing 41 (Figs. 2 and 3) in which a printed circuit board 40 is mounted, metallic upper and lower panels 10 and 20 covering the opposite outer surfaces of the insulating housing 41, and a back connector 30 between the metallic panels 10 and 20 and having a plug opening exposed at one end of the insulating housing 41. The metallic panel 10 is made from a thin conductive metallic sheet and is provided with a portion 11 folded back on the inside. Similarly, the metallic panel 20 is made from a thin conductive metallic sheet provided with a portion 21 folded back on the inside.

[0013] The back connector 30 includes an insulating block 31 having a protruding portion on which contact terminals 33 are arranged and a conductive shield shell 32 mounted on the insulating block 31 and surrounding the plug opening. A cutout portion 32A is provided in the shield shell 32 in front of the plug opening. The cutout portion 32A is dimensioned so as to receive the folded portions 11 and 21 of the metallic panels 10 and 20.

[0014] Fig. 2 shows the PC 1 card including the metallic panels 10 and 20 and the back connector 30 facing a mating connector plug. As described above, the PC card 1 comprises the card-like insulating housing 41 accommodating the printed circuit board 40, the back connector 30 mounted in the housing 41 such that its plug opening is exposed at the end of the housing 41, and the metallic panels 10 and 20 covering the upper and
lower surfaces of the housing 41. The folded portions 11 and 21 of the metallic panels 10 and 20 are fitted in the cutout portion 32A of the shield shell 32. The connection portions of the contact terminals 33 of the back connector 30 are electrically connected to corresponding conductors of the printed circuit board 40.

[0015] The mating connector plug 50 is conventional. For example, it includes an isolating block 51 having a plug projection which is dimensioned so as to fit in the plug opening of the back connector 30, contact terminals 53 provided in the plug projection, and a grounding plate 52 with a contact projection 52A provided on the surface of the plug projection.

[0016] In Fig. 3, the PC card 1 is plugged to the mating connector plug 50. The contact terminals 53 of the mating connector plug 50 are brought into electrical contact with the contact terminals 33 of the back connector 30 while the ground plate 52 of the mating connector plug 50 is brought into electrical contact with the shield shell 32 of the back connector 30 via the compressed contact projection 52A and the folded portion 11 of the metallic panel 10. This makes it possible to connect the metallic panel 10 directly to the ground of the mating plug 50 by bypassing the back connector 30.

[0017] In the embodiment of Fig. 4, the card-like insulating housing of the PC card is again omitted from the figure as in Fig. 1. The PC card includes an insulating housing 41A (Figs. 5 and 6) accommodating a printed circuit board 40, upper and lower metallic panels 60 and 70 covering the opposite outer surfaces of the insulating housing 41A, and a back connector 80. As will be described hereinafter with reference to Figs. 5 and 6, the structure of the back connector is simplified, and the manufacturing cost is reduced.

[0018] The back connector 80 includes an insulating block 81 having a protruding portion on which contact terminals 82 are arranged. The back connector 80 is not provided with a separate shield shell, unlike the embodiment of Figs. 1-3. As will be described hereinafter with reference to Figs. 5 and 6, the shield shell of the back connector 80 in this embodiment is made up of the folded portions 61 and 71 of the metallic panels 60 and 70. In Fig. 6, the PC card 1A is plugged to the mating connector plug 50. The contact terminals 53 of the mating connector plug 50 are brought into electrical contact with the contact terminals 82 of the back connector 80 while the ground plate 52 of the mating connector plug 50 is brought into electrical contact with the folded portion 61 of the metallic panel 60 via the compressed contact projection 52A. This makes it possible to connect the metallic panel 60 directly to the ground of the mating connector plug 50 by bypassing the back connector 80.

[0021] The invention is applied to the PC card in the above embodiments but it is applicable to other information cards as well.

[0022] Using the invention, the sectional area of the metallic panel at the plug opening of an information card is minimized without wasting the space of the information card, such as a PC card, or changing the size of the card. Further, the danger of injuring a hand is avoided, and the card appearance is improved. Since the metallic panels at the plug opening (to which forces are applied upon plugging) are folded back, the PC card and the plug opening are reinforced. The ground of a mating connector is directly connected to the metallic panel by bypassing the connector of a PC card. In the embodiment of Figs. 4-6, the structure of the back connector is simplified, and the manufacturing cost is reduced.

Claims

1. An information card comprising a pair of parallel metallic panels (10,20;60,70) located on the opposite outer surfaces of a card-like insulating housing (41;41A) and a back connector (30;80) located between the metallic panels and having a plug opening exposed at one end of the housing, each metallic panel having a portion folded back (11,21;61,71) on the inside at the plug opening, characterised in that the folded-back portion is adapted for direct connection with a ground element (52,52A) of a mating connector (50), and in that the metallic panel having a portion folded back (11,21;61,71) on the inside at the plug opening, characterised in that the folded-back portion is adapted for direct connection with a ground element (52,52A) of a mating connector (50), and in that the folded-back portion is further adapted to provide direct electrical contact between a shield shell (32;61,71) and the back connector and a ground element (52,52A) of a mating connector.

2. An information card according to claim 1, wherein the shield shell is formed by the folded-back portions (61,71).

3. An information card according to claim 1, wherein the shield shell (32) has a cut-out portion (32A) in
front of the plug opening adapted to receive the fold-
ed-back portions (11, 21) of the panels (10, 20) and
making electrical contact therewith.

4. A back connector (30) for an information card as
claimed in claim 3, including said shield shell (32).

5. A card blank for an information card as claimed in
claim 2, the card blank comprising a pair of parallel
metallic panels (60, 70) located on the opposite out-
er surfaces of a card-like insulating housing (41A),
each metallic panel having a portion folded back
(61, 71) on the inside, characterised in that
the folded-back portion is adapted for direct connection
with a ground element (52, 52A) of a mating connec-
tor (50), and in that the folded-back portion is further
adapted to provide direct electrical contact between
a shield shell (61, 71) for a back connector and a
ground element (52, 52A) of a mating connector, the
shield shell being formed by the folded-back por-
tions.

Patentansprüche

1. Informationskarte, umfassend ein Paar paralleler
metallischer Platten (10; 20; 60; 70), die sich auf
den gegenüberliegenden Außenflächen eines kar-
tenählichen Isoliergehäuses (41; 41A) befinden,
und einen rückseitigen Steckverbinder (30; 80), der
sich zwischen den metallischen Platten befindet
und eine Steckeröffnung aufweist, die an einem En-
de des Gehäuses freiliegend ist, wobei jede metal-
lische Platte einen Abschnitt aufweist, der auf der Innenseite
zurückgebogen (11, 21; 61, 71) ist,
dadurch gekennzeichnet, dass
der zurückgebogene Abschnitt für eine Direktverbindung
mit einem Masseelement (52; 52A) eines Gegen-
steckers (50) gestaltet ist, und dadurch,
dass der zurückgebogene Abschnitt ferner so gestaltet ist,
dass ein direkter elektrischer Kontakt zwischen ei-
 nem Abschirmmantel (61, 71) für einen rückseitigen
Steckverbinder und einem Masseelement (52; 52A)
eines Gegensteckers zustande kommt, wobei der Abschirmmantel von den zurückgebogenen Ab-
schnitten gebildet wird.

2. Informationskarte nach Anspruch 1, bei dem der
Abschirmmantel von den zurückgebogenen Ab-
schnitten (61, 71) gebildet wird.

3. Informationskarte nach Anspruch 1, bei dem der
Abschirmmantel (32) einen Ausschnitt (32A) vor
der Steckeröffnung aufweist, der so gestaltet ist,
dass er die zurückgebogenen Abschnitte (11, 21)
der Platten (10, 20) aufnimmt und damit einen elek-
trischen Kontakt herstellt.

4. Rückseitiger Steckverbinder (30) für eine Informa-
tskaлемент nach Anspruch 3 mit dem genannten Ab-
schirmmantel (32).

5. Kartenrohling für eine Informationskarte nach An-
spruch 2, wobei der Kartenrohling ein Paar paralle-
eroehlingeinschlägig aufgenommenen Außenflächen eines
cartenähnlichen Isoliergehäuses (41A) befinden,
wobei jede metallische Platte einen Abschnitt auf-
weist, der auf der Innenseite zurückgebogen (61, 71)
is, dadurch gekennzeichnet, dass der zur-
rückgebogene Abschnitt für eine Direktverbindung
mit einem Masselement (52; 52A) eines Gegen-
steckers (50) gestaltet ist, und dadurch,
dass der zurückgebogene Abschnitt ferner so gestaltet ist,
dass ein direkter elektrischer Kontakt zwischen ei-
 nem Abschirmmantel (61, 71) für einen rückseitigen
Steckverbinder und einem Masselement (52; 52A)
eines Gegensteckers zustande kommt, wobei der Abschirmmantel von den zurückgebogenen Ab-
schnitten gebildet wird.

Revendications

1. Carte d’information comprenant une paire de pan-
neaux métalliques parallèles (10; 20; 60; 70) situés
sur les surfaces extérieures opposées d’un boîtier isolant pareil à une carte (41; 41A) et un connecteur
arrière (30; 80) situé entre les panneaux métalli-
ques et ayant une ouverture de fiche exposée à une extrémité du boîtier, chaque panneau métallique
ayant une partie repliée en arrière (11, 21; 61, 71)
à l’intérieur au niveau de l’ouverture de fiche, ca-
ractérisée en ce que la partie repliée en arrière est
adaptée pour connexion directe avec un élément de masse (52, 52A) d’un connecteur d’accouplement
(50), et en ce que la partie repliée en arrière est adaptée en outre pour fournir un contact électrique
direct entre une coquille de protection (32; 61, 71)
pour le connecteur arrière et un élément de masse (52, 52A) d’un connecteur d’accouplement.

2. Carte d’information selon la revendication 1, dans
laquelle la coquille de protection est formée par les
parties repliées en arrière (61, 71).

3. Carte d’information selon la revendication 1, dans
laquelle la coquille de protection (32) a une partie
découpée (32A) devant l’ouverture de fiche adap-
tée pour recevoir les parties repliées en arrière (11, 21) des panneaux (10, 20) et établissant un contact électrique avec celles-ci.

4. Connecteur arrière (30) pour une carte d’informa-
tion telle que revendiquée dans la revendication 3,
incluant ladite coquille de protection (32).
5. Ebauche de carte pour une carte d'information telle que revendiquée dans la revendication 2, l'ébauche de carte comprenant une paire de panneaux métalliques parallèles (60, 70) situés sur les surfaces extérieures opposées d'un boîtier isolant pareil à une carte (41A), chaque panneau métallique ayant une partie repliée en arrière (61, 71) à l'intérieur, caractérisée en ce que la partie repliée en arrière est adaptée pour connexion directe avec un élément de masse (52, 52A) d'un connecteur d'accouplement (50), et en ce que la partie repliée en arrière est adaptée en outre pour fournir un contact électrique direct entre une coquille de protection (61, 71) pour un connecteur arrière et un élément de masse (52, 52A) d'un connecteur d'accouplement, la coquille de protection étant formée par les parties repliées en arrière.