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(71) Applicant (for all designated States except US): **FCI ASIA TECHNOLOGY PTE LTD** [SG/SG]; 10 Hoe Chiang Road, #18-00, Keppel Towers, Singapore 089315 (SG).

(72) Inventor; and

(75) Inventor/Applicant (for US only): **JUANG, Aruong** [—/—]; No.21, Alley 3, Lane 42, Hsing-Yu Street, Ping-Chen City, Taoyuan Hsien, Taiwan, R.O.C. (TW).

(74) Agent: **ELLA CEHONG MIRANDAH & SPRUSONS LTD**; Robinson Road Post Office, P.O. Box 1531, Singapore 903031 (SG).

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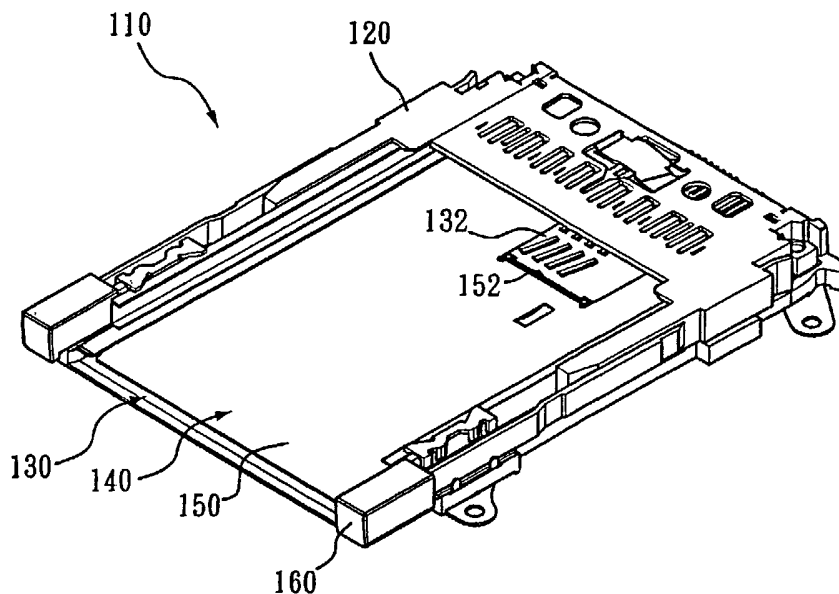
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Declarations under Rule 4.17:

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[Continued on next page]

(54) Title: LOW-PROFILE STACKED MEDIA CARD CONNECTOR



(57) Abstract: Disclosed is a low-profile stacked media card connector (110), having: a housing (120) defining a first storage area (130) for receiving a first card-like media and a second storage area (140) for receiving a second card-like media, the second storage area (140) being stacked above the first storage area (130); a first connecting means (132) being arranged substantially between the first storage area (130) and the second storage area (140); and a second connecting means (142) for connecting the second card-like media, the second connecting means (142) being provided on the housing (120).



MG, MK, MN, MW, MX, MZ, NI, NO, NZ, OM, PG, PH, PL, PT, RO, RU, SC, SD, SE, SG, SK, SL, SY, TJ, TM, TN, TR, TT, TZ, UA, UG, UZ, VC, VN, YU, ZA, ZM, ZW, ARIPO patent (GH, GM, KE, LS, MW, MZ, SD, SL, SZ, TZ, UG, ZM, ZW), Eurasian patent (AM, AZ, BY, KG, KZ, MD, RU, TJ, TM), European patent (AT, BE, BG, CH, CY, CZ, DE, DK, EE, ES, FI, FR, GB, GR, HU, IE, IT, LU, MC, NL, PT, RO, SE, SI, SK, TR), OAPI patent (BF, BJ, CF, CG, CI, CM, GA, GN, GQ, GW, ML, MR, NE, SN, TD, TG)

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Published:

- with international search report

For two-letter codes and other abbreviations, refer to the "Guidance Notes on Codes and Abbreviations" appearing at the beginning of each regular issue of the PCT Gazette.

LOW-PROFILE STACKED MEDIA CARD CONNECTOR

FIELD OF INVENTION

This invention relates to a low-profile stacked media card connector for receiving two media cards, particularly to a stacked media card connector
5 having a low profile.

BACKGROUND OF INVENTION

Single stacked media card connectors formed by stacking connectors for receiving two of media cards are currently available on the market. Some of the stacked media card connectors may receive two PCMCIA cards
10 simultaneously, while the others may receive one PCMCIA card and a non-PCMCIA card, such as a smart card, SD card, or an MMC card.

For such stacked media card connectors, a connecting means that is compatible with the specific media card(s) is electrically connected to the card(s) serving as a communication interface between the media card(s) and the
15 computer.

Fig. 1 illustrates a perspective view of a prior stacked media card connector. As shown in Fig. 1, the prior stacked media card connector 10 comprises: a housing 20 defining a first storage area 30 and a second storage area 40, the second storage area 40 being stacked above the first storage area
20 30, wherein the first storage area 30 and the second storage area 40 are separated by a shield 50.

The prior connector 10 further comprises: a first connecting means 32 for electrically connecting a first card-like media, such as a smart card, the first connecting means being arranged at an outer face of the first storage area 30,
25 and a second connecting means (not shown) for electrically connecting the second card-like media, such as a PCMCIA card, the second connecting means

being provided at an end of the housing 20.

As shown in Fig. 1, though the prior stacked media card connector 10 may receive two media cards at the same time, because such a stacked media card connector for receiving a smart card and a PCMCIA card is constructed by stacking a conventional smart connector over a conventional PCMCIA card connector, a covering 60 must be provide at an outer side thereof for mounting of the first connecting means 32. The covering 60 and the first connecting means 32 jointly increase the overall thickness of the stacked media card connector 10.

In addition, because the first connecting means 32 is provided at an outer side of the conventional PCMCIA card connector, the first storage area 30 must be stacked above the second storage area 40, but not vice versa, when mounting such a stacked media card connector for receiving a smart card and a PCMCIA card to a motherboard, so as to reduce the flexibility in the design of the assembled product.

To meet the consumers' demands for further reduction of the weight and size of computer products, the thickness of a portable computer is a major concern for the consumers in selecting a portable computer.

To further reduce the thickness of the portable computer, the computer manufacturers have been striving to reduce the sizes of various components, even by a difference of 0.2 to 3 mm, in order to reduce the overall thickness of the portable computers.

SUMMARY OF INVENTION

It is thus a primary objective of this invention to provide a stacked media card connector for receiving two media cards, by reducing its thickness to obtain a low-profile stacked media card connector.

It is another objective of this invention to use a connecting means compatible to a specific media card to be part of a shield between two storage spaces for receiving the two media cards.

5 It is a further objective of this invention to provide a stacked media card connector that may be mounted in a regular or an upside-down orientation, to improve flexibility in mounting and designing the assembled product.

To achieve the above objectives, this invention discloses a low-profile stacked media card connector, comprising: a housing defining a first storage area for receiving a first card-like media and a second storage area for receiving
10 a second card-like media, the second storage area being stacked above the first storage area; a first connecting means for connecting the first card-like media, the first connecting means being arranged substantially between the first storage area and the second storage area; and a second connecting means for connecting the second card-like media, the second connecting means being
15 provided on the housing.

The structures and characteristics of this invention can be realized by referring to the appended drawings and explanations of the preferred embodiments.

BRIEF DESCRIPTION OF DRAWINGS

20 Fig. 1 is an exploded perspective of a prior stacked media card connector.

Fig. 2 is a perspective view of a low-profile stacked media card connector according to this invention.

Fig. 3 is an exploded perspective view of Fig. 2.

Fig. 4 is a plan view of Fig. 4.

25 Fig. 5 is a cross-sectional view taken along lines 5-5 of Fig. 4.

DETAILED DESCRIPTIONS OF EMBODIMENTS

Figs. 2, 3 and 4 respectively illustrate a perspective view, an exploded perspective view and a plan view of a low-profile stacked media card connector 110 for receiving two media cards according to this invention.

5 As shown in Figs. 2 and 3, the low-profile stacked media card connector 110 according to this invention comprises: a housing 120 defining a first storage area 130 for receiving a first card-like media, such as a smart card, and a second storage area 140 for receiving a second card-like media, such as a PCMCIA card. The second storage area 140 is stacked above the first storage
10 area 130. The first storage area 130 and the second storage area 140 are separated by a shield 150 for shielding from noises. The shield 150 may be made from a malleable metal sheet.

 The connector 110 further comprises: a first connecting means 132 for electrically connecting the first card-like media, and a second connecting means
15 142 for connecting the second card-like media, the second connecting means being 142 provided on the housing 120. To be compatible with a smart card, the first connecting means 132 may be a smart card connecting module; to be compatible with a PCMCIA card, the second connecting means 142 may be a PCMCIA connecting module.

20 The connector 110 may further be provided with a conventional card ejecting mechanism 160 for ejecting the PCMCICA card received in the second storage area 140, if desired. The ejecting means 160 may be that illustrated in Fig. 1 or any other conventional designs.

 To reduce the overall thickness of the stacked media card connector 110 to
25 meet the market demands, the first connecting means 132 is arranged substantially between the first storage area 130 and the second storage area 140.

With reference with Fig. 3, to facilitate mounting of the first connecting means 132 between the first storage area 130 and the second storage area 140, the housing 120 is formed with a recess 122 for receiving at least a half thickness of the first connecting means 132. The shield 150 is also formed with an opening 152 for receiving another half thickness of the first connecting means 132, such that the first connecting means 132 serves as part of shield 150 between the first and second storage spaces 130, 140 for separating the two storage spaces. Because the connecting means 132 is also made of a metallic material, it can serve to shield noises while inhibiting bending and deformation of the card-like media inserted into the first storage area 130 and allowing smooth insertion, ejection and access to the first card-like media.

With reference to Figs. 4 and 5, when mounting such a low-profile stacked media card connector to a motherboard of a portable computer, the first connecting means 132 and the second connecting means 142 are connected to a common transmission board 170 connected to the motherboard, to serve as a communication interface between the two card-like media and the computer.

According to this invention, because the first connection means 13 is arranged substantially between the first storage area 130 and the second storage area 140, the overall thickness of the connector 110 is reduced by at least 2.1 mm as compared to the connector illustrated in Fig. 1, without effecting the functions of the low-profile stacked media card connector 110 and the portable computer with a significant reduction of the overall thickness of the portable computer.

According to this invention, under a state that is permissible by the circuitry of the computer motherboard, such as that while no circuitry is etched to the motherboard at the location onto which the connector is mounted, the covering 60 shown in Fig. 1 that was previously provided at an outer side of the first connecting means 132 may be eliminated to further reduce the overall

thickness.

Furthermore, because the first connecting means 132 is provided between the first storage area 130 and the second storage area 140, in mounting such a stacked media card connector to a computer motherboard, the connector may be mounted in a conventional manner, similar to that shown in Fig. 1, in which the first storage area 13 is stacked above the second storage area 140 for receiving the PCMCIA card, or in a manner shown in Fig. 5, in which the second storage area 140 for storing the PCMCIA card is stacked over the first storage area 130, to improve flexibility in mounting and designing the assembled product.

This invention is related to a novel creation that makes a breakthrough in the art. Aforementioned explanations, however, are directed to the description of preferred embodiments according to this invention. Various changes and implementations can be made by persons skilled in the art without departing from the technical concept of this invention. Since this invention is not limited to the specific details described in connection with the preferred embodiments, changes to certain features of the preferred embodiments without altering the overall basic function of the invention are contemplated within the scope of the appended claims.

LISTING OF NOMENCLATURES

20	Prior Art	Present invention
10	connector	110 connector
20	housing	120 housing
30	first storage area	122 recess
32	first connecting means	130 first storage area
25	40 second storage area	132 first connecting means

50	shield	140	second storage area
60	covering	142	second connecting means
		150	shield
		152	opening
5		160	ejecting means

WHAT IS CLAIMED IS:

1. A low-profile stacked media card connector, comprising:
 - a housing defining a first storage area for receiving a first card-like media and a second storage area for receiving a second card-like media, the second storage area being stacked above the first storage area;
 - a first connecting means for connecting the first card-like media, the first connecting means being arranged substantially between the first storage area and the second storage area; and
 - a second connecting means for connecting the second card-like media, the second connecting means being provided on the housing.
2. The low-profile stacked media card connector of Claim 1, wherein the housing is formed with a recess for receiving at least half thickness of the first connecting means.
3. The low-profile stacked media card connector of Claim 1, further comprising a shield separating the first and second storage areas.
4. The low-profile stacked media card connector of Claim 3, wherein the shield is formed with an opening for receiving at least half thickness of the first connecting means.
5. The low-profile stacked media card connector of Claim 1, wherein the first card-like media is a smart card and the first connecting means is a smart card connecting module.
6. The low-profile stacked media card connector of Claim 1, wherein the second card-like media is a memory card.
7. The low-profile stacked media card connector of Claim 1, wherein the first and second connecting means are connected to a common transmission board connected to a PCB.

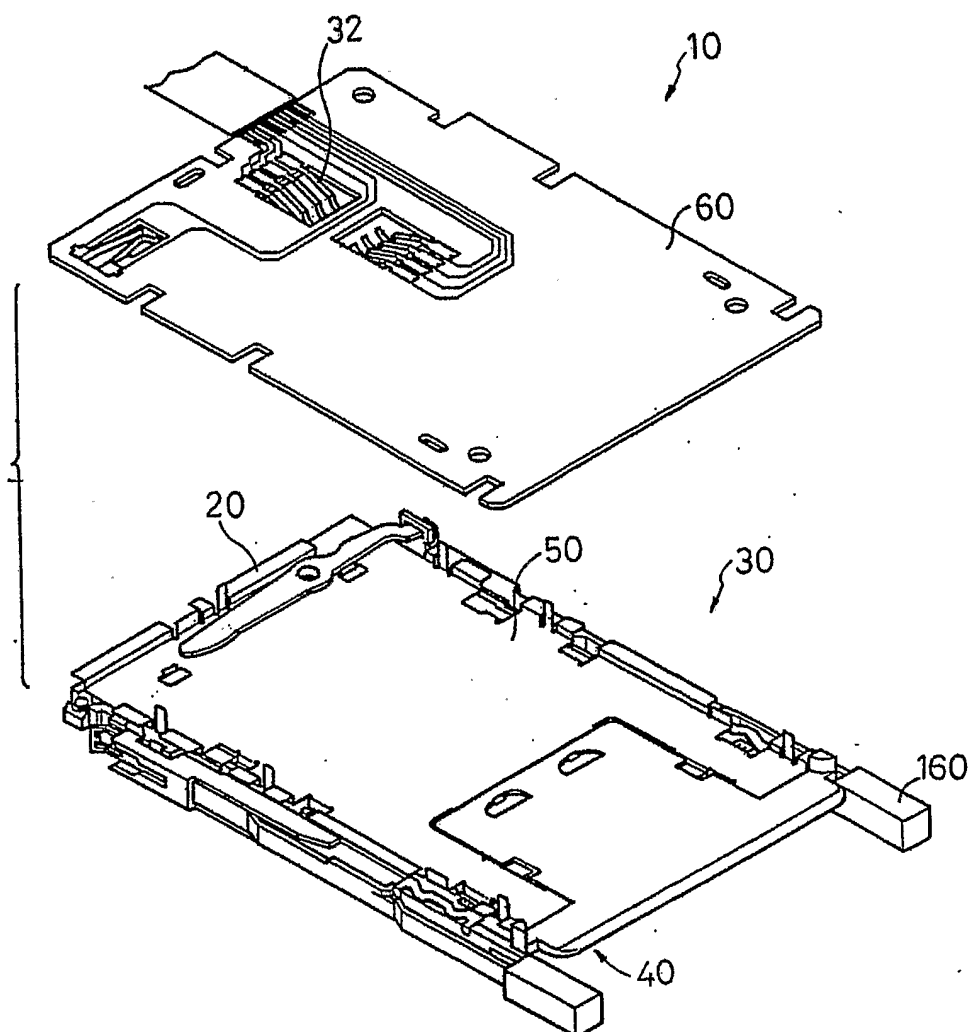


FIG. 1 (PRIOR ART)

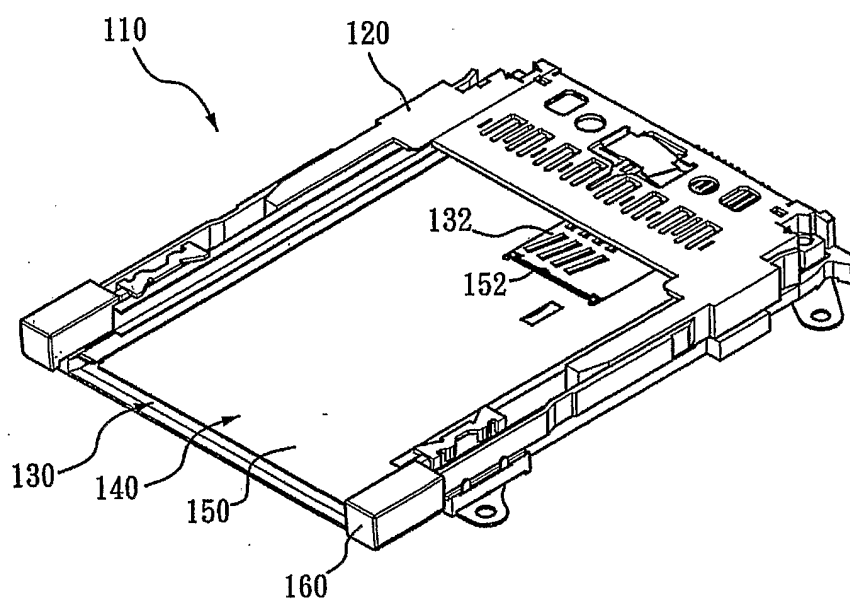


FIG. 2

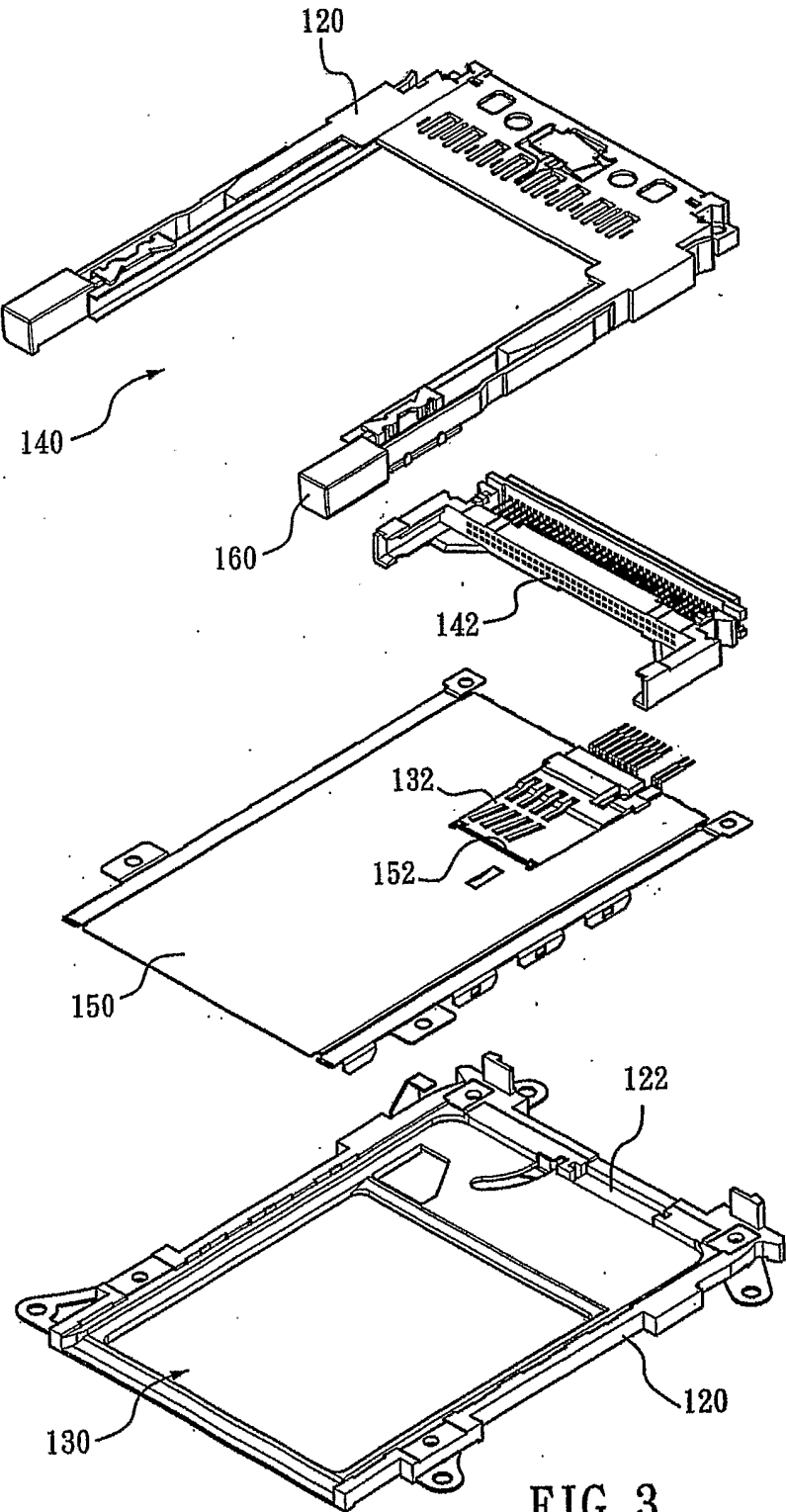
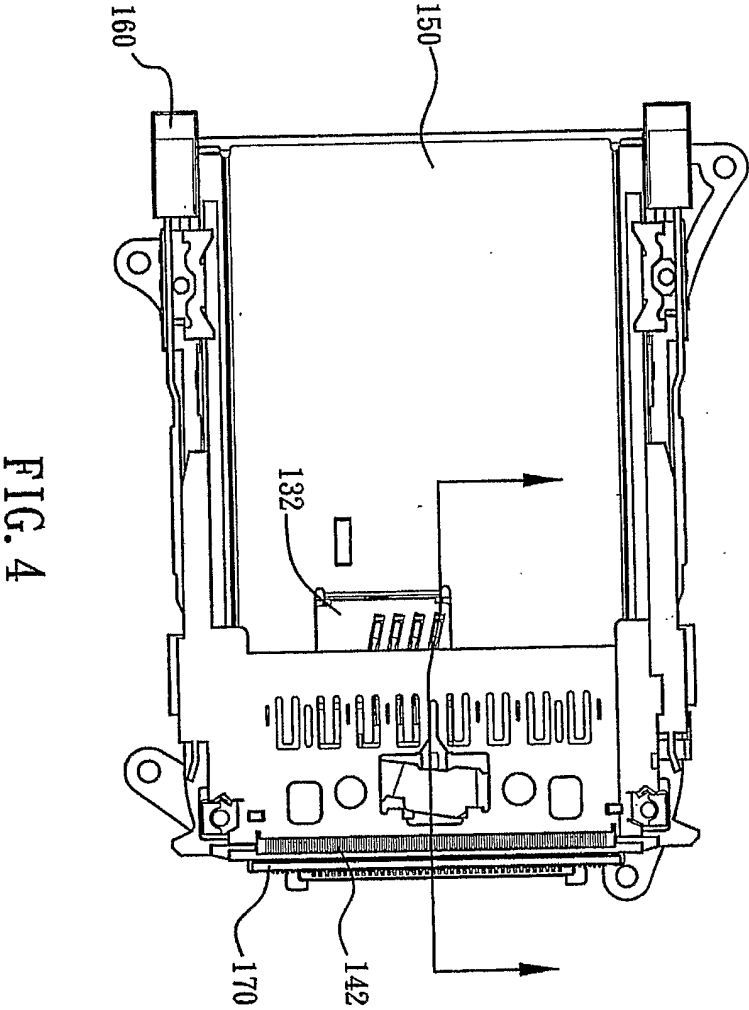
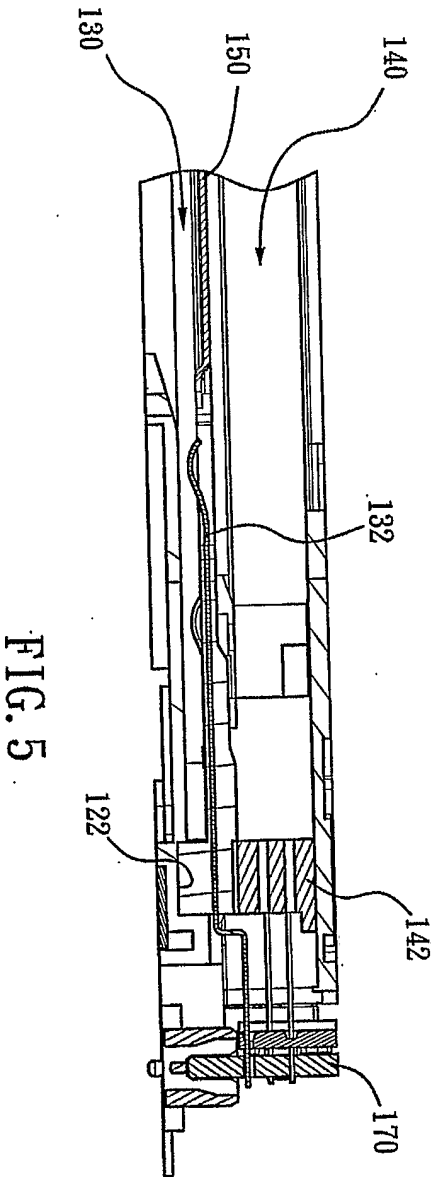


FIG. 3





INTERNATIONAL SEARCH REPORT

International application No.

PCT/SG03/00184

A. CLASSIFICATION OF SUBJECT MATTER

Int. Cl. ⁷: H01R 13/60, 4/16

According to International Patent Classification (IPC) or to both national classification and IPC

B. FIELDS SEARCHED

Minimum documentation searched (classification system followed by classification symbols)

Documentation searched other than minimum documentation to the extent that such documents are included in the fields searched

Electronic data base consulted during the international search (name of data base and, where practicable, search terms used)

DWPI: IPC H01R; G06F; G06K & keywords: (media card, PCMCIA, low profile, stacked, shield, storage) and similar terms.

C. DOCUMENTS CONSIDERED TO BE RELEVANT

Category*	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
A	US 6146193 A (YU) 14 November 2000 Whole document	1-7
A	US 6183273 B (YU ET AL) 6 February 2001 Whole document	1-7
A	US 5324204 A (LWEE) 28 June 1994 Whole document	1-7



Further documents are listed in the continuation of Box C



See patent family annex

* Special categories of cited documents:	
"A" document defining the general state of the art which is not considered to be of particular relevance	"T" later document published after the international filing date or priority date and not in conflict with the application but cited to understand the principle or theory underlying the invention
"E" earlier application or patent but published on or after the international filing date	"X" document of particular relevance; the claimed invention cannot be considered novel or cannot be considered to involve an inventive step when the document is taken alone
"L" document which may throw doubts on priority claim(s) or which is cited to establish the publication date of another citation or other special reason (as specified)	"Y" document of particular relevance; the claimed invention cannot be considered to involve an inventive step when the document is combined with one or more other such documents, such combination being obvious to a person skilled in the art
"O" document referring to an oral disclosure, use, exhibition or other means	"&" document member of the same patent family
"P" document published prior to the international filing date but later than the priority date claimed	

Date of the actual completion of the international search

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25 SEP 2003

Name and mailing address of the ISA/AU

AUSTRALIAN PATENT OFFICE
PO BOX 200, WODEN ACT 2606, AUSTRALIA
E-mail address: pct@ipaustalia.gov.au
Facsimile No. (02) 6285 3929

Authorized officer

A. ALI

Telephone No : (02) 6283 2607

INTERNATIONAL SEARCH REPORT

International application No.
PCT/SG03/00184

C (Continuation). DOCUMENTS CONSIDERED TO BE RELEVANT

Category*	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
A	US 6071149 A (HARA) 6 June 2000 Whole document	1-7
A	US 5316488 A (GARDNER ET AL) 31 May 1994 Whole document	1-7
A	US 5901049 A (SCHMIDT ET AL) 4 May 1999 Whole document	1-7
A	US 5533906 A (ABE) 9 July 1996 Whole document	1-7

INTERNATIONAL SEARCH REPORT

Information on patent family members

International application No.

PCT/SG03/00184

This Annex lists the known "A" publication level patent family members relating to the patent documents cited in the above-mentioned international search report. The Australian Patent Office is in no way liable for these particulars which are merely given for the purpose of information.

Patent Document Cited in Search Report		Patent Family Member			
US	6146193	NONE			
US	6183273	NONE			
US	5324204	EP	532346	JP	6332573
		SG	74617	US	5401176
US	6071149	NONE			
US	5316488	EP	627785	HK	1000373
		SG	46635	JP	7183066
US	5901049	EP	845750		
US	5533906	JP	6264830	GB	2282277
		CN	1101152	JP	7105325
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