STACKED CARD CONNECTOR HAVING TWO ROWS OF TERMINALS EXTENDING OUT OF A BOTTOM SURFACE OF THE CONNECTOR AT A SIDE OPPOSITE TO AN INSERT PORT

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ABSTRACT

A stacked card connector includes a base, a first row of first terminals, and a first row of second terminals. The base is formed with a first slot receiving a first card and a second slot receiving a second card. The contacts of the first terminals are within the first slot to contact the first card. The extensions of the first terminals connect the contacts to the pins respectively and serve as elastic arms. The pins of the first terminals extend out of a bottom surface of the base. The contacts of the terminals are within the second slot to contact the second electric card. The extensions of the second terminals connect the contacts to the pins respectively. The pins of the second terminals extend out of the bottom surface of the base from a side opposite to the insert port of the second slot.
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BACKGROUND OF THE INVENTION

[0001] 1. Field of the Invention

[0002] The invention relates to an electric connector, and in particular to a stacked card connector connecting to an electric card.

[0003] 2. Description of the Related Art

[0004] Referring to FIG. 1, a conventional double-layered stacked card connector is used for an electric card, such as a telephone card or an ATM card, to be inserted into. The card connector includes a lower base 10, an upper base 15, two rows of spaced first terminals 25, two rows of spaced second terminals 30, and a circuit board 20.

[0005] The lower base 10 is formed with a first slot 11 for receiving an electric card, and the first slot 11 has an insert port 12. The upper base 15 is stacked above the lower base 10 and formed with a second slot 16 for receiving another electric card, and the second slot 16 has an insert port 17.

[0006] Each first terminal 25 has a contact 26, an extension 27 and a pin 28. The contacts 26 are in the shapes of convex arcs facing upward, positioned within the first slot 11, and well aligned. The pins 28 extend out of the bottom surface of the lower base 10 from a first side near the insert port 12 and a second side opposite to the insert port 12, respectively.

[0007] Each second terminal 30 has a contact 31, an extension 32 and a pin 33. The contacts 31 are in the shapes of convex arcs facing upward, positioned within the second slot 16, and well aligned. The pins 33 extend out of the bottom surface of the upper base 15 from a first side near the insert port 17 and a second side opposite to the insert port 17, respectively.

[0008] The circuit board 20 is positioned between the upper base 15 and the lower base 10 and formed with two rows of connection terminals 21 at a side opposite to the insert port 12. The pins 33 of the two rows of second terminals are electrically connected to the circuit board 20 and thus to the connection terminals 21 via traces on the circuit board 20.

[0009] According to the above-mentioned structure, when the card connector is mounted on a main board 23, the pins 28 of the two rows of first terminals 25 and the two rows of connection terminals 21 on the circuit board 20 are electrically connected to the main board 23. Thus, the two rows of second terminals 30 may be electrically connected to the main board 23 via the connection terminals 21.

[0010] In the conventional stacked card connector, a circuit board 20 is utilized to stack two bases, each of which having a single slot, into a dual-slot connector. However, due to the addition of the circuit board 20, the manufacturing processes are complicated and the cost may be greatly increased. That is, the cost of a circuit board has to be added. As to the complicated processes, the two rows of connection terminals 21 have to be bonded to the circuit board 20 in advance. Then, the two rows of second terminals 30 have to be bonded to the circuit board 20. Finally, the upper base 15, the circuit board 20, and the lower base 10 have to be stacked.

SUMMARY OF THE INVENTION

[0011] An object of the invention is to provide a stacked card connector, in which the circuit board may be omitted and the manufacturing processes may be simplified, thereby reducing the manufacturing costs.

[0012] To achieve the above-mentioned object, the invention provides a stacked card connector comprising: a base formed with a first slot for receiving a first electric card and a second slot for receiving a second electric card, each of the first and second slots having an insert port, and the second slot being positioned above the first slot; a first row of spaced first terminals, each of the first row of spaced first terminals having a contact, an extension and a pin, the contacts being positioned within the first slot so as to elastically contact the inserted first electric card, the extensions connecting the contacts to the pins respectively and serving as elastic arms, and the pins extending out of a bottom surface of the base; and a first row of spaced second terminals, each of the first row of spaced second terminals having a contact, an extension and a pin, the contacts being positioned within the second slot so as to elastically contact the inserted second electric card, the extensions connecting the contacts to the pins respectively and serving as elastic arms, the pins extending out of the bottom surface of the base from a side opposite to the insert port of the second slot.

BRIEF DESCRIPTION OF THE DRAWINGS

[0013] FIG. 1 is a cross-sectional view showing a conventional stacked card connector.

[0014] FIG. 2 is a cross-sectional view showing a stacked card connector according to a first embodiment of the invention.

[0015] FIG. 3 is a cross-sectional view taken along a line 3-3 of FIG. 2.

[0016] FIG. 4 is a cross-sectional view showing an operation state of the card connector according to the first embodiment of the invention.

[0017] FIG. 5 is a cross-sectional view showing an operation state of the card connector according to a second embodiment of the invention.

[0018] FIG. 6 is a cross-sectional view showing a card connector according to a third embodiment of the invention.

[0019] FIG. 7 is a cross-sectional view showing a card connector according to a fourth embodiment of the invention.

[0020] FIG. 8 is a top view showing the arrangement of the second terminals according to the fourth embodiment of the invention.

DETAILED DESCRIPTION OF THE INVENTION

[0021] Referring to FIG. 2, a stacked card connector according to a first embodiment of the invention includes a base 40, two rows of first terminals 50 and two rows of second terminals 60 and 60'.
The base 40 is composed of a bottom board 41, a middle board 42, and a top board 43, and is formed with a first slot 44 and a second slot 45 for receiving electric cards 35. Each of the first and second slots 44 and 45 has an insert port 46. The second slot 45 is positioned above the first slot 44. Referring to FIGS. 2 and 3, the middle board 42 is formed with spaced terminal slots 47 at a side opposite to the insert port 46, and the terminal slot 47 has a shallower wide slot 48 and a deeper narrow slot 49.

Each first terminal 50 has a contact 51, an extension 52 and a pin 53. The contacts 51 of the two rows of first terminals 50 are in the shapes of convex arcs facing upward, positioned within the first slot 44, and well aligned. Therefore, the contacts 51 may elastically contact the inserted electric card 35. The extensions 52 for connecting the contacts 51 to the pins 53 serve as elastic arms. The pins 53 of the two rows of first terminals 50 extend out of the bottom board 41 from a first side near the insert port 46 and a second side opposite to the insert port 46, respectively.

Each of the second terminals 60 and 60' has a contact 61, an extension 62 and a pin 63. The contacts 61 of the two rows of second terminals 60 and 60' are in the shapes of convex arcs facing upward, positioned within the second slot 45, and well aligned. Therefore, the contacts 61 may elastically contact the inserted electric card 35. The extensions 62 for connecting the contacts 61 to the pins 63 serve as elastic arms. The pins 63 extend out of the bottom board 41 from a side opposite to the insert port 46. The extensions 62 of the second terminals 60 are higher than those of the second terminals 60' while the pins 63 of the second terminals 60 are in front of those of the second terminals 60'. Consequently, the two rows of second terminals 60 and 60' may be positioned within the wide slot 48 and the narrow slot 49 of the base 40, respectively.

Referring to FIG. 4, when the card connector of the invention is electrically connected to the main board 23, the pins 53 of the first terminals 50 and the pins 63 of the second terminals 60 and 60' may be directly inserted into the main board 23. After the electric card 35 is inserted, the main board may receive electrical signals from the electric card 35.

Designing the second terminals 60 and 60' extending out of the bottom board 41 from a side opposite to the insert port 46, the card connector of the invention may be directly electrically connected to the main board 23. Therefore, no additional circuit board has to be provided for signal transmission, thereby facilitating the manufacturing processes and greatly reducing the manufacturing costs accordingly.

As shown in FIG. 5, a card connector according to the second embodiment of the invention is almost the same as that in the first embodiment. The difference between the second and first embodiments resides in that the contacts 61 of the second terminals 60 and 60' within the second slot 45 are in the shapes of convex arcs facing downward. Consequently, two cards 35 have to be oppositely inserted into the first slot 44 and the second slot 45 for electrical connection. The second terminals 60 and 60' located at different heights are mounted within the terminal slots 47 of the top board 43, respectively.

Referring to FIG. 6, a card connector according to the third embodiment of the invention includes a base composed of a lower base 72 and an upper base 70 stacked above the lower base 72. The upper and lower bases 70 and 72 are formed with a second slot 45 and first slot 44, respectively. The second terminals 60 and 60' positioned at different heights are mounted within the terminal slots 47 of the upper base 70, respectively.

Referring to FIGS. 7 and 8, a card connector according to the fourth embodiment of the invention includes a base composed of a lower base 72 and an upper base 70 stacked above the lower base 72, which is the same as that of the third embodiment. The difference between the fourth and third embodiments resides in that the extensions 62 of the second terminals 60 and 60' are flush with each other, and the contacts 61 of the two rows of second terminals 60 and 60' are well aligned and flush with each other. According to such a design, it is not necessary for the terminal slots 47 of the upper base 70 to be designed as wide slots and narrow slots with different depths. However, the extensions 62 of the second terminals 60 have to form bends 65 so that the contacts 61 of the second terminals 60 and 60' may be aligned or flush with each other.

While the invention has been described by way of examples and in terms of preferred embodiments, it is to be understood that the invention is not limited to the disclosed embodiments. To the contrary, it is intended to cover various modifications. Therefore, the scope of the appended claims should be accorded the broadest interpretation so as to encompass all such modifications.

What is claimed is:

1. A stacked card connector, comprising:

   a base formed with a first slot for receiving a first electric card and a second slot for receiving a second electric card, each of the first and second slots having an insert port, and the second slot being positioned above the first slot;

   a first row of spaced first terminals, each of the first row of spaced first terminals having a contact, an extension and a pin, the contacts being positioned within the first slot so as to elastically contact the inserted first electric card, the extensions connecting the contacts to the pins respectively and serving as elastic arms, and the pins extending out of a bottom surface of the base; and

   a first row of spaced second terminals, each of the first row of spaced second terminals having a contact, an extension and a pin, the contacts being positioned within the second slot so as to elastically contact the inserted second electric card, the extensions connecting the contacts to the pins respectively and serving as elastic arms, the pins extending out of the bottom surface of the base from a side opposite to the insert port of the second slot.

2. The stacked card connector according to claim 1, further comprising a second row of spaced second terminals, the extensions of the second row of spaced second terminals and the extensions of the first row of spaced second terminals being positioned at different heights, and the contacts of the second row of spaced second terminals being flush with the contacts of the first row of spaced second terminals.

3. The stacked card connector according to claim 2, wherein the base is formed with spaced terminal slots at a side opposite to the insert port, each of the terminal slots has
a shallower wide slot and a deeper narrow slot, and the first and second rows of the second terminals are positioned within the wide and narrow slots, respectively.

4. The stacked card connector according to claim 1, further comprising a second row of spaced second terminals, the extensions of the second row of spaced second terminals being flush with the extensions of the first row of spaced second terminals, and the contacts of the second row of spaced second terminals being flush with the contacts of the first row of spaced second terminals.

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