

EDGE CARD CONNECTOR

This invention relates to an edge card connector, and more particularly to an edge card connector for use with a memory card.

5 A conventional edge card connector for use with a circuit board includes a plurality of needle eye press-fit terminals, each of which can be press fitted into a hole in the circuit board. Since such press fitting results in deformation of the terminals, it is necessary to provide
10 a support force to the terminals.

Referring to Fig. 1, an edge card connector disclosed in US Patent No. 7,210,955 includes a terminal-positioning plate 92 disposed on a bottom surface of a body 91. Intermediate sections 931 of terminals 93 are clamped
15 between the bottom surface of the body 91 and a top surface of the terminal-positioning plate 92 so that a support force is provided to the terminals 93. Due to the presence of the terminal-positioning plate 92, the manufacturing costs of the edge card connector are increased.

20 Fig. 2 is a bottom perspective view of an edge card connector disclosed in US Patent NO. 7,101,228 that includes a plurality of terminals 94 and a dielectric housing 95. Each of the terminals 94 has a resilient section 941, a first fixed section 942 disposed under the
25 resilient section 941, a needle eye press-fit section 943, and a second fixed section 944 disposed above the needle eye press-fit section 943 for providing a support force

to the corresponding terminal 94 when the needle eye
press-fit section 943 is press fitted into a hole in a
circuit board. However, the design of the second fixed
sections 944 results in complicated structures of the
5 terminals 94. Furthermore, the dielectric housing 95
needs to be formed with a plurality of upright cavities
961 for receiving respectively the second fixed sections
944 of the terminals 94, thereby also resulting in a
complicated structure of the dielectric housing 95.
10 Further, since the first and second fixed sections 942,
944 of each of the terminals 94 are spaced apart from each
other, it is difficult to insert the terminals 94 into
terminal-receiving slots 96.

In addition, US Patent nos. 6,716,068 and 6,312,296 also
15 disclose a terminal formed with two fixed sections, which
have the same drawbacks as the terminals 94.

Therefore, an object of this invention is to provide
an edge card connector that is manufactured and assembled
with ease and that can provide an enhanced support force
20 to terminals.

Another object of this invention is to provide
juxtaposed edge card connectors that have a good heat
dissipating effect.

According to this invention, an edge card connector
25 comprises:

a dielectric housing including an elongated body having
a top side and a bottom side, the top side of the body being

formed with a card-receiving slot that extends along a longitudinal direction of the body and that are defined by two sidewalls, each of the sidewalls being formed with a plurality of terminal-receiving slots spaced apart from each other along the longitudinal direction, each of the terminal-receiving slots being in spatial communication with the card-receiving slot and having an opening at a lower end thereof, the body further having a plurality of stop blocks disposed at the bottom side; and

10 a plurality of conductive terminals each having
 a fixed section fixed within the corresponding terminal-receiving slot,

 a resilient arm extending upwardly from one end of the fixed section,

15 a neck extending downwardly from the other end of the fixed section and through the opening of the corresponding terminal-receiving slot and between two corresponding ones of the stop blocks,

 a support plate section having one end extending from
20 a lower end of the neck and wider than the neck to define a shoulder abutting against the two corresponding ones of the stop blocks, the support plate section having a side surface abutting against the bottom side of the body, and

 a press-fit section extending downwardly from the
25 other end of the support plate section.

The stop blocks cooperate with the support plate sections of the terminals so as to provide an enhanced

support force to the terminals. Furthermore, since the structures of the dielectric housing and the terminals are simple, the terminals can be assembled easily to the dielectric housing, and the edge card connector is made at a low cost.

In one embodiment, the dielectric housing further includes two retainers adapted for retaining an electronic card on the body. The body is disposed between the retainers, and has two opposite end portions connected respectively to the retainers. The retainers have a width along a transverse direction perpendicular to the longitudinal direction, which is smaller than that of the body. As such, when a plurality of juxtaposed edge card connectors of this invention are used, the heat dissipating effect is improved.

These and other features and advantages of this invention will become apparent in the following detailed description of a preferred embodiment of this invention, with reference to the accompanying drawings, in which:

Fig. 1 is a fragmentary, partly sectional, perspective view of an edge card connector disclosed in US Patent No. 7,210,955;

Fig. 2 is a fragmentary, partly sectional, bottom perspective view of an edge card connector disclosed in US Patent NO. 7,101,228;

Fig. 3 is a perspective view of the preferred embodiment of an edge card connector according to this invention;

Fig. 4 is a bottom perspective view of the preferred embodiment;

Fig. 5 is an enlarged view of an area (A) in Fig. 4;

Fig. 6 is a partly exploded bottom perspective view of the preferred embodiment;

Fig. 7 is an enlarged view of an area (B) in Fig. 6;

Fig. 8 is a fragmentary, partly exploded bottom perspective view of the preferred embodiment;

Fig. 9 is an assembled view of Fig. 8;

Fig. 10 is a side view of Fig. 9;

Fig. 11 is a fragmentary, partly sectional, perspective view of the preferred embodiment, illustrating one pair of terminals that are shown entirely;

Fig. 12 is a fragmentary, partly sectional side view of Fig. 11;

Fig. 13 is a view similar to Fig. 11 but illustrating another pair of terminals that are shown entirely;

Fig. 14 is a fragmentary, partly sectional side view of Fig. 13;

Fig. 15 is a perspective view of the preferred embodiment in a state of use with a memory card;

Fig. 16 is an enlarged view of an area (C) of Fig. 15, illustrating a connection between a body and a retainer;

Fig. 17 is a top view of a plurality of juxtaposed edge card connectors of this invention; and

Fig. 18 is a side view of Fig. 17.

For convenience of illustration, in Figs. 4 to 10, the

preferred embodiment of an edge card connector 10 according to this invention is shown in an inverted state.

Referring to Figs. 3 to 7, the edge card connector 10 includes a dielectric housing 1 and a plurality of conductive terminals 2. The dielectric housing 1 includes an elongated body 3 and two retainers 4 for retaining an electronic card 8 (see Fig. 15), such as a memory card, on the body 3. The body 3 is disposed between the retainers 4, and has two opposite end portions connected respectively to the retainers 4. Each of the retainers 4 includes an ejecting member 5.

The body 3 has a top side 31 and a bottom side 32. The top side 31 of the body 3 is formed with a card-receiving slot 33 that extends along a longitudinal direction (F) of the body 3 and that are defined by two sidewalls 34. With further reference to Fig. 8, each of the sidewalls 34 is formed with a plurality of terminal-receiving slots 35 spaced apart from each other along the longitudinal direction (F). Each of the terminal-receiving slots 35 is in spatial communication with the card-receiving slot 33, and has a lower end opening 351 at a lower end thereof. The body 3 further has a plurality of stop blocks 36 disposed at the bottom side 32 of the body 3, and a plurality of recessed support surfaces 37 aligned respectively with the stop blocks 36.

With further reference to Figs. 8 to 11, each of the terminals 2 has a fixed section 21 fixed within the

corresponding terminal-receiving slot 35, a resilient arm 22 extending upwardly from one end of the fixed section 21, a neck 23 extending downwardly from the other end of the fixed section 21 and through the opening 351 of the
5 corresponding terminal-receiving slot 35 and between two corresponding ones of the corresponding stop blocks 36, a support plate section 24 having one end extending from a lower end of the neck 23, and a needle eye press-fit section 25 extending downwardly from the other end of the
10 support plate section 24 and having a needle eye 251. The resilient arm 22 has a contact portion 221 extending into the card-receiving slot 33 and adapted for contact with the electronic card 8 (see Fig. 15). The fixed section 21 has two opposite sides formed with a plurality of barbs
15 211 in contact with inner wall surfaces defining the corresponding terminal-receiving slot 35 to fix the corresponding terminal 2 within the corresponding terminal-receiving slot 35. The support plate section 24 is wider than the neck 23 to define a shoulder 26 (see Fig.
20 8) abutting against two corresponding ones of the stop blocks 36, and has a side surface abutting against the two corresponding ones of the recessed support surfaces 37. The support plate sections 24 of any two adjacent terminals 2 disposed within each of the sidewalls 34 are bent
25 respectively from the corresponding necks 23 in different directions. As such, with further reference to Figs. 11 and 13, the support plate sections 24 of the terminals 2

disposed within each of the sidewalls 34 are arranged in two rows such that the support plate sections 24 in one row is staggered with respect to those in the other row.

5 With further reference to Figs. 12 and 14, the support plate sections 24 of any adjacent pair of the terminals 2 disposed respectively within the sidewalls 34 and aligned with each other in a transverse direction (T) perpendicular to the longitudinal direction (F) are bent respectively from the corresponding necks 23 in the same direction.

10 In an alternative embodiment, the support surfaces 37 may be flat surfaces.

Each of the terminals 2 has a top end 222 abutting against an abutment block 38 of the body 3 so as to provide a preload to the corresponding terminal 2, thereby facilitating electrical contact of the contact portion 221 of the
15 corresponding terminal 2 with the electronic card 8 (see Fig. 15).

Since the side surface of the support plate portion 24 of each of the terminals 2 abuts against the two corresponding ones of the support surfaces 37, and since
20 the shoulder 26 of each of the terminals 2 abuts against the two corresponding ones of the stop blocks 36, when the corresponding needle eye press-fit section 25 is press fitted into a hole (not shown) in a circuit board, a support force is provided to the corresponding terminal 2 to thereby
25 prevent upward movement of the support plate section 24 and, thus, the corresponding fixed section 21.

With further reference to Figs. 15 and 16, the electronic card 8 is retained on the body 3 by the ejecting members 5 of the retainers 4. The ejecting members 5 are operable to eject the electronic card 8 from the body 3.

5 In this embodiment, the retainers 4 have a width along the transverse direction (T), which is smaller than that of the body 3. The sidewalls 34 of the body 3 are formed respectively with two ribs 341 that project respectively therefrom away from each other and that are adjacent to
10 the bottom side 32 of the body 3. Each of the ribs 341 extends along the longitudinal direction (F). The body 3 has two opposite side surfaces each having two inclined surface portions 39 disposed respectively at two opposite end portions thereof such that the width of each of the
15 opposite end portions of the body 3 reduces gradually toward the corresponding retainer 4. With reference to Figs. 17 and 18, when a plurality of juxtaposed edge card connectors of this invention are used, air can flow thereamong due to the presence of the ribs 341 and the inclined surfaces
20 39, thereby dissipating heat from the electronic cards 8. Thus, the heat dissipating effect is improved.

In view of the above, the edge card connector of this invention has the following advantages:

- (1) The housing 1 includes the stop blocks 36 and support
25 surfaces 37 for providing a support force to the terminals 2, thereby reducing the manufacturing costs of the edge card connector, as compared to the

above-mentioned conventional edge card connector having the terminal-positioning plate 92 (see Fig. 1).

- 5 (2) The structures of the terminals 2 are simpler than those of the above-mentioned conventional terminals 94 (see Fig. 2) having the first and second fixed sections 942, 944 (see Fig. 2). Furthermore, the housing 1 does not need to be formed with the upright cavities 961 (see Fig. 2). Thus, the housing 1 and the
- 10 terminals 2 can be formed easily, and the terminals 2 can be assembled easily to the housing 1.
- (3) Since the retainers 4 are narrower than the body 3, when the plurality of the juxtaposed edge card connectors of this invention are used, an enhanced
- 15 heat dissipating effect can be obtained.

CLAIMS:

1. An edge card connector comprising:

- 5 a dielectric housing including an elongated body having a top side and a bottom side, the top side of the body being formed with a card-receiving slot that extends along a longitudinal direction of the body and that are defined by two sidewalls, each of the sidewalls being formed with a plurality of terminal-receiving slots spaced apart from each other along the longitudinal direction, each of the terminal-receiving slots being in spatial communication with the card-receiving slot and having an opening at a lower end thereof, the body further having a plurality of stop blocks disposed at the bottom side; and
- 10 a plurality of conductive terminals each having a fixed section fixed within the corresponding terminal-receiving slot,
- 15 a resilient arm extending upwardly from one end of the fixed section,
- 20 a neck extending downwardly from the other end of the fixed section and through the opening of the corresponding terminal-receiving slot and between two corresponding ones of the stop blocks,
- 25 a support plate section having one end extending from a lower end of the neck and wider than the neck to define a shoulder abutting against the two corresponding ones of the stop blocks, the support plate section having

a side surface abutting against the bottom side of the body, and

a press-fit section extending downwardly from the other end of the support plate section.

- 5 2. The edge card connector as claimed in Claim 1, wherein the body further has a plurality of recessed support surfaces, the side surface of the support plate section of each of the terminals abutting against two corresponding ones of the recessed support surfaces of
10 the body.
3. The edge card connector as claimed in Claim 1, wherein the dielectric housing further includes two retainers adapted for retaining an electronic card on the body, the body being disposed between the retainers and having
15 two opposite end portions connected respectively to the retainers, the retainers having a width along a transverse direction perpendicular to the longitudinal direction, which is smaller than that of the body.
4. The edge card connector as claimed in Claim 3, wherein
20 the body has two opposite side surfaces each having two inclined surface portions disposed respectively at two opposite end portions thereof such that the width of each of the opposite end portions of the body reduces gradually toward the corresponding retainer.
- 25 5. The edge card connector as claimed in Claim 1, wherein the sidewalls of the body are formed respectively with two ribs that project respectively therefrom away from

each other and that are adjacent to the bottom side of the body, each of the ribs extending along the longitudinal direction.

5 6. The edge card connector as claimed in Claim 1, wherein the press-fit section of each of the terminals has a needle eye.

10 7. The edge card connector as claimed in Claim 1, wherein the resilient arm of each of the terminals has a contact portion extending into the card-receiving slot and adapted for contact with the electronic card.