

EDGE CARD CONNECTOR

5 This invention relates to an edge card connector mounted to a circuit board, and more particularly to an edge card connector allowing for insertion of an edge of an electronic card.

10 Referring to Fig. 1, an electrical connector 1 disclosed in US Patent No. 6,319,022 includes a dielectric elongated housing 11, a plurality of terminals 12 disposed in the housing 11 and having tail portions extending outwardly of the housing 11, two boardlocks 13 extending respectively from two opposite ends of the housing 11, and a pair of guiding posts 14 disposed at a bottom portion of the housing 11 and between the boardlocks 13. During assembly of the electrical connector 1 to a circuit board, the boardlocks 13 and the guiding posts 14 are first inserted into and retained fixedly on the circuit board. Next, the tail portions of the terminals 12 are soldered respectively to contacts on the circuit board.

20 The electrical connector 1 has a drawback. That is, when soldering the terminals 12 to the circuit board, since the boardlocks 13 and the guiding posts 14 are fixed on the circuit board, and since the heat expansion coefficients of the materials of the housing 11 and the circuit board are different, expansion of the housing 11 and the circuit board results in misalignment of the tail portions of the terminals 12 from the contacts on the circuit board, respectively. Such misalignment affects

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adversely electrical connection between the electrical connector 1 and the circuit board.

Referring to Fig. 2, an electrical connector 2 disclosed in US Patent No. 5,230,638 includes an elongated dielectric housing 21, a plurality of terminals 22 disposed in the housing 21, a middle mounting peg 23 disposed at a middle portion of the housing 21, and two side mounting pegs 24 disposed respectively at two opposite ends of the housing 21. The middle mounting peg 23 is fit tightly within a hole 201 in a circuit board 20. The side mounting pegs 24 have a V-shaped cross-section, and are inserted respectively into holes 202 in the circuit board 20. As such, the side mounting pegs 24 are movable respectively within the holes 202 so as to maintain alignment of the terminals 22 with the contacts on the circuit board 20, respectively, when soldering the terminals 22 to the circuit board 20. The structure of the side mounting pegs 24, however, is complex to thereby result in a high manufacturing cost. Furthermore, since the degree of the compliant ability provided by the side mounting pegs 24 is limited, when the difference between the heat expansion coefficients of the housing 21 and the circuit board 20 is large, the terminals 22 may be misaligned from the contacts on the circuit board 20.

Therefore, the object of this invention is to provide an edge card connector that is mounted to a circuit board by a simple structure, which is movable on the circuit board

by a greater distance to allow for alignment of terminals of the edge card connector with contacts on the circuit board when soldering the terminals to the contacts, respectively.

5 Accordingly, an edge card connector of this invention is adapted to be mounted on a circuit board. The circuit board has two first through holes and a second through hole located between the first through holes. The edge card connector comprises:

10 an elongated dielectric body extending in a longitudinal direction and having a bottom portion;

 a plurality of conductive terminals disposed in the dielectric body;

 two upright plates disposed respectively at two opposite
15 ends of the dielectric body and projecting from the bottom portion of the dielectric body, each of the upright plates having an insert portion that is adapted to extend into a corresponding one of the first through holes in the circuit board and that has a width smaller than the diameter
20 of the corresponding one of the first through holes in the circuit board to thereby allow the insert portion of a corresponding one of the upright plates to move within the corresponding one of the first through holes in the circuit board in the longitudinal direction; and

25 a positioning member disposed at the bottom portion of the dielectric body and between the two upright plates, the positioning member being adapted to engage the second

through hole in the circuit board in such a manner to prevent movement of the positioning member within the second through hole in the circuit board.

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

 Fig. 1 is a perspective view of an electrical connector disclosed in US Patent No. 6,319,022;

10 Fig. 2 is a perspective view of an electrical connector disclosed in US Patent NO. 5,230,638;

 Fig. 3 is a partly exploded perspective view of the first preferred embodiment of an edge card connector according to this invention, a circuit board, and an electronic card;

15 Fig. 4 is an exploded bottom perspective view of the first preferred embodiment and the circuit board;

 Fig. 5 is a side view of the first preferred embodiment and the circuit board;

20 Fig. 6 is a sectional view taken along Line 6-6 in Fig. 5;

 Fig. 7 is a sectional view taken along Line 7-7 in Fig. 5;

 Fig. 8 is an assembled top perspective view of the first preferred embodiment and the circuit board;

25 Fig. 9 is an assembled bottom perspective view of the first preferred embodiment and the circuit board;

 Fig. 10 is a schematic view illustrating movement of

an upright plate within a first through hole in the circuit board; and

Fig. 11 is an exploded bottom perspective view of the second preferred embodiment of an edge card connector according to this invention and a circuit board.

Before the present invention is described in greater detail in connection with the preferred embodiments, it should be noted that similar elements and structures are designated by like reference numerals throughout the entire disclosure.

Referring to Figs. 3, 4, and 5, the first preferred embodiment of an edge card connector 3 according to this invention is adapted to be mounted on a side surface 400 of a circuit board 4, and allows for insertion of a bottom edge of an electronic card 5.

The circuit board 4 has two first through holes 41 and a second through hole 42 located between the first through holes 41. The side surface 400 of the circuit board 4 has a plurality of contacts 401 disposed between the second through hole 42 and each of the first through holes 41.

The edge card connector 3 includes a dielectric body 31, two latch/eject members 32, a plurality of conductive terminals 33, two upright plates 34, and a positioning member 35. The dielectric body 31 is elongated, and defines longitudinal and transverse directions 301, 302. That is, the dielectric body 31 extends in the longitudinal direction 301. The dielectric body 31 has a top portion

311 and a bottom portion 312. The top portion 311 is formed with a card-receiving slot 313 extending along the longitudinal direction 301. The bottom portion 312 has two first retaining grooves 314 formed respectively in two opposite ends thereof, a second retaining groove 315 disposed between the first retaining grooves 314, and a plurality of terminal-receiving grooves 316 arranged in the longitudinal direction 301. Each of the terminals 33 is received within the corresponding terminal-receiving groove 316, and has a solder end 331 exposed outwardly of the bottom portion 312 of the dielectric body 31. The latch/eject members 32 are disposed respectively and pivotally at two opposite ends of the top portion 311, and are used to hold respectively two sides of the electronic card 5 when the electronic card 5 is inserted into the card-receiving slot 313. The latch/eject members 32 are operable to eject the electronic card 5 from the edge card connector 3.

With further reference to Fig. 6, the upright plates 34 are disposed respectively within the first retaining grooves 314 in the dielectric body 31, and project from the bottom portion 312 of the dielectric body 31. Each of the upright plates 34 has an insert portion 341 that extends into the corresponding first through hole 41 in the circuit board 4 and that has a width (W) (see Fig. 6) smaller than the diameter 411 of the corresponding first through hole 41 to allow the insert portion 341 of the corresponding

upright plate 34 to move within the corresponding first through hole 41, as shown in Fig. 10. Each of the upright plates 34 further has a mounting portion 342 disposed within the corresponding first retaining groove 314 and above the insert portion 341 and formed with a plurality of projections 343 in frictional contact with a wall defining the corresponding first retaining groove 314 for preventing removal of the corresponding upright plate 34 from the corresponding first retaining groove 314, and a tapered lower guiding end 344 for guiding insertion of the corresponding insert portion 341 into the corresponding first through hole 41. In this embodiment, each of the upright plates 34 extends in a direction perpendicular to the longitudinal direction 301.

The positioning member 35 is disposed at the bottom portion 312 of the dielectric body 31 and between the upright plates 34, and engages the second through hole 42 in the circuit board 4 in such a manner to prevent movement of the positioning member 35 within the second through hole 42. In this embodiment, the positioning member 35 is inverted U-shaped, is formed from a metal plate, and has a mounting portion 351 and two legs 352 extending downwardly from the mounting portion 351 and spaced apart from each other. The mounting portion 351 is disposed within the second retaining groove 315 in the dielectric body 31, and is formed with a plurality of projections 353 in frictional contact with a wall defining the second retaining groove

315 for preventing removal of the positioning member 35 from the second retaining groove 315. The legs 352 extend into the second through hole 42 in the circuit board 4, and are formed respectively with aligned projections 354 that extend away from each other and that are disposed under the circuit board 4 for preventing downward removal of the circuit board 4 from the positioning member 35.

When it is desired to solder the edge card connector 3 to the circuit board 4, the positioning member 35 and the upright plates 34 are first inserted respectively into the second through hole 42 and the first through holes 41, as shown in Figs. 6 and 7. Next, the solder ends 331 of the terminals 33 are soldered respectively to the contacts 401 of the circuit board 4, as shown in Fig. 8.

The upright plates 34 are positioned relative to the dielectric body 31 such that, when soldering the solder ends 331 of the terminals 33 respectively to the contacts 401 of the circuit board 4, whether each of the upright plates 34 is located in a left limit position shown by solid lines in Fig. 10 or a right limit position shown by phantom lines in Fig. 10, the solder ends 331 of the terminals 33 are aligned respectively with the contacts 401 of the circuit board 4. In other words, even though either of the upright plates 34 comes into contact with a wall of the circuit board 4 defining the corresponding second through hole 41, the solder ends 331 of the terminals 33 can be located respectively on the contacts 401 of the circuit

board 4.

Fig. 11 shows a modified positioning member 35' that has a cylindrical portion 351' engaging fittingly the second through hole 42 in the circuit board 4, and a frusto
5 lower end 352' for guiding insertion of the positioning member 35' into the second through hole 42.

CLAIMS:

1. An edge card connector adapted to be mounted on a circuit board, the circuit board having two first through holes and a second through hole located between the first through holes, the edge card connector comprising:
 - an elongated dielectric body extending in a longitudinal direction and having a bottom portion;
 - a plurality of conductive terminals disposed in the dielectric body;
 - two upright plates disposed respectively at two opposite ends of the dielectric body and projecting from the bottom portion of the dielectric body, each of the upright plates having an insert portion that is adapted to extend into a corresponding one of the first through holes in the circuit board and that has a width smaller than the diameter of the corresponding one of the first through holes in the circuit board to thereby allow the insert portion of a corresponding one of the upright plates to move within the corresponding one of the first through holes in the circuit board in the longitudinal direction; and
 - a positioning member disposed at the bottom portion of the dielectric body and between the two upright plates, the positioning member being adapted to engage the second through hole in the circuit board in such a manner to prevent movement of the positioning member within the second through hole in the circuit board.

2. The edge card connector as claimed in Claim 1, wherein the dielectric body further has two first retaining grooves formed respectively in the two opposite ends thereof, each of the upright plates further having a mounting portion that is disposed within a corresponding one of the first retaining grooves in the dielectric body and above the insert portion and that is formed with a plurality of projections in frictional contact with a wall defining the corresponding one of the first retaining grooves for preventing removal of a corresponding one of the upright plates from the corresponding one of the first retaining grooves in the dielectric body.
3. The edge card connector as claimed in Claim 2, wherein the dielectric body further has a second retaining groove disposed between the first retaining grooves, the positioning member having a mounting portion that is disposed within the second retaining groove in the dielectric body and that is formed with a plurality of projections in frictional contact with a wall defining the second retaining groove for preventing removal of the positioning member from the second retaining groove in the dielectric body, and two legs extending downwardly from the mounting portion of the positioning member and adapted to extend into the second through hole in the circuit board.
4. The edge card connector as claimed in Claim 3, wherein

the side surface of the circuit board has a plurality of contacts disposed between the second through hole and each of the first through holes, each of the conductive terminals having a solder end exposed outwardly of the bottom portion of the dielectric body, the upright plates being positioned such that, during assembly, when soldering the solder ends of the conductive terminals respectively to the contacts of the circuit board, the solder ends of the conductive terminals are aligned respectively with the contacts of the circuit board even though either of the upright plates comes into contact with a wall of the circuit board defining a corresponding one of the first through holes.

5. The edge card connector as claimed in Claim 1, wherein the positioning member has a cylindrical portion engaging fittingly the second through hole in the circuit board.

6. The edge card connector as claimed in Claim 5, wherein the side surface of the circuit board has a plurality of contacts disposed between the second through hole and each of the first through holes, each of the conductive terminals having a solder end exposed outwardly of the bottom portion of the dielectric body, the upright plates being positioned such that, during assembly, when soldering the solder ends of the conductive terminals respectively to the contacts of the circuit board, the solder ends of the conductive terminals are aligned

respectively with the contacts of the circuit board even though either of the upright plates comes into contact with a wall of the circuit board defining a corresponding one of the first through holes.

- 5 7. The edge card connector as claimed in Claim 1, wherein each of the upright plates extends in a direction perpendicular to the longitudinal direction.
8. The edge card connector as claimed in Claim 1, wherein the side surface of the circuit board has a plurality of contacts disposed between the second through hole and each of the first through holes, each of the conductive terminals having a solder end exposed outwardly of the bottom portion of the dielectric body, the upright plates being positioned such that, during assembly, when soldering the solder ends of the conductive terminals respectively to the contacts of the circuit board, the solder ends of the conductive terminals are aligned respectively with the contacts of the circuit board even though either of the upright plates comes into contact with a wall of the circuit board defining a corresponding one of the first through holes.
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