

"ELECTRICAL CONNECTOR"

FIELD OF THE INVENTION

The present invention relates to an electrical connector. More particularly but not exclusively it relates to an electrical connector adapted for receiving a daughter card or the like.

BACKGROUND OF THE INVENTION

Electrical connectors for daughter cards are used in various electronic devices including routers, switches, servers, and networking equipment. Figure 1 illustrates a typical electrical connector with an inserted daughter card. The electrical connector in Figure 1 has an elongated housing with a slot for receiving a daughter card. The daughter card is held in place via two latches at the two ends of the housing. There are projections on the latches for engaging with corresponding notches on the daughter card to secure or retain the daughter card. To remove the daughter card from the connector, the latches are opened to disengage the projections on the latches from the notches on the daughter card as shown in Figure 2. In this opened position, the overall longitudinal length of the connector increases relative to the closed position, i. e. length Y 201 is greater than length X 101. This in turn increases the estate area required by the connector. With the shift to smaller electronic devices reducing the space required is desirable. As illustrated in Figure 3 the longitudinal length Z 301 of the connector of the present invention is shorter than even the closed position longitudinal length X 101 of the prior art connectors.

SUMMARY OF THE INVENTION

It is therefore an object of the present invention to provide an electrical connector that overcomes or at least ameliorates some of the abovementioned disadvantages or which at least provides the public or industry with a useful choice.

Other objects of the invention may become apparent from the following description which is given by way of example only.

According to the invention there is provided an electrical connector for receiving a daughter card having a plurality of conductive surfaces, said electrical connector comprising:

an elongated housing having a slot for receiving, said daughter card, said slot having electrical terminals for engaging said plurality of conductive surfaces on said daughter card and
5 for electrically connecting said daughter card to said connector;

an arm extending from at least one end of said elongated housing; and

a latch pivotally connected to said arms, said latch pivotal about an axis substantially parallel to a longitudinal axis of said housing, said latch rotatable between a first position at which said daughter card is retained within said elongated slot and a second position at which
10 said daughter card is unrestrained,

wherein the longitudinal axis of said connector is not increased when said latch is in said second position.

The latch preferably has a retaining finger at a first end, said retaining finger engageable in a corresponding notch of said daughter card in said first position.

15 The latch preferably further has an ejection lever at the opposite end of said latch to said retaining finger, said ejection lever usable to move said latch from said first position to said second position.

The arm preferably further has a latch pivot limiter having first and second pivot limiting surfaces, said pivot limiting surfaces being substantially perpendicular to each other,
20 said first pivot limiting surface limiting the movement of said latch when pivoted to said first position and said second pivot limiting surface limiting the movement of said latch when pivoted to said second position.

The latch preferably further has an ejection member adapted to push said daughter card from said slot when said latch is moved from said first to said second position.

25 A detent is preferably included on at least one side of said latch to retain the latch in said first position.

A protuberance is preferably provided on each side of each said latch, said protuberance is engageable with holes on each said arm to form the pivot axis.

Each end of said elongated slot preferably has an arm having a latch pivotally connected.

The daughter card is preferably a memory module.

Other aspects of the invention may become apparent from the following description
5 which is given by way of example only and with reference to the accompanying drawings.

BRIEF DESCRIPTION OF THE DRAWINGS

The invention will now be described by way of example only and with reference to the drawings in which:

Figure 1 is a front view of a connector in a closed position with a daughter card
10 inserted according to the prior art;

Figure 2 is a front view of a connector in an opened position according to the prior art;

Figure 3 is a front view of a connector with a daughter card inserted;

Figure 4 is a perspective view of the connector in an eject position without a daughter
15 card;

Figure 5 is an exploded and close up view of the connector in Figure 4;

Figure 6 is cross sectional view of the connector in a locked position;

Figure 7 is a cross sectional view of the connector in an eject position; and

Figure 8 is a perspective view of the connector showing a detent.

20 DETAILED DESCRIPTION OF THE DISCLOSED EMBODIMENTS

The term “comprising” as used in this specification and claims means “consisting at least in part of”. When interpreting statements in this specification and claims which include that term, the features, prefaced by that term in each statement, all need to be present but other features can also be present. Related terms such as “comprise” and “comprised” are to
25 be interpreted in the same manner.

Figure 3 illustrates the front view of an exemplary embodiment of the invention. An electrical connector 1 has a daughter card 2 inserted. When the connector 1 of the present invention is used for mounting a daughter card 2 substantially parallel to a main board, Figure 3 may then be seen as the top view of the connector. The connector 1 is
 5 advantageous when connecting a daughter card 2 parallel or perpendicular to a main board.

The overall longitudinal length Z 301 of the connector 1 does not change when the latches 3, 4 are moved from a first closed or retained position to a second open or unrestrained position. The latches 3, 4 pivot on an axis substantially parallel to the longitudinal axis of the connector. The workings of the latches will be described in more
 10 detail below.

With reference to Figure 4, the electrical connector 1 has an elongated insulated housing 5 with a pair of arms 6, 7 extending from opposite ends of the housing 5. The latches 3, 4 are releasably and pivotally connected to the arms 6, 7. The latches 3, 4 pivot about an axis parallel to the longitudinal axis A-A 401 of the housing 5. A slot 8 is disposed within the
 15 housing 5 to allow a daughter card 2 to be inserted. A plurality of electrical contacts 9 are located in the slot 8 to electrically connect with an inserted daughter card 2.

Figure 5 shows a close up and exploded view a latch 3 and arm 6. The latch 3 has protuberances 10 on either side of the latch 3 (only shown on one side in Figure 5). These protuberances 10 snap fit into corresponding holes 11 in the arm 6. To enable assembly slots
 20 402 guide the protuberances 10 into the holes 11. The protuberances 10 and the holes 11 form the axis from which the latch 3 pivots.

Alternatively the pivot axis may be formed by a rod connecting the two holes 11. The rod may be moulded when the connector 1 is manufactured. A complementary channel in the latch 3 may be snapped onto the horizontal bar allowing the latch to pivot.

The latch 3 has a retaining finger 12 projecting from the main body 404 of the latch 3 and an ejection lever 14 extending from the main body 404 of the latch in the opposite direction. An ejection member 13 extends from the body between the retaining finger 12 and the ejection lever 14.
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Figure 6 shows the latch 3 in the first retaining position. The retaining finger 12 is
 30 engaged with a corresponding notch 15 on the daughter card 2. This assists in retaining the

daughter card 2 in the slot 8 of the electrical connector 1. In this position, the bottom edge 16 of the daughter card 2 is sitting on the ejection member 13.

A latch pivot limiter has first 17b and second 17a surfaces that limit the pivoting movement of the latch 3 in the retained and unrestrained positions respectively of the pivot.

5 The latch pivot limiting surfaces 17a, 17b are in general perpendicular to each other.

To release the daughter card 2 from the slot 8, the ejection lever 14 is pushed towards the arm 6 in the direction P 601. With reference to Figure 7, upon pushing the ejection lever 14, the retaining finger 12 disengages from the notch 15. At the same time, the movement causes the ejection member 13 to push the bottom edge 16 of the daughter card 2, ejecting the
10 daughter card 2 from the slot 8. Further pivoting of the latch 3 is restricted by the second surface of the latch pivot limiter 17a abutting the ejection lever 14.

To lock or retain the daughter card 2 in the slot 8, the top portion 18 of the retaining finger 12 may be pushed towards the daughter card 2 in the direction Q 701. The first surface 17b of the latch pivot limiter prevents over pivoting the latch 3 by abutting the ejection
15 member 13.

With reference to Figure 8, a detent 19 may be provided on a side of the latch 3 to offer frictional restriction between the latch 3 and arm 6 when the latch is in a first position.

The connector 1 may be made of a moulded resilient plastic; the latches 3, 4 are moulded separately and the connector is assembled.

20 It is to be understood that the scope of the invention is not limited to the described embodiments and therefore that numerous variations and modifications may be made to these embodiments without departing from the scope of the invention as set out in the claims.

What is claimed is:

1. An electrical connector for receiving a daughter card having a plurality of conductive surfaces, said electrical connector comprising:

an elongated housing having a slot for receiving, said daughter card, said slot having
5 electrical terminals for engaging said plurality of conductive surfaces on said daughter card and for electrically connecting said daughter card to said connector;

an arm extending from at least one end of said elongated housing; and

a latch pivotally connected to said arm, said latch pivotal about an axis substantially
parallel to a longitudinal axis of said housing, said latch rotatable between a first position at
10 which said daughter card is retained within said elongated slot and a second position at which said daughter card is unrestrained,

wherein the longitudinal axis of said connector is not increased when said latch is in said second position.

2. An electrical connector for receiving a daughter card as claimed in claim 1 wherein, said
15 latch has a retaining finger at a first end, said retaining finger engageable in a corresponding notch of said daughter card in said first position.

3. An electrical connector for receiving a daughter card as claimed in claim 2 wherein, said latch further has an ejection lever at the opposite end of said latch to said retaining finger, said ejection lever usable to move said latch from said first position to said second position.

20 4. An electrical connector for receiving a daughter card as claimed in claim 3 wherein, said arm has a latch pivot limiter having first and second pivot limiting surfaces, said pivot limiting surfaces being substantially perpendicular to each other, said first pivot limiting surface limiting the movement of said latch when pivoted to said first position and said second pivot limiting surface limiting the movement of said latch when pivoted to said second position.

25 5. An electrical connector for receiving a daughter card as claimed in claim 4 wherein, said latch further has an ejection member adapted to push said daughter card from said slot when said latch is moved from said first to said second position.

6. An electrical connector for receiving a daughter card as claimed in claim 3 wherein, said latch further has an ejection member adapted to push said daughter card from said slot when said latch is moved from said first to said second position.
7. An electrical connector for receiving a daughter card as claimed in claim 6 wherein a
5 protuberance is provided on each side of said latch, engageable with holes on each said arm to form the pivot axis.
8. An electrical connector for receiving a daughter card as claimed in claim 1 wherein a protuberance is provided on each side of said latch, engageable with holes on each said arm to form the pivot axis.
- 10 9. An electrical connector for receiving a daughter card as claimed in claim 7 wherein said latch includes a detent on at least one side to retain the latch in said first position.
10. An electrical connector for receiving a daughter card as claimed in claim 9 wherein each end of said elongated slot has an arm having a latch pivotally connected.
11. An electrical connector for receiving a daughter card as claimed in claim 8 wherein each
15 end of said elongated slot has an arm having a latch pivotally connected.
12. An electrical connector for receiving a daughter card as claimed in claim 7 wherein each end of said elongated slot has an arm having a latch pivotally connected.
13. An electrical connector for receiving a daughter card as claimed in claim 6 wherein each end of said elongated slot has an arm having a latch pivotally connected.
- 20 14. An electrical connector for receiving a daughter card as claimed in claim 5 wherein each end of said elongated slot has an arm having a latch pivotally connected.
15. An electrical connector for receiving a daughter card as claimed in claim 4 wherein each end of said elongated slot has an arm having a latch pivotally connected.
16. An electrical connector for receiving a daughter card as claimed in claim 3 wherein each
25 end of said elongated slot has an arm having a latch pivotally connected.
17. An electrical connector for receiving a daughter card as claimed in claim 2 wherein each end of said elongated slot has an arm having a latch pivotally connected.

18. An electrical connector for receiving a daughter card as claimed in claim 1 wherein each end of said elongated slot has an arm having a latch pivotally connected.
19. An electrical connector for receiving a daughter card as claimed in claim 10 wherein said daughter card is a memory module.
- 5 20. An electrical connector for receiving a daughter card as claimed in claim 1 wherein said daughter card is a memory module.