Description

The invention relates to a connector with means for securing to a substrate, comprising a housing of electrically insulating material containing one or more contact elements, said housing having a front wall from which the contact elements are accessible, an opposite rear wall, a top wall, and a bottom wall which is situated fully or partially opposite a face of the substrate when the connector is mounted, and at least two boundary walls extending between the top wall and the bottom wall, wherein the means for securing the connector comprise at least one metal member having a first part encompassed by a part of the housing and a second part projecting from the bottom wall to engage a corresponding aperture of the substrate to securely mount the connector to said substrate, the connector further comprising channels which are adjacent to each other in the lengthwise direction of the housing for receiving the contact elements, said channels being separated from each other by partition boundary walls.

For securing to a substrate, for example a printed circuit board, connectors are generally provided with projections such as lips or lobes on the end faces of the housing. The connector can then be secured to the substrate by means of, for example, a screwed or riveted joint in a aperture formed in these projections and in the substrate. Examples of such securing means are disclosed in US Patent No. 4,628,410, No. 4,691,971 and No. 4,695,106.

Electronic circuits are currently accommodated as far as possible in a modular manner on printed circuit boards of standard dimensions. The electrical connections between the individual modules and/or the equipment are preferably achieved by means of connectors. As a result of, inter alia, the need for miniaturization, and due to the relatively greater density of the integrated circuits of today, a large number of electronic modules can be disposed on such a printed circuit board. As a result, each of such module can carry out a large number of functions. This means, however, that the number of electrical connections to other modules also increases.

In the effort to achieve the highest possible contact element density, i.e. the greatest possible number of contact elements per volume unit, the above-mentioned projections for securing the connector to a substrate constitute a limiting factor. The space taken up on the substrates by these projections can not be used for fitting circuit elements or contact elements. These projections also make it impossible, without loss of position of one or more contact elements, to secure several connectors of standard dimensions to a substrate with their end or side boundary walls adjacent to each other, for the purpose of forming a connector of desired dimensions. In trade literature this is also known as end-to-end stacking.

A connector of the kind mentioned in the preamble is known from European Patent Application 0.147.039. The connector known from this patent application is a surface mount connector. Side walls, a top wall and a bottom wall enclose contact elements, whereas a beam-like member fixing the contact elements extends at the rear side of the connector. Moreover, the beam-like member extends beyond the side walls of the connector and comprises a pair of studs outside the side walls, to be put into holes of a printed circuit board. In one embodiment the studs are metallic and partly mounted in the extensions of the beam-like member outside the side walls and partly extend from its bottom. Each stud is substantially cylindrically shaped.

The object of the invention is to provide a connector of the type mentioned in the preamble in which the metal member to secure the connector to a substrate does not need any additional space within the housing in order to support the goal of miniaturisation and the possibility of end-to-end stacking.

This is achieved according to the invention in that said at least one metal member is disposed within at least one of the partition boundary walls, is T-shaped and is provided with a lip projecting at right angles to the plane of the member, said lip being disposed within the bottom wall of the housing. By the application of these measures, first of all, no additional space is occupied in the housing by said metal member. Moreover, accommodating each metal member in a partition boundary wall of the connector is preferred since, in practice, they are thicker than side boundary walls. Especially, when connectors are stacked end-to-end without loss of contact element positions, the side boundary walls are of a thickness which is less than or equal to half the thickness of a partition boundary wall. Then, the side boundary walls might not be strong enough to accommodate a metal member.

The T-shape provided with the lip disposed within the bottom wall of the housing is especially advantageous in that forces acting on the housing in the direction of the pin-shaped part of each metal member are effectively absorbed.

The invention meets the required standard of sturdy retention on the substrate, particularly in the case of connectors with several contact elements arranged in rows and columns, in order to prevent undesirable forces being exerted on the connections of the connecting ends of the contact elements to the substrate when such a connector is contacted.

In the preferred embodiment of the invention, said at least one metal member projects from the rear wall of the housing into a boundary wall.

In the case of automated assembly on a printed circuit board the connector designed in this way is firmly fixed on the substrate by means of the pin-shaped part of the at least one metal member during the soldering process of the components, for example

in a soldering bath and the like. The pin-shaped part is preferably accommodated in a "through-metallized" aperture or hole of the substrate and soldered into it. The contact area is in this case the inside wall, of the relevant aperture, coated or plated with solderable material. The soldered joint also provides the possibility of replacing the connector in a simple manner in the event of a fault. This contrasts with, for example, connectors which are fixed by means of adhesive on a printed circuit board, in which replacement is generally impossible or risks damaging the board.

The invention is explained in greater detail below with reference to an embodiment shown in the drawing.

Fig. 1 shows schematically a cross section of an embodiment of a connector made according to the invention, secured on a substrate;

Fig. 2 shows schematically a front view of the connector of Fig. 1;

Fig. 3 shows schematically a bottom view of the connector of Fig. 1 secured on a substrate; and

Figs. 4a and 4b show schematically on an enlarged scale views of the metal member used in Figs. 1-3 for securing the connector.

Fig. 1, which is a cross sectional view along the line I-I of Fig. 2, shows a preferred embodiment of a connector with securing means for fitting on a substrate according to the invention. The connector, which is indicated in its entirety by reference number 1, comprises a housing of electrically insulating material containing several contact elements 2 of electrically conducting material. In the embodiment shown the contact elements 2 have a socket-type contact end 3 for receiving a mating connector, and connecting ends 4 for electrically connecting the contact elements 2 to the substrate 5, for example a printed circuit board, by means of pin-hole connections which are known per se. It goes without saying that, instead of the socket-type contact ends 3 shown, the contact elements 2 can also have contact ends designed as contact pins (not shown).

The housing of the connector 1, which is preferably made of plastic, has a front wall 6 from which the contact ends 3 are accessible, a rear wall 7 from which the connecting ends 4 of the contact elements 2 project outside the housing, a top wall 8 and a bottom wall 9, part of which projects beyond the edge of the substrate 5, while another part rests on the face of the substrate 5. The boundary walls situated on the end faces of the housing are indicated by reference numbers 10, 11 in Figs. 2 and 3, which show the front view from the line II-II in Fig. 1 and the bottom view of the connector according to Fig. 1 fitted on the substrate 5, respectively.

According to the invention, from the part of the bottom wall 9 which is opposite the face of the substrate 5 a part 21 of a metal member 20 projects at right angles to the bottom wall 9, and is inserted in an aperture 14 of the substrate 5.

By placing a metallized contact area on the surface of the substrate 5 where the part 21 projects, for example corresponding to the metallized contact areas disposed on a printed circuit board for fixing the electrical connection of connecting wires of components and the like, the connector 1 can be secured firmly on the substrate 5 by soldering the metal member 20 onto such a contact area. It is preferable to use a through-metallized aperture 14 whose inside wall is plated with solderable material.

As shown in Figs. 2 and 3, the connector is free from lateral lips or lobes for securing it to the substrate 5. By making the wall thickness of the end boundary walls 10, 11 half or less the material thickness of the vertical partition boundary walls 15 situated between adjacent contact elements 2 (viewed in the plane of the drawing), connectors with securing means according to the invention can advantageously be made end-to-end stackable. This means that extensive connectors with a high contact element density can be assembled without loss of position of one or more contact elements.

In order effectively to absorb forces acting in the lengthwise direction of the connector 1 and to make the positioning of the connector easier, it is provided with positioning lobes 16 which project at right angles to the bottom wall 9 and engage with corresponding apertures of the substrate.

Figs. 4a and 4b show different views of a preferred embodiment of the metal member 20 for securing the connector 1. The flat metal member 20 shown has an approximately T-shaped periphery. The pin-shaped part 21 thereof is used here to fix the connector to the substrate 5, while the part 22 extending at right angles to the part 21 is accommodated in a boundary wall of the housing of the connector 1. It can be seen in Fig. 2 that the part 22 extends in a partition boundary wall 15. The part 22 of the metal member 20 is also provided with a lip 23 projecting at right angles to the face thereof, and being accommodated in the bottom wall 9 of the housing when disposed. The lip 23 effectively absorbs forces acting on the housing in the lengthwise direction of the pin-shaped part 21.

The thickness of the metal member 20 is selected in such a way that it can be contained entirely by a partition boundary wall 15. In a housing made of plastic or the like, the metal member can be pressed into a boundary wall. Although not shown, it will be clear that the metal member 20 can also be accommodated in one or both side or end boundary walls 10, 11. For the sake of the envisaged mechanical strength, it is preferable for the metal member 20 to be fitted in a partition boundary wall. Of course, several metal members 20 can also be used for securing the connector in the housing thereof.

In addition to the embodiment of the metal member shown and discussed for securing a connector ac-

cording to the invention to a substrate, which metal member 20 is preferably made from a sheet of solderable metal by cutting out and flanging, it will be clear to an expert that other embodiments thereof are possible. Of course, several differently formed metal members can be disposed in one housing.

Nor is the invention, which is defined by the claims, limited to the embodiments of a connector shown and discussed, but it can in principle be used for any type of connector which need to be secured on a substrate.

Claims

1. Connector (1) with means for securing to a substrate (5), comprising a housing of electrically insulating material containing one or more contact elements (2), said housing having a front wall (6) from which the contact elements are accessible, an opposite rear wall (7), a top wall (8), and a bottom wall (9) which is situated fully or partially opposite a face of the substrate when the connector is mounted, and at least two boundary walls (10,11) extending between the top wall (8) and the bottom wall (9), wherein the means for securing the connector comprise at least one metal member (20) having a first part (22) encompassed by a part of the housing and a second part (21) projecting from the bottom wall (9) to engage a corresponding aperture (14) of the substrate (5) to securely mount the connector to said substrate, the connector further comprising channels which are adjacent to each other in the lengthwise direction of the housing for receiving the contact elements (2), said channels being separated from each other by partition boundary walls characterized in that said at least one metal member (20) is disposed within at least one of the partition boundary walls, is T-shaped and is provided with a lip (23) projecting at right angles to the plane of the member, said lip (23) being disposed within the bottom wall (9) of the housing.

2. Connector according to claim 1, wherein said at least one metal member (20) projects from the rear wall (7) of the housing into a partition boundary wall.

3. Connector according to one or more of the preceding claims, wherein the housing is made of plastic, and said at least one metal member (20) is pressed into one or more of the partition boundary walls of the housing.

4. Connector according to one or more of the preceding claims, wherein the thickness of said at least one metal member (20) is less than the thickness of a wall of the housing within which it is disposed.

5. Connector according to one or more of the preceding claims, wherein the outward-projecting second part (21) of said at least one metal member (20) is pin-shaped, for connection thereof by soldering to a metallized contact area of the substrate (5).

6. Connector according to claim 5, wherein said at least one metal member (20) is formed from a sheet of solderable metal.

Patentansprüche

1. Steckverbinder (1) mit einer Einrichtung zur Befestigung an einem Substrat (5), enthaltend ein Gehäuse aus elektrisch isolierendem Material, das ein oder mehrere Kontaktelemente (2) enthält, wobei das Gehäuse aufweist: eine vordere Wand (6), von der aus die Kontaktelemente zugänglich sind, eine gegenüberliegende hintere Wand (7), eine obere Wand (8) und eine untere Wand (9), die sich ganz oder teilweise gegenüber einer Fläche des Substrats befindet, wenn der Steckverbinder montiert ist, und wenigstens zwei Begrenzungswände (10, 11), die sich zwischen der oberen Wand (8) und der unteren Wand (9) erstrecken, wobei die Einrichtung zur Befestigung des Steckverbinders enthält: wenigstens ein Metallglied (20) mit einem ersten Teil (22), der von einem Teil des Gehäuses umschlossen ist, und einen zweiten Teil (21), der von der unteren Wand (9) absteht, um in eine entsprechende Öffnung (14) des Substrats (5) einzugreifen zur sicheren Befestigung des Steckverbinders am Substrat, wobei der Steckverbinder ferner Kanäle enthält, die in Längsrichtung des Gehäuses nebeneinanderliegen und die Kontaktelemente (2) aufnehmen, wobei die Kanäle durch Begrenzungstrennwände voneinander getrennt sind, dadurch **gekennzeichnet**,
daß wenigstens ein Metallglied (20) sich innerhalb wenigstens einer der Begrenzungstrennwände befindet, T-förmig ist und mit einem Rand (23) versehen ist, der im rechten Winkel zur Ebene des Glieds absteht, wobei der Rand (23) innerhalb der unteren Wand (9) des Gehäuses angeordnet ist.

2. Steckverbinder nach Anspruch 1, wobei das wenigstens eine Metallglied (20) von der hinteren Wand (7) des Gehäuses in eine Begrenzungstrennwand ragt.

3. Steckverbinder nach einem oder mehreren der

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2. Connector according to claim 1, wherein said at least one metal member (20) projects from the rear wall (7) of the housing into a partition boundary wall.

3. Connector according to one or more of the preceding claims, wherein the housing is made of plastic, and said at least one metal member (20) is pressed into one or more of the partition boundary walls of the housing.

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daß wenigstens ein Metallglied (20) sich innerhalb wenigstens einer der Begrenzungstrennwände befindet, T-förmig ist und mit einem Rand (23) versehen ist, der im rechten Winkel zur Ebene des Glieds absteht, wobei der Rand (23) innerhalb der unteren Wand (9) des Gehäuses angeordnet ist.

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3. Steckverbinder nach einem oder mehreren der

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vorhergehenden Ansprüche, wobei das Gehäuse aus Kunststoff hergestellt ist und das wenigstens eine Metallglied (20) in eine oder mehrere der Begrenzungstrennwände des Gehäuses gepreßt ist.

4. Steckverbinder nach einem oder mehreren der vorhergehenden Ansprüche, wobei die Dicke des wenigstens einen Metallglieds (20) kleiner als die Dicke der Wand des Gehäuses ist, in dem es angeordnet ist.

5. Steckverbinder nach einem oder mehreren der vorhergehenden Ansprüche, wobei der nach außen überstehende zweite Teil (21) des wenigstens einen Metallglieds (20) stiftförmig ist zu seiner durch Löten erfolgenden Verbindung mit einer metallisierten Kontaktfläche des Substrats (5).

6. Steckverbinder nach Anspruch 5, wobei das wenigstens eine Metallglied (20) aus einem Blech aus lötbarem Metall gebildet ist.

Revendications

1. Connecteur (1) avec des moyens de fixation sur un substrat (5), comprenant un boîtier en matériau isolant de l'électricité contenant un ou plusieurs éléments de contact (2), ledit boîtier ayant une paroi avant (6) d'où sont accessibles des éléments de contact, une paroi arrière (7) placée à l'opposé, une paroi de dessus (8) et une paroi de fond (9) située en totalité ou en partie opposée à une face du substrat lorsque le connecteur est monté, et au moins deux parois limitrophes (10, 11) s'étendant entre la paroi de dessus (8) et la paroi de fond (9), dans lequel les moyens de fixation du connecteur comprennent au moins un organe métallique (20) ayant une première partie (22) entourée par une partie du boîtier et une deuxième partie (21) faisant saillie depuis la paroi de fond (9), pour venir en contact avec une ouverture (14) correspondante du substrat (5) afin de donner un montage sûr du connecteur sur ledit substrat, le connecteur comprenant en outre des canaux adjacents les uns aux autres dans la direction longitudinale du boîtier et destinés à recevoir les éléments de contact (2), lesdits canaux étant séparés les uns des autres par des parois limitrophes de séparation, caractérisé en ce que ledit au moins un organe métallique (20) est disposé à l'intérieur d'au moins l'une des parois limitrophes de séparation, a une forme en T et est pourvue d'une lèvre (23) faisant saillie à angle droit du plan de l'organe, ladite lèvre (23) étant disposée à l'intérieur de la paroi de fond (9) du boîtier.

2. Connecteur selon la revendication 1, dans lequel ledit au moins un organe métallique (20) fait saillie de la paroi arrière (7) du boîtier, dans une paroi limitrophe de séparation.

3. Connecteur selon une ou plusieurs des revendications précédentes, dans lequel le boîtier est en matière plastique et ledit au moins un organe métallique (20) est pressé dans une ou plusieurs des parois limitrophes de séparation du boîtier.

4. Connecteur selon l'une ou plusieurs des revendications précédentes, dans lequel l'épaisseur dudit au moins un organe métallique (20) est inférieure à l'épaisseur de la paroi du boîtier dans lequel il est disposé.

5. Connecteur selon l'une ou plusieurs des revendications précédentes, dans lequel ladite deuxième partie (21) faisant saillie vers l'extérieur dudit au moins un organe métallique (20) est en forme de broche, pour permettre sa connexion par soudure ou brasure sur une zone de contact métallisée du substrat (5).

6. Connecteur selon la revendication 5, dans lequel ledit au moins un organe métallique (20) est formé d'une feuille de métal susceptible d'être soudée ou brasée.