

Description

The present invention relates to an electrical connection device.

Electrical connectors and headers are used to effect electrical connection to and from printed circuit boards and typically include a housing and an array of receptacles or pins supported in the housing for mating connection with a similar array of pins or receptacles of the corresponding header or connector. Each pin or receptacle includes a "tail" portion that extends from the housing to define an array of tail portions that are designed to be received within and passed through an array of holes on the printed circuit board. The tail portions can extend rearwardly in a straight-line fashion from the housing or can be bent at a right angle relative to the principal mating axis of the contact pair.

In many electronic systems, it is important that the various interconnected circuits be shielded or otherwise protected from external electric fields and, conversely, that any electric fields developed from those circuits be prevented from propagating to other circuits. The problem is of particular concern in signal-bus applications in which higher bus speeds and the attendant signal transitions cause electromagnetic interference that can adversely affect adjacent circuits. Headers that use straight-back tail portions are typically mounted upon the printed circuit board so that the tail portion length, and its attendant antenna effect, is minimal. The situation is somewhat different with regard to right-angle mounting arrangements since the tail portions extend rearwardly from the housing and then extend at a right angle to provide a substantially longer tail portion in which the segment lengths can provide a measure of wavelength-matching at certain signal speeds.

While the straight-back approach provides a minimum tail length and minimal consequent antenna effect, the design is not well suited for use in card-cage type packaging systems which printed circuit boards are mounted in closely adjacent positions. In traditional circuit board designs, electromagnetic interference can be addressed by providing a full-shield housing or other shield structure to prevent electric field emission and provide a measure of protection against external radiation.

GB-A-2027290 describes an electrical pin arrangement or a pin strip for a multi-row plug connector for transmitting small signals with low cross talk in data processing systems. The pin strip comprises three parallel rows of pins, the central row being connected to earth potential. A shield plate is resiliently held between the central row of pins and one of the outer rows. The shield plate contacts the pins of the central row and is insulated from the

outer row by an insulating member.

While shielding can prevent radiation from emanating from a signal - carrying set of circuit conductors, it oftentimes represents an extra cost increment not consistent with cost-effective conductor systems. In addition, shielding oftentimes does not fully address the problem of inter-circuit interference between or among the various tail portions. Accordingly, a need arises for a cost-effective technique which prevents or at least attenuates radiation from signal carrying circuits and prevents those circuits from being adversely affected by external fields.

SUMMARY OF THE INVENTION

In view of the above, it is an object of the present invention, among others, to provide terminal lead shielding for headers and connectors which serves to attenuate the electrical field emission from signal-carrying circuits connected between a header or connector and a printed circuit board.

It is another object of the present invention to provide terminal lead shielding for headers and connectors to provide a measure of shielding to attenuate adverse effects of external electric fields on the signal-carrying circuits connected between the header or connector and the printed circuit board.

It is still another object of the present invention to provide terminal lead shielding for headers and connectors in which a measure of inter-circuit shielding is provided between the signal-carrying circuits of a header or connector and the printed circuit board upon which it is mounted.

The present invention advantageously aims to provide for the shielding of the terminal leads of headers and connectors in the context of right-angle mountings so as to attenuate electric field radiation from and between the various circuits and attenuate the effect of external fields on those circuits in a cost-effective manner.

From GB-A-2027290, an electrical connection device is known comprising: a housing having rows of spaced apart electrical contacts in a rectangular matrix for effecting connection with respective contacts of complementary type, each electrical contact having a tail portion having a first segment extending in a rearward direction from the housing and a second segment extending at an angle in a selected direction relative to its first segment; and a first row of spaced apart ground contacts above one of the rows of electrical contacts, each ground contact having a tail portion having a first segment extending in a rearward direction from the housing and a second segment extending at an angle in the selected direction relative to the first segment, the

tail portions of the rows of ground contacts being arranged intermediate the tail portions of the electrical contacts, wherein respective second segments of the tail portions of the electrical contacts and the ground contacts extend at substantially a right angle relative to their respective first segments.

According to the present invention, an electrical connection device is provided as claimed in Claim 1.

Thus, in contrast to GB-A-2027290 and in accordance with the invention, there is provided a complementary lower second row of spaced apart ground contacts below said rows of electrical contacts, each said ground contact in the second row having a tail portion, with a first segment extending in a rearward direction from said housing and a second segment extending at an angle in the selected direction relative to its first segment, the tail portions of each ground contact in the first row and in the second row corresponding therewith being arranged intermediate corresponding columns of said tail portions of each of said electrical contacts and with each column of electrical contacts being interdigitated with the tail portions of the ground contacts.

The device can be configured as a right-angle header arrangement suitable for fitment to a printed circuit board wherein the electrical contacts can then take the form of pins.

Other objects, features and further scope of applicability of the present invention will become apparent from the detailed description to follow, taken in conjunction with the accompanying drawings, in which like parts are designated by like reference characters.

BRIEF DESCRIPTION OF THE DRAWING

FIG. 1 is a rear perspective view of an exemplary right-angle ejection latch header mounted upon a printed circuit board in which selected portions have been cut away for reasons of clarity;

FIG. 1A is a side view of a spring contact used with the header of FIG. 1;

FIG. 2 is a partial rear perspective view of the ejection latch header of FIG. 1 illustrating a first tail portion connection arrangement;

FIG. 3 is similar to that shown in FIG. 2 and illustrates a second tail portion connection configuration in accordance with the present invention;

FIG. 4, similar to FIGS. 2 and 3, illustrates a third tail portion connection arrangement in accordance with the present invention;

FIG. 5 is a rear perspective view of another right-angle mounting which includes a shield

member for attenuating electric field radiation from and to the tail portions;

FIG. 6 is a rear elevational view, in cross-section, of the header of FIG. 5 taken along line 6-6 of FIG. 5;

FIG. 6A is an enlarged detail view of the connector of FIG. 5; and

FIG. 6B is a side view, in cross section, of the view of FIG. 6A taken along line 6B-6B.

DESCRIPTION OF THE PREFERRED EMBODIMENT

An exemplary right-angle mounted header in accordance with the present invention is illustrated in perspective view in FIG. 1 and designated generally therein by the reference character 10. As shown, the header 10 is mounted on the side of a printed circuit board 12 and includes a housing 14, typically fabricated from a molded thermoplastic material, and includes a base 16 and first and second spaced apart walls 18 and 20 that define a cavity or recess 22 which receives a mating connector (not shown). The opposite ends of the housing 14 are provided with forwardly extending projections 24, each of which includes a slot 26. A finger-operable latch 28 is pivotably retained in each slot 26 and is movable between a first, eject position (shown in FIG. 1) and a second position. Movement of the latches 28 from the second position towards the first position causes the latches 28 to eject and disconnect a mating connector received within the recess 22. The exemplary header 10 of FIG. 1 is provided with two parallel rows of contacts, typically square-sided or cylindrical pins 30, arranged in a rectangular matrix or array pattern and which are secured within the base 16 and extend forwardly into the recess 22 for engagement with the receptacles (not shown) of a mating connector. The pins 30 each include a tail portion, generally designated by the reference character T, that extends rearwardly of the housing 14 for effecting electrical connection with the printed circuit board 12. Each tail portion T includes a first segment T₁ that extends linearly and rearwardly from its pin 30 and a second segment T₂ that extends at an angle, typically a right angle, relative to the first segment T₁ and which extends through a suitable bore 32 formed in the printed circuit board 12. The header 10 is available under part number designation 66429-XXX from DuPont Electronics of New Cumberland, PA 17070.

The header 10 is provided with a series of ground-path spring contacts 34 that serve to establish electrical contact with a conductive shroud or shield of the mating connector as is conventional in the art. As shown in FIG. 1 and the side view of FIG. 1A, each spring contact 34 includes a beam

portion 36, a distal end 38, a stem portion 40, and a tail portion that includes a first segment 42 that is generally in line with and extends rearwardly from the beam portion 36, and a second segment 44 that extends at a right angle relative to the first segment 42. The spring contacts 34 are typically stamped or pressed from a beryllium-copper alloy.

As shown in the cut-away section of FIG. 1, the facing surfaces of the walls 18 and 20 of the housing are provided with respective grooves 46 for accepting the spring contacts 34. Each groove leads to an interior passageway (unnumbered) in the base 16 of the housing 14 from which the segment 42 extends in the rearward direction. The stem portion 40 includes various retention barbs or spurs (unnumbered) that engage the sides of the interior passageway to retain the spring contact 34 in place. The various spring contacts 34 thus define an upper series or row of spaced apart spring contacts 34 above the array of pins 30 and a complementary lower row of spaced apart spring contacts 34 below the array of pins 30. As can be appreciated, the grooves in which the spring contacts 34 are positioned provide sufficient clearance to allow the beam portion to be resiliently biased toward the pins 30.

The tail portions T of the various pins 30 and the segments 42 and 44 of the spring contacts 34, as shown in the FIGS. 2, 3, and 4, extend from the rear of the housing 14 with the tail portions of the spring contacts 34 arranged between or intermediate those of the pins 30. As explained below, the various tail portions of the pins 30 and contacts 34 are connected to the printed circuit board 12 to minimize electric field radiation from the various signal-carrying circuits, and, conversely, minimize the adverse affect of external electric fields on the signal-carrying circuits.

As shown in FIG. 2, the first segments T₁ of the tail portions of the lower row of pins 30 extend rearwardly from the housing 14 and are bent downwardly at a right angle with respective segment T₂ extending through a corresponding hole 32 in the printed circuit board 12. In a similar manner, the first segments T₁ of the uppermost row of pins 30 extend a selected distance rearwardly of the housing 14 and are then bent downwardly at a right angle with the respective segment T₂ extending through their respective holes 32 in the printed circuit board 12. As can be appreciated, the segments T₁ for the tail portions T of the uppermost row of pins 30 are longer than the corresponding segments T₁ for the lower row of pins 30 in order to provide sufficient front-to-rear spacing between the descending segments T₂ of the upper and lower rows of pins 30.

In a somewhat analogous manner, the first segments 42 of the upper row of spring contacts 34

extends rearwardly a selected distance from the housing 14 and are bent downwardly at a right angle with the second segments 44 extending into holes 32 in the printed circuit board 12. Likewise, the first segments 42 of the lower row of spring contacts 34 extends rearwardly from the housing 14 and are bent downwardly at a right angle so the second segments 44 extend into respective holes 32 in the printed circuit board 12. As shown in FIG. 2, the first segments 42 for both the uppermost and lowermost rows of the spring contacts 34 extend an identical or near identical distance from the rear of the housing 14 so that the second segment 44 of the uppermost row and the second segment 44 of the lowermost row engage each other in adjacent planes and pass through the same hole 32 in the printed circuit board. Thus, each column of pins 30 provides tail portions T that are interdigitated with the first segments 42 and the second segments 44 of the spring contacts 34. It has been found that the interdigitated arrangement of the first segments and second segments of the spring contacts 34 as described above and as shown in FIG. 2 minimizes or at least greatly attenuates electric field radiation from the intermediate signal-carrying tail portions and, conversely, minimizes adverse effects on the signal-carrying circuits from external fields.

A first variation of the configuration of FIG. 2 is illustrated in FIG. 3, and, as shown therein, the tail portions T of the various pins 30 are arranged in a manner identical to that shown in FIG. 2 with the first segments T₁ extending rearwardly from the housing 14 and with the second segments T₂ extending at a right angle and downwardly to and through respective holes 32 in the printed circuit board 12. The first segments 42 and second segments 44 of the lower row of spring contacts 34 are configured identically to that of FIG. 2, that is, the first segments 42 extend a selected distance rearwardly from the housing 14 and then are bent at a right angle downwardly with the second segments 44 extending into respective receiving holes 32 in the printed circuit board 12. In contrast to the configuration of FIG. 2, the first segments 42 of the upper row of spring contacts 34 extend a substantially greater distance rearwardly than the first segments 42 of the lowermost row and, additionally, the first segments T₁ of the uppermost row of pins 30. The second segments T₂ are then directed at a right angle downwardly into respective receiving holes 32 in the printed circuit board 12. Accordingly, the second segments 44 of the upper and lower row of spring contacts 34 are spaced front-to-rear from one another in a manner analogous to that of the various second segments T₂ of the various tails T.

A second variation of the configuration of FIG. 2 is illustrated in FIG. 4, and, as shown therein, the tail portions T of the various pins 30 are arranged in a manner identical to that shown in FIGS. 2 and 3 with the first segments T₁ extending rearwardly from the housing 14 and with the second segments T₂ extending at a right angle and downwardly to and through respective holes 32 in the printed circuit board 12. The first segments 42 and second segments 44 of the upper row of spring contacts 34 are configured identically to that of FIG. 3, that is, the first segments 42 extend a selected distance rearwardly from the housing 14 and then are bent at a right angle downwardly with the second segments 44 extending into respective receiving holes 32 in the printed circuit board 12. In contrast to the configuration of FIG. 2, the first segments 42 of the lower row of spring contacts 34 extend a similar distance rearwardly as the first segments 42 of the upper row of pins 30. The second segments T₂ are then directed at a right angle downwardly into respective receiving holes 32 in the printed circuit board 12, these holes 32 being the same that accommodate the second segments 44 of the upper row of pins. Accordingly, the second segments 44 of the upper and lower row of spring contacts 34 are generally rearward of the second segments T₂ of the pin contacts.

As can be appreciated from the above, the configurations of FIGS. 2, 3, and 4 serves to position a number of grounded, conductive first and second segments 42 and 44 in an interdigitated fashion with the signal carrying tail portions T. It has been found that the presence of the first and second segments 42 and 44 serves to attenuate electric field emission from the individual signal-carrying circuits as well attenuate the effect of external fields on the signal carrying conductors in a cost-effective manner.

A second variation of the header configuration of FIG. 1 is shown in FIGS. 5 and 6, and, as shown, the header 10' includes a molded thermoplastic housing 50 having a mounting bracket 52 extending laterally from each end for mounting the header 10' upon a printed circuit board (not shown in FIGS. 5-6). The header 10' includes a base and side wall structure as described above in connection with FIG. 1 and includes upper and lower rows of pins (not shown) having tail portions T₁ that extend rearwardly of the housing 50 and tail portions T₂ that are bent downwardly at a right angle as described above in relationship to FIGS. 2, 3, and 4. The header 10' additionally includes a set of upper row and lower row spring contacts (not specifically shown) each of which includes a first segment 42 and a second segment 44 that cooperate with a shield 56 that surrounds the tail portions T₁ and T₂. The shield 56 is fabricated from a stamped

or pressed conductive sheet stock, and, as shown in FIG. 5, includes spaced parallel side walls 58 and 60 connected by a contiguous top 62 with a series of spaced depending lugs 64 extending from the lower edge of each side wall 58 and 60. The lugs 64 are designed to be received within appropriate receiving bores in the printed circuit board and soldered in place, with the lugs typically making contact with appropriate ground traces or a ground plane fabricated as part of the printed circuit board. As best shown in FIG. 6, the side wall 58 is provided with a series of adjacent, vertically elongated openings 66 through which the segments T₁ of the various tail portions of the upper and lower rows of pins extend. The top wall, at the intersection of the side wall 58, as best shown in FIG. 6A and 6B, are provided with a series of spaced semicircular cut-outs 68 that are in alignment with the first segments 42 of the upper row of spring contacts. The rearwardly extending first segments 42 of the various spring contacts of the upper row extend over the top of the side wall 58 at each cut-out 68 with the second segments 44 bent downwardly at a right angle to crimp and thereby secure the side wall 58 against the rear of the header housing 50. The lower edge of the side wall 58 is similarly crimped with the second segments 44 of the lower row of spring contacts. As can be appreciated, the spring contacts of the upper and lower rows are used to effectively secure the shield 56 to the rear of the housing and provide both mechanical and electrical connection with the spring contacts.

The invention has been described above in the context of two-row headers utilizing pins mounted in a housing; as can be appreciated, the invention is equally suited to headers using more or less than two rows of contacts as well as connectors utilizing receptacles mounted in a housing.

Claims

1. An electrical connection device (10) comprising:

a housing (14, 50) having rows of spaced apart electrical contacts (30) arranged in a rectangular matrix for effecting connection with respective contacts of a complementary type, each electrical contact (30) having a tail portion (T) having a first segment (T₁) extending in a rearward direction from said housing (14) and a second segment (T₂) extending at an angle in a selected direction relative to its first segment (T₁);

a first row of spaced apart ground contacts (34) above said rows of electrical contacts and a complementary lower second row of spaced apart ground contacts (34) below said rows of



A second variation of the configuration of FIG. 2 is illustrated in FIG. 4, and, as shown therein, the tail portions T of the various pins 30 are arranged in a manner identical to that shown in FIGS. 2 and 3 with the first segments T₁ extending rearwardly from the housing 14 and with the second segments T₂ extending at a right angle and downwardly to and through respective holes 32 in the printed circuit board 12. The first segments 42 and second segments 44 of the upper row of spring contacts 34 are configured identically to that of FIG. 3, that is, the first segments 42 extend a selected distance rearwardly from the housing 14 and then are bent at a right angle downwardly with the second segments 44 extending into respective receiving holes 32 in the printed circuit board 12. In contrast to the configuration of FIG. 2, the first segments 42 of the lower row of spring contacts 34 extend a similar distance rearwardly as the first segments 42 of the upper row of pins 30. The second segments T₂ are then directed at a right angle downwardly into respective receiving holes 32 in the printed circuit board 12, these holes 32 being the same that accommodate the second segments 44 of the upper row of pins. Accordingly, the second segments 44 of the upper and lower row of spring contacts 34 are generally rearward of the second segments T₂ of the pin contacts.

As can be appreciated from the above, the configurations of FIGS. 2, 3, and 4 serves to position a number of grounded, conductive first and second segments 42 and 44 in an interdigitated fashion with the signal carrying tail portions T. It has been found that the presence of the first and second segments 42 and 44 serves to attenuate electric field emission from the individual signal-carrying circuits as well attenuate the effect of external fields on the signal carrying conductors in a cost-effective manner.

A second variation of the header configuration of FIG. 1 is shown in FIGS. 5 and 6, and, as shown, the header 10' includes a molded thermoplastic housing 50 having a mounting bracket 52 extending laterally from each end for mounting the header 10' upon a printed circuit board (not shown in FIGS. 5-6). The header 10' includes a base and side wall structure as described above in connection with FIG. 1 and includes upper and lower rows of pins (not shown) having tail portions T₁ that extend rearwardly of the housing 50 and tail portions T₂ that are bent downwardly at a right angle as described above in relationship to FIGS. 2, 3, and 4. The header 10' additionally includes a set of upper row and lower row spring contacts (not specifically shown) each of which includes a first segment 42 and a second segment 44 that cooperate with a shield 56 that surrounds the tail portions T₁ and T₂. The shield 56 is fabricated from a stamped

or pressed conductive sheet stock, and, as shown in FIG. 5, includes spaced parallel side walls 58 and 60 connected by a contiguous top 62 with a series of spaced depending lugs 64 extending from the lower edge of each side wall 58 and 60. The lugs 64 are designed to be received within appropriate receiving bores in the printed circuit board and soldered in place, with the lugs typically making contact with appropriate ground traces or a ground plane fabricated as part of the printed circuit board. As best shown in FIG. 6, the side wall 58 is provided with a series of adjacent, vertically elongated openings 66 through which the segments T₁ of the various tail portions of the upper and lower rows of pins extend. The top wall, at the intersection of the side wall 58, as best shown in FIG. 6A and 6B, are provided with a series of spaced semicircular cut-outs 68 that are in alignment with the first segments 42 of the upper row of spring contacts. The rearwardly extending first segments 42 of the various spring contacts of the upper row extend over the top of the side wall 58 at each cut-out 68 with the second segments 44 bent downwardly at a right angle to crimp and thereby secure the side wall 58 against the rear of the header housing 50. The lower edge of the side wall 58 is similarly crimped with the second segments 44 of the lower row of spring contacts. As can be appreciated, the spring contacts of the upper and lower rows are used to effectively secure the shield 56 to the rear of the housing and provide both mechanical and electrical connection with the spring contacts.

The invention has been described above in the context of two-row headers utilizing pins mounted in a housing; as can be appreciated, the invention is equally suited to headers using more or less than two rows of contacts as well as connectors utilizing receptacles mounted in a housing.

Claims

1. An electrical connection device (10) comprising:

a housing (14, 50) having rows of spaced apart electrical contacts (30) arranged in a rectangular matrix for effecting connection with respective contacts of a complementary type, each electrical contact (30) having a tail portion (T) having a first segment (T₁) extending in a rearward direction from said housing (14) and a second segment (T₂) extending at an angle in a selected direction relative to its first segment (T₁);

a first row of spaced apart ground contacts (34) above said rows of electrical contacts and a complementary lower second row of spaced apart ground contacts (34) below said rows of



electrical contacts (30), each said ground contact having a tail portion with a first segment (42) extending in a rearward direction from said housing (14) and a second segment (44) extending at an angle in the selected direction relative to its first segment (42), the tail portion of each ground contact of said first row of ground contacts (34) and the tail portion of each ground contact of said second row of ground contacts (34) corresponding therewith being arranged intermediate corresponding columns of said tail portions (T) of each of said electrical contacts (30); wherein respective second segments (T₂, 44) of said tail portions of said electrical contacts (30) and of said ground contacts (34) extend at substantially a right angle relative to the respective said first segments (T₁, 42) with each column of electrical contacts (30) being interdigitated with the tail portions (42) of the ground contacts (34).

2. A connection device according to Claim 1, wherein the housing (14) comprises a right-angle header for mounting to a printed circuit board (12) and wherein the electrical contact (30) are pins.

3. A connection device of Claim 1 or 2 wherein said first segments (42) of said first and second row of ground contacts (34) are of substantially the same length.

4. A connection device of Claim 3, wherein said second segments (44) of said first row of ground contacts (34) are in electrical contact with corresponding ones of said second segments (44) of said second row of ground contacts (34).

5. A connection device of any one of Claims 1 to 4, wherein the lengths of said first segments (42) of the first and/or the second row of ground contacts (34) are substantially less than the lengths of said first segments (T₁) of said electrical contact tail portions (T).

6. A connection device of any one of Claims 1 to 4, wherein the lengths of said first segments (42) of the first and/or the second row of ground contacts (34) are substantially greater than the lengths of said first segments (T₁) of said electrical contact tail portions (T).

7. A connection device of any one of Claims 1 to 4, wherein the lengths of said first segments (42) of said first row of ground contacts (34) are less than the length of said first segments (42) of said electrical contact tail portions (T)

and the length of said first segments (42) of said second row of ground contacts (34) are greater than the length of said first segments (42) of said electrical contact tail portions (T).

8. A connection device of any one of Claims 1 to 7 and further comprising a shield (56), having at least first and second spaced sidewalls (58, 60) connected by a top wall (62) and a mechanical connection to said first and second segments (42, 44) of said ground contacts (34) to secure said shield to said housing (50).

9. A connection device of Claim 8, wherein said first and second segments (42, 44) of said ground contacts (34) crimp said shield (56) to said housing (50).

10. A connection device of Claim 8 or 9, wherein one wall of the shield (56) includes openings (66) therein through which said tail portions (T) of said electrical contacts (30) extend.

Patentansprüche

1. Elektrische Verbindungsvorrichtung (10), welche folgendes aufweist:

ein Gehäuse (14, 50), welches Reihen von im Abstand angeordneten elektrischen Kontakten (30) hat, welche in einer viereckförmigen Matrix zur Herstellung einer Verbindung mit entsprechenden Kontakten einer komplementären Bauart angeordnet sind, wobei jeder elektrische Kontakt (30) ein Endteil (T) hat, welches ein erstes Segment (T₁), welches von dem Gehäuse (14) in Rückwärtsrichtung verläuft, und ein zweites Segment (T₂) besitzt, welches unter einem Winkel in einer gewünschten Richtung relativ zu dem ersten Segment (T₁) verläuft;

eine erste Reihe von im Abstand angeordneten Massekontakten (34) oberhalb einer Reihe von elektrischen Kontakten und eine komplementäre, untere, zweite Reihe von im Abstand angeordneten Massekontakten (34) unterhalb der Reihen von elektrischen Kontakten (30), wobei jeder Massekontakt ein Endteil hat, welches ein erstes Segment (42), welches von dem Gehäuse (14) in Rückwärtsrichtung verläuft, und ein zweites Segment (44) besitzt, welches unter einem Winkel in der gewünschten Richtung relativ zu dem ersten Segment (42) verläuft, wobei das Endteil jedes Massekontakts der ersten Reihe von Massekontakten (34) und das Endteil jedes Massekontaktes der zugeordneten zweiten Reihe von Massekontakten (34) zwischen entsprechenden Spalten der Endteile (T) der jeweiligen elektrischen Kontak-



te (30) angeordnet sind;

bei der zugeordnete zweite Segmente (T_2 , 44) der Endteile der elektrischen Kontakte (30) und der Massekontakte (34) im wesentlichen rechtwinklig relativ zu den zugeordneten ersten Segmenten (T_1 , 42) verlaufen, wobei jede Spalte von elektrischen Kontakten (30) parallel geschaltet mit den Endteilen (42) der Massekontakte (34) ist.

2. Verbindungsvorrichtung nach Anspruch 1, bei der das Gehäuse (4) ein rechtwinkliges Kopfteil zum Anbringen an einer gedruckten Schaltungsplatte (12) aufweist, und bei der die elektrischen Kontakte (30) Stifte sind.
3. Verbindungsvorrichtung nach Anspruch 1 oder 2, bei der die ersten Segmente (42) der ersten und zweiten Reihe von Massekontakten (34) eine im wesentlichen gleiche Länge haben.
4. Verbindungsvorrichtung nach Anspruch 3, bei der die zweiten Segmente (44) der ersten Reihe von Massekontakten (34) in elektrischem Kontakt mit den jeweils zugeordneten zweiten Segmenten (44) der zweiten Reihe von Massekontakten (34) sind.
5. Verbindungsvorrichtung nach einem der Ansprüche 1 bis 4, bei der die Längen der ersten Segmente (42) der ersten und/oder der zweiten Reihe von Massekontakten (34) wesentlich kleiner als die Längen der ersten Segmente (T_1) der elektrischen Kontakt-Endteile (T) sind.
6. Verbindungsvorrichtung nach einem der Ansprüche 1 bis 4, bei der die Längen der ersten Segmente (42) der ersten und/oder der zweiten Reihe von Massekontakten (34) wesentlich größer als die Längen der ersten Segmente (T_1) der elektrischen Kontakt-Endteile (T) sind.
7. Verbindungsvorrichtung nach einem der Ansprüche 1 bis 4, bei der die Längen der ersten Segmente (42) der ersten Reihe von Massekontakten (34) kleiner als die Länge der ersten Segmente (42) der elektrischen Kontakt-Endteile (T) sind, und die Länge der ersten Segmente (42) der zweiten Reihe von Massekontakten (34) größer als die Länge der ersten Segmente (42) der elektrischen Kontakt-Endteile (T) ist.
8. Verbindungsvorrichtung nach einem der Ansprüche 1 bis 7, welche ferner eine Abschirmung (56) aufweist, welche wenigstens erste und zweite, im Abstand angeordnete Seitenwände (58, 60) hat, welche durch eine obere

Wand (62) und eine mechanische Verbindung mit den ersten und zweiten Segmenten (42, 44) der Massekontakte (34) verbunden sind, um die Abschirmung am Gehäuse (50) festzulegen.

9. Verbindungsvorrichtung nach Anspruch 8, bei der die ersten und zweiten Segmente (42, 44) der Massekontakte (34) die Abschirmung (56) mit dem Gehäuse (50) in Form einer Klemm- bzw. Quetschverbindung verbinden.
10. Verbindungsvorrichtung nach Anspruch 8 oder 9, bei der eine Wand der Abschirmung (56) Öffnungen (66) darin umfaßt, durch welche die Endteile (T) der elektrischen Kontakte (30) verlaufen.

Revendications

1. Un dispositif de connection électrique comprenant:
 - un boîtier 14, 50 comportant des rangées de contacts électriques 30 espacés les uns des autres et disposés suivant une matrice rectangulaire pour effectuer une connection avec des contacts respectifs d'un type complémentaire, chaque contact électrique 30 présentant une portion de queue (T) comportant un premier segment (T_1) s'étendant vers l'arrière à partir dudit boîtier 14 et un second segment (T_2) s'étendant en formant un angle dans une direction choisie par rapport à ce premier segment (T_1).
 - une première rangée de contacts avec la terre 34, espacés les uns des autres au-dessus des dites rangées de contacts électriques et une seconde rangée inférieure complémentaire de contacts avec la terre 34, espacés les uns des autres en dessous des dites rangées de contacts électriques 30, chacun des dits contacts avec la terre comportant une portion de queue présentant un premier segment 42 s'étendant vers l'arrière à partir dudit boîtier 14 et un second segment 44 s'étendant en formant un angle dans une direction choisie par rapport audit premier segment 42, la portion de queue de chaque contact avec la terre de ladite première rangée de contacts avec la terre 34 et la portion de queue de chaque contact avec la terre de ladite seconde rangée de contacts 34 avec la terre leur correspondant étant intercalés entre les colonnes correspondantes des dites portions de queue de chacun des



- 5 dits contacts électriques 30; les seconds segments respectifs (T2, 44) des dites portions de queue desdits contacts électriques 30 et desdits contacts avec la terre 34 s'étendant sensiblement à angle droit par rapport auxdits premiers segments respectifs (T1, 42), chaque colonne desdits contacts électriques 30 étant intercalée avec les portions de queue 42 des dits contacts avec la terre 34. 10
2. Un dispositif de connection selon la revendication 1, caractérisé en ce que le boîtier 14 comprend une tête de contact à angle droit pour le montage sur une carte de circuit imprimé 12 et en ce que les contacts électriques 30 sont des broches. 15
3. Un dispositif de connection selon la revendication 1 ou 2, caractérisé en ce que lesdits premiers segments 42 desdites première et seconde rangées de contacts avec la terre 34 sont sensiblement de la même longueur. 20
4. Un dispositif de connection selon la revendication 3, caractérisé en ce que lesdits seconds segments 44 de ladite première rangée de contacts avec la terre 34 sont en contact électrique avec ceux desdits seconds segments (44) qui leur correspondent dans ladite seconde rangée de contacts avec la terre 34. 25 30
5. Un dispositif de connection selon l'une quelconque des revendications 1 à 4, caractérisé en ce que la longueur desdits premiers segments 42 de la première et/ou de la seconde rangée desdits contacts 34 avec la terre sont sensiblement inférieures aux longueurs desdits premiers segments (T1) des portions de queue (T) desdits contacts électriques. 35 40
6. Un dispositif de connection selon l'une quelconque des revendications 1 à 4, caractérisé en ce que les longueurs desdits premiers segments 42 de la première et/ou de la seconde rangée des contacts avec la terre 34 sont sensiblement plus grandes que les longueurs des premiers segments (T1) des portions (T) de queue desdits contacts électriques. 45 50
7. Un dispositif de connection selon l'une quelconque des revendications 1 à 4, caractérisé en ce que les longueurs desdits premiers segments 42 de ladite première rangée de contacts avec la terre 34 sont inférieures à la longueur desdits premiers segments 42 des portions (T) de queue desdits contacts électriques en ce que les longueurs desdits premiers 55

segments 42 de ladite seconde rangée de contact avec la terre 34 sont plus grandes que la longueur des premiers segments 42 des portions de queue (T) desdits contacts électriques.

8. Un dispositif de connection selon l'une quelconque des revendications 1 à 7, caractérisé en ce qu'il comprend en outre un blindage 56 comportant au moins une première et une seconde parois latérales 58, 60 reliées par une paroi supérieure 62 et une connection mécanique desdits contacts avec la terre 34 auxdits premier et second segments 42, 44 pour fixer ledit blindage sur ledit boîtier 50.
9. Un dispositif de connection selon la revendication 8, caractérisé en ce que lesdits premier et second segments 42, 44 desdits contacts avec la terre 34, sertissent ledit blindage 56 sur ledit boîtier 50.
10. Un dispositif de connection selon la revendication 8 ou 9, caractérisé en ce que l'une des parois du blindage 56 comprend des orifices 66 à travers desquels s'étendent lesdites portions (T) de queue desdits contacts électriques 30.