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Conductor connecting module for printed circuit boards

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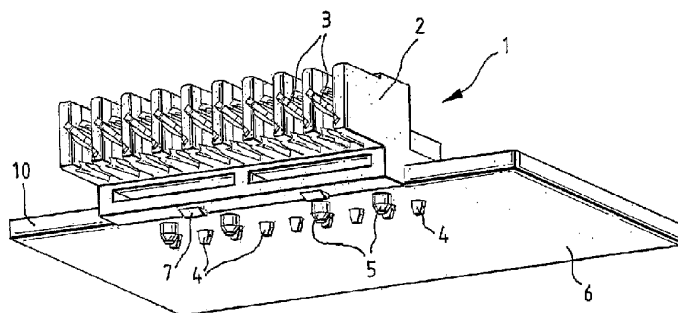
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[Fortsetzung auf der nächsten Seite]

(54) **Title:** CONDUCTOR CONNECTING MODULE FOR PRINTED CIRCUIT BOARDS

(54) **Bezeichnung:** ADERANSCHLUSSMODUL FÜR LEITERPLATTEN



(57) **Abstract:** The invention relates to a conductor connecting module (1) for printed circuit boards, comprising a housing (2) in which contact elements are disposed. Said contact elements have a first contact area that is configured as an insulation displacement contact (3), and a second contact area that is configured as a solderable contact pin (4). The contact pins (4) are disposed at a right angle to the insulation displacement contacts (3) so that the insulation displacement contacts (3), in the mounted state, lie in a plane parallel to the printed circuit board (6).

(57) **Zusammenfassung:** Die Erfindung betrifft ein Aderanschlussmodul (1) für Leiterplatten, umfassend ein Gehäuse (2), in dem Kontaktelemente angeordnet sind wobei die Kontaktelemente einen ersten Kontaktbereich aufweisen, der als Schneid-Klemm-Kontakt (3) ausgebildet ist, und einen zweiten Kontaktbereich aufweisen, der als lötlbarer Kontaktpin (4) ausgebildet ist, wobei die Kontaktpins (4) in einem rechten Winkel zu den Schneid-Klemm-Kontakten (3) angeordnet sind, so dass die Schneid-Klemm-Kontakte (3) im montierten Zustand in einer Ebene parallel zur Leiterplatte (6) liegen.



RO, SE, SI, SK, TR), OAPI (BE, BJ, CE, CG, CI, CM, GA, GN, GQ, GW, ML, MR, NI, SN, TD, TG).

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Zur Erklärung der Zweibuchstaben-Codes und der anderen Abkürzungen wird auf die Erklärungen ("Guidance Notes on Codes and Abbreviations") am Anfang jeder regulären Ausgabe der PCT-Gazette verwiesen.

2004302244 23 Sep 2009

- 1 -

CONDUCTOR CONNECTING MODULE FOR PRINTED CIRCUIT BOARDS**Field of Invention**

- 5 The invention relates to a conductor connection module for printed circuit boards.

Background of Invention

- 10 A conductor connection module for printed circuit boards is described, for example, in EP 0 766 952 B1. The conductor connection module has a housing in which contact elements are arranged, with the contact elements having a first contact area which is in the form of an insulation-displacement terminal contact, and having a second contact area which is in the form of a detachable contact pin. The housing is integral and is soldered to the printed circuit board via the contact
- 15 pins. The contact elements are inserted from the upper face of the housing and are held by stops, with the contact pins projecting out of the lower face of the housing in the inserted state. Shielding plates are provided for shielding, are inserted from the lower face of the housing and are in each case arranged between two pairs of contact elements. The shielding plates likewise have contact
- 20 pins, so that they can likewise be soldered to the printed circuit board and can be connected to a common ground line. Conductor connection modules such as these are also referred to, in the German language, as PCB print modules. Conductors can then be electrically connected to the printed circuit board via the contact areas, which are in the form of insulation-displacement terminal contacts.
- 25 When the printed circuit boards are used in a housing or in an insert, then the printed circuit board must be connected in advance, and the housing or the insert must be removed for any retrospective change to the circuitry.

- It is generally desirable to overcome or ameliorate one or more of the above
- 30 described difficulties, or to at least provide a useful alternative.

2004302244 23 Sep 2009

- 2 -

Summary of Invention

In accordance with one aspect of the present invention, there is provided a conductor connection module for printed circuit boards, having a housing in which
5 contact elements are arranged, with the contact elements having first contact areas which are in the form of insulation-displacement terminal contacts, and having second contact areas which are in the form of a detachable pin contacts with the insulation-displacement terminal contacts having slots,

characterized in that

10 the contact elements are designed such that the longitudinal axes of the insulation-displacement terminal contacts lie parallel to the surface of the printed circuit board when the conductor connection module is in the installed state, and in that the slots run parallel to the longitudinal axes of the insulation-displacement terminal contacts.

15

The invention is preferably a solution to the technical problem of providing a conductor connection module for printed circuit boards which allows conductors to be connected more easily.

20 In accordance with a preferred embodiment of the invention, the contact elements are designed such that the longitudinal axes of the insulation-displacement terminal contacts lie parallel to the surface of the printed circuit board when the conductor connection module is in the installed state. This means that it is possible to ensure that the insulation-displacement terminal contacts in the case of
25 inserts are accessible from the outside via the front panel. This in turn allows simple retrospective connection of the insulation-displacement terminal contacts without having to remove the insert or adjacent inserts. This also applies in the same sense where the printed circuit board is arranged in a housing. A further advantage is that the arrangement on the printed circuit board has a somewhat
30 smaller physical height. In one preferred embodiment, the contact pins are arranged at right angles to the insulation-displacement terminal contacts, so that, in the installed state, they are at right angles to the surface of the printed circuit

- 3 -

board, thus allowing simple plugging through and soldering. The contact elements are preferably integral and are preferably inserted from the end face of the housing that is associated with the insulation-displacement terminal contacts, with the contact pins subsequently being bent.

5

The housing is preferably an integral plastic housing.

10 In one preferred embodiment, the housing has fixing pins via which the conductor connection module can be fixed to and aligned with respect to the printed circuit board. The fixing pins may be in the form of a push fit or may have at least partially cylindrical latching. Alternatively, the fixing pins may be in the form of hot stamping pins.

15 In a further preferred embodiment, the housing has a stop surface in order to support the housing on an end surface of the printed circuit board. The printed circuit board can thus at least partially absorb the connection forces which occur during connection of the insulation-displacement terminal contacts.

Brief Description of the Drawings

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Preferred embodiments of the present invention are hereafter described, by way of non-limiting example only, with reference to the accompanying drawings, in which:

- 25 Fig.1 shows a perspective view from underneath of a conductor connection module for printed circuit boards,
- Fig. 2 shows a perspective plan view of the conductor connection module in the installed state on a printed circuit board,
- Fig. 3 shows a perspective view from underneath of the illustration shown in Figure 2,
- 30 Fig.4 shows a perspective illustration of the conductor connection module in the cutaway state,
- Fig. 5 shows a perspective front view of a front panel, and

2004302244 23 Sep 2009

- 4 -

Fig. 6 shows a perspective rear view of the front panel.

Detailed Description of Preferred Embodiments of the Invention

- 5 Figure 1 shows the conductor connection module 1 for printed circuit boards. The conductor connection module 1 has a housing 2 with contact elements, with the contact elements having a contact area which is in the form of an insulation-displacement terminal contact 3 and a contact area which is in the form of a contact pin 4. The contact pins 4 are in this case arranged at right angles to the
- 10 insulation-displacement terminal contact 3 as can be seen, for example, in Figure 4. By way of example, the contact pins 4 are in the form of simple solder pins based on plug-through technology, in the form of push-in pins or have a particular geometry for SMD soldering, with the embodiment in the form of solder pins based on plug-through technology being illustrated in Figures 1-4. In this case, the
- 15 longitudinal axes L of the insulation-displacement terminal contacts 3 lie parallel to the surface of the printed circuit board 6 and to the cutting edges of the insulation-displacement terminal contact 3. The housing 2 has fixing pins 5, which are plugged through corresponding holes in the printed circuit board 6, as is illustrated in Figure 3. Furthermore, the housing 2 has latching tabs 7, 8 on the upper face
- 20 and lower face, by means of which the conductor connection module 1 can be latched to a front panel. In addition, the housing 2 has a stop surface 9, which supports the housing 2 on one end surface 10 of the printed circuit boards 6, as is illustrated in Figures 2 and 3. As can be seen in particular in Figure 2, the rear part of the housing 2 also lies on the printed circuit board 6. Two formed areas 11
- 25 are arranged on the housing 2 in the area of the bend in the contact pin 4, and these hold and fix the contact pins 4. In comparison to cable plug connectors which are latched onto the end face of a printed circuit board, the conductor connection module 1 according to the invention allows use of different printed circuit board thicknesses as is actually required, for static reasons, for relatively
- 30 large printed circuit boards 6, or as is standardized for use with 19-inch technology. The modules may be designed to have a pitch which complies with the standard electronic grid system of 5.08 mm, so that contact rows with a

2004302244 23 Sep 2009

- 4a -

relatively large number of poles can be produced simply by arranging the conductor connection modules 1 in a row within the same grid system.

Figures 5 and 6 show three conductor connection modules 1 within a front panel 12. As can be seen in Figure 5, the insulation-displacement terminal contacts 3 are freely accessible from the end face of the front panel 12, so that the conductors can easily be connected using standard tools, without having to remove the front panel 12. As can likewise be seen, when two or more inserts with front panels 12 are arranged one above the other, they do not interfere with one another in terms of connection.

Throughout this specification and the claims which follow, unless the context requires otherwise, the word "comprise", and variations such as "comprises" and "comprising", will be understood to imply the inclusion of a stated integer or step or group of integers or steps but not the exclusion of any other integer or step or group of integers or steps.

The reference in this specification to any prior publication (or information derived from it), or to any matter which is known, is not, and should not be taken as an acknowledgment or admission or any form of suggestion that that prior publication (or information derived from it) or known matter forms part of the common general knowledge in the field of endeavour to which this specification relates.

List of reference symbols

	1	Conductor connection module
	2	Housing
5	3	Insulation-displacement terminal contact
	4	Contact pin
	5	Fixing pin
	6	Printed circuit board
	7	Latching tab
10	8	Latching tab
	9	Stop surface
	10	End surface
	11	Formed area
	12	Front panel

2004302244 23 Sep 2009

- 6 -

THE CLAIMS DEFINING THE INVENTION ARE AS FOLLOWS:

1. A conductor connection module for printed circuit boards, having a housing in which contact elements are arranged, with the contact elements having a first contact areas which are in the form of insulation-displacement terminal contacts, and having second contact areas which are in the form of detachable pin contacts with the insulation-displacement terminal contacts having slots,
characterized in that
the contact elements are designed such that the longitudinal axes of the insulation-displacement terminal contacts lie parallel to the surface of the printed circuit board when the conductor connection module is in the installed state, and in that the slots run parallel to the longitudinal axes of the insulation-displacement terminal contacts.
2. The conductor connection module for printed circuit boards as claimed in claim 1, characterized in that the contact pins are arranged at right angles to the insulation-displacement terminal contacts.
3. The conductor connection module for printed circuit boards as claimed in claim 1 or 2, characterized in that the housing is an integral plastic housing.
4. The conductor connection module for printed circuit boards as claimed in claim 2 or 3, characterized in that the housing has fixing pins which are arranged parallel to the contact pins.
5. The conductor connection module for printed circuit boards as claimed in one of the preceding claims, characterized in that the housing has a stop surface in order to support the housing on an end surface of the printed circuit board.

2004302244 23 Sep 2009

- 7 -

6. The conductor connection module for printed circuit boards substantially as hereinbefore described, with reference to the accompanying drawings.

1/4

FIG.1

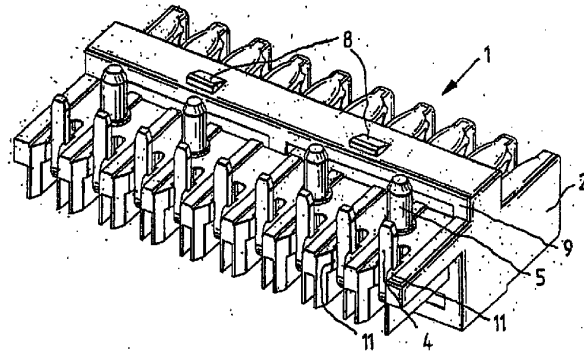
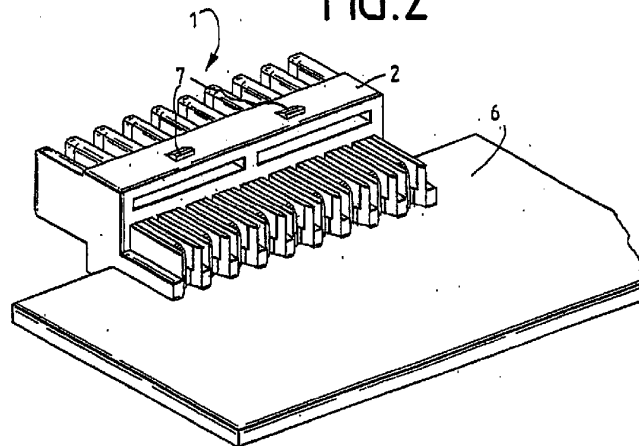


FIG.2



2/4

FIG.3

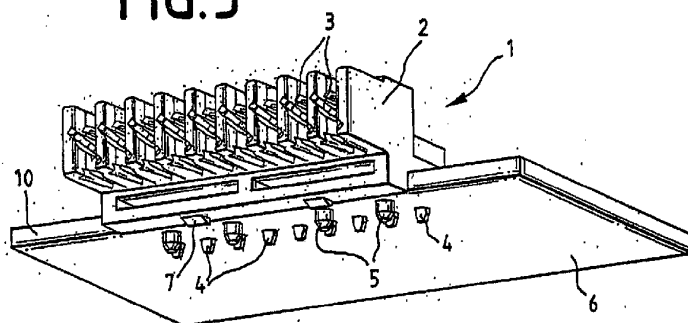
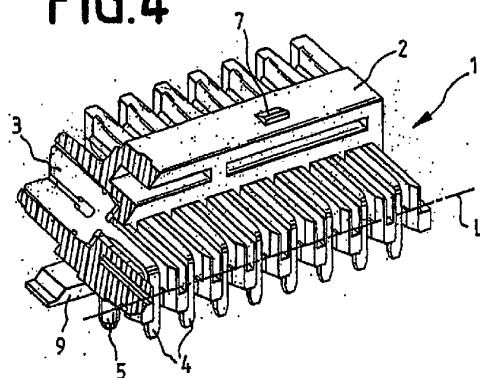
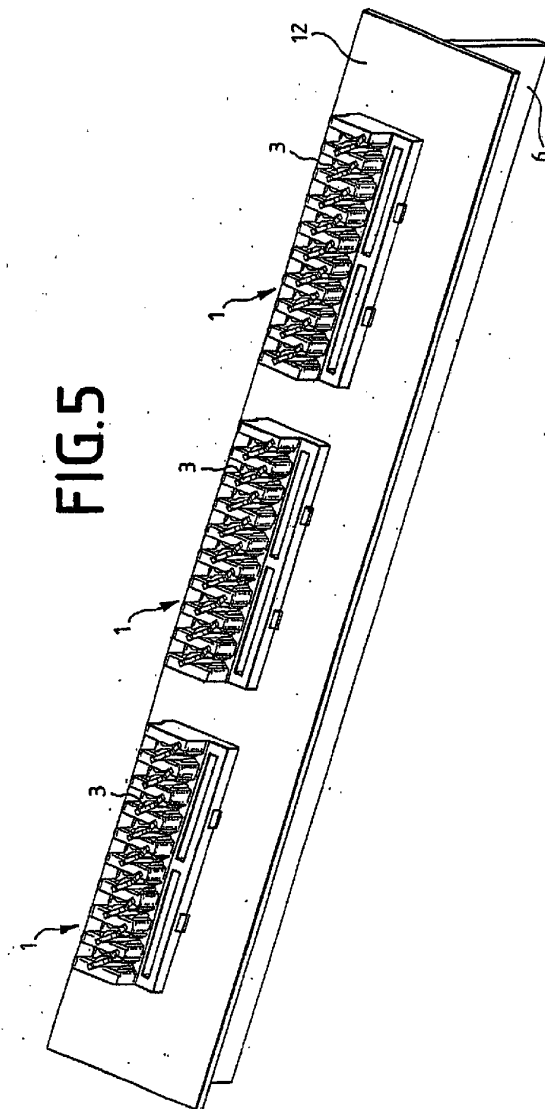


FIG.4



3/4

FIG. 5



4/4

FIG.6

