

Connector for Circuit Boards

The invention relates to a connector of printed or otherwise produced circuit boards, in particular according to the preamble of Patent Claim 1.

For the power supply of a plurality of circuit boards in electronic equipment, in particular for wired backplanes in the computer industry - irrespective of the particular technical configuration of the backplanes, for example by wire-wrap technique, metal-plate technique, and printed circuit by solder or press-in technique - various solutions for the power supply and various conductor bar concepts are known, which have in principle, however, one common feature: the usual contacts of the board connector are used for transfer of the current to the individual daughterboards within the plug connection. The direct contacting of a conductor bar by means of an additional plug is also known.

However, on equipment with low-voltage supply, as increasingly provided today in particular for computer installations, the currents flowing via the power supply contacts reach considerable values; this is particularly true when very fast-switching semiconductor components with metal barrier layer (Schottky barrier) are used. When connecting a circuit board via the connector, it is frequently also desired to ensure that the power supply is guaranteed in any case for all parts of the circuit before any component on the circuit board to be connected can execute its intended switching function. This is known as a so-called desired "power lead". If, however, the power supply is established via the usual contacts of the board connector, in the case of relatively high supply currents, several contacts have to be used, for which simultaneous and uniform contact making has to be guaranteed. As is apparent, in this case the requirement of a power lead also presents a certain problem.

The other known solution for direct contacting of the conductor bar by means of an additional plug is, however, obviously more complex and, in some cases, can lead to problems of space in the equipment.

5 The solution according to the invention specified in Patent Claim 1 offers the special advantage of a direct contacting of the conductor bar by a slight modification of existing indirect board plugs, the invention being
10 inserted on at least one narrow side of the contact clip strip for the contacting of a conductor bar, assigned to several connectors, via an opening in the corresponding narrow side of the protective shroud of the contact clip strip.

15 Advantageous developments of the inventive idea are specified in subclaims and explained in the following description.

It is advantageous for increasing the contact stability at the conductor bar to provide two or more additional
20 contact clips connected electro-galvanically in parallel in the narrow side mentioned of the contact clip strip.

To be able to ensure at the same time a twist protection against unintended incorrect plugging together of the contact strip and the contact clip strip for the connector,
25 it is provided in an advantageous embodiment to insert the additional contact clip(s) into a chamber-like projection which is open at the side and projects from the narrow side of the contact clip strip provided for contact bar contact making, to be precise by a piece which corresponds approximately to the wall thickness of the protective
30 shroud of the contact strip. On the protective shroud, there is provided a corresponding opening, via which the contact-making access of the additional contact clip or clips is guaranteed.

The conductor bar itself may be clipped into plastic hooks moulded onto the housing section of the blade or pin contact strip or be held by additional clip elements connected to this housing section in such a way that the level of the conductor bar can be varied in a simple way to ensure thereby a desired lead of the contact making of the high-current contacts over the signal contacts of the connector. The lead of the power contact making may also be achieved, however, by means of a different, in particular somewhat larger, length of the additional contact clip or clips.

An exemplary embodiment of the invention is described below, with reference to a connector in accordance with DIN 41612, type R, which, according to the invention, is provided with the lateral additional contacts.

Fig. 1 shows an example of a backplane, wired on the underside, with several connectors of the type according to the invention arranged on the upper side, including two conductor bars, each running along the narrow sides of the connector;

Fig. 2 shows the perspective partial view of the contact clip strip of a board connector with features according to the invention; and

Figs. 3 to 5 show examples of the mounting of a conductor bar in the case of board connectors with features according to the invention.

The backplane 1, for example of an electronic computing element, is fitted with a plurality of (blade or pin) contact strips 11 which are inserted into the backplane from the upper side equidistant from one another in parallel alignment and the contact pins of which, passing through the backplane, are wired on the underside in a way not shown here, for example by the so-called wire-wrap technique. The contact pins 16 of a contact strip 11 are surrounded by a protective shroud 2, the inside dimensions

of which are adapted to the border dimensions of a clip strip 6 (taken out in the diagram), which is fitted in a known way with a number of clip contacts (not shown) corresponding to the number of contact pins 16 and simultaneously serves for the mechanical mounting of in each case one of a plurality of daughterboards 5. One or both walls of the protective shroud 2 of the contact strip 11 are removed, apart from a residual section - the cam 7 which serves as a twist protection in a way to be described in more detail later - on the narrow side 10 of the contact strip 11, so that an opening 9 is formed. In the example shown, two conductor bars 3, 4 run along the narrow sides 10 and are freely accessible from the inside of the protective shroud 2 via the opening 9, in other words they are electrically contactable in the region of the opening. If only one conductor bar is required for the power supply of the daughterboards 5, if necessary just one opening 9 and just one cam 7 may be provided at each contact strip 11. The conductor bars 3, 4 thus form in the region of the openings 9 the end termination of the protective shroud 2 of the contact strips 11.

The clip strip 6, shown in partial view in enlarged perspective view in Fig. 2, exhibits in the region of the narrow side 10' shown, in the section engaging in the protective shroud 2, two projecting side walls 14, 15, which form a chamber open toward the narrow side 10', into which two additional contact clips 8 are inserted in the example shown, which contact clips contact the assigned contact bar 3 or 4 via the opening 9. As is apparent, just one contact clip 8 or more than two contact clips may also be provided. However, for a reliable contacting of the assigned conductor bar 3 or 4, as a rule two contact clips 8 should be expedient, directly and integrally connected to one or more terminal contact pin(s) 13. The distance between the two side walls 14, 15 of the chamber 12 corresponds to the width of the opening 9, while a remaining face wall section 18 corresponds approximately to the width of the cam 7. The outside dimensions of the

chamber walls 14, 15 in interaction with the opening 9 and the remaining face wall section 18 in interaction with the cam 7 form a "confusion protection" or a twist protection, so that it is always ensured that the respective daughterboard 5 with the assigned clip strip 6 is in each case inserted the right way round into the assigned contact strip 11.

The conductor bars 3, 4 may be secured by means of contact clips attached to the protective shroud 2 or to the backplane 1 or else to the housing of the equipment (not shown) in such a way that a slight vertical adjustment of the conductor bars 3, 4, in other words perpendicular to the level of the backplane 1, and thus a setting of the contact-making lead of the power supply is possible. The conductor bars 3, 4 may also be inserted in receiving slits 20 in the insulator of the contact strips 11 and fixed by clipping in one or two catch hooks 22 or 24, 26 directly moulded onto the contact strips 11 (cf. Figs. 3 and 4).

Another solution for the slightly vertically adjustable fixing of the conductor bar 3 or 4 is shown by Fig. 5. In this case, the conductor bar 3 or 4 is likewise inserted into end receiving slits 20 of the insulator of the contact strip 11. A metallic clasp 28 serves to fix the conductor bar 3 or 4, pulling the conductor bar 3 or 4 against a cam 30 moulded onto the insulator.

PATENT CLAIMS

1. Connector for circuit boards consisting of a (blade or pin) contact strip with surrounding protective shroud (2) on the one hand and a contact clip strip (6) which is adapted to the inside dimensions of the protective shroud (2) on the other hand, characterized in that a additional contact clip (8) is inserted on at least one narrow side (10) of the contact clip strip for the contacting of a conductor bar (3), assigned to several connectors, via an opening (9) in the corresponding narrow side of the protective shroud (2).
2. Connector according to Claim 1, characterized in that, to increase the contact stability at the conductor bar (3), at least two additional contact clips (8), connected electrically parallel, are inserted on one narrow side (10) of the contact clip strip (6).
3. Connector according to Claim 1 or 2, characterized in that the additional contact clip(s) are inserted into a lateral chamber (12), which is open to the conductor bar (3) and the side walls (14, 15) of which project from the narrow side surface (13) of the contact clip strip (6) by a piece corresponding approximately to the wall thickness of the protective shroud (2) of the contact strip, and the distance between them corresponds approximately to the width of the opening (9).
4. Connector according to one of the preceding claims, characterized in that the additional contact clip (s) is (are) galvanically connected to a terminal contact



pin (13), projecting on the terminal side of the contact clip strip (6), for the power supply of a circuit board (5).

5. Connector according to Claim 3, characterized in that the projecting walls (14, 15) of the chamber (12), together with the opening in the protective shroud (2), form a twist protection against unintended incorrect plugging together of contact strip and contact clip strip.

6. Connector according to one of the preceding claims, characterized in that the conductor bar (3) is held along the narrow sides of a plurality of catch hooks (22; 24, 26) arranged in parallel alignment.

7. Connector according to one of the preceding Claims 1 to 5, characterized in that the conductor bar (3) along the narrow sides of a plurality of contact strips arranged alongside one another in parallel alignment is held by additional clip elements (28).

8. Connector according to one of the preceding claims, characterized in that the relative contact position between the conductor bar (3) and the additional contact clip(s) (8) is adjustable for setting the contact-making lead of the power supply of a circuit board.

9. Connector according to Claim 8, characterized in that the level of the conductor bar (3) relative to the contact point is adjustable by the additional contact clip(s).

