

CONNECTING BOARD

This invention relates to connecting lands or pads
5 used for the connection of compression-type electrical
contacts of electrical connectors thereto.

Connecting or circuit boards are known in the art
which usually are placed facing each other to retain
compression-type connectors which are used to form
10 electrical connection, for example, between IC chip
carriers and printed circuit boards.

The connecting or circuit boards of this type
generally have a number of rectangular or round lands
forming connecting pads. However, some connecting
15 boards have lands located on the surface intended for
the mounting of electronic components by means of a flow
soldering method; however, there is a danger that molten
solder can adhere to the lands during this operation.
In order to prevent the solder from adhering to the
20 lands, a resist layer is formed around each land. This
leads to a build-up of the solder on the land surface if
the solder flows over the land. Such a build-up
produces an increase in the height of the land equal to
the thickness of the solder accumulated on the land
25 surface. With an increase in the land height, spring-
loaded portions of the contacts making connections with
such lands can be deformed beyond permissible limits.
In addition, due to the difference in the height between
the lands without a solder build-up and the lands with
30 an accumulation of the solder, the pressure applied to
different lands by respective contacts will be also
different. This may result in an inappropriate
connection with electrical connectors.

This invention was made taking into consideration
35 the circumstances mentioned above, and its purpose is to
offer a connecting board in which the solder build-up
does not lead to a considerable increase in the height
of the lands even if accumulation of the solder takes

place, resulting in the formation of reliable connections of the lands with contacts of an electrical connector.

5 In order to achieve the above stated purposes, the connecting boards, according to this invention, have lands or connecting pads in the form of electrically-connected narrow and fine land or pad sections.

10 Due to the fact that the lands of the connecting board, according to the invention, are in the form of electrically-connected narrow fine land sections, in the event if the solder flows over the lands during the flow soldering operation, the solder adheres to a number of fine land sections. Since the fine land sections are narrow, only a small amount of solder adheres to them, 15 and their height increase is insignificant. Because of this, no substantial difference exists between the lands with a build-up of the solder and the lands without it. As a result, a contact of the electrical connector electrically contacting with a land having a solder 20 build-up is not subject to a deformation beyond the permissible limits. At the same time, there is no large difference in the contacting pressure between the contacts applied to lands no matter whether they have solder adhered to them or not. This makes it possible 25 to provide for an optimum connection with an electrical connector at all times, thus substantially improving the reliability of the connection.

30 Embodiments of the invention will now be described by way of example with reference to the accompanying drawings in which:

Figure 1 is a cross-sectional view showing a state of contact between a land on a circuit board according to this invention and a contact.

35 Figure 2 is a plan view of a series of lands according to this invention.

Figure 3 is a plan view of another embodiment of the invention.

Figure 4 is a plan view of a further embodiment of the invention.

Figure 5 is a plan view of an additional embodiment of the invention.

5 Figure 6 is a plan view of a still further embodiment of the invention.

Figure 7 is an exploded perspective view of an electrical connector and circuit boards.

10 Figure 8 is a plan view of a series of conventional lands.

Figure 9 is a cross-sectional view taken along line 9-9 of Figure 8.

As can be seen from Fig. 1, land or contact pad 21 is made of narrow and fine land sections 21a occupying a large enough area for forming a sufficient electrical contact with contact section 11a of electrical contact 11. From Fig. 2, it can be seen that the fine land sections 21a constituting one land 21 are formed as an integral unit from a copper foil or a similar material, with all fine land section being electrically connected. as can be seen from Fig. 1, due to such a design of the land 21, it is possible to limit the height h of the solder 22 accumulated on the land 21 to a negligible amount in the event if electronic components are mounted on the connecting or circuit board 20 by means of flow soldering. Therefore, the solder does not accumulate in large quantities on the top of the lands, and the difference in the land heights between the lands with adhered solder and without solder is not very large. Because of this, the contacts of a compression-type connector which come in contact with the lands having a solder build-up do not experience a deformation beyond permissible limits. As a result, there is no large difference in the contacting pressure between individual contacts and lands which makes it possible to ensure a good electrical connection with compression-type

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electrical connectors and to improve the reliability of the connection.

The lands can be made in a number of configurations other than those depicted in Fig. 2. Various modified configurations of the lands 21A, 21B, 21C and 21D are shown in Figs. 3 through 6. Multiple fine land sections 21a can be produced either in one manufacturing operation or by means of a multistage process as far as the final result is an integral land of the most suitable configuration.

Fig. 7 represents a schematic oblique view of an embodiment of a connecting board according to this invention and a compression-type connector. Fig. 7 shows a pressure-type connector 10 simply as an example that is used to interconnect lands 21 or circuit boards 20 via electrical contacts 11 when the boards and connector are held together by fastening members 22, 24. The invention is not limited to the use with only such a connector.

For comparison, a conventional land is shown in Fig. 8. Its shape and the shape of the solder build-up are shown in Fig. 9. Since the entire area of the land 21E shown in Fig. 8 is large, the height H of the solder 22 adhered to it becomes rather high contrary to the present invention.



Claims

1. A circuit board having connecting pads thereon for electrical connection of electrical contacts of an electrical connector thereto, said connecting pads being
5 located on a surface of the circuit board, each of said connecting pads occupying a large enough area for electrical engagement with one of the electrical contacts and including interconnected narrow land sections.
- 10 2. A circuit board as claimed in claim 1, wherein the narrow land sections include parallel side members and parallel members connected therebetween.
3. A circuit board as claimed in claim 1, wherein the narrow land sections include an elongated member
15 from which extend parallel members.
4. A circuit board as claimed in claim 1, wherein the narrow land sections include parallel side members and an intermediate member therebetween, and parallel members connected between each of said side members and
20 said intermediate member.
5. A circuit board as claimed in claim 1, wherein the narrow land sections form a square wave configuration.
- 25 6. A circuit board as claimed in claim 1, wherein the narrow land sections include a central member from each side of which extend parallel members.