

Internal distribution code:

- (A) Publication in OJ
(B) To Chairmen and Members
(C) To Chairmen
(D) No distribution

**Datasheet for the decision
of 24 October 2013**

Case Number: T 1972/12 - 3.4.03
Application Number: 03000693.6
Publication Number: 1330145
IPC: H05K 1/14, H05K 1/11, H05K 7/14
Language of the proceedings: EN

Title of invention:

Electrical connection system for two printed circuit boards mounted on opposite sides of a mid-plane printed circuit board at angles to each other

Applicant:

FCI

Headword:

-

Relevant legal provisions (EPC 1973):

EPC Art. 84, 111(1)

Keyword:

"Clarity (yes)"
"Remittal (yes)"

Decisions cited:

-

Catchword:

-



Case Number: T 1972/12 - 3.4.03

D E C I S I O N
of the Technical Board of Appeal 3.4.03
of 24 October 2013

Appellant:
(Applicant)

FCI
18 Parc Ariane III
3/5 Rue Alfred Kastler
F-78280 Guyancourt (FR)

Representative:

van Looijengoed, Ferry Antoin Theodorus
De Vries & Metman
Overschiestraat 180
NL-1062 XK Amsterdam (NL)

Decision under appeal:

**Decision of the Examining Division of the
European Patent Office posted 30 March 2012
refusing European patent application
No. 03000693.6 pursuant to Article 97(2) EPC.**

Composition of the Board:

Chairman: G. Eliasson
Members: V. L. P. Frank
T. Karamanli

Summary of Facts and Submissions

- I. This is an appeal by the applicant against the refusal of European patent application No. 03 000 693 for the reason that claim 1 of the main and 1st auxiliary requests were not clear (Article 84 EPC 1973).
- II. The appellant applicant requested in writing that the decision under appeal be set aside and that a patent be granted on the basis of the main request. In case the board would be inclined to refuse the application on any ground not yet examined by the examining division, it was requested that the case be remitted to the examining division. Oral proceedings were requested, as a precautionary measure, should the board be inclined to uphold the contested decision. In case the board would decide to reject the main request, it was requested to maintain the patent with amended claims according to the auxiliary request.
- III. The independent claim of the main request, which is identical to the claim on which the contested decision was based, reads as follows:
- "1. A routing system for interconnecting two surface mounted printed circuit boards comprising:
a mid-plane printed circuit board including a first face and a second face, said second face parallel to said first face;
a first printed circuit board (101) surface mounted on said first face of said mid-plane printed circuit board, said first printed circuit board containing pairs of electrical connections (211a, 212a);

a second printed circuit board (102) surface mounted on said second face of said mid-plane printed circuit board, said second printed circuit board containing pairs of electrical connections (211b, 212b), said second printed circuit board mounted at an angle of misalignment (A) to said first printed circuit board;

a plurality of pairs of via holes (111a, 112a; 111b, 112b) on said first and second faces of said mid-plane printed circuit board, said pairs of via holes (111a, 112a) on said first face of said mid-plane printed circuit board directly overlaying said pairs of via holes (111b, 112b) on said second face of said mid-plane printed circuit board;

and a plurality of electrical paths (201a, 202a; 201b, 202b) through said overlaying pairs of via holes connecting said pairs of electrical connections on said first printed circuit board to said electrical connections on said second printed circuit board

characterized in that the pairs of via holes (111a, 112a; 111b, 112b) are positioned with respect to the angle of misalignment (A) such that each via hole in each pair is fixed on an axis perpendicular to an axis that bisects the angle of misalignment or the pairs of via holes (111a, 112a; 111b, 112b) are positioned with respect to the angle of misalignment (A) such that each via hole in each pair is fixed directly on the axis that bisects the angle of misalignment."

The auxiliary request is not relevant to the present decision.

IV. The examining division argued as follows:

- Claim 1 specified an angle of misalignment between two boards. An angle could only be defined between two one-dimensional intersecting objects, ie two lines, rays or axes. The general definition of an angle was *"an angle (in full, plane angle) is the figure formed by two rays sharing a common end point"*. However, in the present case, it was attempted to define an angle by referring to two three-dimensional objects (printed circuit boards). Even in the case that printed circuit boards were considered two-dimensional objects, ie planes, it was not possible to define an angle by merely stating that the boards were mounted at an angle. It was not clear if in this case the dihedral angle was meant, the only angle that could be unambiguously defined by two planes. Although in figures 1 and 3 two rays 101 and 102 were indicated and identified as top and bottom connector boards, it was not clear how the boards related to these one dimensional objects (rays).

- Although the applicant argued that the skilled person would recognize the angle of misalignment as the angle between the columns of the first and the second printed circuit boards and that the angle of misalignment related to a rotation about an axis orthogonal to the faces of the mother board, this interpretation could not be deduced from the wording of the claim itself. Moreover, the interpretation the applicant provided was one of

many possible and hence not unambiguously and directly derivable from the application as filed.

- Throughout the claims as well as the description the angle of misalignment was only defined as the angle between the two daughter boards and not as an angle defined by an intersecting line of the two boards with the mid-plane board. Moreover, from the application as filed it was not even unambiguously clear that the two daughter boards needed to be mounted such that they intersected the mid-plane board, they could also be surface mounted parallel onto the mid-plane board.

V. The appellant applicant argued essentially as follows:

- The conclusion of the examining division that an angle could only be defined between two one dimensional intersecting objects, was not correct. As acknowledged in the contested decision, the dihedral angle was an angle between two planes which could be defined unambiguously. It was common use to refer to an "angle" between two planes, when actually the dihedral angle was meant. Also the conclusion of the examining division that it would not be clear that the angle of misalignment was a dihedral angle was not correct. The application indicated that the misalignment angle was 90 degrees when the two daughter boards were orthogonal. When two planes were orthogonal, the only 90 degrees angle was the dihedral angle. Accordingly, it was unambiguously clear that the "angle of misalignment" was the dihedral angle.

- The claims should also be read with an attempt to make technical sense out of it, as pointed out in the Guidelines for Examination, part C, Chapter III-8, paragraph 4.2. Claim 1 as a whole did not relate to a configuration of daughter boards on a mid-plane board. Instead, claim 1 pertained to a routing system on a mid-plane board for interconnecting two boards mounted on the mid-plane board. The routing system was essentially of a two-dimensional nature. The angle of misalignment was an angle within this two-dimensional environment. Moreover, in claim 1 the angle between the two daughter boards was used to position the via holes on the mid-plane board. This made it directly and unambiguously clear that the so-called angle of misalignment was an angle within the plane of the mid-plane board surface. Furthermore, in claim 1 the angle of misalignment was bisected by an axis on the mid-plane board. The via holes through the mid-plane board were either on the bisector or on an axis perpendicular to the bisector. This meant that the bisector and the axis perpendicular to the bisector were both within the plane of the mid-plane board surface. Consequently, the angle of misalignment had to be an angle between the daughter boards in the plane of the mid-plane board surface. For these reasons, it was directly and unambiguously clear for an average skilled practitioner that the angle of misalignment had to be the angle that the daughter boards made on the surface of the mid-plane board. An angle between two boards on a two-dimensional surface could be determined unambiguously. Any other interpretation of the angle of misalignment would be meaningless,

particularly in the context of the problem to be solved.

Reasons for the Decision

1. The appeal is admissible.
2. *Main request*
 - 2.1 The examining division refused the application for the reason that claim 1 was not clear (Article 84 EPC 1973), since the claim did not define the *"angle of misalignment A"* between the first and second printed circuit boards (PCB). In their view an angle could only be defined between two one-dimensional objects, the PCBs however were in reality three-dimensional objects, although they could be considered also as two-dimensional objects, ie planes. However the decision under appeal also contains a statement contradicting this finding, namely that *"the only angle that could be unambiguously defined by two planes (is) the dihedral angle"*.
 - 2.2 The board agrees with the appellant applicant in that the skilled person would understand a reference to an angle between two planes to be a reference to the dihedral angle, defined as the angle between the two lines orthogonal to the respective planes. Moreover the disclosure in the description that when two daughter boards are orthogonal to each other their misalignment angle is 90 degrees further confirms this interpretation (page 5, lines 23-25; page 7, lines 1-3).

2.3 Also the diagrams of figures 1 and 3 showing as the misalignment angle A the angle between the top and bottom connector boards indicated by lines 101 and 102 (page 5, lines 17-19; page 6, lines 26-27) is in agreement with this interpretation, since it is clear to the skilled person that the dotted lines 101 and 102 are the projections of the two daughter boards on the plane of the mother board. It is true that lines 101 and 102 could also be interpreted as the intersection lines between the planes of the mother board and those of the two daughter boards. However, both interpretations (ie projection or intersection) coincide when the daughter boards are mounted orthogonal to the plane of the mother board. The board considers it unrealistic that a skilled person would consider a configuration in which this would not be the case.

2.4 The board is thus persuaded that the person skilled in the art would have no doubts as to what is meant by the misalignment angle between the two daughter boards mounted on opposite sides of the mother board. Claim 1 further defines the position of the via holes and the electrical paths through the via holes with respect to the axis bisecting that angle, either lying on an axis perpendicular to the bisecting axis or lying directly on the bisecting axis. Hence all the features describing the routing system for interconnecting the two surface mounted printed circuit boards are clearly defined.

2.5 The board finds for these reasons that claim 1 of the main request is clear (Article 84 EPC 1973).

3. *Further prosecution of the case*

3.1 The appellant applicant requested in writing that the case be remitted to the examining division in the event that the board would be inclined to refuse the application on any ground not yet examined by the examining division.

3.2 According to Article 111(1) EPC 1973 it is within the discretionary powers of a board of appeal to exercise any power within the competence of the department which was responsible for the decision appealed or to remit the case to that department for further prosecution.

3.3 In the present case, the main request overcomes the sole reason for refusal invoked in the appealed decision. However, no complete examination of the application as to patentability requirements has yet been carried out in the first-instance proceedings. In accordance with established jurisprudence, this is a reason for remitting the case to the department of first-instance. Whether the board would be inclined to refuse the application on any ground not yet examined by the examining division is not a reason for remitting the case to the first-instance department.

3.4 In view of the above, the board decides to remit the case to the examining division for further prosecution.

Order

For these reasons it is decided that:

1. The decision under appeal is set aside.
2. The case is remitted to the department of first instance for further prosecution.

Registrar:

Chair:

S. Sánchez Chiquero

G. Eliasson