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Optical backplanes — Product specification

Part 2-1: Optical backplane using optical fibre circuit boards and multi-core right angle optical connectors

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Part 2-1: Optical backplane using optical fibre circuit boards and multi-core right angle optical connectors

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- the subject is still under technical development or where, for any other reason, there is the future but no immediate possibility of an agreement on an International Standard.

Technical specifications are subject to review within three years of publication to decide whether they can be transformed into International Standards.

IEC 62661-2-1, which is a technical specification, has been prepared by IEC technical committee 86: Fibre optics.

The text of this technical specification is based on the following documents:

Enquiry draft	Report on voting
86/439/DTS	86/452/RVC

Full information on the voting for the approval of this technical specification can be found in the report on voting indicated in the above table.

This publication has been drafted in accordance with the ISO/IEC Directives, Part 2.

The committee has decided that the contents of this publication will remain unchanged until the stability date indicated on the IEC web site under "http://webstore.iec.ch" in the data related to the specific publication. At this date, the publication will be

- transformed into an International Standard,
- reconfirmed,
- withdrawn,
- replaced by a revised edition, or
- amended.

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OPTICAL BACKPLANES – PRODUCT SPECIFICATION –

Part 2-1: Optical backplane using optical fibre circuit boards and multi-core right angle optical connectors

1 Scope

1.1 General

This part of IEC 62661 gives guidelines for an optical backplane using optical fibre boards and multi-core right angle optical connectors with low bending loss multimode fibres (hereafter called low-loss RAO) to connect daughter boards to the optical backplane.

NOTE Low bending multimode fibres are currently under study.

1.2 Product definition

The structure of an optical backplane specified in this specification is as follows

a) The optical backplane has the structure to fit to a sub-rack specified in IEC 60297-3-101 with a height of more than 3U (44,45 mm × 3).

b) One optical backplane occupies a space of 100 mm (height) and 420 mm (width) in the optical backplane stated in item a).

c) A multiple number of optical backplanes may be installed to a sub-rack specified in IEC 60297-3-101 if multiple spaces specified in item b) are available, that is, a height of 44,45 mm × N (N≥5).

d) The backplane installs maximum of 14 front boards (daughter boards) with a pitch of 6HP (30,48 mm).

e) New Type RAO connectors specified in Annex B are used in the optical backplane.

f) Multimode optical fibres are used for optical wiring in the optical backplane. More specifically, the optical backplane is made of an optical fibre board specified in IEC 62496-3-1 using low bending loss optical fibres.

1.3 Connection arrangement

Connection arrangement for the optical backplane is as follows:

a) The construction of optical connection specified in this document consists of using the compact right-angled optical board connectors specified in Annex B which are mounted on an optical backplane housed in a sub-rack specified in IEC 60297-3-101.

b) The slots are assigned the following numerical designations in this specification: the slot on the left end is designated slot number 1, and the slot on the right end is designated slot number 14. The daughter board located at slot 7 or slot 8 is defined as daughter board B, while daughter boards located on any of the other slots are defined as daughter board A. This document specifies an optical dual star connection between daughter board A and daughter board B.

1.4 Classification of connections

Connections in this specification are classified as shown in Table 1.

Table 1 – Classification of ferrules

Class	Total number of optical cables in optical backplane	Optical connect-ions in daughter board A	MT ferrule in the connector in slot of daughter board A	MT ferrule in the connector in slot of daughter board B
DS 192 optical backplane	96 × 2 = 192 lines	8 × 2 = 16 lines	8 core MT ferrule	12 core MT ferrule
DS 384 optical backplane	192 × 2 = 384 lines	16 × 2 = 32 lines	16 core MT ferrule	24 core MT ferrule

The 16 core MT ferrule and the 24 core MT ferrule used on DS 384 optical backplane are 125 μm pitch high-density MT ferrules defined by Figure B.5.

1.5 Operating environment

The operating environment is specified in Table A.1 of IEC 62496-3:2011, Category C (temperature range of –10 °C to +60 °C).

2 Normative references

The following documents, in whole or in part, are normatively referenced in this document and are indispensable for its application. For dated references, only the edition cited applies. For undated references, the latest edition of the referenced document (including any amendments) applies.

IEC 60297-3-101, *Mechanical structures for electronic equipment – Dimensions of mechanical structures of the 482,6 mm (19 in) series – Part 3-101: Subracks and associated plug-in units*

IEC 60793-1-22, *Optical fibres – Part 1-22: Measurement methods and test procedures – Length measurement*

IEC 61300-1:2011, *Fibre optic interconnecting devices and passive components – Basic test and measurement procedures – Part 1: General and guidance*

IEC 61300-2-1, *Fibre optic interconnecting devices and passive components – Basic test and measurement procedures – Part 2-1: Tests – Vibration (sinusoidal)*

IEC 61300-2-2, *Fibre optic interconnecting devices and passive components – Basic test and measurement procedures – Part 2-2: Tests – Mating durability*

IEC 61300-2-9, *Fibre optic interconnecting devices and passive components – Basic test and measurement procedures – Part 2-9: Tests – Shock*

IEC 61300-2-17, *Fibre optic interconnecting devices and passive components – Basic test and measurement procedures – Part 2-17: Tests – Cold*

IEC 61300-2-18, *Fibre optic interconnecting devices and passive components – Basic test and measurement procedures – Part 2-18: Tests – Dry heat – High temperature endurance*

IEC 61300-2-19, *Fibre optic interconnecting devices and passive components – Basic test and measurement procedures – Part 2-19: Tests – Damp heat (steady state)*

IEC 61300-2-22, *Fibre optic interconnecting devices and passive components – Basic test and measurement procedures – Part 2-22: Tests – Change of temperature*

IEC 61300-3-4, *Fibre optic interconnecting devices and passive components – Basic test and measurement procedures – Part 3-4: Examinations and measurements – Attenuation*

IEC 61300-3-6, *Fibre optic interconnecting devices and passive components – Basic test and measurement procedures – Part 3-6: Examinations and measurements – Return loss*

IEC 61754-25, *Fibre optic connector interfaces - Part 25: Type RAO connector family*

IEC 62496-3:2011, *Optical circuit boards – Part 3: Performance standards – General and guidance*

IEC 62496-3-1, *Optical circuit boards – Part 3-1: Performance standards –Flexible optical circuit boards using unconnectorized optical glass fibres*

3 Terms and definitions

For the purposes of this document, the following terms and definitions apply.

3.1
optical backplane
optical circuit board on which optical connectors are mounted in parallel and the connectors are mutually connected by optical waveguides, which are physical lines of optical signals such as, but not limited to, an optical fibre, planar polymer waveguide, planar glass waveguide, and other optical circuit boards, which are called daughter boards, are assembled on the board vertically to construct a book-shelf like structure

Note 1 to entry: Daughter boards are mutually connected optically for the required functionality. Electrical connectors are usually also mounted on the backplane to supply electric power, static control signals or low-speed bus signals to daughter boards, if necessary. An optical backplane has the function of optical connections and also mechanical support of the daughter boards.

3.2
daughter board
optical circuit board connected orthogonally to an optical backplane

Note 1 to entry: Multiple optical devices and electric/electronic devices are mounted on a daughter board, and the devices are connected optically and/or electrically.

3.2.1
daughter board A
daughter board connected to one of slot numbers 1 through 6 and 9 through 14

3.2.2
daughter board B
daughter board connected to either slot number 7 or 8

3.3
reference position of an optical backplane
positional reference point against which to determine positions of optical fibres and connectors installed in an optical backplane in this specification

3.4
reference position of an optical backplane to daughter board
positional reference point against which to determine positions of connectors installed in an optical backplane for insertion of daughter boards in this specification

3.5
dual star optical connection
optical wiring pattern in which each daughter board A is optically connected to two daughter boards B arranged at the centre of the backplane

3.6
slot
alignment structure in the backplane construction to hold daughter boards in the sub-rack, formed as a groove

3.7
standard daughter board for testing
daughter board mounted with a master cord of an MT connector which has a sufficiently small confirmed interconnection loss and a sufficiently large confirmed return loss for the evaluation of optical characteristics of an optical backplane

3.7.1
standard daughter board A for testing
daughter board to be inserted into slot numbers1 through 6 and 9 through 14 for testing of optical characteristics of an optical backplane

3.7.2
standard daughter board B for testing
daughter board to be inserted to slot numbers 7 and 8 for testing of optical characteristics of an optical backplane

4 Dimensional requirements

4.1 Dimension of a sub-rack

The optical backplane is housed on the inside face of the back of a sub-rack with dimensions shown in Figure 1. The height and width shall comply with IEC 60297-3-101 and the condition specified in Figure 1. The depth (Dc) of the sub-rack shall be selected from the specification given in IEC 60297-3-101.

Dimensions in millimetres

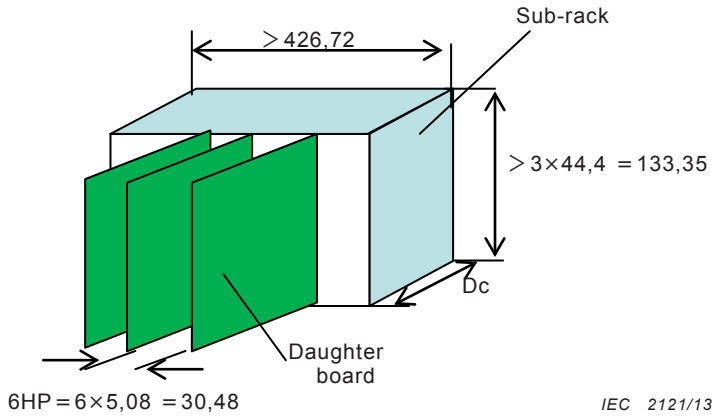


Figure 1 – Sub-rack for optical back plane

4.2 Dimension of optical wiring on optical backplane

The area for optical wiring and the position of optical connectors mounted on an optical backplane are shown in Figure 2. The reference position on an optical backplane is determined first; the dimensions to other parts on the backplane are determined by the distance from the reference position. The position of an optical fibre as connected to an optical connector is defined by the connecting position of an MT ferrule of a low-loss RAO

connector specified by IEC 61754-25. The position of a ferrule is specified by the centre of the ferrule.

The optical wiring pattern is formed on the optical fibre board at the connecting position corresponding to the holes for fibres in an MT ferrule. The size of the optical fibre board is 420 mm × 100 mm. The optical wiring pattern is formed on the board avoiding the positions to which low-loss RAO connectors are to be mounted. The positions for electric connectors are designed based on the reference position on the optical backplane when both optical and electric connectors are needed on the board.

Dimensions in millimetres

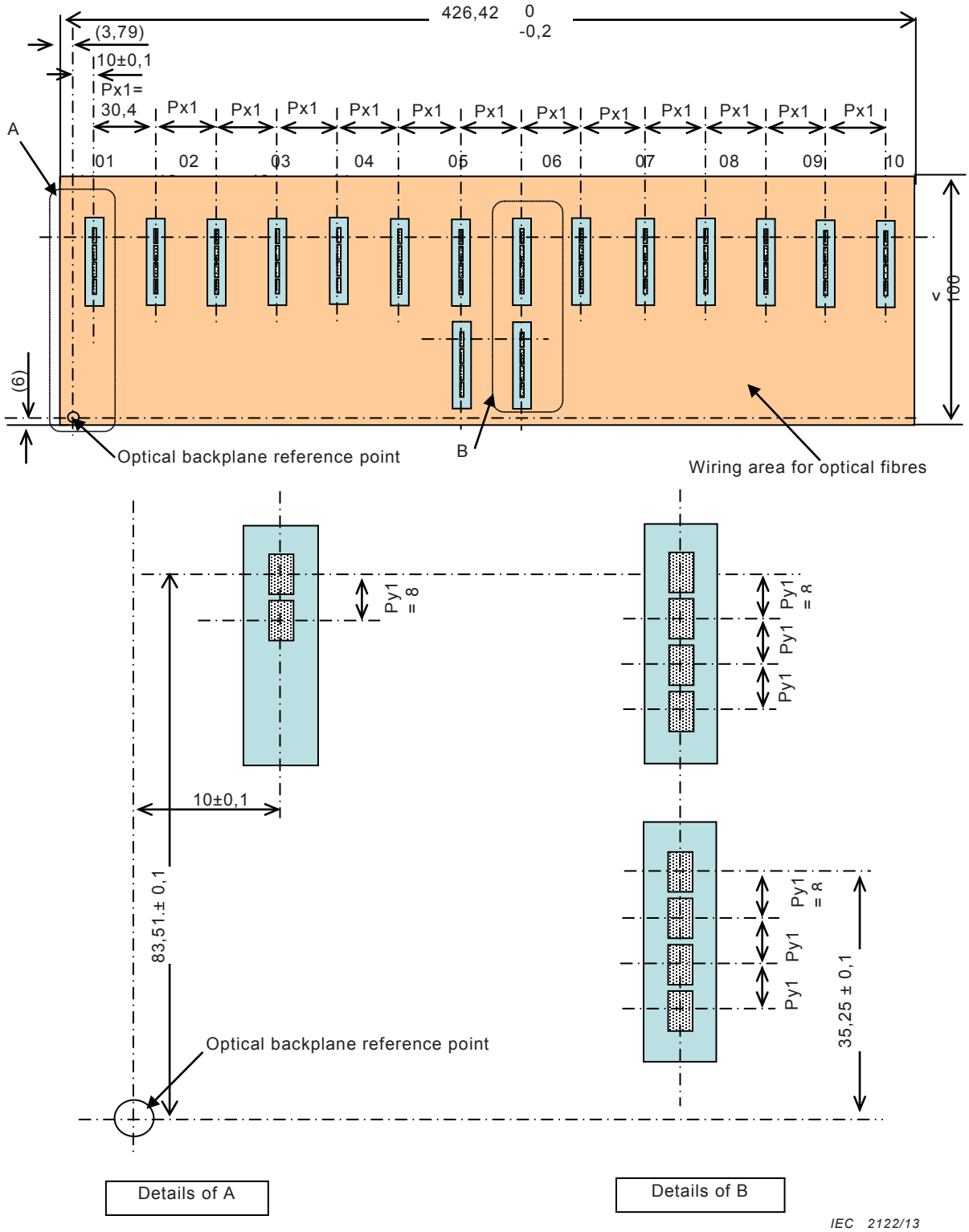


Figure 2 – Area for optical wiring and positions of optical connectors on optical backplane

4.3 Interconnection condition of connectors on optical backplane

Connectors used in the optical backplane are the low loss RAO connector specified in Annex B. The ferrule used in the low loss RAO connector is compatible with Annex B with a surface polished at an 8° angle. The direction of angle polish is shown in Figure 3.

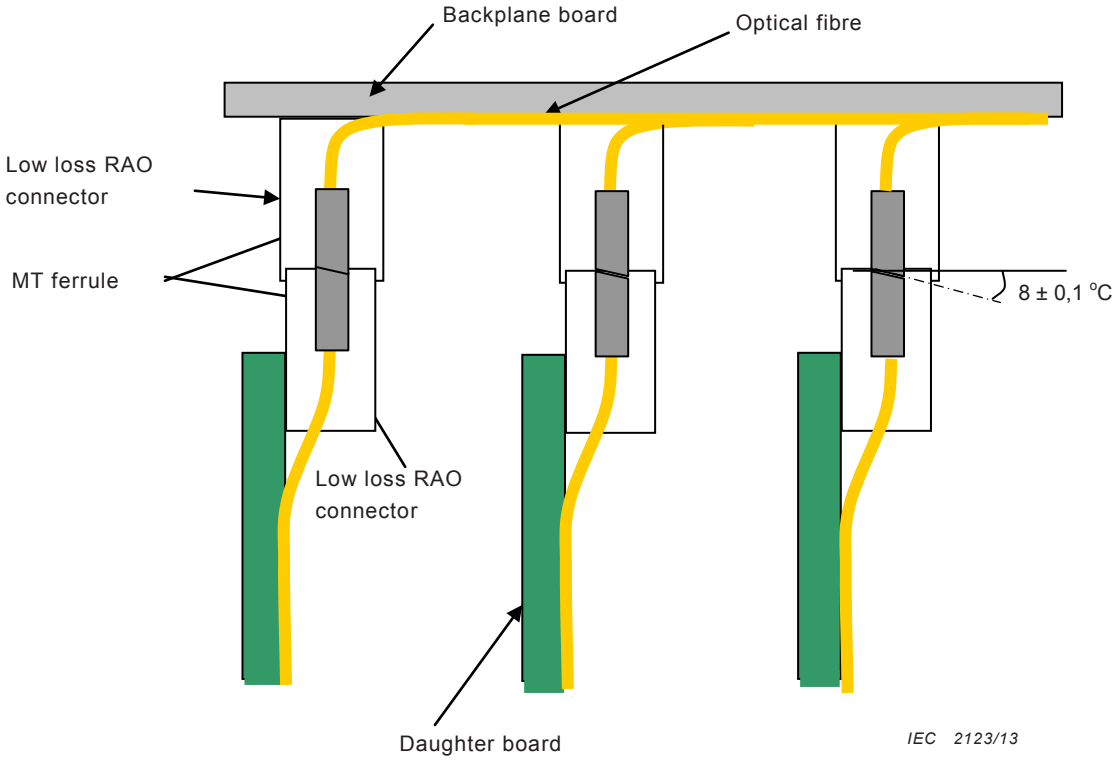


Figure 3 – 8 degree angle polish of ferrule

4.4 Mounting position of connectors on optical backplane

Mounting condition of the low loss RAO connectors on an optical backplane is shown in Figure 4. Positions of the holes to mount the RAO connectors are defined by the relative distance from the reference position on the optical backplane. The area for mounting of connectors is also defined as the area C in Figure 4. Optical fibres are not allowed to be installed in this area. An actual example of the relation of distance from the reference point of the optical backplane to the position of electric connectors is described in Annex A.

4.5 Mounting position of connectors on daughter board

Mounting condition of the low loss RAO connectors on a daughter board is shown in Figure 5. The highest hole position in the mounting holes of the RAO connector to be mounted on the highest position on the daughter board is defined as the reference position on the daughter board. This position shall also be used as the reference position of an electrical/electronic connector to be mounted. The distance to the edge of a daughter board is approximately illustrated in the Figure (distance shown in the figure with parentheses). An actual example of mounting of RAO connectors to a daughter board is given in Annex A.

Dimensions in millimetres

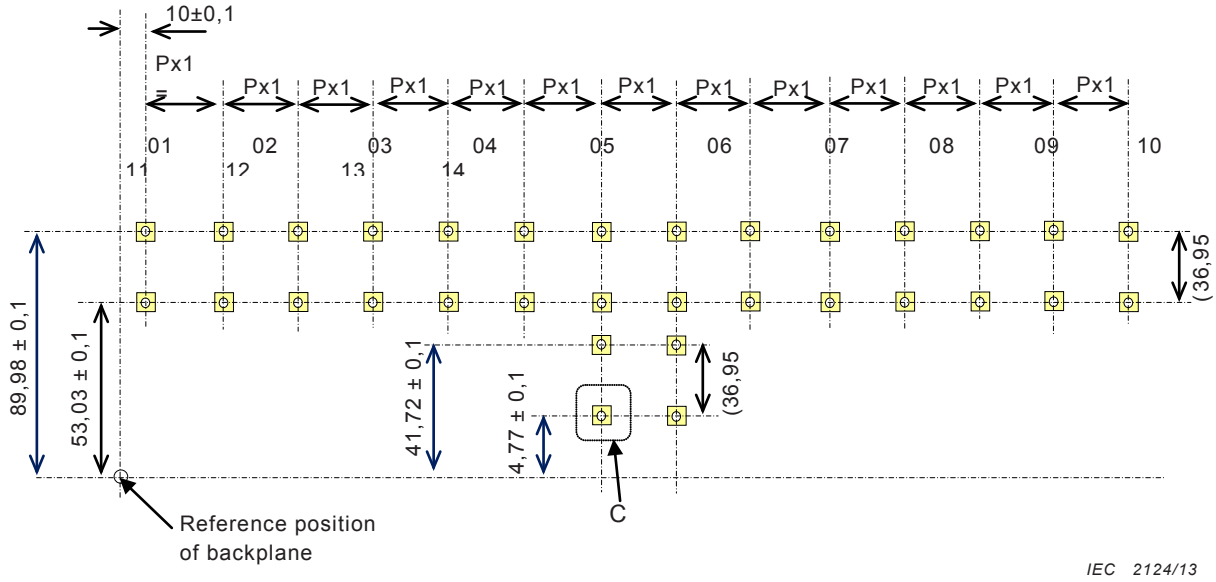


Figure 4 – Hole positions of low loss RAO connectors on optical backplane

Dimensions in millimetres

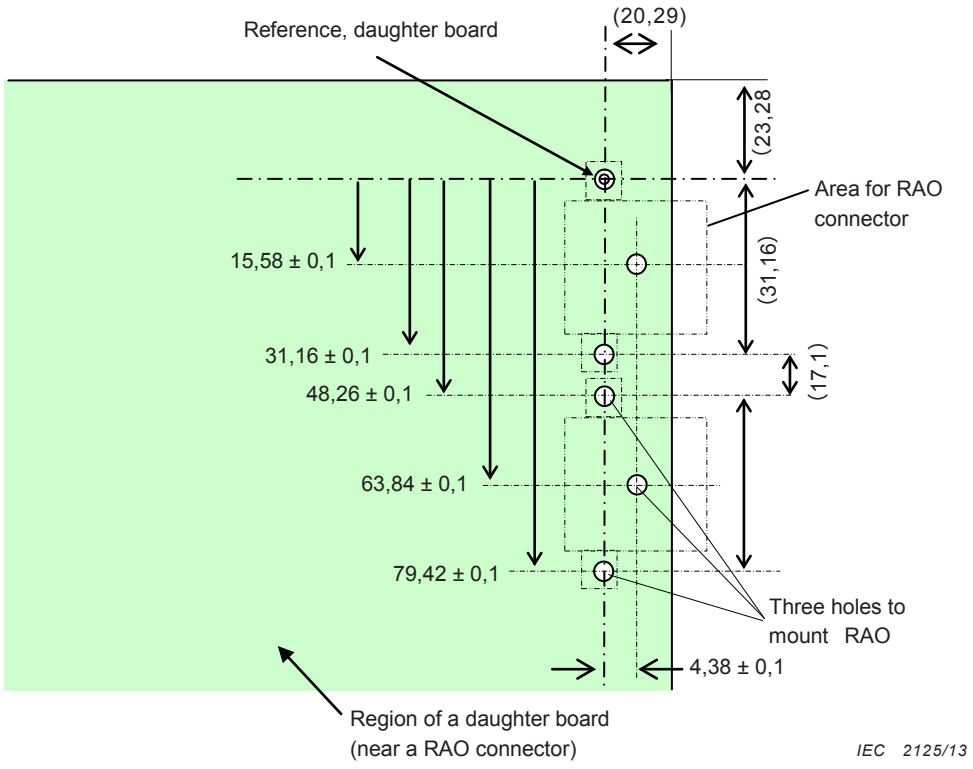


Figure 5 – Hole positions to mount a RAO connector to a daughter board

5 Requirements for dual-star optical circuits connection

5.1 Assignment of the name of an optical connection point

The names of the optical connection points are assigned as illustrated in Figure 6. The name is constructed of the following parameters in the order (1) slot number, (2) connector mounting step, (3) MT ferrule number, (4) type of ferrule, and (5) position of fibre hole.

Slot number: Slots are numbered 01, 02, 03, 04, etc. from left to right as viewed when facing the insertion side of the front board.

Connector mounting step: Step is assigned as A, B, C, etc. from the top to the bottom of the backplane

Ferrule number: Four MT ferrules housed in a RAO connector are assigned as 01, 02, 03 and 04 from the top to the bottom.

Type of ferrule: 8 core MT ferrule is called A, 12 core MT ferrule is called B, 16 core MT ferrule is called C, and 24 core MT ferrule is called D.

Position of fibre hole: The fibre hole number in the MT ferrule is assigned as 01, 02, etc. from the top to the bottom.

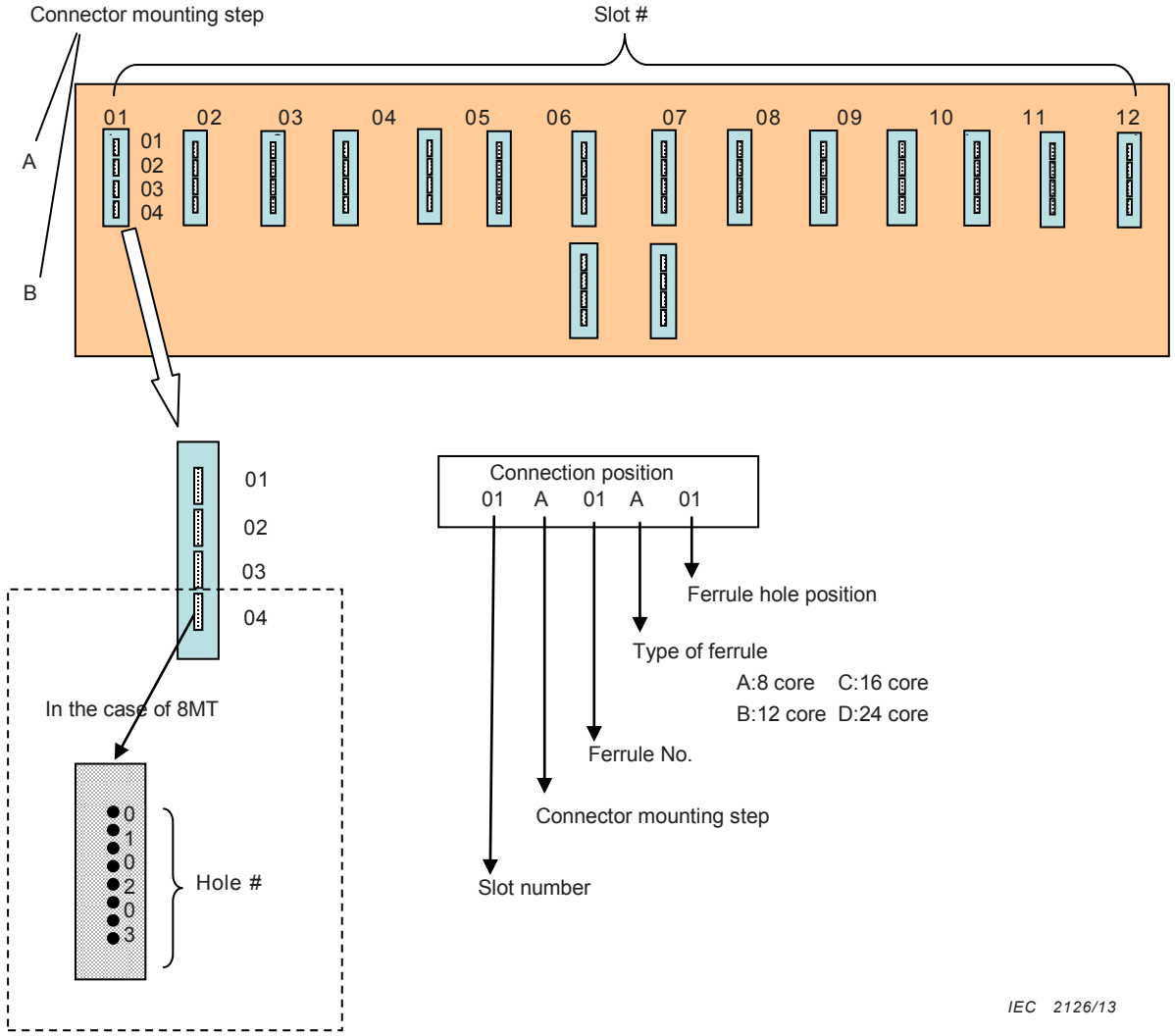


Figure 6 – Assignment of connection points

5.2 Specification of optical cable connection

The interconnection in the backplane in this specification specifies the connection between 12 daughter boards A and the two centrally situated daughter boards B. The interconnection for the DS 192 optical wiring backplane is given in Table 2 and for DS 384 is given in Table 3.

Table 2 – DS192 Optical backplane

Channel no.	Daughter board A	Daughter board B	Channel no.	Daughter board A	Daughter board B	Channel no.	Daughter board A	Daughter board B	Channel no.	Daughter board A	Daughter board B
1	01A01A01	07A01B01	**25**	04A01A01	07A03B01	**49**	01A02A01	08A01B01	**73**	04A02A01	08A03B01
2	01A01A02	07A01B02	**26**	04A01A02	07A03B02	**50**	01A02A02	08A01B02	**74**	04A02A02	08A03B02
3	01A01A03	07A01B03	**27**	04A01A03	07A03B03	**51**	01A02A03	08A01B03	**75**	04A02A03	08A03B03
4	01A01A04	07A01B04	**28**	04A01A04	07A03B04	**52**	01A02A04	08A01B04	**76**	04A02A04	08A03B04
5	01A01A05	07A01B05	**29**	04A01A05	07A03B05	**53**	01A02A05	08A01B05	**77**	04A02A05	08A03B05
6	01A01A06	07A01B06	**30**	04A01A06	07A03B06	**54**	01A02A06	08A01B06	**78**	04A02A06	08A03B06
7	01A01A07	07A01B07	**31**	04A01A07	07A03B07	**55**	01A02A07	08A01B07	**79**	04A02A07	08A03B07
8	01A01A08	07A01B08	**32**	04A01A08	07A03B08	**56**	01A02A08	08A01B08	**80**	04A02A08	08A03B08
9	02A01A01	07A01B09	**33**	05A01A01	07A03B09	**57**	02A02A01	08A01B09	**81**	05A02A01	08A03B09
10	02A01A02	07A01B10	**34**	05A01A02	07A03B10	**58**	02A02A02	08A01B10	**82**	05A02A02	08A03B10
11	02A01A03	07A01B11	**35**	05A01A03	07A03B11	**59**	02A02A03	08A01B11	**83**	05A02A03	08A03B11
12	02A01A04	07A01B12	**36**	05A01A04	07A03B12	**60**	02A02A04	08A01B12	**84**	05A02A04	08A03B12
13	02A01A05	07A02B01	**37**	05A01A05	07A04B01	**61**	02A02A05	08A02B01	**85**	05A02A05	08A04B01
14	02A01A06	07A02B02	**38**	05A01A06	07A04B02	**62**	02A02A06	08A02B02	**86**	05A02A06	08A04B02
15	02A01A07	07A02B03	**39**	05A01A07	07A04B03	**63**	02A02A07	08A02B03	**87**	05A02A07	08A04B03
16	02A01A08	07A02B04	**40**	05A01A08	07A04B04	**64**	02A02A08	08A02B04	**88**	05A02A08	08A04B04
17	03A01A01	07A02B05	**41**	06A01A01	07A04B05	**65**	03A02A01	08A02B05	**89**	06A02A01	08A04B05
18	03A01A02	07A02B06	**42**	06A01A02	07A04B06	**66**	03A02A02	08A02B06	**90**	06A02A02	08A04B06
19	03A01A03	07A02B07	**43**	06A01A03	07A04B07	**67**	03A02A03	08A02B07	**91**	06A02A03	08A04B07
20	03A01A04	07A02B08	**44**	06A01A04	07A04B08	**68**	03A02A04	08A02B08	**92**	06A02A04	08A04B08
21	03A01A05	07A02B09	**45**	06A01A05	07A04B09	**69**	03A02A05	08A02B09	**93**	06A02A05	08A04B09
22	03A01A06	07A02B10	**46**	06A01A06	07A04B10	**70**	03A02A06	08A02B10	**94**	06A02A06	08A04B10
23	03A01A07	07A02B11	**47**	06A01A07	07A04B11	**71**	03A02A07	08A02B11	**95**	06A02A07	08A04B11
24	03A01A08	07A02B12	**48**	06A01A08	07A04B12	**72**	03A02A08	08A02B12	**96**	06A02A08	08A04B12
97	14A01A01	07B01B01	**121**	11A01A01	07B03B01	**145**	14A02A01	08B01B01	**169**	11A02A01	08B03B01

Channel no.	Daughter board A	Daughter board B	Channel no.	Daughter board A	Daughter board B	Channel no.	Daughter board A	Daughter board B	Channel no.	Daughter board A	Daughter board B
98	14A01A02	07B01B02	**122**	11A01A02	07B03B02	**146**	14A02A02	08B01B02	**170**	11A02A02	08B03B02
99	14A01A03	07B01B03	**123**	11A01A03	07B03B03	**147**	14A02A03	08B01B03	**171**	11A02A03	08B03B03
100	14A01A04	07B01B04	**124**	11A01A04	07B03B04	**148**	14A02A04	08B01B04	**172**	11A02A04	08B03B04
101	14A01A05	07B01B05	**125**	11A01A05	07B03B05	**149**	14A02A05	08B01B05	**173**	11A02A05	08B03B05
102	14A01A06	07B01B06	**126**	11A01A06	07B03B06	**150**	14A02A06	08B01B06	**174**	11A02A06	08B03B06
103	14A01A07	07B01B07	**127**	11A01A07	07B03B07	**151**	14A02A07	08B01B07	**175**	11A02A07	08B03B07
104	14A01A08	07B01B08	**128**	11A01A08	07B03B08	**152**	14A02A08	08B01B08	**176**	11A02A08	08B03B08
105	13A01A01	07B01B09	**129**	10A01A01	07B03B09	**153**	13A02A01	08B01B09	**177**	10A02A01	08B03B09
106	13A01A02	07B01B10	**130**	10A01A02	07B03B10	**154**	13A02A02	08B01B10	**178**	10A02A02	08B03B10
107	13A01A03	07B01B11	**131**	10A01A03	07B03B11	**155**	13A02A03	08B01B11	**179**	10A02A03	08B03B11
108	13A01A04	07B01B12	**132**	10A01A04	07B03B12	**156**	13A02A04	08B01B12	**180**	10A02A04	08B03B12
109	13A01A05	07B02B01	**133**	10A01A05	07B04B01	**157**	13A02A05	08B02B01	**181**	10A02A05	08B03B01
110	13A01A06	07B02B02	**134**	10A01A06	07B04B02	**158**	13A02A06	08B02B02	**182**	10A02A06	08B03B02
111	13A01A07	07B02B03	**135**	10A01A07	07B04B03	**159**	13A02A07	08B02B03	**183**	10A02A07	08B03B03
112	13A01A08	07B02B04	**136**	10A01A08	07B04B04	**160**	13A02A08	08B02B04	**184**	10A02A08	08B03B04
113	12A01A01	07B02B05	**137**	09A01A01	07B04B05	**161**	12A02A01	08B02B05	**185**	09A02A01	08B03B05
114	12A01A02	07B02B06	**138**	09A01A02	07B04B06	**162**	12A02A02	08B02B06	**186**	09A02A02	08B03B06
115	12A01A03	07B02B07	**139**	09A01A03	07B04B07	**163**	12A02A03	08B02B07	**187**	09A02A03	08B03B07
116	12A01A04	07B02B08	**140**	09A01A04	07B04B08	**164**	12A02A04	08B02B08	**188**	09A02A04	08B03B08
117	12A01A05	07B02B09	**141**	09A01A05	07B04B09	**165**	12A02A05	08B02B09	**189**	09A02A05	08B03B09
118	12A01A06	07B02B10	**142**	09A01A06	07B04B10	**166**	12A02A06	08B02B10	**190**	09A02A06	08B03B10
119	12A01A07	07B02B11	**143**	09A01A07	07B04B11	**167**	12A02A07	08B02B11	**191**	09A02A07	08B03B11
120	12A01A08	07B02B12	**144**	09A01A08	07B04B12	**168**	12A02A08	08B02B12	**192**	09A02A08	08B03B12

Table 3 – DS384 Optical wiring backplane

Channel no.	Daughter board A	Daughter board B	Channel no.	Daughter board A	Daughter board B	Channel no.	Daughter board A	Daughter board B	Channel no.	Daughter board A	Daughter board B
1	01A01C01	07A01D01	**25**	02A01C09	07A02D01	**49**	04A01C01	07A03D01	**73**	05A01C09	07A04D01
2	01A01C02	07A01D02	**26**	02A01C10	07A02D02	**50**	04A01C02	07A03D02	**74**	05A01C10	07A04D02
3	01A01C03	07A01D03	**27**	02A01C11	07A02D03	**51**	04A01C03	07A03D03	**75**	05A01C11	07A04D03
4	01A01C04	07A01D04	**28**	02A01C12	07A02D04	**52**	04A01C04	07A03D04	**76**	05A01C12	07A04D04
5	01A01C05	07A01D05	**29**	02A01C13	07A02D05	**53**	04A01C05	07A03D05	**77**	05A01C13	07A04D05
6	01A01C06	07A01D06	**30**	02A01C14	07A02D06	**54**	04A01C06	07A03D06	**78**	05A01C14	07A04D06
7	01A01C07	07A01D07	**31**	02A01C15	07A02D07	**55**	04A01C07	07A03D07	**79**	05A01C15	07A04D07
8	01A01C08	07A01D08	**32**	02A01C16	07A02D08	**56**	04A01C08	07A03D08	**80**	05A01C16	07A04D08
9	01A01C09	07A01D09	**33**	03A01C01	07A02D09	**57**	04A01C09	07A03D09	**81**	06A01C01	07A04D09
10	01A01C10	07A01D10	**34**	03A01C02	07A02D10	**58**	04A01C10	07A03D10	**82**	06A01C02	07A04D10
11	01A01C11	07A01D11	**35**	03A01C03	07A02D11	**59**	04A01C11	07A03D11	**83**	06A01C03	07A04D11
12	01A01C12	07A01D12	**36**	03A01C04	07A02D12	**60**	04A01C12	07A03D12	**84**	06A01C04	07A04D12
13	01A01C13	07A01D13	**37**	03A01C05	07A02D13	**61**	04A01C13	07A03D13	**85**	06A01C05	07A04D13
14	01A01C14	07A01D14	**38**	03A01C06	07A02D14	**62**	04A01C14	07A03D14	**86**	06A01C06	07A04D14
15	01A01C15	07A01D15	**39**	03A01C07	07A02D15	**63**	04A01C15	07A03D15	**87**	06A01C07	07A04D15
16	01A01C16	07A01D16	**40**	03A01C08	07A02D16	**64**	04A01C16	07A03D16	**88**	06A01C08	07A04D16
17	02A01C01	07A01D17	**41**	03A01C09	07A02D17	**65**	05A01C01	07A03D17	**89**	06A01C09	07A04D17
18	02A01C02	07A01D18	**42**	03A01C10	07A02D18	**66**	05A01C02	07A03D18	**90**	06A01C10	07A04D18
19	02A01C03	07A01D19	**43**	03A01C11	07A02D19	**67**	05A01C03	07A03D19	**91**	06A01C11	07A04D19
20	02A01C04	07A01D20	**44**	03A01C12	07A02D20	**68**	05A01C04	07A03D20	**92**	06A01C12	07A04D20
21	02A01C05	07A01D21	**45**	03A01C13	07A02D21	**69**	05A01C05	07A03D21	**93**	06A01C13	07A04D21
22	02A01C06	07A01D22	**46**	03A01C14	07A02D22	**70**	05A01C06	07A03D22	**94**	06A01C14	07A04D22
23	02A01C07	07A01D23	**47**	03A01C15	07A02D23	**71**	05A01C07	07A03D23	**95**	06A01C15	07A04D23
24	02A01C08	07A01D24	**48**	03A01C16	07A02D24	**72**	05A01C08	07A03D24	**96**	06A01C16	07A04D24
97	01A02C01	08A01D01	**121**	02A02C09	08A02D01	**145**	04A02C01	08A03D01	**169**	05A02C09	08A04D01

Channel no.	Daughter board A	Daughter board B	Channel no.	Daughter board A	Daughter board B	Channel no.	Daughter board A	Daughter board B	Channel no.	Daughter board A	Daughter board B
98	01A02C02	08A01D02	**122**	02A02C10	08A02D02	**146**	04A02C02	08A03D02	**170**	05A02C10	08A04D02
99	01A02C03	08A01D03	**123**	02A02C11	08A02D03	**147**	04A02C03	08A03D03	**171**	05A02C11	08A04D03
100	01A02C04	08A01D04	**124**	02A02C12	08A02D04	**148**	04A02C04	08A03D04	**172**	05A02C12	08A04D04
101	01A02C05	08A01D05	**125**	02A02C13	08A02D05	**149**	04A02C05	08A03D05	**173**	05A02C13	08A04D05
102	01A02C06	08A01D06	**126**	02A02C14	08A02D06	**150**	04A02C06	08A03D06	**174**	05A02C14	08A04D06
103	01A02C07	08A01D07	**127**	02A02C15	08A02D07	**151**	04A02C07	08A03D07	**175**	05A02C15	08A04D07
104	01A02C08	08A01D08	**128**	02A02C16	08A02D08	**152**	04A02C08	08A03D08	**176**	05A02C16	08A04D08
105	01A02C09	08A01D09	**129**	03A02C01	08A02D09	**153**	04A02C09	08A03D09	**177**	06A02C01	08A04D09
106	01A02C10	08A01D10	**130**	03A02C02	08A02D10	**154**	04A02C10	08A03D10	**178**	06A02C02	08A04D10
107	01A02C11	08A01D11	**131**	03A02C03	08A02D11	**155**	04A02C11	08A03D11	**179**	06A02C03	08A04D11
108	01A02C12	08A01D12	**132**	03A02C04	08A02D12	**156**	04A02C12	08A03D12	**180**	06A02C04	08A04D12
109	01A02C13	08A01D13	**133**	03A02C05	08A02D13	**157**	04A02C13	08A03D13	**181**	06A02C05	08A04D13
110	01A02C14	08A01D14	**134**	03A02C06	08A02D14	**158**	04A02C14	08A03D14	**182**	06A02C06	08A04D14
111	01A02C15	08A01D15	**135**	03A02C07	08A02D15	**159**	04A02C15	08A03D15	**183**	06A02C07	08A04D15
112	01A02C16	08A01D16	**136**	03A02C08	08A02D16	**160**	04A02C16	08A03D16	**184**	06A02C08	08A04D16
113	02A02C01	08A01D17	**137**	03A02C09	08A02D17	**161**	05A02C01	08A03D17	**185**	06A02C09	08A04D17
114	02A02C02	08A01D18	**138**	03A02C10	08A02D18	**162**	05A02C02	08A03D18	**186**	06A02C10	08A04D18
115	02A02C03	08A01D19	**139**	03A02C11	08A02D19	**163**	05A02C03	08A03D19	**187**	06A02C11	08A04D19
116	02A02C04	08A01D20	**140**	03A02C12	08A02D20	**164**	05A02C04	08A03D20	**188**	06A02C12	08A04D20
117	02A02C05	08A01D21	**141**	03A02C13	08A02D21	**165**	05A02C05	08A03D21	**189**	06A02C13	08A04D21
118	02A02C06	08A01D22	**142**	03A02C14	08A02D22	**166**	05A02C06	08A03D22	**190**	06A02C14	08A04D22
119	02A02C07	08A01D23	**143**	03A02C15	08A02D23	**167**	05A02C07	08A03D23	**191**	06A02C15	08A04D23
120	02A02C08	08A01D24	**144**	03A02C16	08A02D24	**168**	05A02C08	08A03D24	**192**	06A02C16	08A04D24
193	14A01C01	07B01D01	**217**	13A01C09	07B02D01	**241**	11A01C01	07B03D01	**265**	10A01C09	07B04D01
194	14A01C02	07B01D02	**218**	13A01C10	07B02D02	**242**	11A01C02	07B03D02	**266**	10A01C10	07B04D02
195	14A01C03	07B01D03	**219**	13A01C11	07B02D03	**243**	11A01C03	07B03D03	**267**	10A01C11	07B04D03
196	14A01C04	07B01D04	**220**	13A01C12	07B02D04	**244**	11A01C04	07B03D04	**268**	10A01C12	07B04D04

Channel no.	Daughter board A	Daughter board B	Channel no.	Daughter board A	Daughter board B	Channel no.	Daughter board A	Daughter board B	Channel no.	Daughter board A	Daughter board B
197	14A01C05	07B01D05	**221**	13A01C13	07B02D05	**245**	11A01C05	07B03D05	**269**	10A01C13	07B04D05
198	14A01C06	07B01D06	**222**	13A01C14	07B02D06	**246**	11A01C06	07B03D06	**270**	10A01C14	07B04D06
199	14A01C07	07B01D07	**223**	13A01C15	07B02D07	**247**	11A01C07	07B03D07	**271**	10A01C15	07B04D07
200	14A01C08	07B01D08	**224**	13A01C16	07B02D08	**248**	11A01C08	07B03D08	**272**	10A01C16	07B04D08
201	14A01C09	07B01D09	**225**	12A01C01	07B02D09	**249**	11A01C09	07B03D09	**273**	09A01C01	07B04D09
202	14A01C10	07B01D10	**226**	12A01C02	07B02D10	**250**	11A01C10	07B03D10	**274**	09A01C02	07B04D10
203	14A01C11	07B01D11	**227**	12A01C03	07B02D11	**251**	11A01C11	07B03D11	**275**	09A01C03	07B04D11
204	14A01C12	07B01D12	**228**	12A01C04	07B02D12	**252**	11A01C12	07B03D12	**276**	09A01C04	07B04D12
205	14A01C13	07B01D13	**229**	12A01C05	07B02D13	**253**	11A01C13	07B03D13	**277**	09A01C05	07B04D13
206	14A01C14	07B01D14	**230**	12A01C06	07B02D14	**254**	11A01C14	07B03D14	**278**	09A01C06	07B04D14
207	14A01C15	07B01D15	**231**	12A01C07	07B02D15	**255**	11A01C15	07B03D15	**279**	09A01C07	07B04D15
208	14A01C16	07B01D16	**232**	12A01C08	07B02D16	**256**	11A01C16	07B03D16	**280**	09A01C08	07B04D16
209	13A01C01	07B01D17	**233**	12A01C09	07B02D17	**257**	10A01C01	07B03D17	**281**	09A01C09	07B04D17
210	13A01C02	07B01D18	**234**	12A01C10	07B02D18	**258**	10A01C02	07B03D18	**282**	09A01C10	07B04D18
211	13A01C03	07B01D19	**235**	12A01C11	07B02D19	**259**	10A01C03	07B03D19	**283**	09A01C11	07B04D19
212	13A01C04	07B01D20	**236**	12A01C12	07B02D20	**260**	10A01C04	07B03D20	**284**	09A01C12	07B04D20
213	13A01C05	07B01D21	**237**	12A01C13	07B02D21	**261**	10A01C05	07B03D21	**285**	09A01C13	07B04D21
214	13A01C06	07B01D22	**238**	12A01C14	07B02D22	**262**	10A01C06	07B03D22	**286**	09A01C14	07B04D22
215	13A01C07	07B01D23	**239**	12A01C15	07B02D23	**263**	10A01C07	07B03D23	**287**	09A01C15	07B04D23
216	13A01C08	07B01D24	**240**	12A01C16	07B02D24	**264**	10A01C08	07B03D24	**288**	09A01C16	07B04D24
289	14A02C01	08B01D01	**313**	13A02C09	08B02D01	**337**	11A02C01	08B03D01	**361**	10A02C09	08B04D01
290	14A02C02	08B01D02	**314**	13A02C10	08B02D02	**338**	11A02C02	08B03D02	**362**	10A02C10	08B04D02
291	14A02C03	08B01D03	**315**	13A02C11	08B02D03	**339**	11A02C03	08B03D03	**363**	10A02C11	08B04D03
292	14A02C04	08B01D04	**316**	13A02C12	08B02D04	**340**	11A02C04	08B03D04	**364**	10A02C12	08B04D04
293	14A02C05	08B01D05	**317**	13A02C13	08B02D05	**341**	11A02C05	08B03D05	**365**	10A02C13	08B04D05
294	14A02C06	08B01D06	**318**	13A02C14	08B02D06	**342**	11A02C06	08B03D06	**366**	10A02C14	08B04D06
295	14A02C07	08B01D07	**319**	13A02C15	08B02D07	**343**	11A02C07	08B03D07	**367**	10A02C15	08B04D07

Channel no.	Daughter board A	Daughter board B	Channel no.	Daughter board A	Daughter board B	Channel no.	Daughter board A	Daughter board B	Channel no.	Daughter board A	Daughter board B
296	14A02C08	08B01D08	**320**	13A02C16	08B02D08	**344**	11A02C08	08B03D08	**368**	10A02C16	08B04D08
297	14A02C09	08B01D09	**321**	12A02C01	08B02D09	**345**	11A02C09	08B03D09	**369**	09A02C01	08B04D09
298	14A02C10	08B01D10	**322**	12A02C02	08B02D10	**346**	11A02C10	08B03D10	**370**	09A02C02	08B04D10
299	14A02C11	08B01D11	**323**	12A02C03	08B02D11	**347**	11A02C11	08B03D11	**371**	09A02C03	08B04D11
300	14A02C12	08B01D12	**324**	12A02C04	08B02D12	**348**	11A02C12	08B03D12	**372**	09A02C04	08B04D12
301	14A02C13	08B01D13	**325**	12A02C05	08B02D13	**349**	11A02C13	08B03D13	**373**	09A02C05	08B04D13
302	14A02C14	08B01D14	**326**	12A02C06	08B02D14	**350**	11A02C14	08B03D14	**374**	09A02C06	08B04D14
303	14A02C15	08B01D15	**327**	12A02C07	08B02D15	**351**	11A02C15	08B03D15	**375**	09A02C07	08B04D15
304	14A02C16	08B01D16	**328**	12A02C08	08B02D16	**352**	11A02C16	08B03D16	**376**	09A02C08	08B04D16
305	13A02C01	08B01D17	**329**	12A02C09	08B02D17	**353**	10A02C01	08B03D17	**377**	09A02C09	08B04D17
306	13A02C02	08B01D18	**330**	12A02C10	08B02D18	**354**	10A02C02	08B03D18	**378**	09A02C10	08B04D18
307	13A02C03	08B01D19	**331**	12A02C11	08B02D19	**355**	10A02C03	08B03D19	**379**	09A02C11	08B04D19
308	13A02C04	08B01D20	**332**	12A02C12	08B02D20	**356**	10A02C04	08B03D20	**380**	09A02C12	08B04D20
309	13A02C05	08B01D21	**333**	12A02C13	08B02D21	**357**	10A02C05	08B03D21	**381**	09A02C13	08B04D21
310	13A02C06	08B01D22	**334**	12A02C14	08B02D22	**358**	10A02C06	08B03D22	**382**	09A02C14	08B04D22
311	13A02C07	08B01D23	**335**	12A02C15	08B02D23	**359**	10A02C07	08B03D23	**383**	09A02C15	08B04D23
312	13A02C08	08B01D24	**336**	12A02C16	08B02D24	**360**	10A02C08	08B03D24	**384**	09A02C16	08B04D24

6 Tests

6.1 Sample size

All samples shall be randomly selected. For the purposes of this specification, a sample is defined as a mated male and female plug and an adapter.

The sample size and product sourcing requirements are given in Annex A.

The adapter plays no role in the final alignment of this connector style.

The length of cable (or fibre) on each side of the connector set shall be at least 3 m.

The length of the cable for the patch cords in the temperature cycle test is 5 m.

6.2 Test and measurement methods

All tests and measurements have been selected from the IEC 61300 series.

Unless otherwise stated in the individual test details, all measurements shall be performed at the optical wavelength 850 nm or 1 300 nm with fluctuation band ± 30 nm.

Attenuation change is defined as the difference between the maximum and minimum values of attenuation measured during the test.

No deviation from the specified test method is allowed.

6.3 Test sequence

All products shall first be subjected to 8.1.1, Test 1: Attenuation, and 8.1.2, Test 2: Return loss, in this order; after this, tests 3 through 11 should be carried out in any order.

6.4 Pass/fail criteria

A product will have met the requirements of this specification provided no failures occur in the sample group for any test.

In the event of a failure occurring, the test shall be rerun using a sample size double that of the original. A rerun is only allowed one time.

7 Test report

A fully documented test report and supporting data shall be prepared and must be available for inspection as evidence that the tests described in Clause 8 have been carried out according to this specification.

8 Product qualification requirements

8.1 Optical performance requirements

8.1.1 Test 1: Attenuation, IEC 61300-3-4, Method C

8.1.1.1 Test method

Attenuation for the optical backplane shall be measured using the following procedure:

a) The attenuation measurement is made for the optical wiring slot of the optical backplane by inserting either standard test daughter board A or B as applicable.

b) The attenuations, both between a standard test board A and a daughter board B, and a daughter board A and a standard test board B are measured. A test light is input through a standard test daughter board A or B as applicable.

c) A reference cord with an MT ferrule whose optical characteristics have been confirmed is mounted on the standard testing daughter board A and B.

d) The attenuation of the said reference cord shall be less than 0,2 dB and the return loss shall be larger than 40 dB.

e) Multimode launch conditions are specified in Annex B of IEC 61300-1:2011. Annex B provides a procedure for establishing a launch condition for multimode fibre. The launch conditions are defined by tolerance bands on a target encircle flux (EF) metric.

   The wavelength of the light source, 850 nm or 1 300 nm, used in a measurement shall be stated in the test report.

f) The attenuation between optical connectors shall be defined excluding the attenuation of both the standard testing daughter board A and B.

8.1.1.2 Requirement

Class A: The attenuation between daughter board A and daughter board B, and vice versa, mounted onto respective slots of the backplane shall not exceed 2 dB.

Class B: The attenuation between daughter board A and daughter board B, and vice versa, mounted onto respective slots of the backplane shall not exceed 4 dB.

8.1.2 Test 2: Return loss, IEC 61300-3-6, Method: branching devices

8.1.2.1 Test method

Return loss for the optical backplane shall be measured using the following procedure:

a) When the return loss of the backplane connector on the slot for daughter board A shall be measured, the measurement set-up will eliminate additional back-reflections from interfaces along the optical channel beyond the backplane connector under test such as the fibre ends on standard test board B.

b) This can be achieved by immersing the fibre ends on the standard test board B in an index matching fluid or curling the fibre on standard test board B around a radius of curvature which exceeds the critical bend limit of the fibre.

c) The return loss of the connector on the backplane relative to a standard test daughter board B shall be made with the master cord of the daughter board A in the same manner as stated in item b).

d) The master cord used in the test shall have an attenuation of less than 0,2 dB and a return loss of larger than 40 dB.

e) A multimode light source shall be used. Measurement is made using a light source, which is mode controlled by means such as a mode scrambler. The light source wavelengths of 850 nm or 1 300 nm may be used. The wavelength of the light source used in the measurement shall be stated in the test report.

8.1.2.2 Requirement

Class B: Return loss of the connector on the backplane connected to a daughter board A and to daughter board B shall be larger than 20 dB.

8.1.3 Test 3: Optical propagation delay (fibre length), IEC 60793-1-22, Method B

8.1.3.1 Test method

The optical propagation delay between the connectors mounted on an optical backplane shall be determined as follows.

The optical propagation delay is measured using an optical time-domain reflectometer (OTDR), as in IEC 60793-1-22, method B, as follows:

a) Insert standard daughter board A and B to the optical back plane under test.
b) Connect an optical fibre cable from the OTDR to daughter board A or B.
c) Determine the optical propagation delay of the optical back plane under test using the distance between reflected signals of the OTDR trace.

Fibre length on a standard daughter board should be larger than the dead-zone length of the OTDR apparatus, and the measurement resolution of the OTDR apparatus should be more than 1 cm.

NOTE If the length of the fibre in the backplane is already known, the propagation delay can be calculated from the fibre specification.

8.1.3.2 Requirement

Class A: Deviation of the propagation delay of the relevant fibre shall be less than 50 ps (corresponding to optical fibre length of 1 cm).

Class B: Deviation of the propagation delay of the relevant fibre shall be less than 150 ps (corresponding to optical fibre length of 3 cm).

8.2 Mechanical performance requirements

8.2.1 Test 4: Mating durability, IEC 61300-2-2

8.2.1.1 Test method

The mating durability of a daughter board onto the optical backplane shall be tested as follows:

a) Evaluate the change in attenuation over time after repeated insertion and extraction of daughter board A or B to and from a given slot on an optical backplane.
b) The number of daughter board insertions/extractions shall be 200.
c) This test is to measure a relative change in attenuation. A standard test daughter board may not be used in the test.

8.2.1.2 Requirement

Class A: The increase in attenuation over the course of the durability tests shall be less than 1,5 dB.

Class B: The increase in attenuation over the course of the durability tests shall be less than 1,5 dB.

8.2.2 Test 5: Vibration, IEC 61300-2-1

8.2.2.1 Test method

The vibration test shall be carried out as follows:

a) More than half the slots on an optical backplane shall be populated with daughter boards A and B in relevant slots, and the backplane shall be tested on a vibration testing machine.
b) Severities are as follows:
   – frequency range: 10 Hz – 55 Hz, 1 octave/min;
   – number of sweeps per axis: 15 (10 Hz – 55 Hz – 10 Hz);
   – number of axis: 3;
   – amplitude: 1,5 mm peak to peak.
c) This test is to measure a relative change in attenuation. A standard test daughter board may not be used in the test.

8.2.2.2 Requirement

Class A: There shall be no instantaneous loss of optical signal transmission. The change in attenuation over the course of the vibration test shall be less than 1,5 dB.

Class B: There shall be no instantaneous loss of optical signal transmission. The change in attenuation over the course of the vibration test shall be less than 3 dB.

8.2.3 Test 6: Shock, IEC 61300-2-9

8.2.3.1 Test method

The shock test shall be carried out as follows:

a) More than half the slots on an optical backplane shall be populated with daughter boards A and B in relevant slots, and the backplane shall be dropped from a height of 5 cm.
b) Severities are as follows:
   – acceleration force: 500 m/s^2;
   – duration: 1 ms;
   – number of shocks: 2 directions, 2 shocks per axis;
   – number of axes: 3 mutually perpendicular.
c) This test is a measurement of a relative change in attenuation. A standard test daughter board may not be used in the test.

8.2.3.2 Requirement

Class A: The change of the attenuation shall be less than 1,5 dB after the shock test.

Class B: The change of the attenuation shall be less than 3 dB after the shock test.

8.3 Environmental performance requirements

8.3.1 Test 7: Cold, IEC 61300-2-17

8.3.1.1 Test method

The cold test shall be carried out as follows:

a) The attenuation shall be continuously monitored for an optical backplane in a sub-rack inserted with daughter board A or B inserted for 24 h each at –10 °C ± 2 °C.
b) This test is to measure a relative change in attenuation. A standard test daughter board may not be used in the test.

8.3.1.2 Requirement

Class A: The variation of attenuation shall be less than 0,6 dB.

Class B: The variation of attenuation shall be less than 1,5 dB.

8.3.2 Test 8: Dry heat, IEC 61300-2-18

8.3.2.1 Test method

The dry heat test shall be carried out using the following conditions.

a) The attenuation shall be continuously monitored for an optical backplane in a sub-rack inserted with a daughter board A or B for 24 h each at –60 °C ± 2 °C .

b) This test is to measure a relative change in attenuation. A standard test daughter board may not be used in the test.

8.3.2.2 Requirement

Class A: The variation of attenuation shall be less than 0,6 dB.

Class B: The variation of attenuation shall be less than 1,5 dB.

9 Reliability

9.1 General

The following requirements must be met when the reliability of each component in the system cannot be guaranteed. Prepare a sub-rack incorporating an optical backplane and populate one or more connector slots with daughter boards. Carry out the environmental testing regime outlined in Clause 9. The sequence in which these tests are carried out may be arbitrary.

9.2 Test 9: High temperature endurance, IEC 61300-2-18

The high temperature endurance test shall be carried out using the following conditions.

a) Test condition: Temperature +70 °C ± 2 °C for 336 h (14 days)

b) Requirement
   - Class A: The change of attenuation after an environmental test shall be less than 0,6 dB.
   - Class B: The change of attenuation after an environmental test shall be less than 1,5 dB.

9.3 Test 10: Damp heat, IEC 61300-2-19

The damp heat test shall be carried out using the following conditions.

a) Test condition: Temperature of +60 °C ± 2 °C, humidity of 85 RH % for 336 h (14 days).

b) Requirement
   - Class A: The change of attenuation after an environmental test shall be less than 0,6 dB.
   - Class B: The change of attenuation after an environmental test shall be less than 1,5 dB.

9.4 Test 11: Change of temperature, IEC 61300-2-22

The change of temperature test shall be carried out using the following conditions.

a) Test condition: –40 °C ± 2 °C (3 h) – room temperature (1 h) – +75 °C ± 2 °C (3 h), 42 cycles.

b) Requirement

- Class A: The change of attenuation after an environmental test shall be less than 0,6 dB.
- Class B: The change of attenuation after an environmental test shall be less than 1,5 dB.

Annex A
(normative)

Mounting an optical backplane to zone 3 of the advanced telecommunication computing architecture (ATCA) backplane

A.1 General

Annex A specifies the mounting of the optical backplane specified in this standard to zone 3 of the ATCA (advanced telecommunication computing architecture) backplane. The arrangement of connectors on an optical backplane is based on the mounting interface condition for dual-star wire connection.

A.2 Dimensional condition

A.2.1 Mounting position of an optical backplane

The condition for connecting the optical backplane specified in this standard to zone 3 of the ATCA backplane is shown in Figure A.1. The positional specifications and tolerances between the reference point of the optical backplane and the uppermost left pin on the electrical connector are also shown in Figure A.1.

Dimensions in millimetres

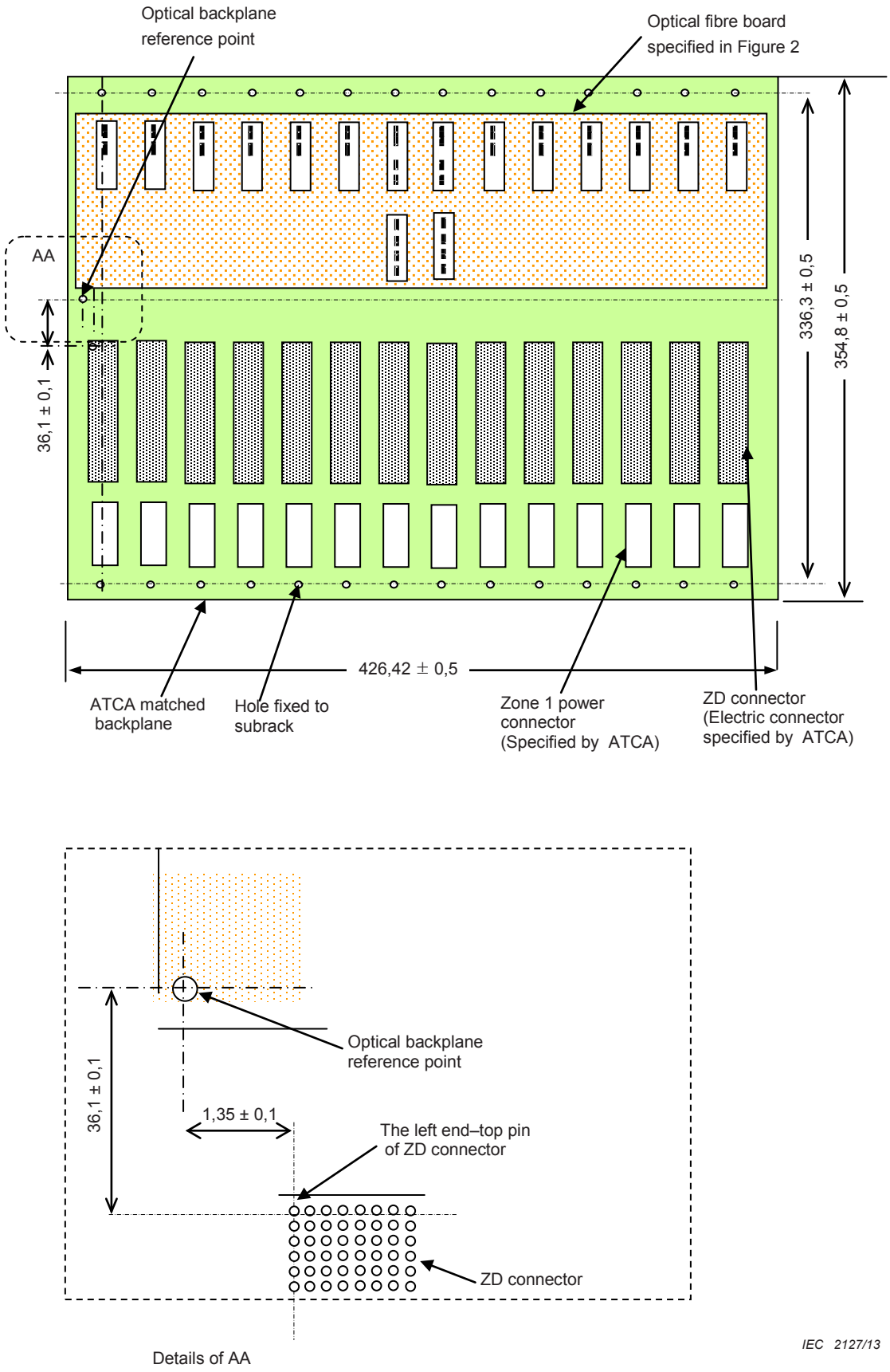


Figure A.1 – Mounting position of optical backplane

A.2.2 Dimensional condition of the daughter board

Figure A.2 Showsthe mounting position of the optical connectors (low loss RAO connectors) on the daughter board to be mounted to an ATCA backplane and the positional relation of a daughter board B. The daughter board A uses the upper connector only (three mounting holes). The mounting reference position of the daughter board is specified by the relative position of the push-in/pull-out lever of the daughter board.

Dimensions in millimetres

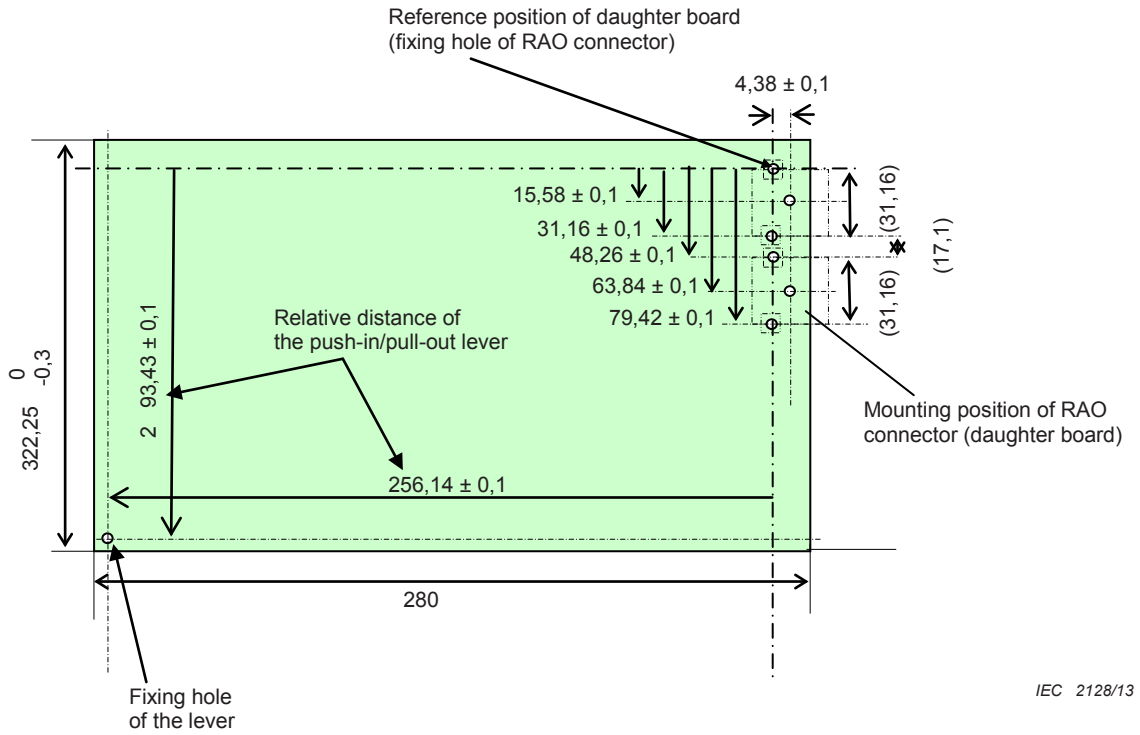


Figure A.2 – Structure of optical daughter board

Annex B
(normative)

Specification for compact right-angled optical board (CRO) connector

B.1 General

Annex B defines interfaces dimensions for compact right-angled optical board connector (CRO connector).

B.2 Description

The CRO connector is a miniaturized new connector based on the RAO connector specified in IEC 61745, which is a multiway, right-angled optical board connector for glass fibre.

It is an optical connector that makes the right-angled optical path when optical daughter board is connected with right-angle on an optical backplane.

In a CRO connector, a part of flexible fibre board in an optical backplane is bent at right-angles by the curvature radius within the range that gives a permissible optical loss.

The optical connection is the physical contact of optical fibres with rectangular ferrules nominally 6,4 mm by 2,5 mm, which use two 0,7 mm diameter alignment pins.

The rectangular ferrules are applicable with two types of MT connectors. One is the ferrule for 0,250 mm pitch arrayed fibres, and the other is 0,125 mm pitch arrayed fibres

B.3 Interfaces

Annex B contains the following standard interfaces:

Figure B.1a: CRO connector configuration (top view)

Figure B.1b: CRO connector configuration (side view)

Figure B.2: CRO socket connector interface

Figure B.3: CRO plug connector interface

Figure B.4: Optical datum target location diagrams for 0,250 mm pitch fibre arrayed

Figure B.5: Optical datum target location diagrams for 0,125 mm pitch fibre arrayed

Table B.1: Dimensions the CRO socket connector interface

Table B.2: Dimensions the CRO plug connector interface

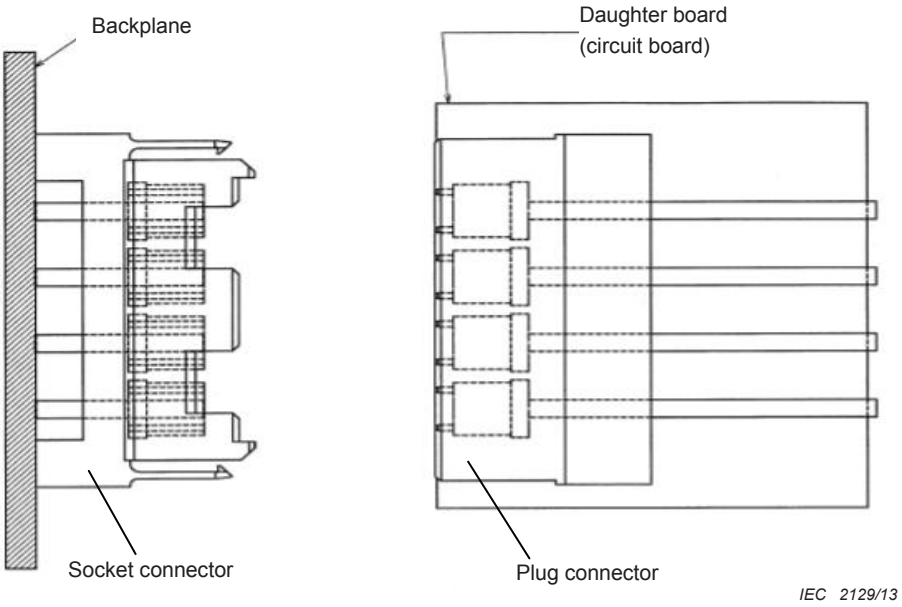


Figure B1.a) – Top view

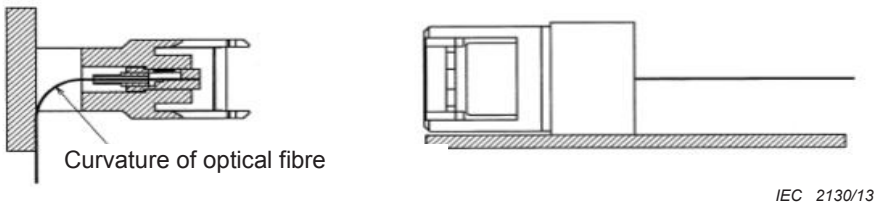


Figure B1.b) – Side view

Figure B.1 – CRO connector configuration

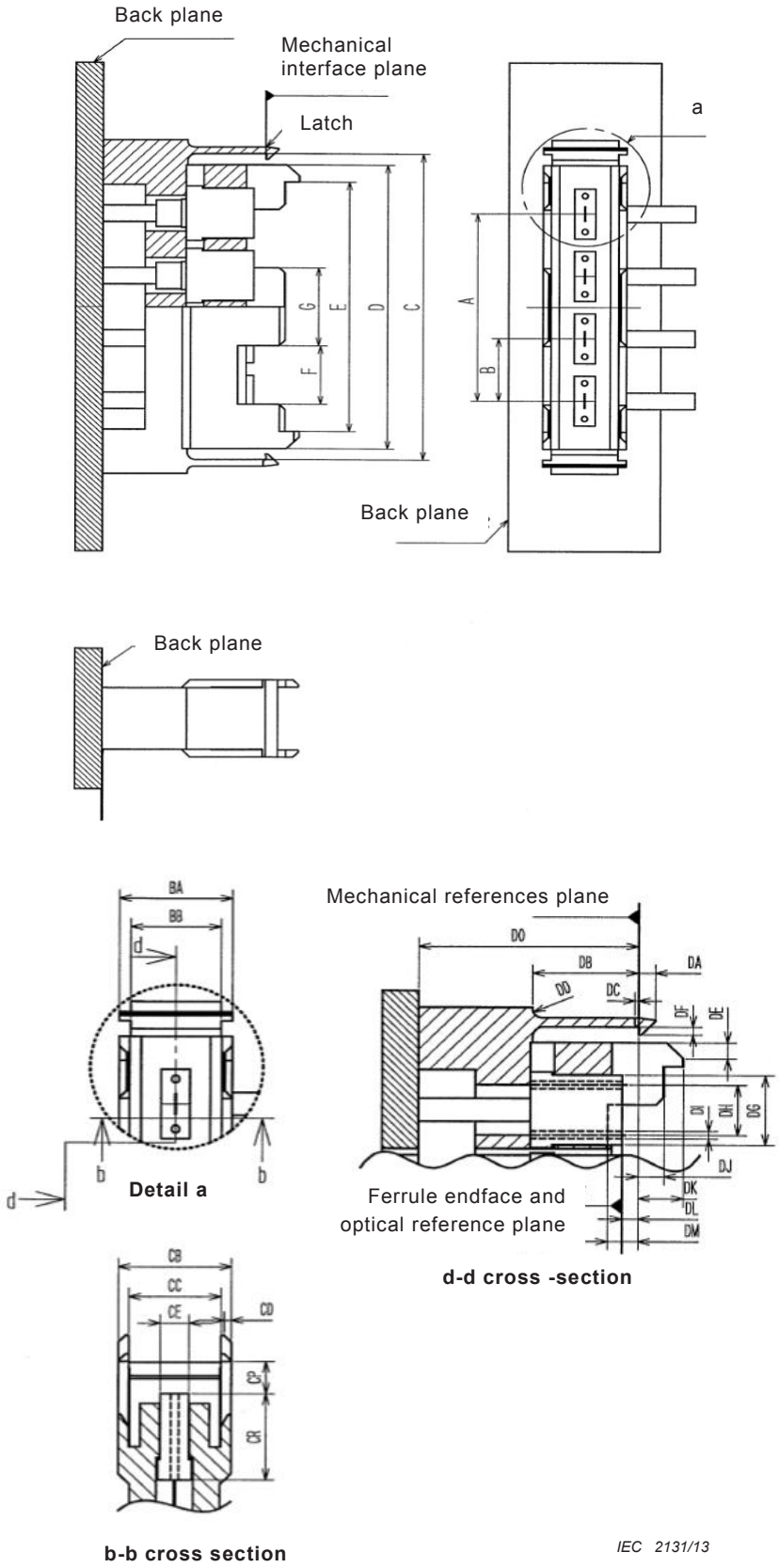


Figure B.2 – CRO socket connector interface

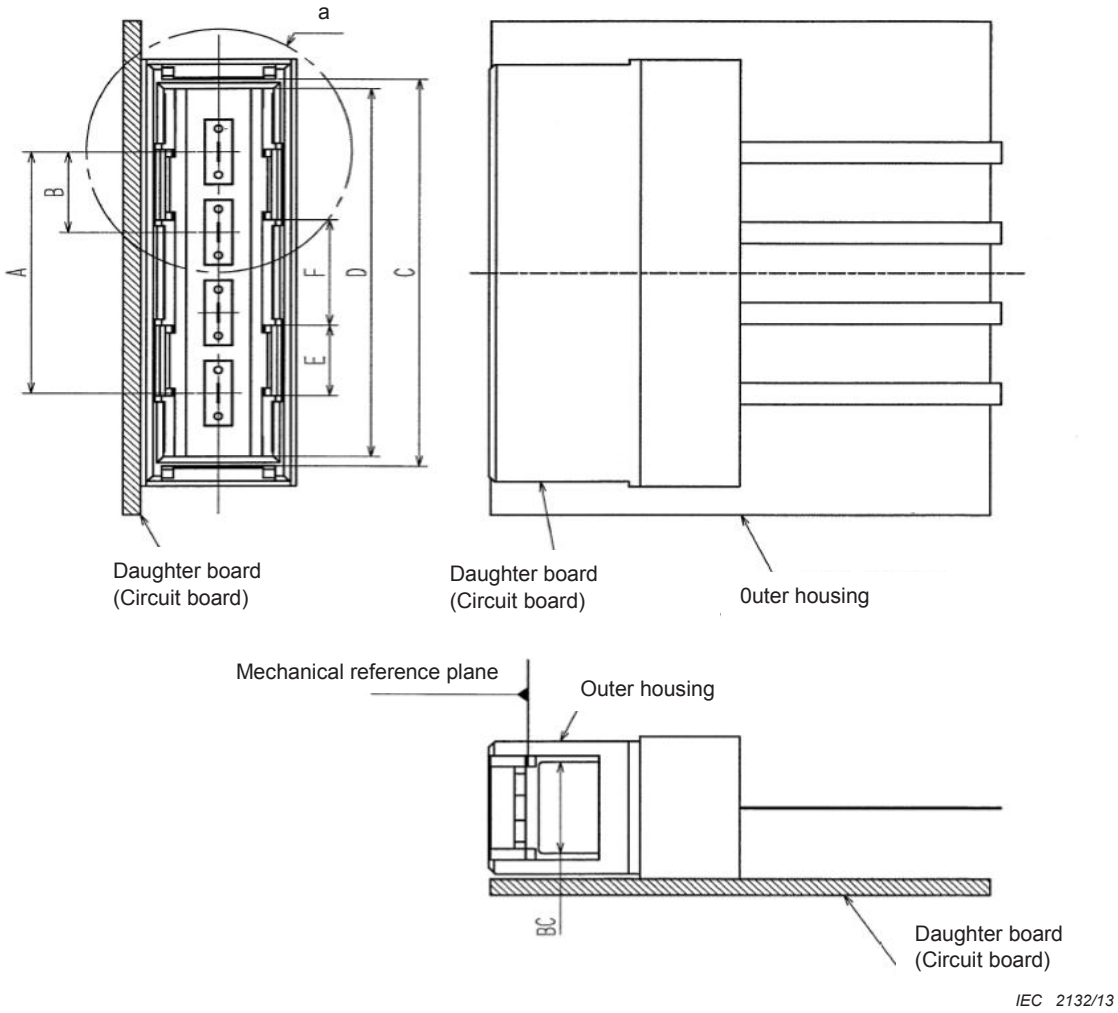
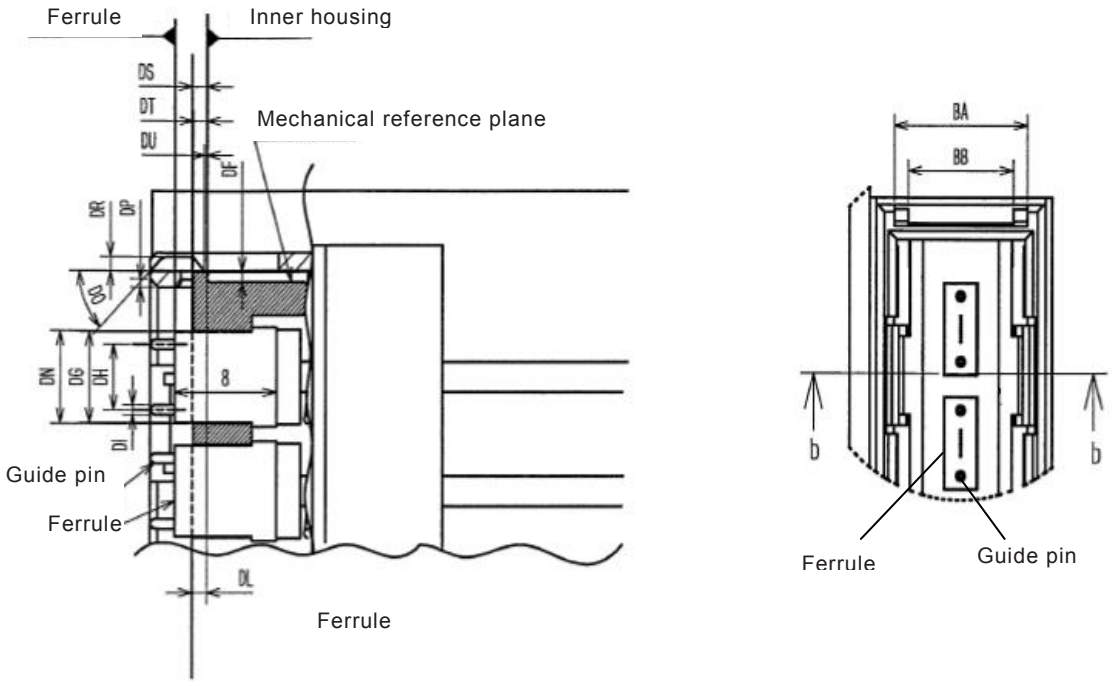


Figure B.3 – CRO plug connector interface *(1 of 2)*



Detail of section a

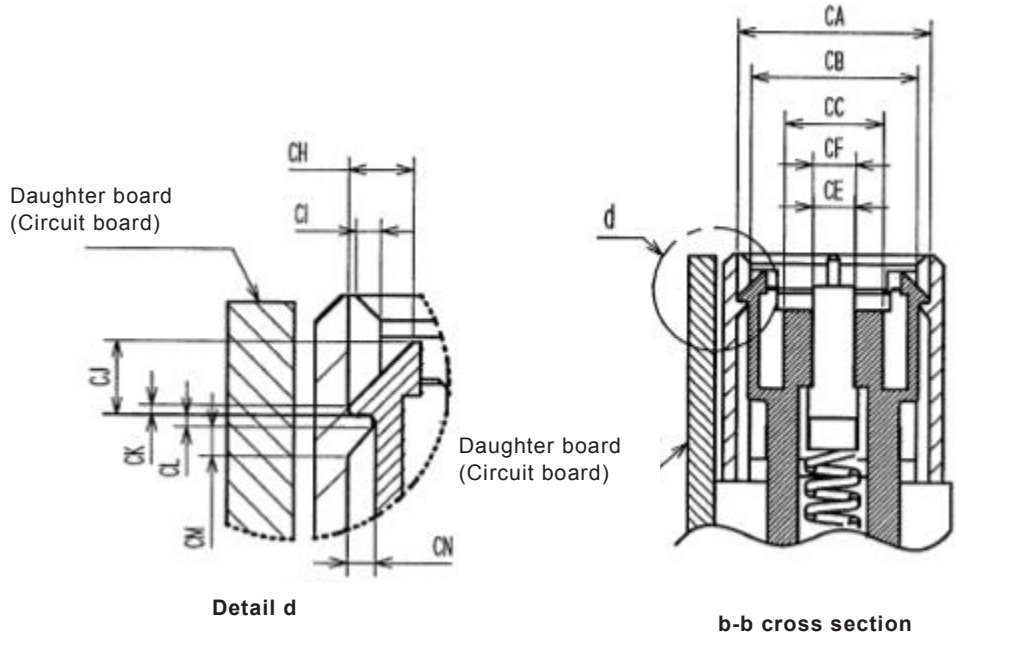


Figure B.3 *(2 of 2)*

Dimensions in millimetres

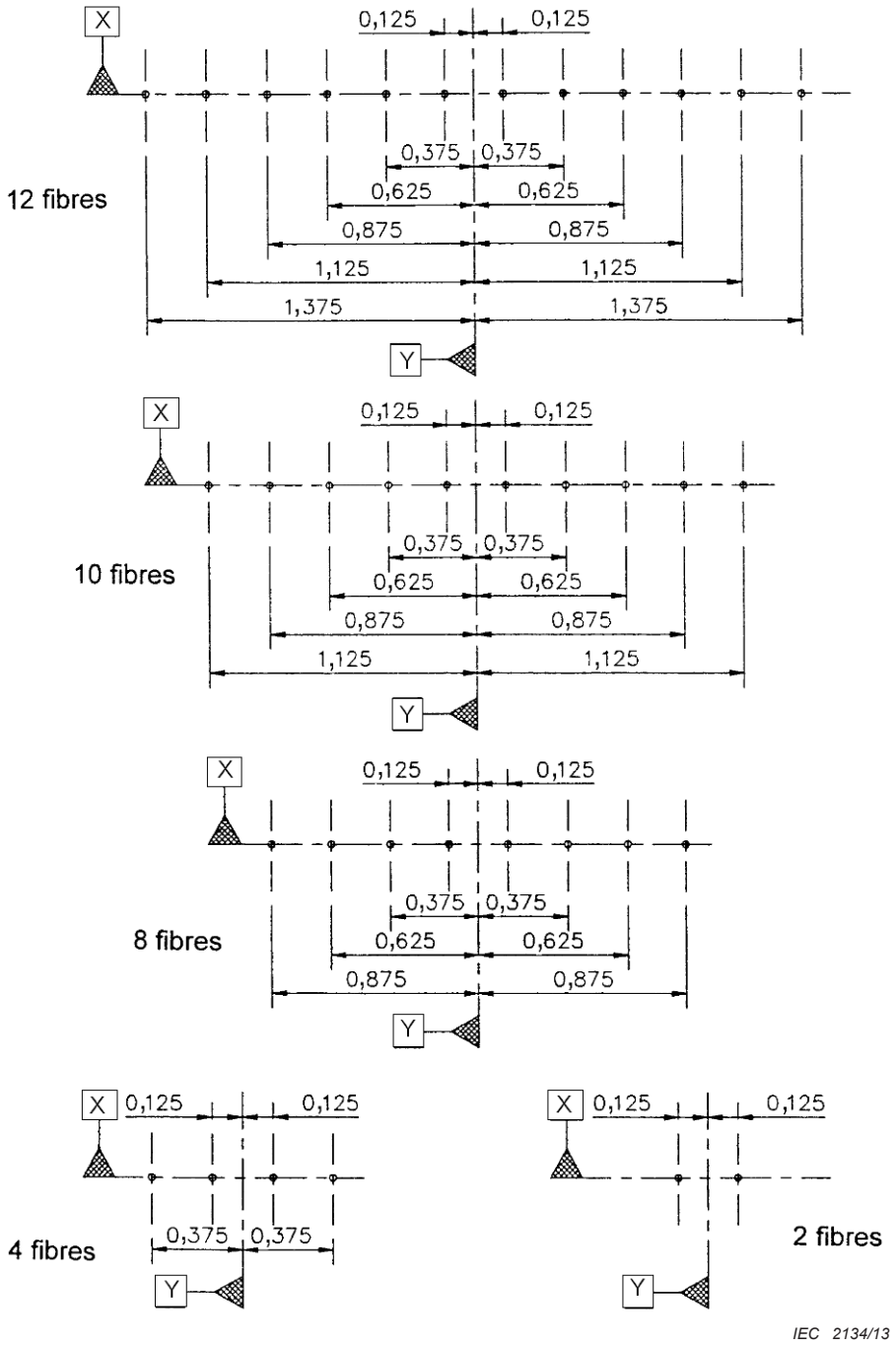
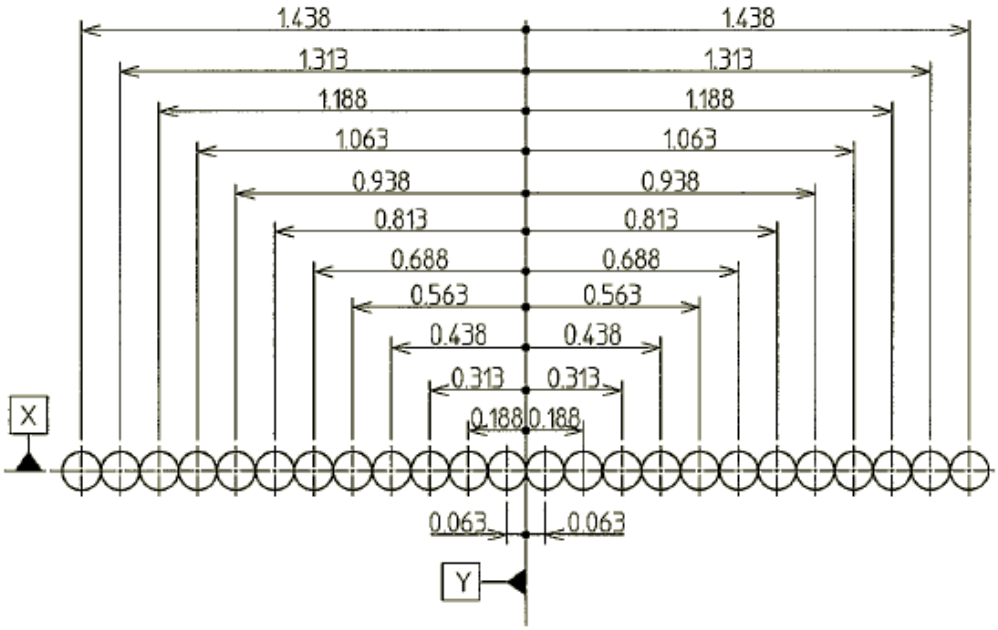
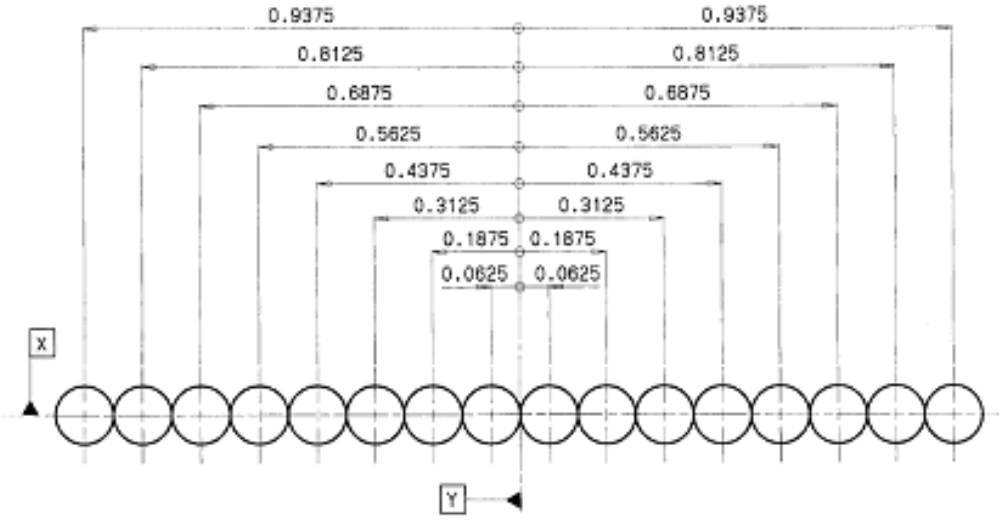


Figure B.4 – Optical datum target location diagrams for 0,250 mm pitch fibre arrayed

Dimensions in millimetres



24 fibres



16 fibres

IEC 2135/13

Figure B.5 – Optical datum target location diagrams for 0,125 mm pitch fibre arrayed

Table B.1 – Dimensions of the CRO socket connector interface

Item	Dimensions mm		Remarks
	Minimum	Maximum	
A	23,95	24,05	
B	7,95	8,05	
C [a]	38,6	39,0	
D	36,40	36,50	
E	31,9	32,1	
F	7,5	7,6	
G	9,9	10,0	
BA	9,8	9,9	
BB	7,8	8,0	
CB	9,82	9,90	
CC	8,01	8,09	
CD	0,60	0,70	Chamfer
CE	2,4	2,5	
CP	2,8	3,2	
CR	7,9	8,1	
DA	1,35	1,45	
DB	9,38	9,42	
DC	0,3	0,4	
DD	—	1,0	Radius
DE	1,45	1,55	Chamfer
DF	0,73	0,83	
DG	6,3	6,5	
DH	4,597	4,603	
DI	φ0,697	φ0,699	
DJ	1,8	2,1	
DK	3,84	3,94	
DL	1,35	1,65	
DM	3,37	3,43	
DO [b]	19,28	19,38	Note 2

[a] This dimension is for the tip of the clamping stopper. The dimension at the base of the stopper should be no less than 3,89 mm.

[b] This is an auxiliary dimension for the right-angled bend of the high delta glass fibres with a curvature radius of 5 mm.

NOTE For the dimension of the ferrule, see IEC 61754-5.

Table B.2 – Dimensions of the CRO plug connector interface

Item	Dimensions mm		Remarks
	Minimum	Maximum	
A	23,95	24,05	
B	7,95	8,05	
C	38,8	38,9	
D	36,55	36,65	
E	6,9	7,0	
F	10,3	10,7	
BA	10,05	10,35	
BB	8,1	8,3	
BC	8,1	9,1	
CA	11,55	11,65	
CB	9,95	10,03	
CC	7,92	8,00	
CE	2,4	2,5	
CF	2,55	2,60	
CH	1,17	1,18	
CI	0,55	0,65	Chamfer
CJ	1,7	2,3	
CK	0,20	0,30	
CL	0,30	0,40	
CM	0,8	1,0	
CN	0,55	0,65	
DF	0,725	0,925	
DG	6,3	6,5	
DH	4,597	4,603	
DI	φ0,699	φ0,701	
DL	1,32	1,64	
DN	6,55	6,60	
DO	35°	50°	
DP	0,55	0,65	Chamfer
DR	0,9	1,1	
DS[a, b]	1,10	1,40	
DT	1,15	1,25	
DU[b]	0,3	0,4	

[a] The inner housing should have a clearance enabling it to move 0,9 mm in the direction illustrated in the figure while the connection is being established.

[b] This dimension represents the state where the inner housing is shifted in the direction illustrated in the figure. This dimension is not required to be measured.

NOTE For the dimension of the ferrule, see IEC 61754-5.

Bibliography

IEC 61754-5, *Fibre optic connector interfaces – Part 5: Type MT connector family*

IEC 62496-2-1, *Optical circuit boards – Part 2-1: Measurements – Optical attenuation and isolation*

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