

This is a preview - click here to buy the full publication



IEC/TS 62661-2-1

Edition 1.0 2013-08

# TECHNICAL SPECIFICATION



---

**Optical backplanes – Product specification –  
Part 2-1: Optical backplane using optical fibre circuit boards and multi-core right  
angle optical connectors**

INTERNATIONAL  
ELECTROTECHNICAL  
COMMISSION

PRICE CODE

W

---

ICS 33.180.99

ISBN 978-2-8322-1039-0

**Warning! Make sure that you obtained this publication from an authorized distributor.**

## CONTENTS

FOREWORD.....	4
1 Scope.....	6
1.1 General.....	6
1.2 Product definition.....	6
1.3 Connection arrangement.....	6
1.4 Classification of connections.....	6
1.5 Operating environment.....	7
2 Normative references .....	7
3 Terms and definitions .....	8
4 Dimensional requirements .....	9
4.1 Dimension of a sub-rack .....	9
4.2 Dimension of optical wiring on optical backplane.....	9
4.3 Interconnection condition of connectors on optical backplane .....	11
4.4 Mounting position of connectors on optical backplane.....	11
4.5 Mounting position of connectors on daughter board .....	11
5 Requirements for dual-star optical circuits connection .....	12
5.1 Assignment of the name of an optical connection point.....	12
5.2 Specification of optical cable connection.....	13
6 Tests .....	20
6.1 Sample size .....	20
6.2 Test and measurement methods .....	20
6.3 Test sequence .....	20
6.4 Pass/fail criteria .....	20
7 Test report.....	20
8 Product qualification requirements.....	20
8.1 Optical performance requirements .....	20
8.1.1 Test 1: Attenuation, IEC 61300-3-4, Method C.....	20
8.1.2 Test 2: Return loss, IEC 61300-3-6, Method: branching devices.....	21
8.1.3 Test 3: Optical propagation delay (fibre length), IEC 60793-1-22, Method B .....	22
8.2 Mechanical performance requirements.....	22
8.2.1 Test 4: Mating durability, IEC 61300-2-2.....	22
8.2.2 Test 5: Vibration, IEC 61300-2-1.....	22
8.2.3 Test 6: Shock, IEC 61300-2-9.....	23
8.3 Environmental performance requirements .....	23
8.3.1 Test 7: Cold, IEC 61300-2-17 .....	23
8.3.2 Test 8: Dry heat, IEC 61300-2-18 .....	24
9 Reliability .....	24
9.1 General.....	24
9.2 Test 9: High temperature endurance, IEC 61300-2-18.....	24
9.3 Test 10: Damp heat, IEC 61300-2-19 .....	24
9.4 Test 11: Change of temperature, IEC 61300-2-22 .....	24
Annex A (normative) Mounting an optical backplane to zone 3 of the advanced telecommunication computing architecture (ATCA) backplane .....	26

A.1	General.....	26
A.2	Dimensional condition.....	26
A.2.1	Mounting position of an optical backplane.....	26
A.2.2	Dimensional condition of the daughter board.....	28
Annex B (normative)	Specification for compact right-angled optical board (CRO) connector.....	29
B.1	General.....	29
B.2	Description.....	29
B.3	Interfaces.....	29
Bibliography.....		38
Figure 1 – Sub-rack for optical back plane.....		9
Figure 2 – Area for optical wiring and positions of optical connectors on optical backplane.....		11
Figure 3 – 8 degree angle polish of ferrule.....		11
Figure 4 – Hole positions of low loss RAO connectors on optical backplane.....		12
Figure 5 – Hole positions to mount a RAO connector to a daughter board.....		12
Figure 6 – Assignment of connection points.....		13
Figure A.1 – Mounting position of optical backplane.....		27
Figure A.2 – Structure of optical daughter board.....		28
Figure B.1 – CRO connector configuration.....		30
Figure B.2 – CRO socket connector interface.....		31
Figure B.3 – CRO plug connector interface (1 of 2).....		32
Figure B.4 – Optical datum target location diagrams for 0,250 mm pitch fibre arrayed.....		34
Figure B.5 – Optical datum target location diagrams for 0,125 mm pitch fibre arrayed.....		35
Table 1 – Classification of ferrules.....		7
Table 2 – DS192 Optical backplane.....		14
Table 3 – DS384 Optical wiring backplane.....		16
Table B.1 – Dimensions of the CRO socket connector interface.....		36
Table B.2 – Dimensions of the CRO plug connector interface.....		37

## INTERNATIONAL ELECTROTECHNICAL COMMISSION

---

### OPTICAL BACKPLANES – PRODUCT SPECIFICATION –

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

##### FOREWORD

- 1) The International Electrotechnical Commission (IEC) is a worldwide organization for standardization comprising all national electrotechnical committees (IEC National Committees). The object of IEC is to promote international co-operation on all questions concerning standardization in the electrical and electronic fields. To this end and in addition to other activities, IEC publishes International Standards, Technical Specifications, Technical Reports, Publicly Available Specifications (PAS) and Guides (hereafter referred to as “IEC Publication(s)”). Their preparation is entrusted to technical committees; any IEC National Committee interested in the subject dealt with may participate in this preparatory work. International, governmental and non-governmental organizations liaising with the IEC also participate in this preparation. IEC collaborates closely with the International Organization for Standardization (ISO) in accordance with conditions determined by agreement between the two organizations.
- 2) The formal decisions or agreements of IEC on technical matters express, as nearly as possible, an international consensus of opinion on the relevant subjects since each technical committee has representation from all interested IEC National Committees.
- 3) IEC Publications have the form of recommendations for international use and are accepted by IEC National Committees in that sense. While all reasonable efforts are made to ensure that the technical content of IEC Publications is accurate, IEC cannot be held responsible for the way in which they are used or for any misinterpretation by any end user.
- 4) In order to promote international uniformity, IEC National Committees undertake to apply IEC Publications transparently to the maximum extent possible in their national and regional publications. Any divergence between any IEC Publication and the corresponding national or regional publication shall be clearly indicated in the latter.
- 5) IEC itself does not provide any attestation of conformity. Independent certification bodies provide conformity assessment services and, in some areas, access to IEC marks of conformity. IEC is not responsible for any services carried out by independent certification bodies.
- 6) All users should ensure that they have the latest edition of this publication.
- 7) No liability shall attach to IEC or its directors, employees, servants or agents including individual experts and members of its technical committees and IEC National Committees for any personal injury, property damage or other damage of any nature whatsoever, whether direct or indirect, or for costs (including legal fees) and expenses arising out of the publication, use of, or reliance upon, this IEC Publication or any other IEC Publications.
- 8) Attention is drawn to the Normative references cited in this publication. Use of the referenced publications is indispensable for the correct application of this publication.
- 9) Attention is drawn to the possibility that some of the elements of this IEC Publication may be the subject of patent rights. IEC shall not be held responsible for identifying any or all such patent rights.

The main task of IEC technical committees is to prepare International Standards. In exceptional circumstances, a technical committee may propose the publication of a technical specification when

- the required support cannot be obtained for the publication of an International Standard, despite repeated efforts, or
- 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.

A bilingual version of this publication may be issued at a later date.

**IMPORTANT – The 'colour inside' logo on the cover page of this publication indicates that it contains colours which are considered to be useful for the correct understanding of its contents. Users should therefore print this document using a colour printer.**

## **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 connections 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
<b>DS 192 optical backplane</b>	96 × 2 = 192 lines	8 × 2 = 16 lines	8 core MT ferrule	12 core MT ferrule
<b>DS 384 optical backplane</b>	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*