IEC 62148-6

Edition 2.0 2020-02
REDLINE VERSION

INTERNATIONAL STANDARD

colour inside

Fibre optic active components and devices – Package and interface standards – Part 6: ATM-PON transceivers

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This redline version of the official IEC Standard allows the user to identify the changes made to the previous edition. A vertical bar appears in the margin wherever a change has been made. Additions are in green text, deletions are in strikethrough red text.

International Standard IEC 62148-6 has been prepared by subcommittee 86C: Fibre optic systems and active devices, of IEC technical committee 86: Fibre optics.

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INTRODUCTION

Fibre optic transceivers are used to convert electrical signals into optical signals and vice versa. This document covers the physical interface for transceivers for ATM-PON systems. This transceiver is designed as a 24-pin package for use with through holes on the printed circuit board.

FIBRE OPTIC ACTIVE COMPONENTS AND DEVICES – PACKAGE AND INTERFACE STANDARDS –

Part 6: ATM-PON transceivers

1 Scope

This part of IEC 62148 covers the physical interface specification of optical transceivers for asynchronous transfer mode-passive optical network (ATM-PON) systems recommended by the International Telecommunication Union (ITU) as ITU Recommendation G.983.1.

2 Normative references

The following documents are referred to in the text in such a way that some or all of their content constitutes requirements of this document. For dated references, only the edition cited applies. For undated references, the latest edition of the referenced document (including any amendments) applies.

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IEC 60874 (all parts), *Fibre optic interconnecting devices and passive components – Connectors for optical fibres and cables*

IEC 61754 (all parts), *Fibre optic interconnecting devices and passive components – Fibre optic connector interfaces*

IEC 62148-1, *Fibre optic active components and devices – Package and interface standards – Part 1: General and guidance*

ITU-T Recommendation G.652, *Characteristics of a single-mode optical fibre and cable*

ITU-T Recommendation G.657, *Characteristics of a bending-loss insensitive single-mode optical fibre and cable*

ITU-T Recommendation G.983.1, *Broadband optical access systems based on Passive Optical Networks (PON)*

3 Terms, definitions and abbreviated terms

3.1 Terms and definitions

For the purposes of this document, the terms and definitions given in IEC 62148-1, ITU-T Recommendation G.983.1 and the following apply.

ISO and IEC maintain terminological databases for use in standardization at the following addresses:

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3.1.1
OAN
optical access network
set of access links sharing the same network-side interfaces and supported by optical access transmission systems

Note 1 to entry: The OAN ~~may~~ can include a number of ODNs connected to the same OLT.

Note 2 to entry: This note applies to the French language only.

3.1.2
ODN
optical distribution network
apparatus or component that provides the optical transmission means from the OLT to the users, and vice versa

Note 1 to entry: The ODN utilizes passive optical components.

Note 2 to entry: This note applies to the French language only.

3.1.3
OLT
optical line termination
apparatus that provides the network-side interface of the OAN, and is connected to one or more ODNs

Note 1 to entry: This note applies to the French language only.

3.1.4
ONU
optical network unit
apparatus that provides (directly or remotely) the user-side interface of the OAN, and is connected to the ODN

Note 1 to entry: This note applies to the French language only.

3.2 Abbreviated terms

ATM-PON	asynchronous transfer mode-passive optical network
CDR	clock and data recovery
LD	laser diode
IC	integrated circuit

4 Classification

This document, which gives the interface standards of optical transceiver modules for ATM-PON systems, specifies the interface of a type 3 module with LD driver circuits and clock and data recovery (CDR) ICs for ONU module which is described in IEC 62148-1.

~~Fibre optic transceiver modules are classified into 5 types of forms according to the combination of mating types of electrical and optical interfaces. Details are described in IEC 62148-1. The 5 types are as follows:~~

~~Type 1: Fibre optic connector interface with direct solderable type electrical terminals.~~

~~Type 2: Fibre optic connector interface with plug-in type electrical terminals.~~

~~Type 3: Fibre optic pigtail interface with direct solderable type electrical terminals.~~

~~Type 4: Fibre optic pigtail interface with plug-in type electrical terminals.~~

~~Type 5: Modules are not classified into type 1 – type 4. (A typical example is a module that has both electrical connectors and non-connector type terminals as an electrical~~

~~interface such as a coaxial connector for signal and lead terminals for the power supply.)~~

5 Optical interface

5.1 General

The intent of this document is to adequately specify the physical requirements of an optical transceiver that will enable mechanical interchangeability of transceivers to this document both at the printed circuit board and for any panel mounting requirement.

5.2 Pigtail interface

All optical fibres defined in IEC 60793-2 (all parts), ITU-T Recommendation G.652, and ITU-T Recommendation G.657 are applicable.

All optical connectors defined in IEC 60874 (all parts) and IEC 61754 (all parts) are applicable if a pigtail is to be terminated with an optical connector.

6 Electrical interface

6.1 General

The electrical interface in this document defines only the basic functionality of each pin.

6.2 Numbering of electrical terminals

Pin numbering assignments are shown in Figure 1 (electrical terminals viewed from the top of the module with pins underneath).

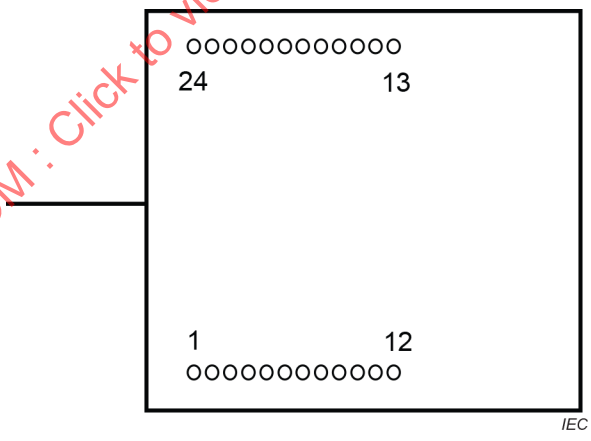


Figure 1 – Numbering assignments of electrical terminals (viewed from above with pins underneath)

6.3 Electrical terminal assignment

Electrical terminal assignment is based on Table 1 and Table 2, which provide the definitions of the pin functions for the transmitter section and the receiver section of the transceiver, respectively.

Table 1 – Pin function definitions: transmitter section of the transceiver

Pin number	Terminal identification	Functional description	Notes
1	Tx V_{CC}	Transmitter power supply	
2	Tx GND	Transmitter ground	
3	Bias cont (p)	Transmitter bias control, positive	Optional
4	Bias cont (n)	Transmitter bias control, negative	Optional
5	NC		
6	Clock in (p)	Transmitter clock in, positive	
7	Clock in (n)	Transmitter clock in, negative	
8	Tx GND	Transmitter ground	
9	Data in (p)	Transmitter data in, positive	
10	Data in (n)	Transmitter data in, negative	
11	Shut down	Transmitter shut down	
12	Tx V_{cc}	Transmitter power supply	

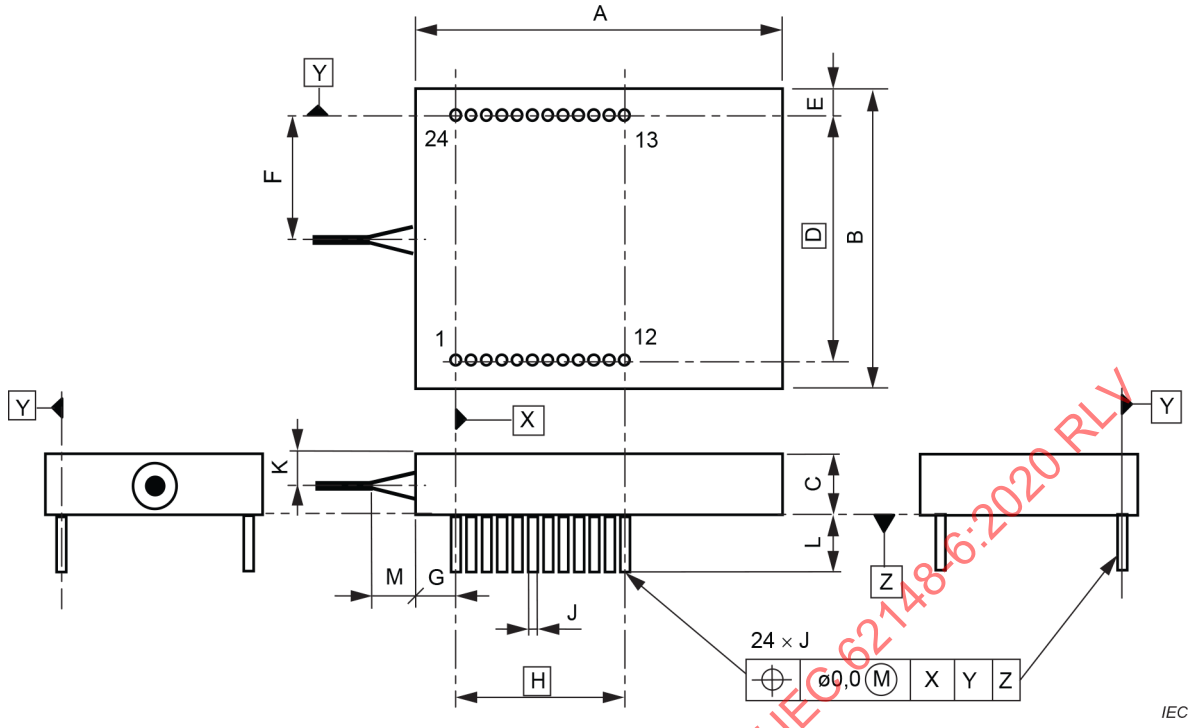
Table 2 – Pin function definitions: receiver section of the transceiver

Pin number	Terminal identification	Functional description
13	Rx V_{CC}	Receiver power supply
14	NC	
15	Data out (n)	Receiver data out, negative
16	Data out (p)	Receiver data out, positive
17	Rx GND	Receiver ground
18	Clock out (n)	Receiver clock out, negative
19	Clock out (p)	Receiver clock out, positive
20	Rx alarm	Receiver alarm
21	NC	
22	NC	
23	Rx GND	Receiver ground
24	Rx V_{CC}	Receiver power supply

7 Outline

7.1 Drawing of case outline

The case outline drawing, as well as the dimensions, are shown in Figure 2.



Dimensions of case outline

Dimension	Minimum mm	Maximum mm	Notes
A		55,00	
B		43,00	
C		8,90	
D	35,56		Basic dimension
E		3,72	
F		35,56	a
G		24,52	
H	27,94		Basic dimension [b]
J	0,45	0,70	
K	0,15	8,75	
L	3,10		
M		40,00	Strain relief [c]

[a] This item shall be specified by each vendor.

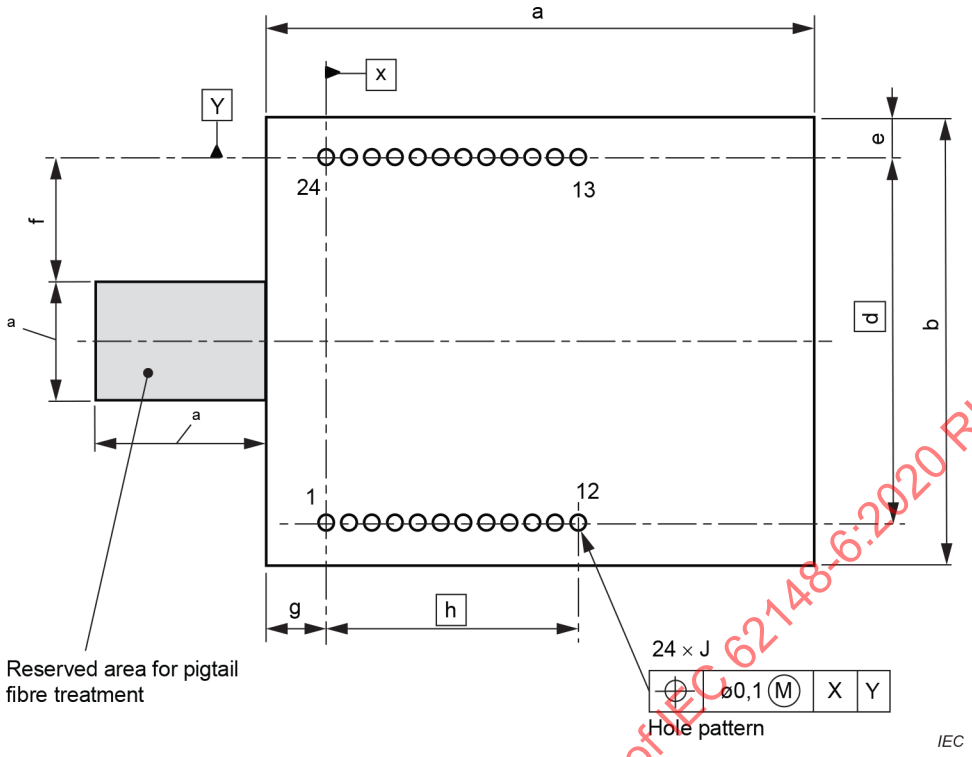
[b] All 24 pins are treated as a single pattern.

[c] Some vendors do not use the strain relief.

Figure 2 – Case outline

7.2 Drawing of case footprint

The drawing of the case footprint and the dimensions are shown in Figure 3.



[a] These items shall be specified by each vendor.

Dimensions of case footprint

Dimension	Minimum mm	Maximum mm	Notes
a	55,00		
b	43,00		
d	35,56		Basic dimension
e	3,72		
f	0,0	~~35,56~~	
g	2,54		
h	27,94		Basic dimension [a]
J	0,8	1,0	
[a] Pin holes 11 × 2,54 pitch			

Figure 3 – Case footprint

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IEC 60191 (all parts), *Mechanical standardization of semiconductor devices*

IEC 60603 (all parts), *Connectors for ~~frequencies below 3 MHz for use with printed boards~~ electronic equipment*

IEC 60794 (all parts), *Optical fibre cables*

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IEC 60825 (all parts), *Safety of laser products*

~~IEC 61076: all parts, *Connectors with assessed quality, for use in d.c., low-frequency analogue and in digital high speed data applications*~~

IEC 61076 (all parts), *Connectors for electrical and electronic equipment – Product requirements*

IEC 61281-1, *Fibre optic communication subsystems – Part 1: Generic specification*

~~IEC 61754: all parts, *Fibre optic connector interfaces*~~

~~ISO 1101: *Technical drawings – Geometrical tolerancing – Tolerancing of form, orientation, location and run-out – Generalities, definitions, symbols, indications on drawings*~~

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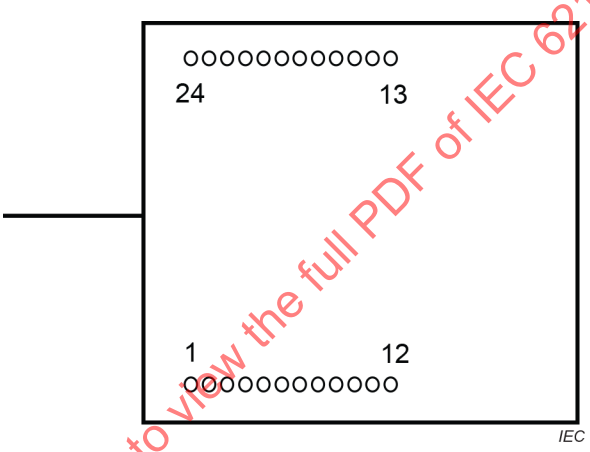


Figure 1 – Numbering assignments of electrical terminals (viewed from above with pins underneath)

6.3 Electrical terminal assignment

Electrical terminal assignment is based on Table 1 and Table 2, which provide the definitions of the pin functions for the transmitter section and the receiver section of the transceiver, respectively.

Table 1 – Pin function definitions: transmitter section of the transceiver

Pin number	Terminal identification	Functional description	Notes
1	Tx V_{CC}	Transmitter power supply	
2	Tx GND	Transmitter ground	
3	Bias cont (p)	Transmitter bias control, positive	Optional
4	Bias cont (n)	Transmitter bias control, negative	Optional
5	NC		
6	Clock in (p)	Transmitter clock in, positive	
7	Clock in (n)	Transmitter clock in, negative	
8	Tx GND	Transmitter ground	
9	Data in (p)	Transmitter data in, positive	
10	Data in (n)	Transmitter data in, negative	
11	Shut down	Transmitter shut down	
12	Tx V_{cc}	Transmitter power supply	

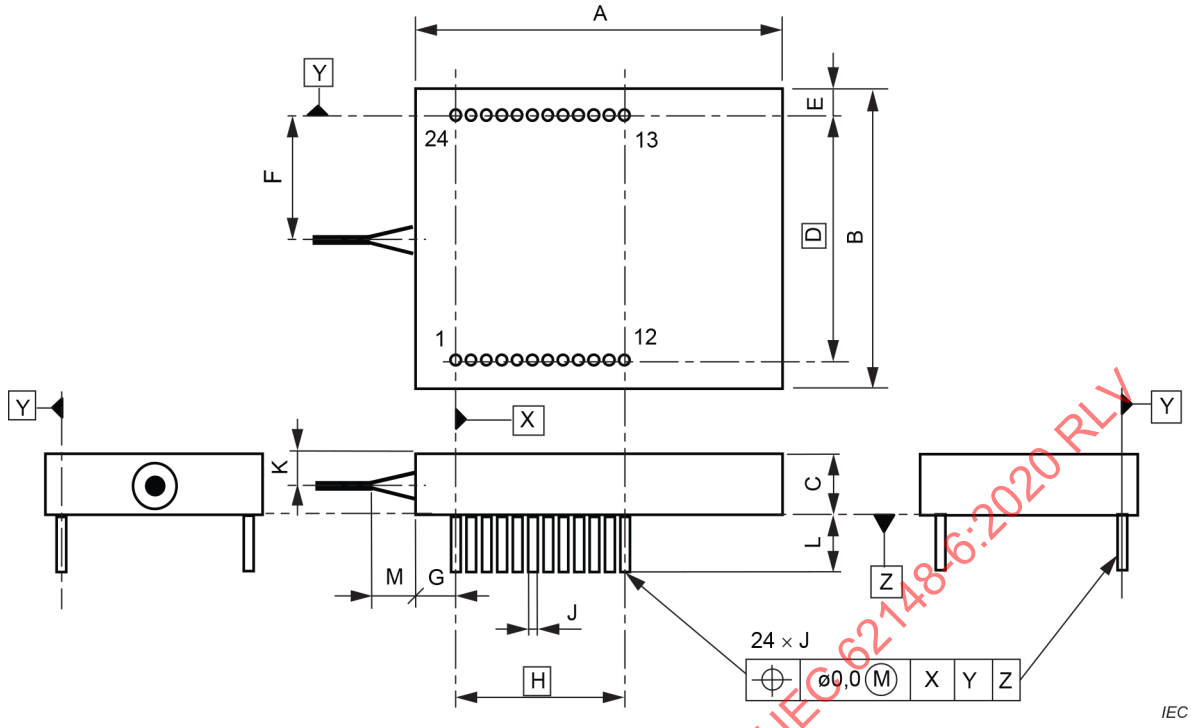
Table 2 – Pin function definitions: receiver section of the transceiver

Pin number	Terminal identification	Functional description
13	Rx V_{CC}	Receiver power supply
14	NC	
15	Data out (n)	Receiver data out, negative
16	Data out (p)	Receiver data out, positive
17	Rx GND	Receiver ground
18	Clock out (n)	Receiver clock out, negative
19	Clock out (p)	Receiver clock out, positive
20	Rx alarm	Receiver alarm
21	NC	
22	NC	
23	Rx GND	Receiver ground
24	Rx V_{CC}	Receiver power supply

7 Outline

7.1 Drawing of case outline

The case outline drawing, as well as the dimensions, are shown in Figure 2.



Dimensions of case outline

Dimension	Minimum mm	Maximum mm	Notes
A		55,00	
B		43,00	
C		8,90	
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E		3,72	
F		35,56	a
G		24,52	
H	27,94		Basic dimension [b]
J	0,45	0,70	
K	0,15	8,75	
L	3,10		
M		40,00	Strain relief [c]

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Figure 2 – Case outline

7.2 Drawing of case footprint

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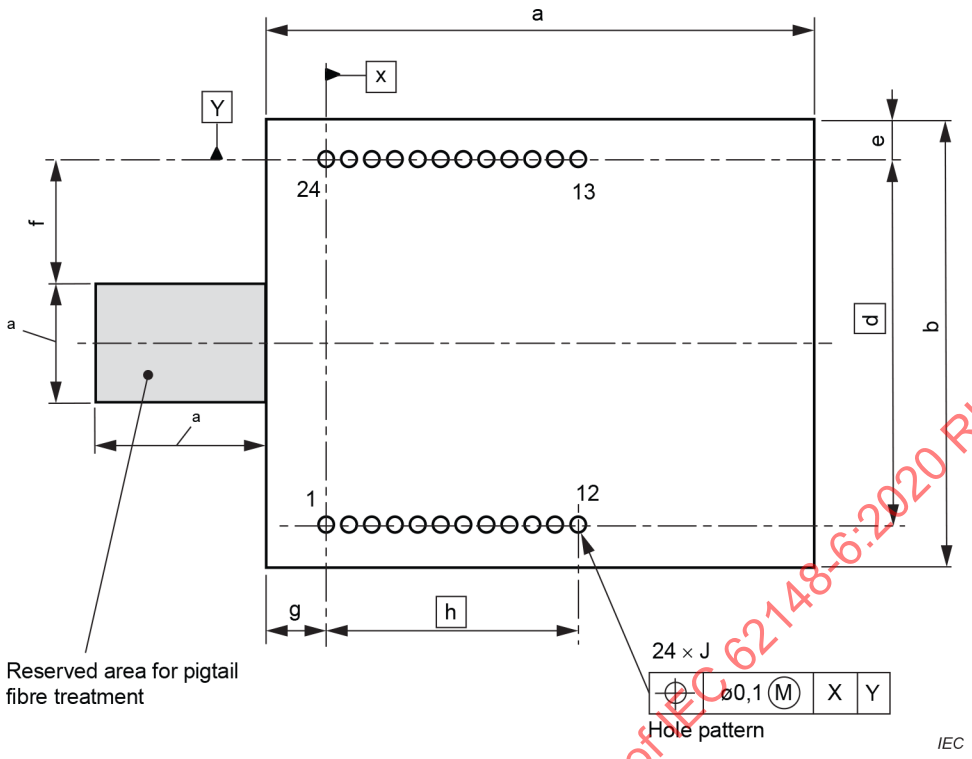

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Figure 3 – Case footprint

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IEC 60807 (all parts), *Rectangular connectors for frequencies below 3 MHz*

IEC 60825 (all parts), *Safety of laser products*

IEC 61076 (all parts), *Connectors for electrical and electronic equipment – Product requirements*

IEC 61281-1, *Fibre optic communication subsystems – Part 1: Generic specification*

ISO 1101, *Geometrical product specifications (GPS) – Geometrical tolerancing – Tolerances of form, orientation, location and run-out*

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COMMISSION ÉLECTROTECHNIQUE INTERNATIONALE

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COMPOSANTS ET DISPOSITIFS ACTIFS FIBRONIQUES – NORMES DE BOÎTIER ET D'INTERFACE –

Partie 6: Emetteurs-récepteurs ATM-PON

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La Norme internationale IEC 62148-6 a été établie par le sous-comité 86C: Systèmes et dispositifs actifs à fibres optiques, du comité d'études 86 de l'IEC: Fibres optiques.

Cette deuxième édition annule et remplace la première édition parue en 2003, dont elle constitue une révision technique.

Cette édition inclut les modifications techniques majeures suivantes par rapport à l'édition précédente:

a) l'incohérence des types à l'Article 4 a été résolue;
b) la liste des parties et des titres a été retirée de l'Avant-propos;
c) les références ont été mises à jour.

Le texte de cette Norme internationale est issu des documents suivants:

CDV	Rapport de vote
86C/1590/CDV	86C/1613/RVC

Le rapport de vote indiqué dans le tableau ci-dessus donne toute information sur le vote ayant abouti à l'approbation de cette Norme internationale.

Ce document a été rédigé selon les Directives ISO/IEC, Partie 2.

Une liste de toutes les parties de la série IEC 62148, publiées sous le titre général *Composants et dispositifs actifs fibroniques – Normes de boîtier et d'interface*, peut être consultée sur site web de l'IEC.

Le comité a décidé que le contenu de ce document ne sera pas modifié avant la date de stabilité indiquée sur le site web de l'IEC sous "http://webstore.iec.ch" dans les données relatives au document recherché. A cette date, le document sera

- reconduit,
- supprimé,
- remplacé par une édition révisée, ou
- amendé.

INTRODUCTION

Les émetteurs-récepteurs fibroniques sont utilisés pour convertir les signaux électriques en signaux optiques et vice versa. Le présent document couvre l'interface physique pour les émetteurs-récepteurs des systèmes ATM-PON. Ces émetteurs-récepteurs sont conçus comme des boîtiers à 24 broches, prévus pour être utilisés avec des trous traversants sur des cartes de circuits imprimées.

COMPOSANTS ET DISPOSITIFS ACTIFS FIBRONIQUES – NORMES DE BOÎTIER ET D'INTERFACE –

Partie 6: Emetteurs-récepteurs ATM-PON

1 Domaine d'application

La présente partie de l'IEC 62148 couvre les spécifications d'interface physique des émetteurs-récepteurs optiques pour les systèmes de réseaux optiques passifs en mode de transfert asynchrone (ATM-PON: *asynchronous transfer mode-passive optical network*) qui suivent les recommandations données par l'Union Internationale des Télécommunications (UIT) dans la Recommandation G.983.1.

2 Références normatives

Les documents suivants sont cités dans le texte de sorte qu'ils constituent, pour tout ou partie de leur contenu, des exigences du présent document. Pour les références datées, seule l'édition citée s'applique. Pour les références non datées, la dernière édition du document de référence s'applique (y compris les éventuels amendements).

IEC 60793-2 (toutes les parties), *Fibres optiques – Partie 2: Spécifications de produits*

IEC 60874 (toutes les parties), *Dispositifs d'interconnexion et composants passifs à fibres optiques – Connecteurs pour fibres et câbles optiques*

IEC 61754 (toutes les parties), *Dispositifs d'interconnexion et composants passifs fibroniques – Interfaces de connecteurs à fibres optiques*

IEC 62148-1, *Composants et dispositifs actifs fibroniques – Normes de boîtier et d'interface – Partie 1: Généralités et recommandations*

Recommandation UIT-T G.652, *Caractéristiques des câbles et fibres optiques monomodes*

Recommandation UIT-T G.657, *Caractéristiques des câbles et fibres optiques monomodes insensibles aux pertes par courbure*

Recommandation UIT-T G.983.1, *Systèmes d'accès optique à large bande basés sur les réseaux optiques passifs*

3 Termes, définitions et termes abrégés

3.1 Termes et définitions

Pour les besoins du présent document, les termes et définitions de l'IEC 62148-1, la Recommandation UIT-T G.983.1, ainsi que les suivants, s'appliquent.

L'ISO et l'IEC tiennent à jour des bases de données terminologiques destinées à être utilisées en normalisation, consultables aux adresses suivantes:

- IEC Electropedia: disponible à l'adresse http://www.electropedia.org/
- ISO Online browsing platform: disponible à l'adresse http://www.iso.org/obp