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Optical transport network module framer interfaces

ITU-T G-series Recommendations – Supplement 58

ITU-T



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Supplement 58 to ITU-T G-series Recommendations

Optical transport network module framer interfaces

Summary

Supplement 58 to ITU-T G-series Recommendations describes several interoperable component-to-component multilane interfaces (across different vendors) to connect an optical module [with or without a digital signal processor (DSP)] to a framer device in a vendor's equipment supporting 40G, 100G or beyond 100G optical transport network (OTN) interfaces.

Only the structure of the 11G, 28G or 56G physical lanes of the different OTN module framer interface (MFI) examples is provided in this Supplement. For their electrical characteristics, the OIF-CEI Implementation Agreement (IA) specifications can be used.

This Supplement relates to Recommendation ITU-T G.709/Y.1331.

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Supplement 58 to ITU-T G-series Recommendations

Optical transport network module framer interfaces

1 Scope

This Supplement describes multilane interfaces between an optical transport network (OTN) framer device and an optical module with or without a digital signal processor (DSP) (module framer interface). The module framer interfaces (MFIs) described in this Supplement carry optical transport unit k (OTU k ; $k = 3, 4$) or optical transport unit C n (OTUC n) signals. Electrical parameters for these interfaces can use specifications provided in the relevant clauses of OIF-CEI Implementation Agreement (IA) specifications.

2 References

- [ITU-T G.652] Recommendation ITU-T G.652 (2016), *Characteristics of a single-mode optical fibre and cable*.
- [ITU-T G.695] Recommendation ITU-T G.695 (2018), *Optical interfaces for coarse wavelength division multiplexing applications*.
- [ITU-T G.709] Recommendation ITU-T G.709/Y.1331 (2016), *Interfaces for the optical transport network*.
- [ITU-T G.709.1] Recommendation ITU-T G.709.1/Y.1331.1 (2018), *Flexible OTN short-reach interface*.
- [ITU-T G.959.1] Recommendation ITU-T G.959.1 (2018), *Optical transport network physical layer interfaces*.

3 Definitions

None.

4 Abbreviations and acronyms

This Supplement uses the following abbreviations and acronyms:

AM	Alignment Marker
DSP	Digital Signal Processor
FCC	FlexO Communications Channel
FEC	Forward Error Correction
FlexO	Flexible Optical transport network
FlexO-m	group of m bonded short-reach FlexO-SR interfaces that carry an OTUC n
FOIC	FlexO-SR Interface
IA	Implementation Agreement
LD	Local Degradation
LLM	Logical Lane Marker
MFAS	Multi-Frame Alignment Signal
MFI	Module Framer Interface

ODSP	Optical line DSP
OH	Overhead area
OSMC	OTN Synchronization Messaging Channel
OTL	Optical Transport Lane
OTN	Optical Transport Network
OTUCn	Optical Transport Unit Cn
OTUk	Optical Transport Unit k
PAD	pad area
PAM4	Pulse Amplitude Modulation, four-level
RS	Reed-Solomon
WDM	Wavelength Division Multiplexing

5 Conventions

Transmission order: The order of transmission of information in all the figures in this supplement is first from left to right and then from top to bottom. Within each byte, the most significant bit is transmitted first. The most significant bit (bit 1) is illustrated at the left in all the figures.

6 Introduction

This Supplement begins with some examples of first generation MFIs for OTU3 and OTU4 signals carried over multiple 11G electrical lanes (using OTL3.4 and OTL4.10 structures, respectively).

Then this Supplement describes some examples of second generation MFIs for OTU4 and OTUCn signals carried over multiple 28G electrical lanes (using OTL4.4, OTLC.4, FOIC1.4, FOIC2.8 or FOIC4.16 structures, respectively). Note that in the case of an OTUCn signal, n OTLC.4 or m FOICx.k interface structures are used.

Finally, this Supplement describes some examples of third generation MFIs for OTUCn signals carried over multiple 56G electrical lanes (using FOIC1.2, FOIC2.4 or FOIC4.8 structures, respectively). Note that m FOICx.k interfaces (FlexO-m group) are used to carry an OTUCn signal.

Users of this Supplement should not assume that possible MFIs are limited to the ones provided in clauses 7, 8 and 9.

7 Signal formats and rates carried over 11G electrical lanes

This clause describes some MFI structures using 11G physical lanes in order to carry 40G OTU3 or 100G OTU4 signals. The electrical characteristics of each 11G physical lane may comply with [b-OIF-CEI IA] CEI-11G-xR specifications.

7.1 OTL3.4 structure

The original purpose of the OTL3.4 interface, as defined in clause 8.1 and Annex C of [ITU-T G.709], was to enable the re-use of pluggable modules developed for Ethernet 40GBASE-R applications. Modules developed for b-IEEE 802.3 40GBASE-LR4 and 40GBASE-ER4 can have corresponding optical specifications for OTU3 interfaces with application codes C4S1-2D1 and C4L1-2D1, respectively, in [ITU-T G.695]. These modules have a four-lane wavelength division multiplexing (WDM) interface to and from a transmit/receive pair of ITU-T G.652 optical fibres.