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SERIES G: TRANSMISSION SYSTEMS AND MEDIA,
DIGITAL SYSTEMS AND NETWORKS

**10-Gigabit-capable passive optical networks:
Interface between media access control with
serializer/deserializer and physical medium
dependent sublayers**

ITU-T G-series Recommendations – Supplement 48

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For further details, please refer to the list of ITU-T Recommendations.

Supplement 48 to ITU-T G-series Recommendations

10-Gigabit-capable passive optical networks: Interface between media access control with serializer/deserializer and physical medium dependent sublayers

Summary

Supplement 48 to ITU-T G-series Recommendations provides information on the electrical interface between media access control (MAC) with serializer/deserializer (SERDES) and physical media dependent (PMD) for a 10-Gigabit-capable passive optical network (XG-PON) system with asymmetric nominal data rate of 9.95328 Gbit/s in the downstream direction and 2.48832 Gbit/s in the upstream direction, hereinafter referred to as XG-PON1.

Information is provided in order to facilitate the interoperability level and mass market use of the equipment based on the ITU-T G.987 series of Recommendations. The information provided in this Supplement is complementary to the physical layer requirements and specifications for the XG-PON physical media dependent (PMD) layer for XG-PON described in Recommendation ITU-T G.987.2. This scope of the information provided in this Supplement is focused on the elements in the interface which are important to the XG-PON1 specific interface, and does not intend to cover full specification for the mechanical and physical aspects of the optical PMD, which can be found in various industry multi-source agreement (MSA) PMD specifications for 10G optics.

History

Edition	Recommendation	Approval	Study Group
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FOREWORD

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Supplement 48 to ITU-T G-series Recommendations

10-Gigabit-capable passive optical networks: Interface between media access control with serializer/deserializer and physical medium dependent sublayers

1 Scope

This Supplement describes the electrical interface between the media access control with serializer/deserializer (MAC/SERDES) and the physical medium dependant (PMD) sublayer for a 10-Gigabit-capable passive optical network asymmetric (XG-PON1) system. This Supplement provides the signalling between the MAC/SERDES and PMD, timing requirements and diagrams and electrical characteristics for the interface.

2 References

- [ITU-T G.783] Recommendation ITU-T G.783 (2006), *Characteristics of synchronous digital hierarchy (SDH) equipment functional blocks*.
- [ITU-T G.825] Recommendation ITU-T G.825 (2000), *The control of jitter and wander within digital networks which are based on the synchronous digital hierarchy (SDH)*.
- [ITU-T G.957] Recommendation ITU-T G.957 (2006), *Optical interfaces for equipments and systems relating to the synchronous digital hierarchy*.
- [ITU-T G.959.1] Recommendation ITU-T G.959.1 (2008), *Optical transport network physical layer interfaces*.
- [ITU-T G.984.1] Recommendation ITU-T G.984.1 (2008), *Gigabit-capable passive optical networks (GPON): General characteristics*.
- [ITU-T G.984.2] Recommendation ITU-T G.984.2 (2003), *Gigabit-capable Passive Optical Networks (G-PON): Physical Media Dependent (PMD) layer specification; Amendment 2 (2008)*.
- [ITU-T G.984.5] Recommendation ITU-T G.984.5 (2007), *Gigabit-capable Passive Optical Networks (G-PON): Enhancement band; Amendment 1 (2009)*.
- [ITU-T G.987] Recommendation ITU-T G.987 (2010), *10-Gigabit-capable passive optical network (XG-PON): Definitions, abbreviations, and acronyms*.
- [ITU-T G.987.1] Recommendation ITU-T G.987.1 (2010), *10-Gigabit-capable passive optical networks: General requirements*.
- [ITU-T G.987.2] Recommendation ITU-T G.987.2 (2010), *10-Gigabit-capable passive optical networks: Physical media dependent layer specification*.
- [ITU-T G.987.3] Recommendation ITU-T G.987.3 (2010), *10-Gigabit-capable passive optical networks: Transmission convergence specifications*.
- [ITU-T G.988] Recommendation ITU-T G.988 (2010), *Optical network unit management and control interface specification*.
- [ITU-T G-Sup.39] ITU-T G-series Recommendations – Supplement 39 (2008), *Optical system design and engineering considerations*.
- [SFP+] SFF Committee, SFF-8431 (2009), *Specifications for Enhanced Small Form Factor Pluggable Module SFP+, Revision 4.1*.

[XFP] SFF Committee, INF-8077i (2005), *10 Gigabit Small Form Factor Pluggable Module*, Revision 4.5.

[SFF-8472] SFF Committee, SFF-8472 (2009), *Specification for Diagnostic Monitoring Interface for Optical Transceivers*, Rev 10.4.

3 Definitions

See clause 3 of [ITU-T G.987].

In addition, this Supplement defines the following terms:

- 3.1 received signal strength indication (RSSI):** A measurement of the optical power present in a received signal. It is specifically used in PON to indicate both continuous mode optical receive power at the ONU and burst mode optical receive power measured and averaged for each ONU separately, at the OLT.
- 3.2 MAC/SERDES:** MAC is media access control and SERDES is serializer/deserializer. It refers to the device implementing the media access control meaning the XGTC and above layers and optionally SERDES device connected to the PMD sublayer.

4 Abbreviations and acronyms

See clause 4 of [ITU-T G.987].

5 Conventions

See clause 5 of [ITU-T G.987].

6 Architecture of the optical access network

See [ITU-T G.984.1]. For convenience, Figure 1 of [ITU-T G.984.2] is reproduced below, presented in Figure 6-1:

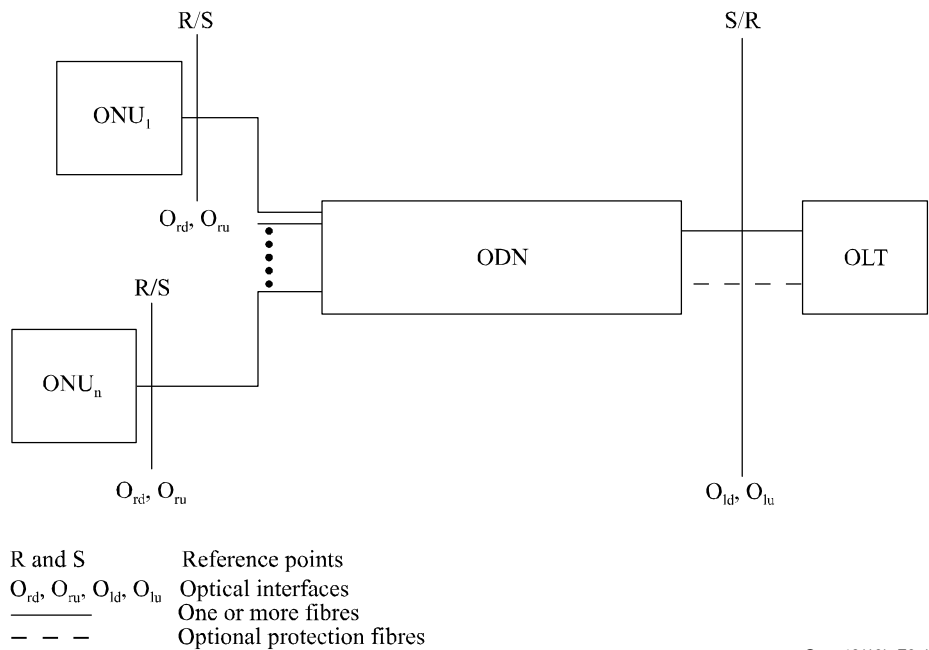


Figure 6-1 – Generic physical configuration of the optical distribution network (reproduced from Figure 1 of [ITU-T G.984.2])