DOUBLE 10 GbE TRANSPONDER

A Versatile 10 Gigabit Ethernet Transponder

The Double 10 GbE Transponder is a powerful part of the Infinera XTM Series, which enables optimized and cost-efficient networks based on CWDM and DWDM technology.

Optimized for Metro Regional Applications

The Double 10 GbE Transponder (TPD10GBE) enables the transport of 10 gigabit Ethernet signals within metro regional applications. The use of XFP pluggable optics enables the unit to be used in CWDM access networks, and forward error correction (FEC) in combination with DWDM XFPs enables the same unit to be used in metro regional applications.

Based on the Infinera iWDM® Concept

The TPD10GBE is based on the Infinera Intelligent WDM (iWDM) concept. iWDM enables the unit to be configured in different operational modes. The TPD10GBE can be configured as two transponders, as a single transponder with two line interfaces giving sub-50 ms line protection (see Figure 1) or as two regenerator functions enabling extension of networks via cascading (see Figure 2). This flexibility reduces operational expenditure (OpEx) since the same plug-in unit can be used for multiple purposes. The regenerator mode can also be used to convert from a CWDM to a DWDM network by using corresponding XFP transceivers on the interfaces. Another application is to use the regenerator mode to convert from one DWDM wavelength to another.

Key benefits:
- Compact and cost-effective; two transponder functions in one plug-in unit
- Built-in FEC enables use in long-haul networks
- Multi-functional plug-in unit. The same hardware can be used in dual transponder, single transponder with 1+1 line protection or dual regenerator configurations
- Technology-agnostic. Pluggable transceivers enable use in CWDM as well as DWDM networks
- Tunable optics for full flexibility and cost-efficient spare management
- Low power design ensures low total cost of ownership
The line coding also provides embedded management channels, quality check of transmission and injection of trail trace labels for validation of circuit connection.

Interoperability with Other XTM Series Products

The client interface of the TPD10GBE recognizes a signal originating from a 9xGbE/10 Gb/s muxponder. This enables management connectivity between these two units, thus giving remote management access if the 9xGbE/10 Gb/s muxponder is placed in, for example, a TM-102 chassis at a customer site (see Figure 3).

![Figure 1. Different Operating Modes of the TPD10GBE, Giving Valuable Flexibility.](image1)

![Figure 2. Cascaded Network.](image2)

![Figure 3. Management Access Toward 9xGbE/10 Gb/s Muxponder.](image3)

The line coding of the TPD10GBE is compatible with the 9xGbE/10 Gb/s FEC muxponder. This enables use of the TPD10GBE in regenerator mode to cascade the line signal from the 9xGbE/10 Gb/s FEC muxponder over multiple optical subnetworks as shown in Figure 4 below.

![Figure 4. Cascaded Networks Using TPD10GBE.](image4)

Tailored Network Element Options

The TPD10GBE transponder can be mounted in any of the XTM Series chassis options:

- As a self-managed network element in a 1U TM-102 chassis
- As one of many traffic units in a TM-3000/II (11U) or TM-301 (3U) chassis

This enables a tailored setup depending on the current and future capacity needs of the site.

In the TM-102 option, the TPD10GBE initiates the complete Embedded Node Manager, including a web server on the onboard microprocessor, i.e. no control unit is required to manage the node. This enables local management simply by connecting any PC or workstation and launching a standard Internet browser. The embedded management channels enable easy remote management via the line signal. There is therefore no need to provide access to the customer data communication network (DCN) network if the TPD10GBE is placed at a customer site.

Low Power Design

A fully equipped TPD10 GbE transponder unit consumes less than 40 W, equating to less than 20 W per transponder function. Low power consumption in combination with a small footprint reduces site costs and enables more capacity to be handled at sites with restrictions on power consumption, cooling and space.
### Specifications

| Supported Traffic Formats | 10 GbE LAN  
| | 10 GbE WAN  
| | STM-64/OC-192  |

| Layer 1 Performance Monitoring | Gigabit Ethernet: based on loss of optical signal, loss of sync  
| | Line signal: based on FEC coding  
| | Collected every 15 min/24 h and presented according to G.784/G.826 using ES, SES, etc.  |

| Protection | Via two line ports set in 1+1 protection. Non-revertive switching <50 ms  |

| Power Consumption | Max 40 W in transponder mode (fully equipped with client and DWDM XFPs)  
| | Max 45 W in regenerator mode with all ports active and using DWDM XFPs  |

| Misc Line Interface Features | Embedded management channels on line signals  
| | Trail trace insertion to validate connection  
| | Forward error correction (FEC) using RS(255,239)  |

| Operational Modes | 2x transponder  
| | 1x transponder with 1+1 line protection  
| | 2x regenerator mode (with embedded management channels on all 4 line ports)  |

| Interfaces | Client interfaces: XFP MM, SM @ 1310 nm/1550 nm versions. Including "single-strand" transceivers enabling direct operation on a single-fiber configuration without need for a DWDM filter  
| | Line interfaces: XFP 40 km/70 km CWDM (up to 8 channels) or DWDM (up to 40 channels via standard XFPs, 80 channels via tunable XFP), also including single-strand transceivers  |

Specifications and Features Are Subject to Change

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