

Double 10GbE Transponder

A versatile 10 Gigabit Ethernet Transponder

Key benefits:

- Compact and cost-effective; two Transponder functions in one plug-in unit
- Inbuilt Forward Error Correction (FEC) enables usage in long-haul networks
- Multi-functional plug-in unit. Same hardware can be used as Dual Transponder, Single Transponder with 1+1 Line protection or as Dual Regenerator
- Technology agnostic. Pluggable transceivers enable usage 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 Double 10GbE Transponder is a powerful part of Transmode’s TM-Series platform enabling optimized and cost efficient networks based on CWDM and DWDM technology.

Optimized for Metro/Access and long-haul applications

The Double 10GbE Transponder (TPD10GBE) is an extremely powerful device for transport of 10 Gigabit Ethernet signals within metro/access and long-haul applications. The usage of pluggable optics (XFPs) enables the unit to be used in CWDM access networks and the Forward Error Correction (FEC) in combination with long-haul capable DWDM XFPs enable the same unit to be used in long-haul networks.

Based on Transmode’s iWDM™ concept

The TPD10GBE is based on Transmode’s intelligent WDM (iWDM) concept. iWDM will, for example, enable the unit to be configured into different operational modes. The HW unit can be configured as two Transponders, as a single Transponder with two line interfaces giving sub 50ms line protection, see figure 1, or as two Regenerator functions enabling extension of networks via cascading, see figure 2.

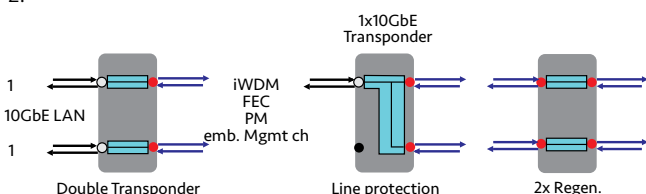


Fig. 1 Different operating modes of the TPD10GBE giving HW flexibility

This flexibility reduces the Operational Expenditures (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 transceivers (XFPs) on the interfaces. Another application is to use the regenerator mode to convert from one DWDM wavelength to another.

The line coding also provides embedded management channels, quality check of transmission and injection of trail trace labels for validation of circuit connection.

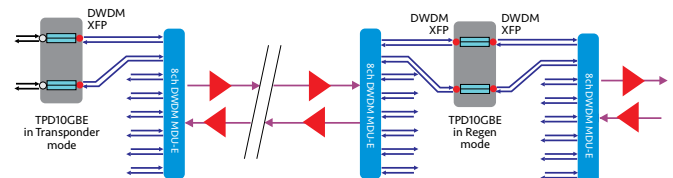


Fig. 2 Cascaded network

Interwork with other TM-Series products

The client interface of the TPD10GBE recognizes a signal originating from a 9xGbE/10G Muxponder. This enables management connectivity between these two units, thus giving remote management access if the 9xGbE/10G Muxponder is placed in e.g. a TM-102 chassis at a customer site, see figure 3.

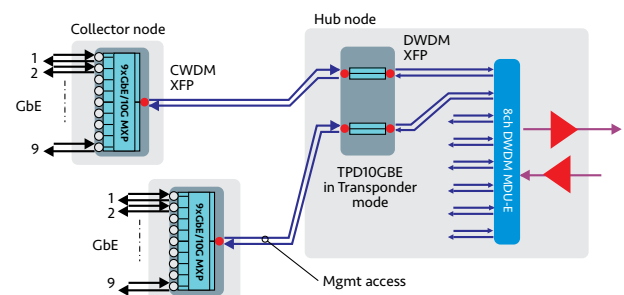


Fig. 3 Management access towards 9xGbE/10G Muxponder

Figure 3 shows an example where 9xGbE/10G Muxponder units are placed in TM-101/-102 chassis at customer premises. Both are connected directly on a fiber-pair via CWDM to the client ports of the TPD10GbE Transponder. The embedded management channels are then extracted from the client ports and provide remote management access to the collector nodes.

The line coding of the TPD10GbE is compatible with the 9xGbE/10G FEC Muxponder (see separate Data Sheet). This enables usage of the TPD10GbE in Regenerator mode to cascade the line signal from the 9xGbE/10G FEC Muxponder over multiple optical subnetworks as shown in figure 4 below.

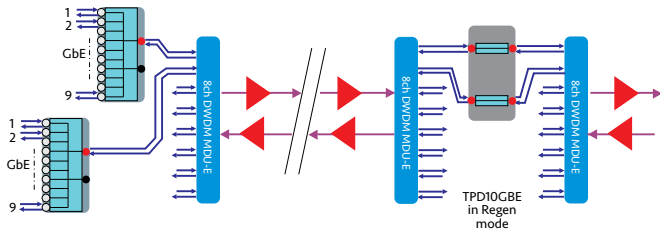


Fig. 4 Cascaded networks using TPD10GbE

Tailored Network Element options

The TPD10GbE Transponder can be mounted in any of the TM-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 (10^{1/3}U) or TM-301 (3U) chassis

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

In the TM-102 option, the TPD10GbE initiates the complete Embedded Node Management (ENM) including a web server on the on-board micro processor, i.e. no Control Unit is required to manage the node. This enables local management simply by connecting any PC or work station 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 DCN network if the TPD10GbE is placed at a customer site.

Low Power Design

A fully equipped TPD10GbE Transponder unit consumes less than 40W, equating to less the 20W 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.

Technical specifications:

Supported traffic formats	10 GbE LAN 10 GbE WAN STM-64/OC-192
Layer-1 performance monitoring	Gigabit Ethernet: Based on LossOfOpticalSignal, LossOfSync, Line signal: Based on FEC coding Collected every 15min/24h 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 <50ms
Power consumption	Max 40W in Transponder mode (fully equipped with client and DWDM XFPs) Max 45W 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 @ 1310nm/1550nm versions Line interfaces: XFP 40km/70km CWDM (up to 8 channels) or DWDM (up to 40 channels via standard XFPs, 80 channels via tunable XFP)

The specifications and information within this document are subject to change without further notice. All statements, information and recommendations are believed to be accurate but are presented without warranty of any kind. Contact Transmode for more details.