

10G Multi-Service Muxponder

Effective aggregation of multiple traffic formats

Key benefits:

- Compact and cost-effective aggregation of up to 10 client signals to a 10Gb/s line signal
- Fully transparent transport of SDH/SONET, Ethernet and Fibre Channel signals
- Dual line ports enabling protected configurations
- Technology agnostic. Pluggable transceivers enable usage in both CWDM and DWDM networks
- Tunable optics for full flexibility and cost efficient spare management
- Inbuilt Forward Error Correction (FEC) enables usage in long-haul networks
- High flexibility and Layer-2 awareness via Transmode's Intelligent WDM (iWDM™) concept
- Low Power Design

The 10G Multi-Service Muxponder (MS-MXP/10G) is a part of the Multi-Service concept within Transmode's TM-Series platform, enabling a traffic unit to be configured and used in multiple applications. Instead of having traffic units that are dedicated for a certain service and application, the same unit can be reconfigured to support different traffic formats as well as being configured to provide a different functional behavior, such as Muxponder, Transponder and Regenerator.

These flexible capabilities in combination with pluggable optics give the lowest Total Cost of Ownership (TCO), in particular when using XFP's with tunable lasers.

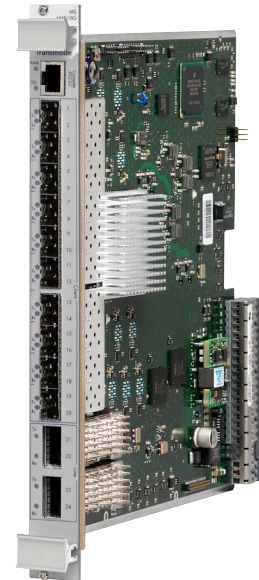
Optimized for Ethernet backhaul applications

The 10G Multi-Service Muxponder is a generic traffic unit for use in metro/regional networks for backhaul of traffic such as Ethernet and SDH/SONET. For wholesale operators it is important to be able to transport both SDH/SONET and Ethernet signals data as well as synchronisation transparently. The latter is of imperative importance for mobile backhauling of Synchronous Ethernet signals.

The 10G Multi-Service Muxponder is a single-slot device for aggregation of up to 10 client signals onto a 10G line signal.

All client interfaces use pluggable transceivers (SFPs) enabling each client connection to be adapted to the client's type of interface (SM, MM etc) and distance to the client equipment. The two line interfaces are also equipped with pluggable transceivers (XFPs) giving the ability to provide sub 50ms 1+1 line protection simply by inserting a second XFP and configuring the unit via the graphical user interface.

The usage of pluggable transceivers provides a high level of flexibility since the Muxponder can be used in both CWDM and DWDM networks by selecting appropriate type of XFPs. The



support for DWDM XFP's with tunable lasers further enhances the flexibility and cost efficiency.

Both line ports provide Forward Error Correction (FEC) which makes the Muxponder also suitable for amplified long-haul networks.

Simplified management via iWDM

The 10G Multi-Service Muxponder is based on Transmode's Intelligent WDM (iWDM) concept where the client signals are wrapped into a digital frame with overhead bytes that are used to carry the management channels as well as providing quality control of the transmission via performance data. The embedded management channel simplifies the management of a Transmode network since management access is provided wherever there is a traffic connection.

iWDM Layer-2 awareness

Even though the 10G Multi-Service Muxponder is a Layer-1 device it has inbuilt Layer-2 functions, such as the ability to measure to what extent each GbE-pipe is utilized. This information gives the operator the ability to insert Layer-2 concentration to better utilize each GbE-pipe and thus avoid adding unnecessary wavelengths in the transport network.

Another powerful Layer-2 feature is the ability to inject and extract VLAN management channels on the GbE-ports. This enables easy remote management of Transmode Layer-2 units via the native GbE signal.

Remote access to an Ethernet Muxponder (EMXP) or Ethernet Demarcation Unit (EDU) is easily provided via the management VLANs and thus providing an integrated solution for management of both Layer-1 and Layer-2 devices in the network.

Cascaded networks

The line format of the 10G Multi-Service Muxponder is compatible with the TPD10GBE Transponder. As an example, this enables usage of this unit in Regenerator mode to cascade the line signal from the 10G Multi-Service Muxponder over multiple optical sub networks as shown in figure below. In this example configuration the 10G Multi-Service Muxponder is used in a CWDM collector network over a single-fiber configuration. In the hub node the 10G line signals are relayed into an amplified DWDM network via the TPD10GBE unit in regenerator mode.

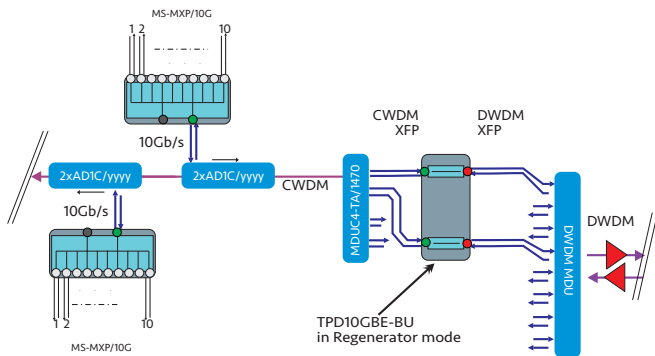


Fig. 1 Cascaded networks using TPD10GBE

Tailored Network Element options

The 10G Multi-Service Muxponder can be mounted in any of the TM-Series chassis options;

- As a self-managed Network Element in a 1U TM-101/102 chassis
- As one of many traffic units in a TM-3000 (10U) or TM-301 (3U) chassis

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

In the TM-101/102 option, the 10G Multi-Service Muxponder initiates the complete Embedded Node Management (ENM) on the on-board micro processor. 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 thus no need to provide access to the customer DCN network if the 10G Multi-Service Muxponder is placed at a customer site.

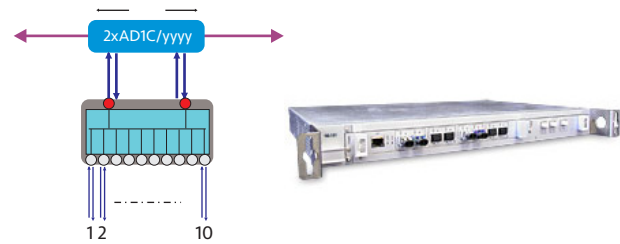


Fig. 2 1U collector node with 1+1 line protection

Low Power Design

A fully equipped 10G Multi-Service Muxponder consumes typically 35W. 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	STM-4/OC-12, STM-16/OC-48 Gigabit Ethernet 1G/2G/4G Fibre Channel Line signal from TPDDGBE, MS-MXP Actual supported formats given by traffic images. Contact Transmode for details.
Layer-1 performance monitoring	SDH/SONET: Based on B1 calculations Gigabit Ethernet: Based on CRC and coding errors SAN formats: Based on CRC and coding errors Line signal: Based on CRC Collected every 15min/24h and presented according to G.826 using ES, SES etc
Protection	1+1 Line protection. Non-revertive switching typically <20ms
Power consumption	Typically 35W including optics
Misc line interface features	Embedded management channels on line signals Trail Trace insertion to validate connection
Interfaces	Client interfaces: SFP-based. Supporting MM, SM @ 1310nm/1550nm, electrical SFPs etc Line interfaces: XFP 40km/70km CWDM (up to 8 channels) or DWDM (up to 40 channels via standard XFPs, 80 channels via tunable XFP)
Layer-2 features	GbE utilization PM (in %) per GbE port Inject and extract of mgmt-VLAN on all GbE ports

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.