DATA SHEET

XTM SERIES

10 Gb/s MULTI-SERVICE MUXPONDER

Effective Aggregation of Multiple Traffic Formats

The 10 Gb/s Multi-Service Muxponder (MS-MXP/10 Gb/s) is part of the Infinera XTM Series. Thanks to its multi-service characteristics, this traffic unit can be configured and used in multiple applications. Instead of using dedicated traffic units for a given service and application, the 10 gigabit per second (Gb/s) multi-service muxponder can be reconfigured to support different traffic formats as well as different functional behavior such as muxponder, transponder or regenerator.

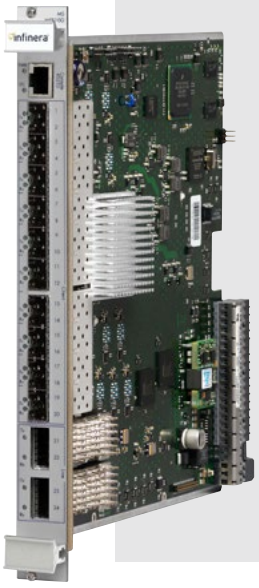
These flexible capabilities, in combination with pluggable optics, give the lowest total cost of ownership (TCO), in particular when using 10 gigabit small form-factor pluggables (XFP) with tunable lasers.

Optimized for Ethernet Backhaul Applications

The 10 Gb/s multi-service muxponder is a generic traffic unit for use in metro/regional networks for backhaul of traffic such as Ethernet and synchronous digital hierarchy (SDH)/synchronous optical network (SONET). For wholesale operators, it is important to be able to transport both SDH/SONET and Ethernet signal data as well as synchronization transparently. The latter is imperative for mobile backhauling of synchronous Ethernet signals, and the 10x synchronous Ethernet (SyncE) traffic image is a unique function in which 10 independent SyncE flows can be carried on the same wavelength.

The 10 Gb/s multi-service muxponder is a single-slot device for aggregation of up to 10 client signals onto a 10 Gb/s line signal.

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



Key benefits:

- Compact and cost-effective aggregation of up to 10 client signals to a 10 Gb/s line signal
- Individual sync- and data-transparent transport of SDH/SONET, Ethernet and Fibre Channel signals
- Dual line ports enabling protected configurations
- Technology agnostic. Pluggable transceivers enable usage in both coarse wavelength-division multiplexing (CWDM) and dense wavelength-division multiplexing (DWDM) networks
- Tunable optics for full flexibility and cost-efficient spares management
- Built-in forward error correction (FEC) enables usage in long-haul networks
- High flexibility and Layer 2 awareness via the Infinera Intelligent WDM (iWDM®) concept
- Low power design

The use of pluggable transceivers provides a high level of flexibility since the 10 Gb/s multi-service muxponder can be used in both CWDM and DWDM networks by selecting the appropriate type of XFPs. The support for DWDM XFPs with tunable lasers further enhances the flexibility and cost efficiency.

Both line ports provide FEC, which makes the 10 Gb/s multi-service muxponder also suitable for amplified long-haul networks.

Simplified Management via iWDM

The 10 Gb/s multi-service muxponder is based on the Infinera iWDM concept, in which the client signals are wrapped into a digital frame with overhead bytes that are used to carry the management channels as well as provide quality control of the transmission via performance data. The embedded management channel simplifies the management of an Infinera network since management access is provided wherever there is a traffic connection.

iWDM Layer 2 Awareness

Even though the 10 Gb/s multi-service muxponder is a Layer 1 device, it has built-in Layer 2 functions, such as the ability to measure to what extent each gigabit Ethernet (GbE) pipe 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 virtual local area network (VLAN) management channels on the GbE ports. This enables easy remote management of Infinera Layer 2 units via the native GbE signal.

Remote access to the packet-optical transport switch (EMXP) or ethernet demarcation unit (EDU) is easily provided via the management VLANs and thus provides an integrated solution for management of both Layer 1 and Layer 2 devices in the network.

Tailored Network Element Options

The 10 Gb/s multi-service muxponder can be mounted in any of the XTM Series chassis options;

- As a self-managed network element in a 1U TM-102/II 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/II option, the 10 Gb/s multi-service muxponder initiates the complete embedded node management (ENM) on the onboard microprocessor. 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 data communication network (DCN) network if the 10 Gb/s multi-service muxponder is placed at a customer site.

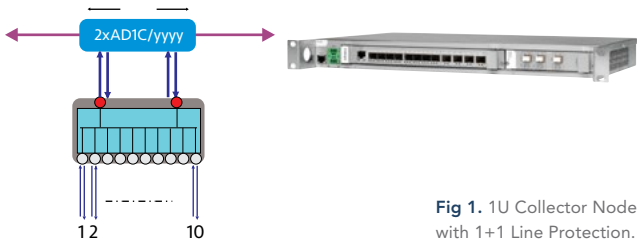


Fig 1. 1U Collector Node with 1+1 Line Protection.

Low Power Design

A fully equipped 10 Gb/s multi-service muxponder typically consumes 35 watts (W). 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	STM-4/OC-12, STM-16/OC-48 Gigabit Ethernet 1 Gb/s /2 Gb/s /4 Gb/s Fiber Channel Line signal from TPDDGBE, MS-MXP, TPQMS
Layer 1 Performance Monitoring	SDH/SONET: Based on B1 calculations Gigabit Ethernet: Based on CRC SAN formats: Based on CRC Line signal: Based on CRC Collected every 15 min/24 h and presented according to G.826 using ES, SES, etc.
Protection	1+1 line protection. Non-revertive switching typically <20 ms
Power Consumption	Typically 35 W including optics
Misc. Line Interface Features	Embedded management channels on line signals Trail trace insertion to validate connection
Released Traffic Combinations	4xGbE (SyncE) + 2xSTM-16/OC-48/TPDDGBE 4xSTM-16/OC-48/TPDDGBE 2x4 Gb/s iWDM or 1 Gb/s / 2 Gb/s / 4 Gb/s FC + 1xGbE(SyncE) + 2x4 Gb/s iWDM protection ports 10x GbE (SyncE) Note: GbE ports can be optical/electrical and also support electrical fast Ethernet Note: SyncE is always optical GbE Note: The 4 Gb/s iWDM protection port supports 1+1 line protection towards 4 Gb/s MS-MXP units Note: The 4 Gb/s iWDM ports support 4 Gb/s MS-MXP and TPQMS line signals
Interfaces	Client interfaces: SFP-based. Supporting MM, SM @ 1310 nm/1550 nm, CWDM/DWDM electrical SFPs, etc. Line interfaces: XFP 40 km/70 km CWDM (up to eight 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 management VLAN on GbE clients

Specifications and Features Are Subject to Change

Infinera