

XTM SERIES

QUAD 10G MULTI-SERVICE TRANSPONDER

Flexible and Versatile 10G Transport

The Quad 10G FEC Transponder (TPQ10GFEC/I) is part of the Infinera XTM Series, which is optimized for cost efficient transport in CWDM and DWDM networks.

This one-slot unit contains four individual transponder functions supporting transport of STM-64/OC-192, 10 GbE-WAN and 10 GbE-LAN signals. The client signal is mapped into a digital wrapper with forward error correction (FEC), which makes the transponders suitable for amplified long-haul networks.

Pluggable Transceivers Providing Great Flexibility

The use of XFP pluggable transceivers for network-facing interfaces provides a high level of flexibility since the transponders can be used in both CWDM and DWDM networks by selecting the appropriate type of XFP. The support for DWDM XFPs with tunable lasers further enhances the flexibility and cost efficiency of the unit.

The client interfaces use SFP+ transceivers, enabling the client connection to be adapted to type of interface (single mode [SM],

multi mode [MM], etc.) and the distance to the client equipment. The use of SFP+ transceivers provides a lower cost compared to XFP transceivers.

These flexible capabilities in combination with pluggable optics give the lowest total cost of ownership (TCO), in particular when using XFPs with tunable lasers.

Optimized for Backhaul Applications

The Quad 10G FEC transponder is a generic traffic unit in metro/regional networks for backhaul of Ethernet and SDH/SONET traffic. 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 multiple synchronous Ethernet signal to support wholesale services to multiple operators over the same infrastructure.



Key benefits:

- Compact and cost-effective transport of 10 Gb/s SDH/SONET and Ethernet signals
- Multiple resilience options
- Technology-agnostic. Pluggable transceivers enable use in CWDM as well as DWDM networks
- Built-in FEC enables use in long-haul networks
- High flexibility and Layer 2 awareness via the Infinera Intelligent WDM (iWDM®) concept
- Low power design ensures low total cost of ownership

Simplified Management via iWDM

The Quad 10G FEC Transponder is based on the Infinera iWDM concept in which the client signal is wrapped into a digital frame with overhead bytes used to carry the management channel and provide quality control of transmission via performance data. The embedded management channel simplifies the management of a Infinera network since management access is provided wherever there is a traffic connection.

Resilience Options

The Quad 10G FEC Transponder supports two basic resilience options: 1+1 line protection and client/equipment protection. The 1+1 line protection is provided by collapsing two transponder functions into a single transponder with sub-50 ms 1+1 line protection.

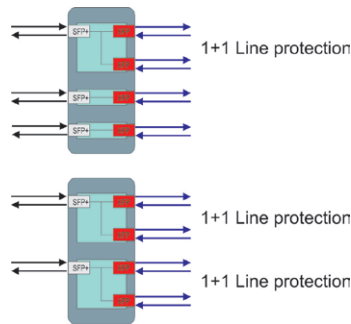


Fig 1. Flexible 1+1 Line Protection Configuration.

Equipment/client protection is provided via an optical coupler. The two transponder functions, typically located on two separate boards, can be placed in the same chassis or in separate chassis. The latter is done by adding a protection control unit (PCU/2) that provides the required fast signaling between the transponder functions.

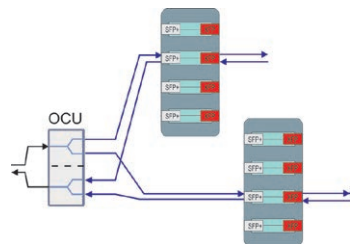


Fig 2. Equipment Protection.

For meshed networks where multiple protection paths are required, a combined client/line protection configuration can be used to provide up to four paths through the network. In this configuration, up to three stand-by paths can be established, i.e. 1+3 line protection.

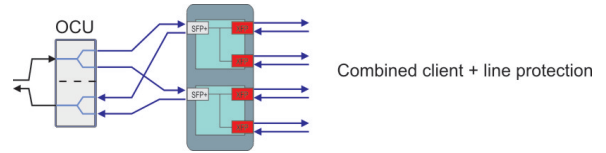


Fig 3. Multi-path Protection.

The Quad 10G FEC Transponder supports optional revertive switching for client/equipment protection configurations.

iWDM Layer 2 Awareness

Even though the Quad 10G FEC Transponder unit is a Layer 1 device, it has inbuilt Layer 2 functions, such as the ability to inject and extract VLAN management channels on the client ports for 10 GbE-LAN signals. This enables easy remote management of Infinera Layer 2 units via the native Ethernet signal.

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

Furthermore, the Quad 10G FEC Transponder has the ability to enable network managers to view the Layer 2 utilization level of the 10G Ethernet streams on a per-port basis shown as a percentage of maximum throughput.

Cascaded Networks

The Quad 10G FEC Transponder unit can be reconfigured into a dual regenerator function. In this configuration only the XFP ports are used. This regenerator function can also be used to regenerate the line signal from the 10G Multi-Service Muxponder (MS-MXP/10G) or the 9xGbE/10G FEC Muxponder (GBE9/MXP10GFEC).

Tailored Network Element Options

The Quad 10G FEC Transponder unit can be mounted in either the TM-3000 (10U), TM-3000/II (11U) or TM-301 (3U) chassis.

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

Low Power Design

A fully equipped Quad FEC 10G Transponder consumes less than 50W. 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-64/OC-192, 10 GbE-WAN, 10 GbE-LAN
Basic Configurations	4x transponder unit or 2x regenerator unit
Layer 1 Performance Monitoring	SDH/SONET: based on B1 calculations Ethernet: CRC bytes and PCS statistics 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/revertive switching typically <20 ms Equipment protection. Non-revertive/revertive switching typically <20 ms Combined equipment/line protection (1+3 line protection)
Power Consumption	Max 50 W worst case (with all client ports active and using DWDM SFPs)
Misc Line Interface Features	Embedded management channels on line signals Trail trace insertion to validate connection
Interfaces	Client interfaces: SFP+-based. Supporting MM, SM, 1310 nm/1550 nm, CWDM and DWDM. Including "SingleStrand" transceivers enabling direct operation on a single-fiber configuration without need for a DWDM filter Line interfaces: 40 ch DWDM via XFP with fixed wavelength, 80 ch via XFP with tunable laser, 8 ch CWDM
Layer 2 Features	Ethernet utilization PM (in %) per 10 GbE-LAN port Inject and extract of mgmt-VLAN on 10 GbE-LAN clients
Synchronization	Through-timing Supports SyncE transport (G.8262/Y.1362 option 1)

Specifications and Features Are Subject to Change

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