

## XTM SERIES

## HEX MULTI-RATE 16G LITE TRANSPONDER

## High Density Multi-service Transport

The **HEX Multi-Rate 16G Lite Transponder (TPMRHEX-L/16G)** is part of the Infinera XTM Series. The TPMRHEX-L/16G is a one-slot unit providing six independent transponder functions. This enables the unit to provide extremely dense and energy-efficient 40/80-channel networking solutions.

The TPMRHEX-L/16G is characterized by high density, low latency and low power capabilities as well as multi-rate support. These are advantages that make the TPMRHEX-L/16G specifically suitable for applications such as data center/SAN interconnects and mobile backhaul/fronthaul. The unit is also useful in generic applications, providing cost-efficient 10 Gb/s transport.

## Multi-Rate Support for Multiple Services

The TPMRHEX-L/16G's interfaces support both SFP and SFP+ transceivers, which provide an extremely wide range of supported signal formats.

This entails "grey" CWDM and DWDM transceivers as well as "single-strand" transceivers that enable direct operation on single-fiber configurations without the need for a DWDM filter.

## Six Independent Transponder Functions in Only One Slot

Each transponder function performs "3R" regeneration (re-amplify, re-shape, re-time) regardless of traffic format.

The transparent 3R functionality enables the TPMRHEX-L/16G to be used as a transponder or a regenerator for any signal format.

Regeneration of forward error correction (FEC) coded signals, such as OTU2, can be done without affecting the performance of the link since the endpoints' FEC coding is sufficient.

Each transponder supports near-end as well as far-end loopback configurations for fault-finding purposes.



## Key benefits:

- Optimized for data center/SAN interconnects and mobile fronthaul thanks to broad support for services such as Fibre Channel (FC), 10 GbE and Common Public Radio Interface (CPRI)/Open Base Station Architecture Initiative (OBSAI)
- Unprecedented high density capabilities with six transponder functions on a one-slot unit, saving valuable rack space
- Wide range of supported traffic formats using SFP and SFP+ transceivers (614 Mb/s – 14 Gb/s)
- Technology-agnostic. Pluggable transceivers enable usage in CWDM as well as DWDM networks
- Low latency, making this unit ideal in data center and mobile fronthaul applications
- Low power consumption, reducing the total cost of ownership

### Management Interconnect without Local DCN Access

A patent pending out-of-band management channel solution enables management interconnect, signaling and software download without the need for local data communication network (DCN) access. This provides a smooth solution to management interconnect as no digital wrapper-based dedicated management channel exists.

### Client/Equipment Protection

Two transponder functions can be connected via an optical coupler into a client/equipment protection configuration. There are three options for this protection mechanism: a) between two transponder functions located on the same unit, b) between two transponders located on two different units within the same card cage, or c) between units located in separate chassis via the protection control unit (PCU/2P).

### Unidirectional Traffic Mode

The TPMRHEX-L/16G has an unusual, but very useful, operational mode where each bidirectional transponder function can be used for two unidirectional transponder functions instead.

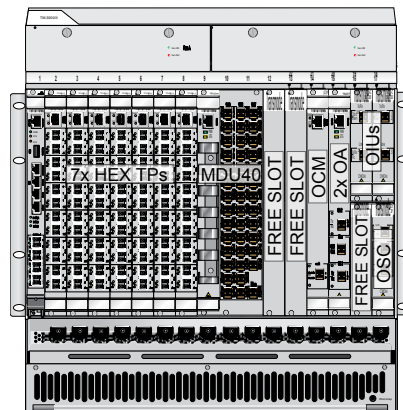
When used in the unidirectional mode, the TPMRHEX-L/16G supports up to 12 unidirectional transponder functions. This capability is particularly useful when transporting the digital return traffic between the hybrid fiber coax (HFC) node and the secondary hub in HFC access networks or in other applications that require unidirectional transport.

### Ideal in Mobile Fronthaul Applications

The TPMRHEX-L/16G supports all CPRIv6.1 and OBSAI rates from 614 Mb/s up to 12.165 Gb/s with the lowest possible latency. This makes the TPMRHEX-L/16G ideal in mobile fronthaul applications.

### High-density Multi-service Application Example

A complete 40-channel multi-service system can be configured within a single TM-3000/II or TM-3000 chassis, as shown in the figure on next page.

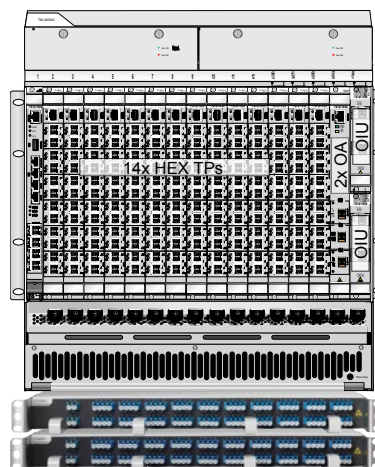


**Fig 1.** A High-density and Complete 40-channel System within a Single TM-3000/II Chassis.

The configuration includes optical interleavers to enable hitless expansion to 80 channels. Automatic power balancing is provided via an optical control loop between the optical channel monitoring unit (OCM/2P) and the variable optical attenuator (VOA) functions within the 40-channel mux/demux unit (MDU). This configuration also includes pre-amplifier and booster amplifier as well as optical supervisory channels. The chassis configuration shows that there are still unused slots in the chassis. The total card cage power consumption for this configuration is about 300 W.

### High-density Data Center Interconnect Example

For one-hop applications where automatic power balancing is not needed, an even denser configuration can be achieved by using the 40-channel MDUs units from the XTG Series. These filters are then mounted in the rack while the active transponder and amplifier units (if required) are located in the chassis. All 80 transponder functions fit into a single chassis with about 450 W card cage power consumption.



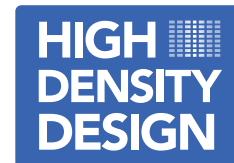
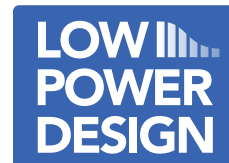
**Fig 2.** A High-density 80-channel System Ideal in Datacenter Interconnect Applications, Combining Both XTM Series and XTG Series.

## Doubling the CWDM Capacity

The TPMRHEX-L/16G supports high-density CWDM transceivers that double the number of wavelength channels in a conventional CWDM network. As an example, a network with an 8-channel CWDM MDU can carry up to 16 high-density CWDM channels with these high-density transceivers.

## Low Power Consumption

A TPMRHEX-L/16G fully equipped with SFP+ transceivers in all ports consumes less than 30 W. Low power consumption in combination with high density reduces site costs and enables more capacity to be handled at sites with restrictions on power consumption, cooling and space.



### Specifications

Supported Traffic Formats	Ethernet	1 GbE, 10 GbE-LAN and 10 GbE-WAN
	SDN/SONET	STM-4/OC-12, STM-16/OC-48, STM-64/OC-192
	OTN	OTU2, OTU2e
	SAN	1G, 2G, 4G, 8G, 10G and 16G FC
	CPRI/OBSAI	0.6144, 1.2288, 2.4576, 3.072, 4.9152, 6.144, 8.110, 9.830, 10.1376, 12.165 Gb/s
	iWDM®	iWDM 10G-FEC, iWDM 10G, iWDM 4G, iWDM 2.5G
Layer-1 Performance Monitoring	Simplified G.826 emulated via loss of optical signal, loss of sync etc.	
Protection	Client/equipment protection	
Power Consumption	Max 30 W worst case (with all interfaces active and using DWDM transceivers)	
Latency	<4 ns	
Misc Features	Out-of-band management channels Far-end and near-end line/client loopback Unidirectional mode (up to 12 transponder functions per unit)	

Specifications and Features Are Subject to Change