

PTN10G Interface Card

Applicable to O9400R-PTN Chassis Only



Description

The PTN10G interface card supports both MPLS-TP and Carrier Ethernet functions as Packet Transport Network. In addition to the native Ethernet transport, this PTN10G card can be used as the gateway of PDH/SDH/SONET into the PSN network using circuit emulation technologies.

The TDM encapsulation technologies supported are TDMoE, TDMoIP, and TDMoMPLS. In parallel, the Circuit Emulation supported are CESoPSN (Nx64K), SAToP (Unframed E1/T1), and CEP (SDH/SONET Circuit Emulation over Packet) for one STM-16/OC-48 worth TDM traffic groomed from all TDM interfaces, including E1/T1, STM-n/OC-n and DS3 (M13).

One PTN10G card with up to 100G packet switching capacity supports three 10GbE SFP+ interfaces and eight 1GbE SFP interfaces. All the interfaces are field configurable as NNI/UNI port.

The PTN10G card is hot-swappable and fully redundant to provide high availability and reliability, required by Carrier, Power Utility, Military, Government and Transportation applications.

With O9400R-PTN as a gateway between SDH/SONET and PTN, existing SDH/SONET network user will be able to migrate from SDH/SONET/PDH to PTN network, smoothly and seamlessly.

Features

System capacity

- Up to 3 x 10GE/1GE SFP+ ports
- Up to 8 x GE SFP
- 100G Packet Switching capacity per card
- L2 switching and MPLS switching (Per port setting)
- 1008 x VC12/1344 x VC11 termination to E1/T1
- 1008 x E1/1344 x DS1 SAToP/CES PWE3
- 1008/1344 x PWs for VC12/VC11 CEP (1 x STM-16 worth)
- Dual 2.5G backplane SDH Bus to dual XCUs for protection

MPLS-TP

- MPLS Transport Profile per RFC-5921
- Any Ethernet port can be configured

Ethernet Services

- E-Line, E-LAN, E-Tree services as defined by MEF 9 and 14 and using VPWS/VPLS
- Native Ethernet packets supported
- Encapsulation: PW/LSP (MPLS-TP), VLAN tagging (1Q), VLAN double tagging (Q-in-Q)

VPLS

- VPLS bridging
- H-VPLS bridging
- 32K MAC addresses
- 2K VPLS instances per device
- Split horizon to prevent forwarding loops

Network Protections

- MPLS-TP
 - MPLS LSP 1+1/1:1
 - Dual-homing PW Protection
 - LSP E2E protection switching within sub 50ms
- CE

- asNNI (MPLS port) or UNI (Ethernet service port)
- Static MPLS LSP label provisioning via NMS
- Pseudo Wire (PW) to support
 - Ethernet Pseudo Wire(VPWS, VPLS, H-VPLS)
 - PDH Pseudo Wire End-2-End Emulation (SATO MPLS, CESoMPLS)
 - SDH Pseudo Wire End-2-End Emulation (SATO MPLS, CEP)
- MPLS-TP OAM
 - Section/LSP/PW TP-OAM using BFD (Per IEEE 8113.2)
- MPLS-TP QoS
 - 64K Granularity Rate Limit Per Flow
 - Ingress/Egress TC/EXP Class Mapping
 - TC/EXP Priority-based Queuing (8 Queues)
 - Tunnel Traffic Engineering CIR/PIR and CBS/PBS Policing/Shaping
 - PW Traffic Engineering CIR/PIR and CBS/PBS Policing/Shaping
 - WRED
 - Strictly Priority / WRR

Carrier Ethernet (CE)

- L2 Switching/Bridging
- RSTP/MSTP (IEEE 802.1w/1s)
- VLAN 1Q 802.1q/ Q in Q8 802.1ad
- VLAN Operation: Stack/Switch/Strip
- Link Aggregation (802.3ad): Static/LACP
- CE OAM
 - Ethernet Service OAM (802.1ag/Y1731)
 - Ethernet Link OAM (802.3ah)
- CE QoS
 - 64K Granularity Rate Limit Per Flow
 - Ingress/Egress CoS Class Mapping
 - CoS Priority-based Queuing (8 Queues)
 - CIR/PIR and CBS/PBS Policing/Shaping (2R/3C)
 - Hierarchical QoS
 - WRED
 - Strictly Priority/WRR

CoS/QoS

- 8 Priority Queues
- Scheduling: Strict Priority, WRR with Hierarchy
- Ingress Policing & Egress Shaping per service
- CIR / PIR (EIR) 2-rate-3-color
- MPLS: TC/EXP-Inferred-PSC (Per Hop Behavior Scheduling Class) LSP

- ERPS Ring (G.8032) Protection
- ELPS (G.8031) Linear Protection
- SDH
 - STM-n MSP 1+1 Protection
- SONET
 - OC-n Line 1+1 Protection

PWE3 over MPLS

- Ethernet Services
 - Ethernet Port based and VLAN based services
 - VPWS, VPLS, H-VPLS services as defined by the MEF 9 and 14
 - Encapsulation: PW over MPLS-TP
- PDH Services
 - E1/T1 Circuit Emulation per SAToP (IETF-PW3)
 - FE1/FT1 per CESoMPLS
 - Timing Recovery : ACR/DCR/System Clock selection per port
- SDH Services
 - Channelized STM-n (to Fractional E1) CES PW over MPLS
 - Channelized STM-n (to E1) SAToP PW over MPLS
 - SDH VC3/VC4 Circuit Emulation over Packet (CEP), per RFC 4842
- SONET Services
 - Channelized OC-n (to Fractional T1) CES PW over MPLS
 - Channelized OC-n (to T1) SAToP PW over MPLS
 - SONET STS Circuit Emulation over Packet (CEP), per RFC 4842

PWE3 over CE

- Ethernet Services
 - Ethernet Port based and VLAN based services
 - EPL, EVPL, ELan, EVPLan, ETree services as defined by the MEF 9/14
 - Encapsulation: VLAN 802.1Q/802.1ad Q in Q
- PDH Services (per IETF-PW3)
 - E1/T1 Circuit Emulation SAToP PW over Ethernet/IP
 - FE1/FT1 Circuit Emulation CES PW over Ethernet/IP
 - Timing Recovery: ACR/DCR/System
- SDH Services
 - Channelized STM-n (to Fractional E1) CES PW over Ethernet/IP
 - Channelized STM-n (to E1) SAToP PW over Ethernet/IP
 - SDH VC3/VC4 Circuit Emulation over Packet (CEP) over Ethernet/IP
- SONET Services
 - Channelized OC-n (to Fractional T1) CES PW over Ethernet/IP
 - Channelized OC-n (to T1) SAToP PW over Ethernet/IP
 - SONET STS Circuit Emulation over Packet

Clock Synchronization

(CEP) PW over Ethernet/IP

- IEEE 1588 v2 PTP
 - Clock modes:
Ordinary/Boundary/Transparent clock
 - ToD (Time of Day)
 - PPS (Pulse per Second) output interface
- SyncE
 - Synchronous Ethernet from all GE ports
 - Ethernet SMC per ITU-T (Ethernet Synchronous Message Channel)
- TDM Clocks
 - External Clock input and output (2Mbps/2MHz)
 - SDH/PDH Line Clocks
 - Stratum 3 Timing

Ordering Information

To specify options, choose from the list below:

Note: RoHS compliant units are identified by the letter **G** appearing immediately at the end of the ordering code.

Model (RoHS compliant)	Description	Notes
Loop-O9400-R-PTN10G- G	MPLS-TP plug-in module with 3 x 10G/1G SFP+ ports and 8 x GE SFP ports, without SFP (mini-GBIC) optical modules	Please order SFP optical modules separately from SFP optical modules brochure
Loop-O9400-R-PTNEXT- G *	MPLS-TP plug-in module with 1 x 10GbE or 9 x GbE SFP ports, without SFP (mini-GBIC) optical modules	Use with Loop-O9400-R-PTN-CCPA- G controller module only Use with Loop-O9400-R-PTN-CHPA- G chassis only.

* Future Option

Accessories**User's Manual**

Loop-O9400-R-PTN10G-UM User's Manual (paper copy).
Note: A CD version of the manual is already included as standard package.

SFP Optical Modules

Please place your order using the 5-digit alphanumeric codes listed in the separate SFP Optical Module Brochure.

Note: Non-Loop SFP modules are not guaranteed to work with our equipments. It is strongly recommended to buy Loop-**logo** SFP modules.

PTN10G Card Specifications

SFP Module Characteristics(Please refer to SFP optical module brochure for detail)

GE Interface

Number of Ports 8
Connector SFP

10G Interface

Number of Ports 3
Connector SFP+

QoS

Eight priority queues

Scheduling – Strict Priority, Weighted Round Robin with hierarchy

Ingress policing per service

Egress shaping per service

CIR / PIR (EIR) Two-rate, three-color. (committed information rate, peak or expected information rate)

E-LSP: EXP-Inferred PSC (Per Hop Behavior Scheduling Class) LSP. (label switching path)

WRED for congestion management. (weighted random early detection)

Standards Compliance

IEEE

802.1ad Tag Stacking (Q-in-Q)
802.3ag Ethernet OAM
802.3ah Ethernet in the First Mile
1588 v2 Precision Time Protocol

RFC (IETF)

2131 & 2132 DHCP
6378 MPLS-TP Linear Protection

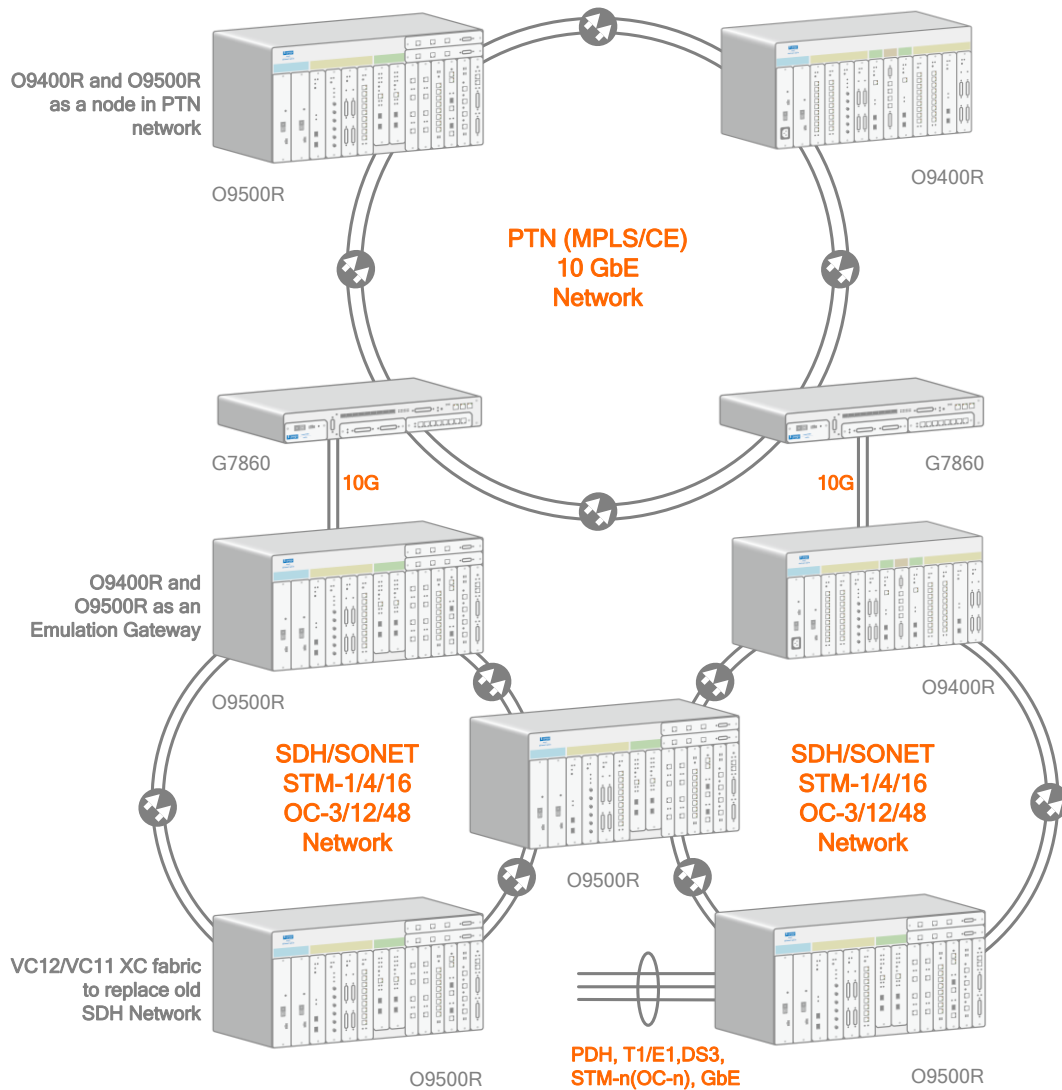
ITU

G.8113.2 MPLS-TP OAM G.8031 ELPS
Y.1731 Ethernet OAM G.8032 ERPS

Certification

EMC/EMI FCC15 Class A, EN55022 Class A, EN55024
Safety EN60950-1

Application Illustrations



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