



PTN10G/PTNext Interface Cards

FOR HX9400R CHPA CHASSIS WITH CCPA CONTROLLER

Description

The PTN10G interface card supports both MPLS-TP and Carrier Ethernet functions as Packet Transport Network. In addition to the native Ethernet transport, PTN10G 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).

The PTN10G card with up to 100G packet switching capacity supports three 10GbE SFP+ interfaces and eight 1GbE SFP interfaces. Each interface can be configured as an NNI/UNI port.

In delivering PTN services, two PTN10G cards, coupled with two PTNext cards, equip a CXR-HX9400 unit with a channel capacity of up to 96G.

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 HX9400R-CHPA 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.

PTN10G provides high availability and reliability of communication systems required in network hauling, power utilities, military and governmental network deployments, and transportation applications. Service continuity and performance can also be monitored via QoS, OAM, and multiple protection schemes. Topology, cross-connection, and management of a large scale PSN can also be achieved remotely via CXR-iNMS and CXR-iNET.



PTN10G

PTNext

Features

System capacity

- Up to 3 x 10GE/1GE SFP+ ports in PTN10G
- Up to 8 x GE SFP in PTN10G
- Up to 10 GE SFP in PTNext
- One 10GE/1G SFP+ port in PTNext
- 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 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 (SAToMPLS,CESoMPLS)
 - SDH Pseudo Wire End-2-End Emulation (SAToMPLS, 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

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)*



L3 Routing

- VRF without multicast protocols
- ARP, Ping, Trace route
- VRRP
- Static Route
- RIP v1/v2
- OSPF v2/v3
- Routing among Physical Ethernet ports, VLAN virtual port (VLAN routing), and PW ports.
- 32 Subinterfaces
- IGMP v2/v3
- PIM-SM
- NTP server/client

VPLS

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

Network Protections

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

Clock Synchronization

- 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

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

PWE3 Services

- Ethernet over CE*
 - Port-based and VLAN-based services
 - EPL, EVPL, EPLAN, EVPLAN, E-Tree services as defined by the MEF 9&14
 - Encapsulation: VLAN 802.1Q/802.1ad Q in Q
- Ethernet over MPLS
 - 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/SDH/SONET over MPLS/CE/IP
 - Fractional E1/T1 (64K timeslots): CES PW
 - Unframed E1/T1: SAToP PW
 - VCn/TU-n/VT-n/STS-n: CEP
 - PDH Clock Recovery : ACR/DCR/System Clock per PW configurable

* Future Option



PTN10G Card specifications**Compatibility**

XCU	CCPA
Chassis	CHPAa
Max	2 PTN10G cards per chassis

GE Interface

Number of ports	PTN10G: 8 PTNext (operable only with PTN10G): 10
Connector	SFP Electrical SFP: 10/100/1000Base-Tx Auto-Sensing (cannot configure to specific rate) Optical SFP: 1000Mbps, SFP type dependent

10G Interface

Number of ports	PTN10G: 3 PTNext (operable only with PTN10G): 1
Connector	SFP+

SDH/SONET

Number of ports	1 x STM-16/OC-48
Connector	Backplane to XCU

Circuit Emulation

SAToP	Unframed E1/T1 packets Fractional
CESoPSN	E1/T1 (N x DS0) packets
CEP	SDH/SONET path packets

Encapsulation

TDM	over MPLS, over Carrier Ethernet, over IP (using pseudowire)
IP	over MPLS (using pseudowire)
Ethernet	VPWS, VPLS (using pseudowire)

QoS

Eight priority queues per port
 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)



Standard Compliance**IEEE**

802.1d	STP
802.1w	RSTP
802.1s	MSTP
802.1q	VLAN
802.1ad	VLAN Tag Stacking (Q-in-Q)
802.1ag	Ethernet OAM (CFM)
802.3ah	Ethernet in the First Mile (EFM)
1588 v2	Precision Time Protocol (PTP)

RFC (IETF)

2131 & 2132	DHCP
6378	MPLS-TP Linear Protection
1058	RIPv1
1389	RIPv2
2328	OSPFv2
5340	OSPFv3
4842	Circuit Emulation over Packet (CEP)
3985	Pseudowire End-to-end Emulation (PWE3)

ITU-T

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

EMC/EMI

FCC15 Class A
EN55022 Class A
EN55024

Safety

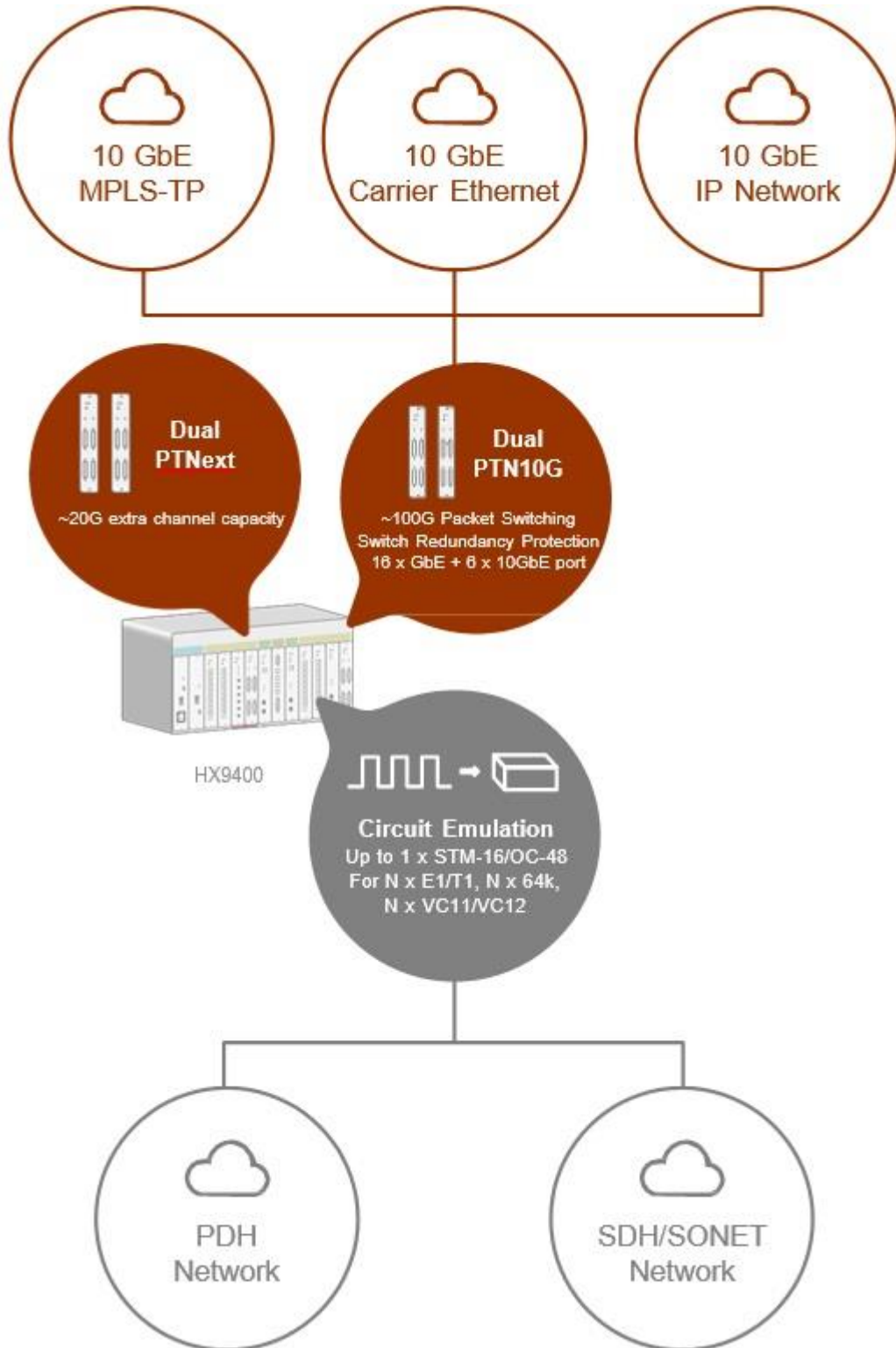
EN60950-1

Physical and Environmental

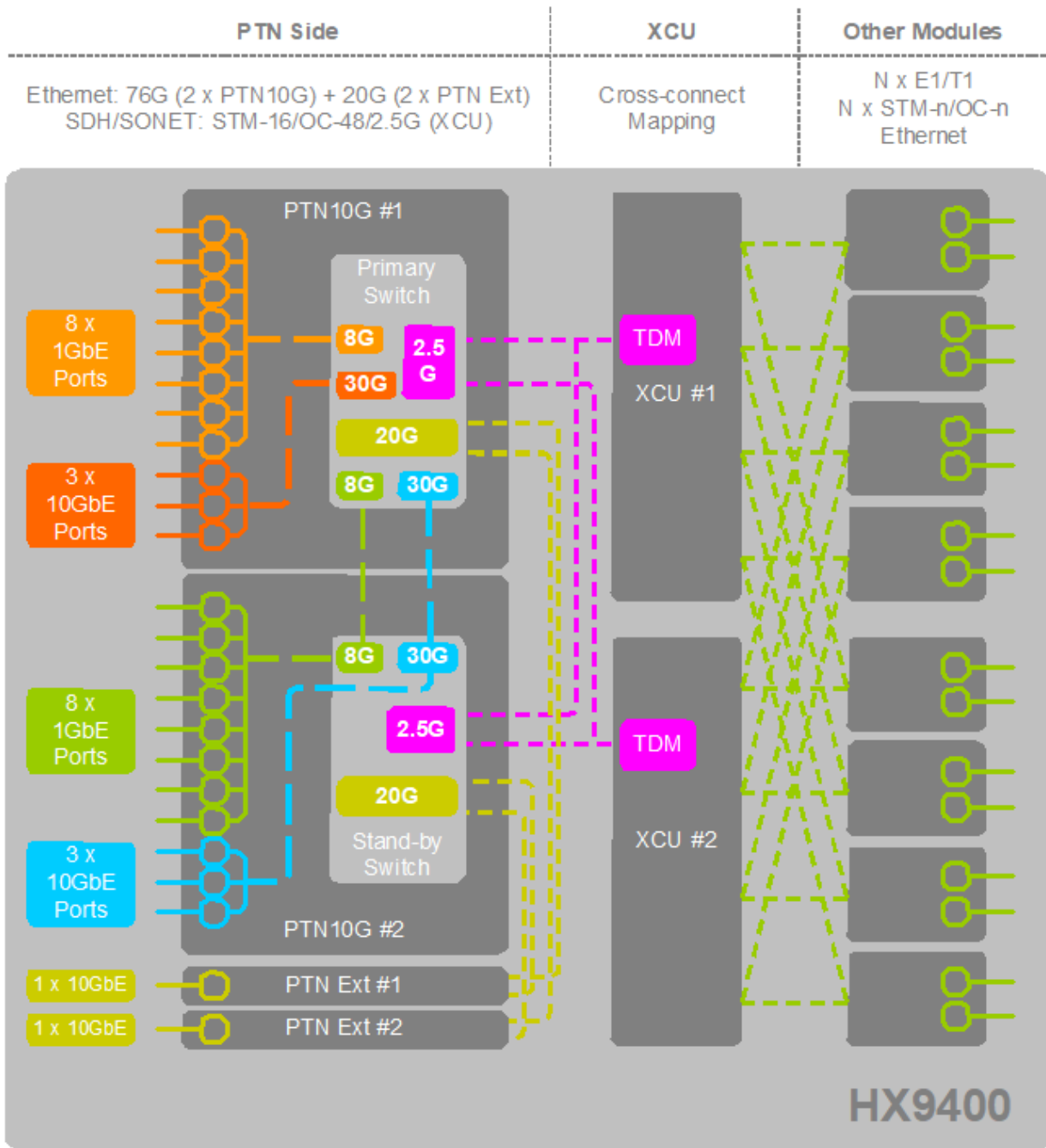
Temperature -20°C to +65 °C, chassis fan must be present at rugged temperatures.

Applications Illustrations

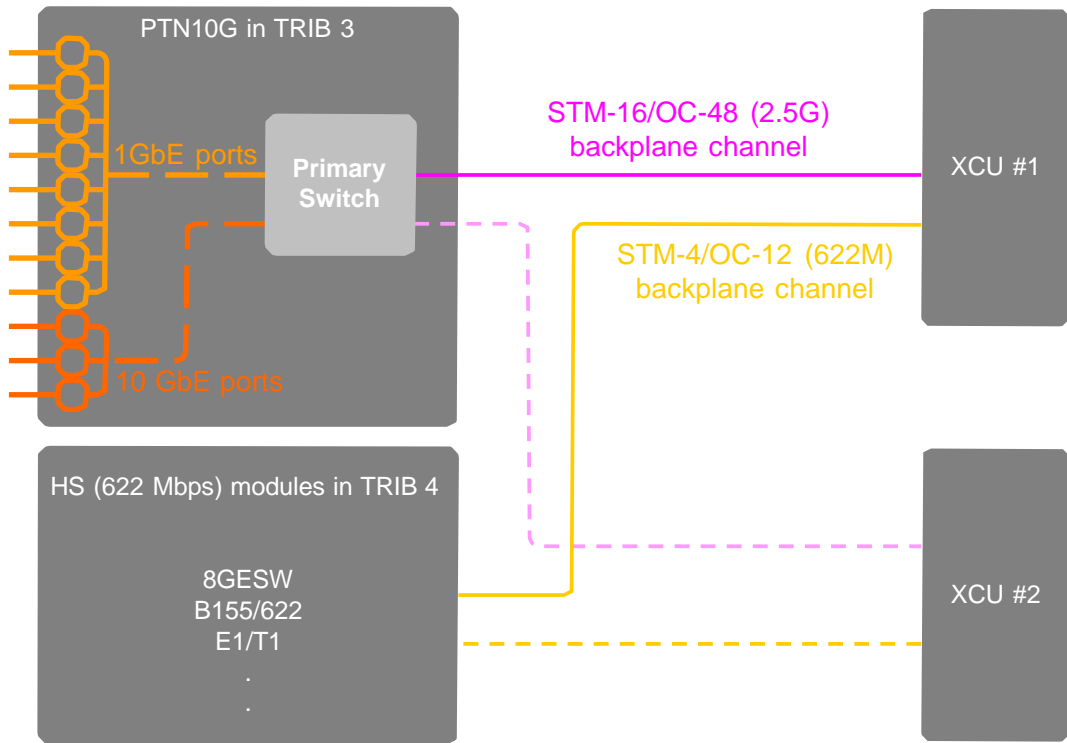
Transcend from PDH and SDH/SONET to 10G



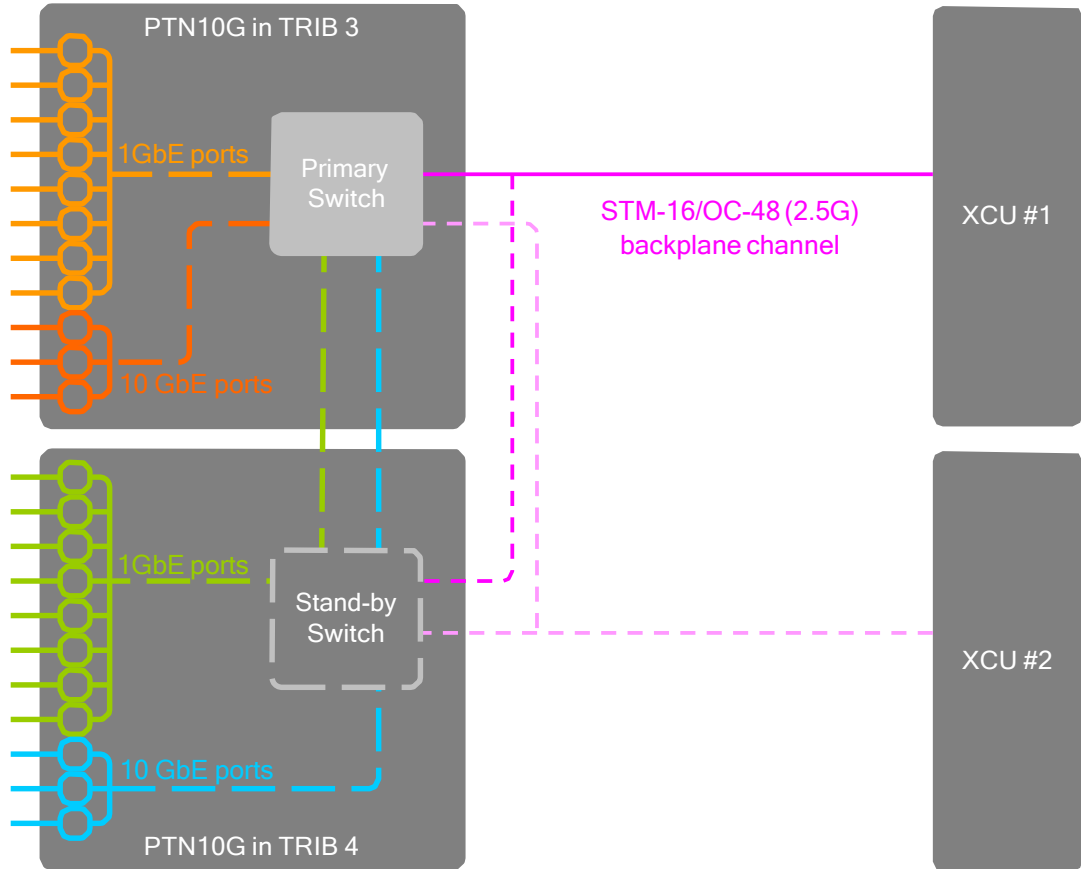
Connectivity and capacity



One PTN10G card per Chassis



Two PTN10G cards per Chassis



Ordering Information

Note 1: Before purchasing, please check the HX9500R main brochure to see if the following models are supported by the controller to be used with.

Models

Ordering Code	Description	Notes
CXR-HX9400-R-PTN10G	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. Compatible with CXR-HX9400-R-CCPA controller module and CXR-HX9400-R-CHPA chassis only. PTNext only operates with PTN10G
CXR-HX9400-R-PTNEXT	MPLS-TP plug-in module with 1 x 10GbE or 10 x GbE SFP ports, without SFP (mini-GBIC) optical modules	

Accessories

User's Manual	
CXR-HX9400-R-PTN10G-UM	User's Manual (paper copy). Note: A CD version of the manual is already included as standard package.
SFP Optical Modules	
Non-CXR SFP modules are not guaranteed to work with our equipment. It is strongly recommended that CXR branded SFP modules be concurrently used.	