



## Features

- 6U height, full front access (ETSI) shelf
- SDH/SONET VCn/VTn Cross-Connect Capacity: 14Gbps bidirectional non-blocking
- PTN (CE and MPLS-TP) Switching Capacity: 100Gbps bidirectional non-blocking
- Aggregate cross-connect modules (controller modules)
  - Up to STM-1/4/16 (OC-3/12/48) aggregate lines with software configuration
- Hot-swappable cross-connect modules, tributary modules and power modules.
- Tributary Modules
  - High-Speed (High Density) access tributary modules (HS)
  - Low-Speed access tributary modules (LS)
- Power Modules
  - DC Module (-48/-125\* Vdc)
  - Dual Power (1+1) Protection
- Protection Scheme
  - Controller cross-connect unit (CCPA) protection, MSP (1+1), SNCP/UPSR Ring
  - Tributary protection
    - E1/T1: Card/Port (1:1) using Y-box, Line (1+1)
    - E3/T3: Line (1+1)
    - B155/622: MSP, SNCP/UPSR
    - Ethernet
    - FOM: Line (1+1)
    - 4GEOsDH: Card
    - PTN Swtich Fabric 1:1 \*
  - Network Protection
    - MSP 1+1
    - SNCP/UPSR
    - Ethernet Ring Protection (ERPS G.8032)
    - Link Aggregation (Inter and Intra board)
    - LSP Linear Protection (1+1/1:1)\* sub 50ms
- External/Internal/Line timing source with SSM
  - SyncE\*
  - IEEE 1588\*
  - TDM clocks
- Ethernet over SDH/SONET supports GFP, LAPS, VCAT, LCAS and non-LCAS
- Alarm suppression, masking and reports
- Management
  - Console port, VT100 menu-driven
  - SNMP Port
  - Telnet and SSH
  - Centralized management with Loop's EMS/NMS over DCC channel
  - Loop-iNET GUI EMS
  - Loop-iNMS with full FCAPS and end-to-end circuit management and diagnosis
- RoHS compliant

## Description

The Loop-O9500R-PTN IMAP-PTN (Integrated Multi-Services Access Platform) is an economical integrated solution supporting PDH/SDH/SONET/PTN simultaneously on the same platform. It's designed to support the DS0 access and PDH interfaces to be freely carried over SDH/SONET or/and PTN (MPLS/CE) uplink.

SDH/SONET uplink is capable of supporting either STM-1/4/16 or OC-3/12/48. While the access is provided through either a non-blocking VCn/VTn cross-connect with HS tributary modules or through an additional non-blocking DS0 cross-connect fabric with LS tributary modules.

With the PTN10G\* interface card, the O9500R-PTN will be able to further transport PDH/SDH/SONET over PSN network. With O9500R-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.

With up to 4 STM-1/4/16 (OC-3/12/48) aggregate interfaces on cross-connect modules and 8 STM-1 (OC-3) interfaces on tributaries, the Loop-O9500R-PTN offers service providers a versatile protection schemes including SNCP(UPSR) and MSP(1+1) protection for both ring and linear network topologies. The O9500R-PTN can work with the Loop-O9100 and Loop-O9400 for SDH/SONET networking.

The non-blocking VC11/VC12/VC3/VC4 (VT1.5/VT2/STS-1/STS-3) cross-connect capability on High Speed (HS) is up to 20 VC4. The HS tributary modules include optical STM-1/4 (OC-3/12), E3/T3, E1/T1 interfaces, FOM and Fast Ethernet/Gigabit Ethernet over STM-1/4/16 (OC-3/12/48). Ethernet signals are mapped onto STM payload through standard techniques such as GFP, LAPS, VCAT, LCAS, and non-LCAS. These HS modules are identical to those used in the rack version of the Loop-O9400.

The uplink non-blocking DS0 cross-connect to HS is up to 21 E1 or 28 T1. The non-blocking DS0 cross-connect capability on Low Speed (LS) is up to 768 DS0. Through a full non-blocking DS0 cross-connect and together can act as a mini DACS. The modules include variety of TDM, IP, and voice interfaces detailed on next page. All LS modules are identical to those used in rack version of the Loop-AM3440.

All interfaces are fully compliant with the relevant ETSI standards and ITU recommendations. The O9500R-PTN provides full Operation, Administration, Maintenance and Provisioning (OAM&P) functionality. Users can easily operate the O9500R-PTN locally or remotely for centralized management with Loop-iNET (EMS) and Loop-iNMS (Integrated NMS).

\* Future Option

Table 1: Loop-O9500R-PTN Tributary Modules

Tributary Type	Plug-in Card Name	Description	Maximum System Capacity
High-Speed (High Density) Access Tributary Modules (HS)	PTN10G*	MPLS-TP plug-in module	3 x 10GbE + 8 x 1GbE
	B16	STM-4 (OC-12)/ STM-1 (OC-3) tributaries	2 STM-4 MSP 1+1 or 1 STM-4 Sub-ring SNCP or 2 STM-4 without protection 4 STM-1 MSP 1+1 or 4 STM-1 Sub-ring SNCP or 8 STM-1 without protection
	63TE	63 port E1/T1 tributaries	252 E1/T1 without protection, or 126 E1/T1 with 1+1 card protection
	32TE	32 port E1/T1 tributaries	
	16TE	16 port E1/T1 tributaries	
	63E75	63 E1(75 ohm) plug-in card	
	32E75	32 E1(75 ohm) plug-in card	
	16E75	16 E1(75 ohm) plug-in card	
	3TE3	3 port E3/T3 tributaries	12 E3/T3 without protection, or 6 E3/T3 with 1+1 card protection
	3TE3M13	3 T3 or 3 E3 software programmable interface plug-in modules with M13 /Mx3 function for T3 interface only	
	B2G5	STM-16/OC-48 software configurable interface plug-in module without SFP (mini-GBIC) optical modules	1 B2G5 without protection, or 1 B2G5 with 1+1 card protection
	9EoS4NSW 9EoS4SW	8FE+1GbE EoS card with/ without built-in L2 switch	32 FE + 4GbE
	4GESW	4GbE EoS card with L2 switch	8 GbE
	7FOM	7 port FOM tributaries	28 FOM without protection, or 14 FOM with protection
Low-Speed Access Tributary Modules (LS)	<b>Low Speed Single-Slot Cards</b>		
	RTB	8-port Bridge/Router	48-port Bridge/Router
	4E1/4T1	4-channel E1/T1	24-channel E1/T1
	3E1/3T1*	3-channel E1/T1	18-channel E1/T1 (DS0 SNCP Protection)
	2GH	2-channel G.SHDSL (2 pairs) without line power	12-channel G.SHDSL (2 pairs) without line power
	4GH	4-channel G.SHDSL (1 pairs) without line power	24-channel G.SHDSL (1 pairs) without line power
	8CD	8-channel G.703 card at 64 Kbps data rate	48-channel G.703 card at 64 Kbps data rate
	1C37 4C37	1 or 4 channel C37.94 (low speed optical)	6 or 24 channel
	8RS232	8-channel RS232/V.24	48-channel RS232/V.24
	8DC	8-channel Dry Contact I/O	48-channel Dry Contact I/O
	8DCB	8-channel Dry Contact I/O type B	48-channel Dry Contact I/O type B
	8EMA	8-channel 2W/4W E&M	48-channel 2W/4W E&M
	12FXS	12-channel FXS	72-channel FXS
	12FXO	12-channel FXO	72-channel FXO
	CONF	Conference card	Conference card
	12MAGA*	12-channel Magneto	72-channel Magneto
	TDMoEA*	TDMoEA	TDMoEA
	8DBRA	8-channel Data Bridge	48-channel Data Bridge
	8UDTEA	8-channel UDTEA	48-channel UDTEA
	1FOMB*	1 port FOM (1FOMB)	6-port FOM
	OCUDPA*	8-channel OCUDPA	48-channel OCUDPA
	6UDTEA	6-channel UDTEA	36-channel UDTEA
	<b>Low Speed Dual-Slot Cards</b>		
	24FXS	24-channel FXS	72-channel FXS
	24FXO	24-channel FXO	72-channel FXO
	TTA	Four ports for DTT input and output.	12-channel TTA

\*Future Option

Table 2: Maximum Number of Channels/Ports on Each Plug-in Card

Name of Card	Slot Port	TRIB 1	TRIB 2	TRIB 3	TRIB 4	XCU 1	XCU 2	Trib 11~16 (per card)	Total
63TE (HS)	T1/E1	63	63	63	63	X	X	X	252 E1/T1
4E1/T1 (LS)	T1/E1	X	X	X	X	X	X	4E1 4T1	21E1 24T1
3TE3	T3/E3	3	3	3	3	X	X	X	12 E3/T3
9EoS4SW (Ethernet)	FE	8	8	8	8	X	X	X	32
	GbE	1	1	1	1	X	X	X	4
4GESW	GbE	X	X	4	4	X	X	X	8
CCPA	STM-1	X	X	X	X	2	2	X	4
	STM-4	X	X	X	X	2	2	X	4
	STM-16	X	X	X	X	2	2	X	4
B16	STM-1	2	2	2	2	X	X	X	8
	STM-4	1		1		X	X	X	2
B2G5*	STM-16	X	X	1		X	X	X	1
PTN10G*	10GE	X	X	3	3	X	X	X	6
	1GE	X	X	8	8	X	X	X	16
7FOM (HS)	FOM	7	7	7	7	X	X	X	28
1FOMB* (LS)	FOM	X	X	X	X	X	X	1	6
RTB	FE	X	X	X	X	X	X	8	48
2GH/4GH	G.SHDSL	X	X	X	X	X	X	2/4	12/24
3 E1/T1	E1/T1	X	X	X	X	X	X	3	18
8CD	G.703	X	X	X	X	X	X	8	48
1C37/4C37	C37.94	X	X	X	X	X	X	1/4	4/24
8DC	Dry	X	X	X	X	X	X	8	48
8DCB	Contact	X	X	X	X	X	X	8	48
8RS232	RS232	X	X	X	X	X	X	8	48
CONF (Note 1)	FXS/E&M /RS232	X	X	X	X	X	X	6	36
12FXS	FXS	X	X	X	X	X	X	12	72
12FXO	FXO	X	X	X	X	X	X	12	72
12MAGA*	Magneto A	X	X	X	X	X	X	12	72
8EMA	E&MA	X	X	X	X	X	X	8	48
TDMoEA*	TDMoEA	X	X	X	X	X	X	4	24
8DBRA	RS232	X	X	X	X	X	X	8	48
8UDTEA	RS232/ RS422/ RS449	X	X	X	X	X	X	8	48
OCUDPA*	OCUDP	X	X	X	X	X	X	8	48
6UDTEA	RS232/ X.21/V.35 */V.36*/ EIA530*	X	X	X	X	X	X	6	36

\*Future Option

X: not applicable

**Note 1:** A conference plug-in card contains two RS232 data ports, two FXS ports and two E&M ports.

Table 3: Compatibility Chart for Each Plug-in Card

Chassis Plug-in Card	O9500R	O9500R-PTN	O9400R	O9400R-PTN	AM3440-A/B/C
16/32/63TE	v	v	v	v	x
16/32/63E75	v	v	v	v	x
3TE3	v	v	v	v	x
3TE3M13	v	v	v	v	x
7FOM	v	v	v	v	x
9EoS4NSW	v	v	v	v	x
9EoS4SW	v	v	v	v	x
4GESW	v	v	v	v	x
B16	v	v	v	v	x
B2G5*	v	v	v	v	x
PTN10G*	v	v	v	v	x
4E1	v	v	x	x	v
4T1	v	v	x	x	v
3E1	v	v	x	x	v
3T1 *	v	v	x	x	v
2GH	v	v	x	x	v
4GH	v	v	x	x	v
8DC	v	v	x	x	v
8DCB	v	v	x	x	v
8CD	v	v	x	x	v
1C37	v	v	x	x	v
4C37	v	v	x	x	v
8RS232	v	v	x	x	v
8DBRA	v	v	x	x	v
RTB	v	v	x	x	v
CONF	v	v	x	x	v
TDMoEA *	v	v	x	x	v
6UDTEA	v	v	x	x	v
8UDTEA	v	v	x	x	v
8EMA	v	v	x	x	v
12MAGA*	v	v	x	x	v
12FXS	v	v	x	x	v
12FXO	v	v	x	x	v
1FOMB*	v	v	x	x	v
OCUDPA*	v	v	x	x	x
24FXS	v	v	x	x	v
24FXO	v	v	x	x	v
4TTA	v	v	x	x	v

\*Future Option

## Ordering Information

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

Model	Description	Notes
<b>Main Unit</b>		
Loop-O9500-R-PTN-CHPA- <b>G</b>	6U height Rack chassis for O9500R-PTN without CPU and power	
<b>Controller Modules (CPU)</b>		
Loop-O9500-R-PTN-CCPA- <b>G</b>	Controller module with cross-connect unit and two STM-1/4/16 (OC-3/12/48) interfaces without SFP (mini-GBIC) optical modules	<ul style="list-style-type: none"> <li>• Order two for redundancy.</li> <li>• Please order SFP optical modules separately from SFP optical modules brochure</li> <li>• Use with Loop-O9500-R-PTN-CHPA-<b>G</b></li> </ul>
<b>Connector Board and Fan Modules</b>		
Loop-O9500-R-PTN-CBPA- <b>G</b>	Connector Board	<ul style="list-style-type: none"> <li>• CBPA is required for each chassis.</li> <li>• Clock I/O cable 1meter are included</li> </ul>
Loop-O9500-R-PTN-CBPC- <b>G</b>	Connector Board with PoE+	
Loop-O9500-R-PTN-FANPA- <b>G</b>	Fan Board	<ul style="list-style-type: none"> <li>• One required for each chassis.</li> </ul>

### High Speed or High Density Tributary Modules

Loop-O9500-R-16TE- <b>G</b>	16 E1 (120 ohm) or 16 T1 software programmable plug-in card	<ul style="list-style-type: none"> <li>• Please refer to the compatibility chart in Table 3.</li> </ul>
Loop-O9500-R-32TE- <b>G</b>	32 E1 (120 ohm) or 32 T1 software programmable plug-in card	
Loop-O9500-R-63TE- <b>G</b>	63 E1 (120 ohm) or 63 T1 software programmable plug-in card	
Loop-O9500-R-16E75- <b>G</b>	16 E1(75 ohm) plug-in card	
Loop-O9500-R-32E75- <b>G</b>	32 E1(75 ohm) plug-in card	
Loop-O9500-R-63E75- <b>G</b>	63 E1(75 ohm) plug-in card	
Loop-O9500-R-3TE3- <b>G</b>	3 T3 or 3 E3 software programmable interface plug-in card	<ul style="list-style-type: none"> <li>• Please refer to the compatibility chart in Table 3.</li> </ul>
Loop-O9500-R-3TE3M13- <b>G</b>	3 T3 or 3 E3 software programmable interface plug-in modules with M13 /Mx3 function for T3 interface only	
Loop-O9500-R-7FOM- <b>G</b>	7-port Fiber Optical Interface with 7 SFP housings (SFP not included)	<ul style="list-style-type: none"> <li>• Please refer to the compatibility chart in Table 3.</li> <li>• Please order SFP optical modules separately from SFP optical modules brochure</li> </ul>
Loop-O9500-R-9EoS4NSW- <b>G</b>	1 GbE or 8FE software programmable plug-in card without L2 switch	<ul style="list-style-type: none"> <li>• Please refer to the compatibility chart in Table 3.</li> </ul>
Loop-O9500-R-9EoS4SW- <b>G</b>	1GbE and 8FE plug-in card with L2 switch	
Loop-O9500-R-4GESW- <b>G</b>	4 GbE card with 2 combo and 2 optical (10/100/1000BaseT) interface plug-in module with L2 switch	<ul style="list-style-type: none"> <li>• Please refer to the compatibility chart in Table 3.</li> <li>• Available on tributary slot 3 and 4 only</li> <li>• SFP optical modules are not included. Please order SFP modules separately.</li> <li>• Order two for redundancy</li> </ul>
Loop-O9500-R-B16- <b>G</b>	STM-1/4 (OC-3/12) software configurable plug-in card without SFP (mini-GBIC) optical modules	<ul style="list-style-type: none"> <li>• Please refer to the compatibility chart in Table 3.</li> </ul>
Loop-O9500-R-B2G5- <b>G*</b>	STM-16/OC-48 software configurable interface	<ul style="list-style-type: none"> <li>• Please refer to the compatibility</li> </ul>

	plug-in module without SFP (mini-GBIC) optical modules	<p>chart in Table 3.</p> <ul style="list-style-type: none"> <li>• Available on tributary slot 3 and 4 only</li> <li>• SFP optical modules are not included. Please order SFP modules separately.</li> <li>• Order two for redundancy</li> </ul>
Loop-O9500-R-PTN10G-G*	MPLS-TP plug-in module with 3 x 10G SFP+ ports and 8 x GE SFP ports, without SFP (mini-GBIC) optical modules	This card can only be used in the Loop-O9500R-PTN-CHPA-G and Loop-O9500R-PTN-CCPA-G. Please refer to the compatibility chart in Table 3.

### Low Speed Tributary Modules (Single Slot)

Loop-O9500-R-4E1-cc-G	4-channel E1 plug-in card.	<ul style="list-style-type: none"> <li>• Please refer to the compatibility chart in Table 3.</li> <li>• For <b>cc</b> option, please refer to the table below for detail information</li> </ul>
Loop-O9500-R-4T1-G	4-channel T1 plug-in card	<ul style="list-style-type: none"> <li>• Please refer to the compatibility chart in Table 3.</li> </ul>
Loop-O9500-R-3E1-cc-G	3-channel E1 plug-in card with DS0 (64K bps) SNCP protection	<ul style="list-style-type: none"> <li>• For <b>cc</b> option, please refer to the table below for detail information. Please refer to the compatibility chart in Table 3.</li> </ul>
Loop-O9500-R-3T1-G*	3-channel T1 Interface	<ul style="list-style-type: none"> <li>• For software version 3.02.01 or newer versions.</li> <li>• Please refer to the compatibility chart in Table 3.</li> </ul>
Loop-O9500-R-2GH-G	2-channel G.SHDSL plug-in card (2 pair)	<ul style="list-style-type: none"> <li>• Please refer to the compatibility chart in Table 3.</li> </ul>
Loop-O9500-R-4GH-G	4-channel G.SHDSL plug-in card (1 pair)	<ul style="list-style-type: none"> <li>• Please refer to the compatibility chart in Table 3.</li> </ul>
Loop-O9500-R-8DC-G	8-channel dry contact plug-in card with maximum voltage 100 Vdc or 250 Vac	<ul style="list-style-type: none"> <li>• Please refer to the compatibility chart in Table 3.</li> </ul>
Loop-O9500-R-8DCB-G	8-channel dry contact type B plug-in card with maximum voltage 220 Vdc or 250 Vac	<ul style="list-style-type: none"> <li>• Please refer to the compatibility chart in Table 3.</li> </ul>
Loop-O9500-R-8CD-G	8-channel G.703 plug-in card at 64 Kbps data rate	<ul style="list-style-type: none"> <li>• Please refer to the compatibility chart in Table 3.</li> </ul>
Loop-O9500-R-1C37-LSFOM-G	1- channel C37.94 plug-in card	<ul style="list-style-type: none"> <li>• For <b>LSFOM</b> option, please refer to the table below for detail information</li> <li>• Please refer to the compatibility chart in Table 3.</li> </ul>
Loop-O9500-R-4C37-LSFOM-G	4- channel C37.94 plug-in card	
Loop-O9500-R-8RS232-RJ-G	8-port RS232 plug-in card with X.50 subrate multiplexing scheme and X.54 encoding, with 8 RJ48 connectors for 8 RS232 Async ports	<ul style="list-style-type: none"> <li>• Please refer to the compatibility chart in Table 3.</li> </ul>
Loop-O9500-R-8RS232-DB-G	8-port RS232 plug-in card with X.50 subrate multiplexing scheme and X.54 encoding, with 2RJ48 connectors and 2 DB44 connectors for Async and Sync ports	<ul style="list-style-type: none"> <li>• Two conversion cables are included. (Each cable has one DB44 connector to one DB9 and two DB25 connectors). Please refer to the compatibility chart in Table 3.</li> </ul>
Loop-O9500-R-8DBRA-RJ-G	8-channel data bridge plug-in card, with 8 RJ48 connectors for 8 data bridge Async ports	<ul style="list-style-type: none"> <li>• Please refer to the compatibility chart in Table 3.</li> </ul>
Loop-O9500-R-8DBRA-DB-G	8-channel data bridge plug-in card, with 2 RJ48 connectors and 2DB44 connectors for 8 data bridge Async ports	<ul style="list-style-type: none"> <li>• Two conversion cables are included (DB44 connector to two DB25 and one DB9 connector; (Loop-ACC-CAB-DB44M-100-</li> </ul>



		2DB25F-1DB09F-DB).
Loop-O9500-R-RTB- <b>G</b>	8-LAN port/64 WAN ports router/bridge plug-in card	<ul style="list-style-type: none"> <li>• Please refer to the compatibility chart in Table 3..</li> </ul>
Loop-O9500-R-CONF- <b>G</b>	Conference plug-in card with two RS232 data ports, two FXS ports and two E&M ports	<ul style="list-style-type: none"> <li>• Please refer to the compatibility chart in Table 3.</li> </ul>
Loop-O9500-R-TDMoE-PPM- <b>G</b>	TDMoE card with 2 GbE combo interfaces and 2 Ethernet interfaces (10/100/1000BaseT) plug-in module. Support G.823 Traffic	<ul style="list-style-type: none"> <li>• The SFP module is not included in the TDMoE card.</li> <li>• Please order separately for SFP optical modules from SFP optical brochure.</li> <li>• Please refer to the compatibility chart in Table 3.</li> </ul>
Loop-O9500-R-6UDTEA- <b>G</b>	6-port universal data interface card that supports three software configurable modes: Port 1 to 4: two DB44 connectors Port 5 to 6: two RJ48 connectors  <b>Mode 1:</b> Port 1 to 4: RS232/RS422/X.21, Async/Sync 64kbps with V.110 encoding Port 5 to 6: RS232 for ASYNC only  <b>Mode 2:</b> Port 1 to 4: X.21/RS422 SYNC N*64k, (N=1~32) Port 5 to 6: Not available  <b>Mode 3:</b> Port 1 to 3: X.21/RS422 SYNC N*64k, (N=1~32). Port 4: X.21/RS422 SYNC, N*64k, (N=1~20). Port 5 to 6: RS232 N*64k (N=1~6) oversampling data.	<ul style="list-style-type: none"> <li>• Please order separately for SFP optical modules from SFP optical brochure.</li> <li>• No conversion cable is included. Please order conversion cable separately from below table.</li> <li>• Three conversion cable types are available: Loop-ACC-CAB-DB44M-100-2DB 25F-VB Loop-ACC-CAB-DB44M-100-2DB 15F-VB Loop-ACC-CAB-DB44M-100-1DB 15F-1DB25F-VB</li> </ul>
Loop-O9500-R-8UDTEA- <b>opm-G</b>	8-port universal data interface card that supports RS232/RS422/RS485 DCE interface which is software configurable Available options: Terminal Server, Omnibus, Clock Pass Through, and full-/half duplex modes	<ul style="list-style-type: none"> <li>• For <b>opm</b> option, please refer to the table below for detail information.</li> <li>• Please refer to the compatibility chart in Table 3.</li> </ul>
Loop-O9500-R-8EMA- <b>x-G</b>	8-channel 2W/4W E&MA plug-in card with 8 RJ45	<ul style="list-style-type: none"> <li>• For <b>x</b> option, please refer to the table below.</li> </ul>
Loop-O9500-R-12MAG-A-1G- <b>x-G</b>	12-channel Magneto ring-one-time plug-in module w/ L1. GND	<ul style="list-style-type: none"> <li>• 12MAG-A-1G2 includes all function of 12MAG-A cards.</li> <li>• Please refer to the compatibility chart in Table 3.</li> </ul>
Loop-O9500-R-12MAG-A-12- <b>x-G</b>	12-channel Magneto ring-one-time plug-in module w/ L1, L2	
Loop-O9500-R-12MAG-A-1G2- <b>x-G</b>	12-channel Magneto ring-one-time plug-in module w/ L1, L2, and L1. GND	
Loop-O9500-R-12FXS- <b>sn-pt-G</b>	12-channel FXS plug-in card with 600/ 900 Impedance, Battery Reverse, PLAR, without Ground Start and Metering Pulse. Used with 12 RJ11.	<ul style="list-style-type: none"> <li>• 12FXSA-GMP includes all FXS Card functions.</li> </ul>
Loop-O9500-R-12FXS-P- <b>sn-pt-G</b>	12-channel FXS plug-in card with 600/ 900 Impedance, Battery Reverse, PLAR, without Ground Start and Metering Pulse PLAR bit programmable function. Used with 12 RJ11.	<ul style="list-style-type: none"> <li>• For <b>sn</b> option, please refer to the table below for detail information.</li> <li>• <b>pt=</b> power type</li> </ul>
Loop-O9500-R-12FXS-M- <b>pt-G</b>	12-channel FXS plug-in card with 600/ 900 Impedance, Battery Reverse, PLAR, [Metering Pulse]. Used with 12 RJ11.	<ul style="list-style-type: none"> <li>• For <b>pt</b> option, please refer to the table below for detail information</li> </ul>
Loop-O9500-R-12FXS-MPP- <b>pt-G</b>	12-channel FXS plug-in card with 600/ 900 Impedance, Battery Reverse, PLAR and PLAR bit programmable function, [Metering	<ul style="list-style-type: none"> <li>• O9500-R-12FXS-S1-PWR-<b>G*</b></li> </ul>

	Pulse]. Used with 12 RJ11.	
Loop-O9500-R-12FXS-GS- <b>pt-G</b>	12-channel FXS plug-in card with 600/ 900 Impedance, Battery Reverse, PLAR, [Ground Start] . Used with 12 RJ11.	
Loop-O9500-R-12FXS-GM- <b>pt-G</b>	12-channel FXS plug-in card with 600/ 900 Impedance, Battery Reverse, PLAR, [Ground Start, and Metering Pulse]. Used with 12 RJ11.	
Loop-O9500-R-12FXS-GMP- <b>pt-G</b>	12-channel FXS plug-in card with 600/ 900 Impedance, Battery Reverse, PLAR and PLAR bit programmable function, [Ground Start, and Metering Pulse]. Used with 12 RJ11.	<b>*Future Option</b>
Loop-O9500-R-12FXO- <b>G</b>	12-channel FXO plug-in card with 600/ 900 Impedance, Battery Reverse, without Ground Start and Metering Pulse. Used with 12 RJ11.	<ul style="list-style-type: none"> <li>• 24FXO-GM includes all FXO card functions.</li> </ul>
Loop-O9500-R-12FXO-M- <b>G</b>	12-channel FXO plug-in card with 600/ 900 Impedance, Battery Reverse, [Metering Pulse] Used with 12 RJ11.	<ul style="list-style-type: none"> <li>• These cards will occupy two slots.</li> <li>• Please refer to the compatibility chart in Table 3.</li> </ul>
Loop-O9500-R-12FXO-GS- <b>G</b>	12-channel FXO plug-in card with 600/ 900 Impedance, Battery Reverse, [Ground Start] Used with 12 RJ11.	
Loop-O9500-R-12FXO-GM- <b>G</b>	12-channel FXO plug-in card with 600/ 900 Impedance, Battery Reverse, [Ground Start, and Metering Pulse] Used with 12 RJ11.	
Loop-O9500-R-1FOMB- <b>opt-G</b> *	1FOMB Fiber Optical Interface with 1x9 optical port	<ul style="list-style-type: none"> <li>• For <b>opt</b> option, please refer to the table below for detail information</li> <li>• Please refer to the compatibility chart in Table 3.</li> </ul>
Loop-O9500-R-OCUDPA*	8-channel OCU-DP plug-in module	<ul style="list-style-type: none"> <li>• Only <b>non-RoHS</b> compliant model available</li> <li>• Please refer to the compatibility chart in Table 3.</li> </ul>

### Low Speed Tributary Modules (Dual Slots)

Loop-O9500-R-24FXS-sn- <b>pt-G</b>	24-channel FXS plug-in card with 600/900 Impedance, Battery Reverse, Loop Start and PLAR Without Ground Start and Metering Pulse	
Loop-O9500-R-24FXS-P-sn- <b>pt-G</b>	24-channel FXS plug-in card with 600/900 Impedance, Battery Reverse, Loop Start, PLAR and [PLAR bit programmable]. Without Ground Start and Metering Pulse	<ul style="list-style-type: none"> <li>• 24FXSA-GMP includes all FXS card functions.</li> </ul>
Loop-O9500-R-24FXS-M- <b>pt-G</b>	24-channel FXS plug-in card with 600/900 Impedance, Battery Reverse, Loop Start, PLAR and [Metering Pulse].	<ul style="list-style-type: none"> <li>• These cards will occupy two slots.</li> <li>• Please refer to the compatibility chart in Table 3.</li> </ul>
Loop-O9500-R-24FXS-MPP- <b>pt-G</b>	24-channel FXS plug-in card with 600/900 Impedance, Battery Reverse, Loop Start, PLAR, [PLAR bit programmable] and [Metering Pulse].	<ul style="list-style-type: none"> <li>• For <b>sn</b> option, please refer to the table below for detail information</li> </ul>
Loop-O9500-R-24FXS-GS- <b>pt-G</b>	24-channel FXS plug-in card with 600/900 Impedance, Battery Reverse, Loop Start, PLAR and [Ground Start].	<ul style="list-style-type: none"> <li>• For <b>pt</b> option, please refer to the table below for detail information</li> </ul>
Loop-O9500-R-24FXS-GM- <b>pt-G</b>	24-channel FXS plug-in card e with 600/900 Impedance, Battery Reverse, Loop Start, PLAR, [Ground Start] and [Metering Pulse].	
Loop-O9500-R-24FXS-GMP- <b>pt-G</b>	24-channel FXS plug-in card with 600/900 Impedance, Battery Reverse, Loop Start, PLAR, [PLAR bit programmable], [Ground Start] and [Metering Pulse].	
Loop-O9500-R-24FXO- <b>G</b>	24-channel FXO plug-in card with 600/900 Impedance, Battery Reverse and Loop Start.	<ul style="list-style-type: none"> <li>• 24FXO-GM includes all FXO card</li> </ul>



Loop-O9500-R-24FXO-M-G	Without Ground Start and Metering Pulse 24-channel FXO plug-in card with 600/900 Impedance, Battery Reverse, Loop Start and [Metering Pulse].	functions.  • These cards will occupy two slots. • Please refer to the compatibility chart in Table 3.
Loop-O9500-R-24FXO-GS-G	24-channel FXO plug-in card with 600/900 Impedance, Battery Reverse, Loop Start and [Ground Start].	
Loop-O9500-R-24FXO-GM-G	24-channel FXO plug-in card with 600/900 Impedance, Battery Reverse, Loop Start, [Ground Start] and [Metering Pulse].	
Loop-O9500-R-TTA-pwr-G	Dual slot transfer trip plug-in module for O9500R. Four ports for DTT input and output.	Used in Loop-O9500R Chassis  For <b>pwr</b> option, please refer to the table below for detail information.

### Feature Activation License

Loop-O9500-R-3M13	Feature Activation License for O9500-R-PTN 3TE3 module to support M13/Mx3 function for T3 interface only	• Use with 3TE3 HS tributary module
Loop-O9500-R-ERING	Feature Activation License for O9500-R-PTN controller module to support framed E1 PDH-Ring function	• Use with 4E1 or FOM LS tributary modules
Loop-O9500-R-TRING	Feature Activation License for O9500-R-PTN controller module to support framed T1 PDH-Ring function	• Use with 4T1 LS tributary modules

### Accessories

#### 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.

#### User's Manual

Loop-O9500-R-PTN-UMA	Optional, paper copy of User Manual. A CD version of the manual is already included as standard package.
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#### Power Modules

Loop-O9500-R-SD48-G	Single power module -48Vdc	• For redundancy purposes, order 2 single DC.
Loop-O9500-R-SD48/125-G*	Single power module (300W) Input, 48Vdc/125Vdc (36 to 140Vdc)	• For redundancy purposes, order 2 single DC.

#### Power Adaptor (All power adaptor are RoHS compliant)

Loop-ACC-APA-240-G	240 Watt, AC (100 to 120 Vac, 5.0A/200 to 240 Vac, 2.5A auto sensing) to DC (-48 Vdc, 5A) adaptor for USA 🇺🇸	• This power adaptor is only for Loop-O9500-R-PTN-SD48.
Loop-ACC-APE-240-G	240 Watt, AC (100 to 120 Vac, 5.0A/200 to 240 Vac, 2.5A auto sensing) to DC (-48 Vdc, 5A) adaptor for Europe 🇪🇺	
Loop-ACC-APU-240-G	240 Watt, AC (100 to 120 Vac, 5.0A/200 to 240 Vac, 2.5A auto sensing) to DC (-48 Vdc, 5A) adaptor for UK 🇬🇧	

#### FXO BOX

Loop-ACC-FXOBOX	Support FXO Interface Feed
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#### Mounting Ear

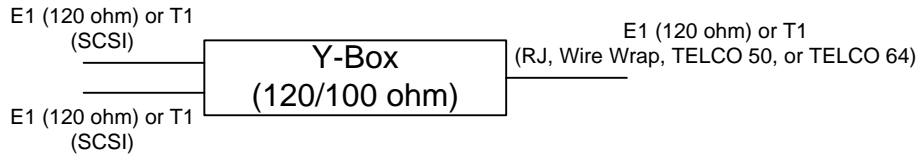
19"/23" ear mounts	A pair of 19"/23" ear mounts is supplied as part of standard package. <b>Note:</b> For other sizes, please contact your nearest Loop sales representative.
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#### Conversion Panels

Loop-ACC-P-1SCSI-16RJ-G	1u panel for one SCSI to 16 RJ connectors without cable 432x44x23mm (WxHxD)	• Use with 16/32/63TE HS tributary modules • This panel can also be used in the Loop-O9400R.
Loop-ACC-P-1SCSI-16WW-G	1u panel for one SCSI to 16 Wire Wrap connectors without cable	• Use with 16/32/63TE or 16/32/63E75 HS tributary modules • This panel can also be used in the

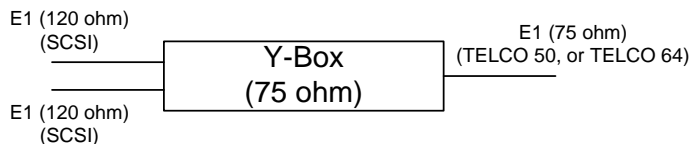
	432x44x40mm (WxHxD)	Loop-O9400R.
Loop-ACC-P-1SCSI-16BNC-G	1.5u panel for one SCSI to 16 BNC connectors without cable 432x66x53mm (WxHxD)	<ul style="list-style-type: none"> <li>• Use with 16/32/63E75 HS tributary modules</li> <li>• This panel can also be used in the Loop-O9400R.</li> </ul>

**Y-box Panels for 120/100 ohm**



Loop-ACC-Y-2SCSI-16RJ-G	1u Y-box 16-port panel for two SCSI (E1(120 ohm) or T1) to 16 RJ (E1(120 ohm) or T1) connectors without cable	Use with Loop-O9500-R-16TE-G
Loop-ACC-Y-2SCSI-16WW-G	1u Y-box 16-port panel for two SCSI (E1(120 ohm) or T1) to 16 Wire Wrap (E1(120 ohm) or T1) without cable	
Loop-ACC-Y-2SCSI-2T50P8-16TE-G	1u 16-port Y-box panel in (E1(120 ohm) or T1) for two SCSI to two TELCO 50 (E1(120 ohm) or T1) connectors (8 ports per TELCO connector) without cable	
Loop-ACC-Y-2SCSI-2T50P12-16TE-G	1u 16-port Y-box panel in (E1(120 ohm) or T1) for two SCSI to two TELCO 50 (E1(120 ohm) or T1) connectors (12 ports to the first TELCO connector, 4 ports to the second TELCO connector ) without cable	
Loop-ACC-Y-2SCSI-1T64P16-16TE-G	1u 16-port Y-box panel in (E1(120 ohm) or T1) for two SCSI to one TELCO 64 (E1(120 ohm) or T1) connectors (16 ports per TELCO connector) without cable	
Loop-ACC-Y-4SCSI-4T50P8-32TE-G	1u 32-port Y-box panel in (E1(120 ohm) or T1) for four SCSI to four TELCO 50 (E1(120 ohm) or T1) connectors (8 ports per TELCO connector) without cable	Use with Loop-O9500-R-32TE-G or Loop-O9400-R-63TE-G
Loop-ACC-Y-4SCSI-3T50P12-32TE-G	1u 32-port Y-box panel in (E1(120 ohm) or T1) for four SCSI to three TELCO 50 (E1(120 ohm) or T1) connectors (12 ports to the first TELCO connector, 12 ports to the second TELCO connector and 8 ports to the third TELCO connector) without cable	
Loop-ACC-Y-4SCSI-2T64P16-32TE-G	1u 32-port Y-box panel in E1 120 ohm or T1 for four SCSI to two TELCO 64 (E1(120 ohm) or T1) connectors (16 ports per TELCO connector) without cable	

**Y-box Panels for 75 ohm**



Loop-ACC-Y-2SCSI-2T50P8-16E75-G	1u 16-port Y-box panel for two SCSI (E1(120 ohm)) to two TELCO 50 (E1(75 ohm)) connectors (8 ports per TELCO connector) without cable	Use with Loop-O9500-R-16TE-G
Loop-ACC-Y-2SCSI-2T50P12-16E75-G	1u 16-port Y-box panel for two SCSI (E1(120 ohm)) to two TELCO 50 (E1(75 ohm)) connectors (12 ports to the first TELCO	Use with Loop-O9500-R-32TE-G or Loop-O9500-R-63TE-G

	connector, 4 ports to the second TELCO) straight without cable	
Loop-ACC-Y-2SCSI-1T64P16-16E75-G	1u 16-port Y-box panel for two SCSI (E1(120 ohm)) to one TELCO 64 (E1(75 ohm))connectors (16 ports per TELCO connector) straight without cable	Use with Loop-O9500-R-16TE-G
Loop-ACC-Y-4SCSI-4T50P8-32E75-G	1u 32-port Y-box panel for four SCSI (E1(120 ohm)) to four TELCO 50 (E1(75 ohm))connectors (8 ports per TELCO connector) without cable	
Loop-ACC-Y-4SCSI-3T50P12-32E75-G	1u 32-port Y-box panel for four SCSI (E1(120 ohm)) to three TELCO 50 (E1(75 ohm))connectors (12 ports to the first TELCO connector, 12 ports to the second TELCO connector and 8 ports to the third TELCO connector) without cable	Use with Loop-O9500-R-32TE-G or Loop-O9500-R-63TE-G
Loop-ACC-Y-4SCSI-2T64P16-32E75-G	1u 32-port Y-box panel for four SCSI(E1(120 ohm)) to two TELCO 64 (E1(75 ohm))connectors (16 ports per TELCO connector) without cable	
<b>Y-Box (All Y-Box are RoHS compliant)</b>		
Loop-VV-B-G	1 for 1 protection Y-Box with BNC connectors (4-E1)	Use with Loop-O9500-R-4E1-BNC-G
Loop-VV-R-G	1 for 1 protection Y-Box with RJ48C connectors (16-E1)	Use with Loop-O9500-R-4E1-RJ-G
Loop-VV-T-G	1 for 1 protection Y-Box with RJ48C connectors (16-T1)	Use with Loop-O9500-R-4T1-G
<b>Conversion Cables (All conversion cables are RoHS compliant)</b>		
Loop-ACC-CAB-SCSI68M-200-1SCSI68M-G	SCSI 68 pin/Male to SCSI 68 pin/Male Extension Cable Length:200cm	Used in Loop-O9500R-PTN Y-box panels and conversion panels
Loop-ACC-CAB-DB44M-100-2DB25F-1DB09F-DB	DSUB-44 pin/Male to two DSUB-25 pin/Female- one DSBU-9 pin/Female Length 100cm	Used in Loop-O9500-R-8RS232-DB-G and Loop-O9500-R-8DBRA-DB-G plug-in card
Loop-ACC-CAB-DB25M-30-1M34F	DSUB-25pin/Male to M34/Female V.35 Conversion cable Length: 30 cm	Used in Loop-O9500-R-6V35A-G plug-in card
Loop-ACC-CAB-DB25M-30-1DB37F	DSUB-25pin/Male to DSUB-37/Female RS449 Conversion cable Length: 30 cm	Used in Loop-O9500-R-6V36A-G and Loop-O9500-R-6R449A-G plug-in cards
<b>Blank Panels</b>		
30.002473.A00LF	Blank panel for CPU slot (CCPA)	
30.001076.A00LF	Blank panel for power supply slots	Applicable on the Loop-O9400R and Loop-O9400R-PTN as well.
30.001077.A00LF	Blank panel for High-speed slots (Slots 1~4)	
30.001027.A00LF	Blank Panel for Low-speed slots (Slots 11~16)	Applicable on the Loop-AM3440-A as well.

**For 4E1 and 3E1 card:**

■ Where **cc** is used to select connector:

cc =	Description	Notes
RJ	RJ48C connector	
BNC	BNC connector	

**For 8UDTEA card:**

■ Where **opm** is used to select 8UDTEA functions:

opm =	Description
DCE	Support RS232/RS422/RS485 DCE interface which is software configurable
TS	Support Terminal Server Function and DCE
OMNI	Support Omnibus Function and DCE
CPT	Support Clock Pass Through function and DCE
TSOMNI	Support Terminal Server, Omnibus Function and DCE
HD	Support RS232/RS422/RS485 DCE interface with Full- and Half-Duplex

	modes
TSHD	Support Terminal Server Function and DCE with Full- and Half-Duplex modes
OMNIHD	Support Omnibus Function and DCE with Full- and Half-Duplex modes
TSOMNIHD	Support Terminal Server, Omnibus Function and DCE with Full- and Half-Duplex modes
FULL	Support Terminal Server, Omnibus Function, Clock Pass Through and DCE with Full- and Half-Duplex modes
<b>Feature Activation License</b>	<b>Description</b>
Loop-O9500-R-8UDTEA-UPGR-TS	Feature Activation License for O9500-R 8UDTE card to support Terminal Server function
Loop-O9500-R-8UDTEA-UPGR-OMNI	Feature Activation License for O9500-R 8UDTE card to support Omnibus function
Loop-O9500-R-8UDTEA-UPGR-CPT	Feature Activation License for O9500-R 8UDTE card to support Clock Pass Through function
Loop-O9500-R-8UDTEA-UPGR-TSOMNI	Feature Activation License for O9500-R 8UDTE card to support Terminal Server function and Omnibus function
Loop-O9500-R-8UDTEA-UPGR-HD	Feature Activation License for O9500-R 8UDTE card to support Full- and Half-Duplex modes
Loop-O9500-R-8UDTEA-UPGR-TSHD	Feature Activation License for O9500-R 8UDTE card to support Terminal Server function with Full- and Half-Duplex modes
Loop-O9500-R-8UDTEA-UPGR-OMNIHD	Feature Activation License for O9500-R 8UDTE card to support Omnibus function with Full- and Half-Duplex modes
Loop-O9500-R-8UDTEA-UPGR-TSOMNIHD	Feature Activation License for O9500-R 8UDTE card to support Terminal Server function and Omnibus function with Full- and Half-Duplex modes
Loop-O9500-R-8UDTEA-UPGR-FULL	Feature Activation License for O9500-R 8UDTE card to support Terminal Server, Omnibus and Clock Pass Through functions with Full- and Half-Duplex modes

**For 1FOMB \* Card:**

■ where **opt** is used to select optical module type:

opt =	Description	Notes
<b>SAA</b>	single optical module with dual uni-directional fiber, 1310 nm, SC optical connector, 30 km - <b>S1.1 physical layer*</b>	<ul style="list-style-type: none"> <li>• Use 2 fibers</li> <li>• * ITU-T Rec G.957 application code</li> </ul>
<b>SBB</b>	single optical module with dual uni-directional fiber, 1310 nm, SC optical connector, 50 km - <b>L1.1 physical layer*</b>	
<b>SCC</b>	single optical module with dual uni-directional fiber, 1310 nm, FC optical connector, 30 km - <b>S1.1 physical layer*</b>	
<b>SDD</b>	single optical module with dual uni-directional fiber, 1550 nm, SC optical connector, 20 km - <b>S1.2 physical layer*</b>	
<b>SEE</b>	single optical module with dual uni-directional fiber, 1550 nm, SC optical connector, 100 km - <b>L1.2 physical layer*</b>	
<b>SSM</b>	single optical module with single bi-directional fiber ( <b>master</b> ), 1310 nm transmit and 1550 receive, SC optical connector, 30 km reach - <b>S1.1/ S1.2 physical layer*</b>	<ul style="list-style-type: none"> <li>• 1310 nm from master to slave</li> <li>• Order <b>SSM</b> to use with <b>SSS</b></li> <li>• Use 1 fiber</li> <li>• * ITU-T Rec G.957 application code</li> </ul>
<b>SSS</b>	single optical module with single bi-directional fiber ( <b>slave</b> ), 1310 nm receive and 1550 transmit, SC optical connector, 30 km reach - <b>S1.1/ S1.2 physical layer*</b>	<ul style="list-style-type: none"> <li>• 1550 nm from slave to master</li> <li>• Order <b>SSS</b> to use with <b>SSM</b></li> <li>• Use 1 fiber</li> <li>• * ITU-T Rec G.957 application code</li> </ul>

**NOTE:** For other special optical modules, please contact your nearest Loop sales representative.

**For 8-channel 2W/4W E&M card:**

■ Where **x** is used to select all of voice card signaling bits. If this option is not required, omit the **x** field in the ordering code.

	x =	Description	Note
<b>8EMA</b>	<b>E</b>	Follows ETSI signaling bits	Jumper selectable for all channels
	<b>A</b>	Follows ANSI signaling bits	
	<b>R</b>	Reverse for ON-HOOK and OFF-HOOK signaling bits exchange	
	<b>AR</b>	Follows ANSI signaling bits and reverse bit	
	<b>ER</b>	Follows ETSI signaling bits and reverse bit	

	<b>S</b>	Follows customer's special bit or function assignment	
	<b>S4</b>	Disable the function of the test button	
	<b>S5</b>	Forcing all ports to be OFF-HOOK when an alarm occurs	
	<b>S6</b>	Forcing all ports to be ON-HOOK when an alarm occurs	

**Note:**

- For S (customer's special bit), please contact your nearest Loop sales representative.
- If x is not selected from table above, the default setting for signaling bits is ETSI and for trunk condition is ON-HOOK.

**For 12/24-channel FXS card:**

- Where **sn** is used to select special function. If this option is not required, omit the **sn** field in the ordering code.

sn =	Description	Note
<b>sn = omit</b>	FXS Loop Feed = -48 Vdc with 25 mA current limit; alarm tone enable; normal ring	
<b>S1</b>	FXS Loop Feed = -48 Vdc with 35 mA current limit	
<b>S4</b>	Remove alarm tone	
<b>S5</b>	Double ring tone transmit	

**Note:** For sn (special function), please contact your nearest Loop sales representative.

- Where **pt** is used to select the following functions.

pt=	Description	Note
<b>PWR</b>	with -48Vdc or -125Vdc power modules	
<b>PWR1613</b>	with -48Vdc power modules complied with IEEE 1613 standard	Only for 12FXS

**For Magneto Card:**

- Where **x** is used to select version type:

x=	Description	Note
<b>16</b>	16 Hz ring generator	20 Hz is the general setting for all MAG cards. For special settings (16, 25, 50), please specify your need by filling in the x option.
<b>20</b>	20 Hz ring generator	
<b>25</b>	25 Hz ring generator	
<b>50</b>	50 Hz ring generator	

**For C37.94 Card:**

- Where **LSFOM** is to select **LS-Fiber Optical Module** option, each module has 5 letters.

LSFOM	Description										Notes
	Mode		Data Rate		Wave Length		Distance		Connector		
Code	Code	Description	Code	Description	Code	Description	Code	Description	Code	Description	
<b>ZHHTT</b>	Z	Multi-mode	H	155 M	H	820nm	T	2km	T	ST connector	1 * 8 Separate transceiver & receiver
<b>QHATT</b>	Q	Multi-mode	H	155 M	A	850nm	T	2km	T	ST connector	1 * 9
<b>NFB3T</b>	N	Single mode	F	125 M	B	1310nm	3	30km	T	ST connector	
<b>QFBTT</b>	Q	Multi-mode	F	125 M	B	1310nm	T	2km	T	ST connector	
<b>NHC2S</b>	N	Single mode	H	155 M	C	1550nm	2	20km	S	SC connector	
<b>NHCUS</b>	N	Single mode	H	155 M	C	1550nm	U	100km	S	SC connector	

**For Transfer Trip (TTA) Card:**

- Where **pwr** is used to select the following functions.

<b>pwr=</b>	<b>Description</b>	<b>Note</b>
<b>24</b>	Complied with 24/48V voltage	*Future option
<b>48</b>	Complied with 48/125V voltage	
<b>125</b>	Complied with 125/250V voltage	*Future option

**Firmware Upgrade**

Loop-O9500-R-card-FWUPGR	Firmware Upgrade and Warranty Renewal. The Customer whose warranty has lapsed or desire to have a firmware upgrade can purchase this option. This will upgrade the firmware to the most current version and provide an additional 12 months of support.	For available card types, please refer to the table below for detail information.
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**For Firmware Upgrade:**

- Where “**card**” is used to select card type:

<b>card=</b>	<b>Description</b>	<b>Note</b>
<b>16TE</b>	16 E1 (120 ohm) or 16 T1 software programmable plug-in card	
<b>32TE-G</b>	32 E1 (120 ohm) or 32 T1 software programmable plug-in card	
<b>63TE</b>	63 E1 (120 ohm) or 63 T1 software programmable plug-in card	
<b>16E75</b>	16 E1(75 ohm) plug-in card	
<b>R-32E75</b>	32 E1(75 ohm) plug-in card	
<b>63E75</b>	63 E1(75 ohm) plug-in card	
<b>B16</b>	STM-1/4 (OC-3/12) software configurable p lug-in card without SFP (mini-GBIC) optical modules	
<b>9EoS4NSW</b>	1 GbE or 8FE software programmable plug-in card without L2 switch	
<b>9EoS4SW</b>	1GbE and 8FE plug-in card with L2 switch	
<b>3TE3</b>	3 T3 or 3 E3 software programmable interface plug-in card	
<b>7FOM</b>	7-port Fiber Optical Interface with 7 SFP housings (SFP not included)	
<b>1FOMB *</b>	1-port Fiber Optical Interface	
<b>RTB</b>	RTB card	
<b>3E1</b>	3-port E1 card	
<b>3T1 *</b>	3-port T1 card	
<b>2GH</b>	2-port G.SHDSL card	
<b>4GH</b>	4-port G.SHDSL card	
<b>TDMoEA *</b>	TDMoEA card	
<b>12/24FXS</b>	12/24 FXS card	
<b>12/24FXO</b>	12/24 FXO card	
<b>8E&amp;M</b>	8-port E&M card	
<b>8RS232</b>	8 RS232 card	
<b>8DBRA</b>	8 Data Bridge A card	
<b>Conference</b>	Conference card	
<b>OCUDPA *</b>	8 channel OCU DP card	

**Example:**

**Loop-O9500-R-PTN-CHPA-G, Loop-O9500-R-PTN-CBPA-G, Loop-O9500-R-FANA-G, Loop-O9500-R-63TE-G, Loop-O9500-4E1-RJ, Loop-O9500-R-4GH, Loop-O9500-R-SD48:**

For model O9500R-PTN 6U height Rack chassis with one CPU card, one connect board, and one Fan board, one 63E1 software programmable interface plug-in card, one 4-channel E1 interface with RJ48C connectors, one 4-channel G.SHDSL plug-in card (1-pair), and a single –48 Vdc power module.



## Loop-O9500R-PTN IMAP-PTN Product Specification

### High Speed or High Density Tributary Modules

#### **Max. Number of Aggregate Lines on Controller Module**

4 x STM-1/4/16 (OC-3/12/48) aggregate optical lines

#### **Max. Number of HS Tributary Lines for the Controller Module**

2 x STM-4 (OC-12) tributaries without protection

8 x STM-1 (OC3) tributaries without protection

12 x E3/T3 tributaries without protection

252 x E1/T1 tributaries without protection

8 x GbE and 32 x FE EoS with build in L2 switch tributaries without protection

32/4 x FE/GE EoS without build in L2 switch tributaries without protection

28 x FOM tributaries without protection

6 x 10G SFP+ and 16 x 1G SFP tributaries without protection

#### **T1 Interface**

Line Rate	1.544 Mbps $\pm$ 32 ppm	Jitter	ITU G.824
Line Code	AMI/B8ZS	Framing	Unframed with a framing monitor on receiving side
Input Signal	ITU G.703 DSX-1 0dB to -6dB	Impedance	100 ohm twisted pair
Output Signal	ITU G.703 DSX-1 w/short (0-110, 110-220, 220-330, 330-440, 440-550, 550~660 (feet)	Connector	SCSI-II 68-pin
Output Mask	Bellcore GR-499-core		One connector for 16 ports Two connectors for 32 ports Four connectors for 63 ports

#### **E1 Interface**

Line Rate	2.048 Mbps $\pm$ 50 ppm	Jitter	ITU G.823
Line Code	AMI/HDB3	Framing	Unframed with a framing monitor on receiving side
Input Signal	ITU G.703	Impedance	75 ohm coax/120 $\Omega$ twisted pair
Output Signal	ITU G.703	Connector	SCSI-II 68-pin
Output Mask	ETS 300 689 Sec.4.2.1.2 ITU G.703		One connector for 16 ports Two connectors for 32 ports Four connectors for 63 ports

#### **E3 Interface**

Line Rate	34.368 Mbps $\pm$ 20ppm	Jitter	ITU G.823
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Line Code	HDB3	Framing	Unframed, G.751
Input Signal	ITU G.703	Impedance	75 ohm coax
Output Signal	ITU G.703	Connector	BNC connector
Output Mask	ETS 300 689 Sec.4.2.1.2 ITU G.703		
<b>T3 interface</b>			
Line Rate	44.736 Mbps ± 20ppm	Jitter	ITU G.824
Line Code	B3ZS	Framing	Unframed, M13/Mx3 (unframed E1/T1), G.747
Input Signal	ITU G.703	Impedance	75Ω coax
Output Signal	ITU G.703	Connector	BNC connector
Output Mask	Bellcore GR-499-core		

**Fast Ethernet interface**

Line Rate	10/100M bps	Mapping	n x VC12, n x VC3, or n x VC4
Layer2 Protocol	RSTP (802.1W), VLAN (802.1Q, 802.1P) Flow Control (802.3X) MSTP (802.1S) IGMP Snooping QoS	Connector	RJ45
Process Protocol	VCAT, GFP(G.7041), LAPS, LCAS(G.7042), and non-LCAS		

**Gigabit Ethernet interface**

Line Rate	10/100/1000Mbps	Mapping	n x VC12, n x VC3, or n x VC4
Layer2 Protocol	RSTP (802.1W), VLAN (802.1Q, 802.1P) Flow Control (802.3X) MSTP (802.1S) IGMP Snooping QoS	Connector	RJ45
Process Protocol	VCAT, GFP(G.7041), LAPS, LCAS(G.7042), and non-LCAS		

**7 FOM**

Port number	7		
Source	Laser	Line Code	Scrambled NRZ
Wavelength	1310 ± 50 nm, 1550 ± 40 nm		
Optical Line Rate	38.84Mbps		
Connector	SFP housing with LC type		
Reach	2~240 Km (For more detail, please refer to the SFP table below)	Protection	1+1 Line Protection

**PTN10G\*****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
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Y.1731

Ethernet OAM

G.8032

ERPS

**4 GbEoSDH Card***SFP Module Characteristics( Please refer to SFP optical module brochure for detail)***Combo Gigabit Ethernet(GbE) Interface**

Number of Ports	2
Speed	10/100/1000 Base-TX or 100/1000 Base-FX
Function	RJ45 Interface <ul style="list-style-type: none"> <li>• 10/100/1000 BaseT, auto-negotiation</li> <li>• Auto MDI/MDIX</li> <li>• Force mode: duplex (half/full), speed (10/100/1000M)</li> </ul>
SFP Housing	<ul style="list-style-type: none"> <li>• Rx power low alarm</li> </ul>
Connector	RJ45 for twisted pair GbE, LC for optical GbE, auto detection

**Gigabit Ethernet (GbE) Interface**

Number of Port	2
Speed	Speed 100/1000 Base-FX
Function	Rx power low alarm
Connector	LC for optical GbE

**Gigabit Ethernet Function**

Line Rate	10/100/1000 Mbps	Mapping	N x VC11, N x VC12, N x VC3, or N x VC4
Layer2 Protocol	RSTP (802.1W), VLAN (802.1Q, 802.1P) Flow Control (802.3X) MSTP (802.1S) IGMP Snooping QoS	Multiplexing	G.707
Process Protocol Bridge	VCAT, GFP(G.7041), LAPS, BCP, LCAS (G.7042) and non-LCAS		
VLAN	802.1d MAC learning (maximum MAC table 16K entry) IEEE 802.1q bridging Supports tag stacking, up to 2 VLAN tags VLAN packet transparent		
QoS/CoS	Eight priority queues Packet classification based on the 802.1p user priority, IPV4 ToS (DiffServ) The scheduling algorithm of the priority queue follows either Strictly Priority or Weighted Round-Robin (WRR).		

**Standards Compliance**

IEEE	802.1q, 802.1p, 802.3, 802.3u, 802.3ab, 802.3z, 802.1s, 802.1w, 802.1x G.7041, G.7042
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**Low Speed Tributary Modules****Network Line Interface – 4E1**

Line Rate	2.048 Mbps ± 50 ppm	Framing	ITU G.704
Line Code	AMI or HDB3	Connector	BNC/RJ48C
Input Signal	ITU G.703	Electrical	75 ohm Coax/120 ohm twisted pair
Output Signal	ITU G.703	Jitter	ITU G.823

**Network Line Interface - 4T1**

Line Rate	1.544 Mbps ± 32 ppm	Output Signal	DSX1w/0, -7.5, -15 dB LBO
Line Code	AMI or B8ZS	Framing	D4/ESF (selectable)
Input Signal	DSX-1 0 dB to -30 dB w/ALBO	Connector	RJ48C

**Network Line Interface - 3E1**

Line Rate	2.048 Mbps ± 50 ppm	Framing	ITU G.704
Line Code	AMI or HDB3	Connector	BNC/RJ48C
Input Signal	ITU G.703	Electrical	75 ohm Coax/120 ohm twisted pair
Output Signal	ITU G.703	Jitter	ITU G.823
Function	Support DS0-SNCP		

**Network Line Interface – 3T1\***

Line Rate	1.544 Mbps $\pm$ 32 ppm	Framing	D4/ESF
Line Code	AMI/B8ZS	Output Signal	DSX-1 w/0, -7.5, -15 dB LBO
Input Signal	DSX-1 0dB to -30dB w/ALBO	Connector	RJ48C
Jitter	AT&T TR 62411	Pulse Template	AT&T TR 62411
Data Rate	n * (64) Kbps (n = 1 to 24)	Surge Protection	FCC Part 68 Sub Part D

**G.shdsl Line Interface (2GH/4GH)**

Number of ports	2 or 4
Line Rate for 4-channel G.shdsl	n x 64Kbps (n= 3 to 31)
Line Rate for 2-channel G.shdsl	n x 64Kbps (n= 3 to 15)
Line Code	16-TCPAM, full duplex with adaptive echo cancellation
Connector	RJ45
Electrical	Unconditioned 19-26 AWG twisted pair
Sealing current	Max. 20 MA source current
Clock Source	From System, Line
Diagnostic Test	G.SHDSL Loopback: To-LINE, To-bus BERT: QRSS

**C37.94 Interface (1/4C37)**

Source	LED
Wavelength	820nm 2Km reach
Connector	ST
Optical Budget	50 Mircon core/9.6 db 62.5 Mircon core/ 15db

**Dry Contact I/O card (8DC)**

<b>Inputs -</b>		<b>Outputs -</b>	
8-channel	2-port per card, 4-pair per port	8-channel	8-pair per card
Connector	RJ45	Connector	Screw type
Internal Resistance	1 K	Initial Insulation Resistance	Min. 100M ohm (at 500 Vdc)
Activation Current	3 ma	Max. Current	5A
Deactivation Current	1.5 ma	Max. Voltage	100 Vdc, 250 Vac
Allowable Current	4 ma		

**Dry Contact Type B Interface**

<b>Inputs -</b>		<b>Outputs -</b>	
8-channel	2-port per card, 4-pair per port	8-channel	8-pair per card
Connector	RJ45	Connector	Screw type
Internal Resistance	100 K	Initial Insulation Resistance	Min. 1000M ohm (at 500 Vdc)
Activation Current	3 ma	Max. Current	2A
Deactivation Current	1.5 ma	Max. Voltage	220 Vdc, 250 Vac
Allowable Current	4 ma		

**Co-directional (G.703) card**

Interface	ITU G.703 64 Kbps co-directional interface
Connector	120ohm, RJ48
Line Distance	Up to 500 meters
Loopback	DTE Payload Loopback, Local Loopback

**Router-B Interface (RTB)**

Number of ports	8 LAN ports, Max. 64 WAN ports. Each WAN port has data rate n x 64K bps, $1 \leq n \leq 32$ ( $\leq 8$ Mbps for total of all 64 WAN ports)
Physical Interface	10/100 BaseT x 8
Connector	RJ45
Routing protocol	RIP-I, RIP-II, OSPF, Static
Supporting Protocols	PPP (IPCP/BCP), MLPPP, HDLC, Frame Relay, and Cisco compatible HDLC, NAT/NAPT, DHCP
Diagnostic	Ping, Trace route
QoS	Rate limit

**DTE(RS232-X.50 mux. 8-port) Interface (RS232)**

Data Port	Up to twelve 8-port RS232 cards
MUX	Maximum 5 subrate port per 64K bps
Data Rate	Asynchronous Mux mode 0.6K, 1.2K, 2.4K, 4.8K, 9.6K

		Independent mode	0.6K, 1.2K, 2.4K, 4.8K, 9.6K, 19.2K, 38.4K						
		Mux mode	0.6K, 1.2K, 2.4K, 4.8K, 9.6K						
	Synchronous	Independent mode	0.6K, 1.2K, 2.4K, 4.8K, 9.6K, 19.2K, 38.4K, 48K, 64K						
	Port Number								
Card Type	1	2	3	4	5	6	7	8	
Eight RJ48	Async	Async	Async	Async	Async	Async	Async	Async	
Two DB44 + Two RJ48 Connector	Async/Sync	Async/Sync	Async	Async/Sync	Async/Sync	Async	Async	Async	
	Eight RJ48 (port 1 to port 8) DB44 (port1,port2,port3), DB44 (port4,port5,port6), RJ48 (port7) and RJ48(port8)								
Conversion Cable	A three-into-one conversion cable adapts the DB44 connector to 3 connectors (one DB9S and two DB25S)								
Electrical	RS232 Interface, DCE								

**Data Bridge Card**

Data Port	Up to twelve 8-port data bridge card (each card supports up to 120 DS0 for data bridge)	
Feature	20 end points per multi-drop circuit to into a logical ended 56K or 64K channel Per port supports bridge function to N remote Trib. Site (N=1~20)	
Data Rate	Asynchronous	Support to receive 1200 to 19200 bps asynchronous data via oversampling channel
Bridge function	one port with one DS-0 to many (Maximum is 20 for remote Tributary data box ) 20 drops for each DS0 to remote Tributary data box and 8 ports RS232 shared the 128 channels.	

**6UDTEA Universal Data Interface Card\***

<b><u>Mode 1</u></b>			
<b><u>DTE Interface (RS232)</u></b>			
Data Port	Up to 2		
MUX	Maximum 6 subrate port / 64Kbps		
Data Rate	Asynchronous	Mux mode	0.6K, 1.2K, 2.4K, 4.8K, 9.6K, 19.2K
		Independent mode	0.6K, 1.2K, 2.4K, 4.8K, 9.6K, 19.2K, 38.4K
		Mux mode	0.6K, 1.2K, 2.4K, 4.8K, 9.6K, 19.2K,
	Synchronous	Independent mode	0.6K, 1.2K, 2.4K, 4.8K, 9.6K, 19.2K, 38.4K, 48K, 64K
Connector	RJ48-ASYNC (port5, port6)		
Alarm	Remote Alarm RTS Loss		
Loopback	To-DTE To-DS1 (To Line)		
Electrical	DCE		
Protocol	V.110		
<b><u>DTE Interface (RS422/RS232)</u></b>			
Data Port	Up to 4		
MUX	Maximum 4 subrate port / 64Kbps		
Data Rate	Asynchronous	Mux mode	0.6K, 1.2K, 2.4K, 4.8K, 9.6K, 19.2K
		Independent mode	0.6K, 1.2K, 2.4K, 4.8K, 9.6K, 19.2K, 38.4K
		Mux mode	0.6K, 1.2K, 2.4K, 4.8K, 9.6K, 19.2K,
	Synchronous	Independent mode	0.6K, 1.2K, 2.4K, 4.8K, 9.6K, 19.2K, 38.4K, 48K, 64K
Connector	DB44 (port1, port2), DB44 (port3, port4)		
Alarm	Remote Alarm RTS Loss		
Loopback	To-DTE To-DS1 (To Line)		
Electrical	DCE		
Protocol	V.110		

**DTE Interface (X.21/RS232)**

Data Port	Up to 4		
MUX	Maximum 4 substrate port / 64Kbps		
Subrate	Asynchronous	Mux mode	0.6K, 1.2K, 2.4K, 4.8K, 9.6K, 19.2K
		Independent mode	0.6K, 1.2K, 2.4K, 4.8K, 9.6K, 19.2K, 38.4K
	Synchronous	Mux mode	0.6K, 1.2K, 2.4K, 4.8K, 9.6K, 19.2K,
		Independent mode	0.6K, 1.2K, 2.4K, 4.8K, 9.6K, 19.2K, 38.4K, 48K, 64K
Connector	DB44 (port1, port2), DB44 (port3,port4)		
Alarm	Remote Alarm RTS Loss		
Loopback	To-DTE To-DS1 (To Line)		
Electrical Protocol	DCE V.110		

**Mode 2****DTE Interface (X.21/RS422)**

Data Port	Up to 4 (Port 1 to 4)
Data Rate	N*64kbps, N = 1~32
Connector	DB44
Alarm	RTS Loss
Loopback	To-DTE To-DS1 (To Line)
Electrical	DCE

**Note:** When oversampling is enabled in MODE 2, port 5~6 will be disabled.

**Mode 3****DTE Interface (X.21/RS422)**

Data Port	Up to 4 (Port 1 to 4)
Data Rate	N * 64 Kbps, N = 1 to 32 for Port 1~3 N * 64 Kbps, N = 1 to 20 for Port 4
Connector	DB44
Alarm	RTS Loss
Loopback	To-DTE To-DS1 (To Line)
Electrical	DCE
Data Port	Up to 2 (Port 5 to 6)
MUX	Max 2 oversampling port / 64kbps
Data Rate	Asynchronous 200, 300, 0.6k, 1.2k, 2.4k, 4.8k, 9.6k, 19.2k, 38.4k
Connector	RJ48 (Port 5 & 6)
Alarm	Remote Alarm RTS Loss
Loopback	To-DTE To-DS1 (To Line)
Electrical	DCE

**8UDTEA (RS232/RS422/RS485) Universal Data Interface Card**

Data Port	8 port UDTE card
ASYNC Data Rate	200,300, 600, 1200, 2400, 4800, 9600, 19.2K, 38.4K, 57.6K, 115.2K, 128K bps by oversampling
Connector	RJ48C
Interface	DCE only
Flow Control (RS232 only)	Hardware (RTS and DTR), none
Loopback function	DTE to DTE loopback; DTE to Line loopback

**1FOMB\***



Source	MLM Laser	Line Code	Scrambled NRZ
Wavelength	1310 ± 50 nm, 1550 ± 40 nm 50 Km reach	Detector Type	PIN-FET

**NOTE:** Longer or shorter, 15 to 120Km, on special order.

#### Voice Card 12 MAG (Magneto)

Connector	Twelve RJ11
Alarm Conditioning	CGA busy after 2.5 seconds of LOS, LOF
Encoding	A-law or $\mu$ -law, user selectable together for all
Impedance	Balanced 600 or magneto telephone impedance match
Longitudinal Conversion Loss	> 46dB
Gain Adjustment	-21 to +10 dB / 0.1dB step transmit & receive
Signal/ Distortion	> 25dB with 1004 Hz, 0dBm input
Frequency Response	- 0.25 to -1 dB from 300 to 3400 Hz, coincide with ITU-T G.712
Idle Channel Noise	Max. -65 dBm0p
Min Detectable Ringing Voltage	16 Vrms
Ringing Detectable Across	L1 and L2 (Tip and Ring), L1 and GND (Tip and GND)
Ringing Generation	Voltage: 76 Vrms (sine wave) Frequency: 20Hz (with optional choices of 16, 25, 50 Hz) Cadence: 1. Normal: Ring after crank 2. PLAR ON: -Single Ring Type: ring for 2 sec. and stop, or ring for 4 sec. and stop -Continuous Ring Type: 1 sec on 2 sec off, or 2 sec on 4 sec off
Ringing Send Across	L1 and L2 (Tip and Ring), L1 and GND (Tip and GND)
Signaling	Magneto MRD(Ringing across Tip and Ring or Tip and Ground)
Signaling Bit A,B,C,D	Programable

Signaling is carried transparently by the digitizing process.  
Use Magneto card default setting for communications between magneto telephones  
Use Magneto card PLAR mode setting for communications between a magneto telephone and a regular telephone

#### Voice Card- E&MA (8EMA)

Connector	Eight RJ45
Alarm Conditioning	CGA busy after 2.5 seconds of LOS, LOF
Encoding	A-law or $\mu$ -law, user selectable together for all
Impedance	Balanced 600 or 900 ohms
Gain Adjustment (Per-port setting)	-16 to +7 dB / 0.1dB step for transmit (D/A) gain -16 to +14 dB / 0.1dB step for receive (A/D) gain
I/O Power Range	A/D Analog input level: -66 dBm (0.00039 Vrms) ~ + 3 dBm (1.09 Vrms) D/A Analog output level: -66 dBm (0.00039 Vrms) ~ + 4 dBm (1.22 Vrms)
Gain Variation	± 0.5 dB at 0 dBm0 input
Frequency Response	± 0.5 dB at 0 dBm0 input
Longitudinal Conversion Loss	> 46dB
Total Distortion	> 35 dB at 0 dBm0 input
Idle Channel Noise	Max. -65 dBm0p
Carrier Connection	Side A ( exchange side) and Side B (carrier side) setup by side switch
Wire Mode	2 wire and 4 wire (programmable)
Signaling	Type 1, Type 2, Type 3, Type 4, and Type 5, Transmit only (programmable)
Modems	Full compatibility with V.90 modems
Output Power on E/M leads	-48Vdc

All in-band signaling tones are carried transparently by the digitizing process.  
Customer is responsible for in-band signaling compatibility between a telephone and a switch, or between a PBX and a switch.

#### Voice Card (12FXSA, 24FXS, 24FXO)

12 FXS/FXO Connector	Twelve RJ11
24 FXS/FXO Connector	One RJ21X femail connector
Alarm Conditioning	CGA busy after 2.5 seconds of LOS, LOF
Encoding	A-law or $\mu$ -law, user selectable together for all
AC Impedance	Balanced 600 or 900 ohms (selectable together for all)
Longitudinal Conversion Loss	> 46dB
Cross talk measure	Max -70dBm0

Gain Adjustment	FXS: -21 to +3 dB / 0.1dB step transmit & receive FXO: -21 to +10 dB / 0.1dB step transmit & receive
Signal/ Distortion	> 25dB with 1004 Hz, 0dBm input
Frequency Response	- 0.25 to -1 dB from 300 to 3400 Hz, coincide with ITU-T G.712
Idle Channel Noise	Max. -65 dBm0p
Variation of Gain	±0.5dB
FXO	Ringing REN 0.5B (AC) Detectable Ringing 25 Vrms Loop Resistance ≤ 1800 Ω DC Impedance (ON-HOOK) > 1M Ω DC Impedance (OFF-HOOK) 235 Ω @ 25mA feed 90 Ω @ 100mA feed
FXS Loop Feed	-48Vdc with 25mA current limit per port Jumper Selectable: 25mA(default=25mA), 30mA, or 35mA(sn=S1)
FXS Signalling	Normal / PLAR: Private Line Auto Ring down
FXS Ringing	1 REN at 5K meters per port 16.7Hz, 20Hz, 25Hz, 50Hz, user selectable for all ports Jumper selectable: 64, 76, and 85 Vrms (triangle wave), (default= 76 Vrms for Ring Voltage) 2 sec on 4 sec off, or 1 sec on 2 sec off optional for PLAR ON
FXS Tone	Alarm Tone: 480Hz/620Hz/-24dBm Ring Back Tone: 440Hz/480Hz/-19dBm
FXS functions	Basic functions: Bettary Reverse, Loop Star, PLAR Optional functions: PLAR ON/PLAR bit programmable, Ground Start, and/or Meter Pulse.
Signaling Bit A,B,C,D	Programable bit
	<ul style="list-style-type: none"> <li>All in-band signaling tones are carried transparently by the digitizing process.</li> <li>Customer is responsible for in-band signaling compatibility between a telephone and a switch, or between a PBX and a switch.</li> </ul>

TDMoEA\*

**Combo Gigabit Ethernet(GbE) Interface**

Number of Ports	2
Speed	10/100/1000M bps
Connector	RJ45 for twisted pair GbE, LC for optical GbE, auto detection

**Gigabit Ethernet(GbE) Interface**

Number of Port	2
Speed	10/100/1000 BaseT
Connector	RJ45

**Ethernet Function**

Basic Features	MDI/MDIX for 10/100/1000M BaseT auto-sensing Ping function contained ARP Per port, programmable MAC hardware address learn limiting (max. MAC table 8192 (8k) entries) Packet Delay Variation: <ul style="list-style-type: none"> <li>- Unframed T1: Up to 340 ms</li> <li>- Framed T1: Up to 256 ms</li> <li>- E1: up to 256 ms</li> <li>- Framed T1 with CAS: Up to 192 ms</li> </ul>
Packet Transparency	Packet transparency support for all types of packet types including IEEE 802.1q VLAN and 802.1ad (Q-in-Q)
QoS	User configurable 802.1p CoS, ToS in out going IP frame
Traffic Control	Ingress packet Rate limiting buckets per port for ethernet port Supporting Rate-based and Priority-based rate limiting for LAN port Granularity: <ul style="list-style-type: none"> <li>a. From 64 Kbps to 1 Mbps in increments of 64 Kbps</li> <li>b. From 1 Mbps to 100 Mbps in increments of 1 Mbps</li> <li>c. From 100 Mbps to 1000 Mbps in increments of 10Mbps</li> </ul> <p>Pause frame issued when the traffic exceeding the limited rate before packet dropped following IEEE802.3X</p>
Link Aggregation	WAN support link aggregation

**Jitter & Wander**

PPM: per G.823 Traffic

**Standard Compliance**

IETF	TDMoIP (RFC5087), SAToP (RFC4553), CESoPSN (RFC5086)
IEEE	802.1q, 802.1p, 802.1d, 802.3, 802.3u, 802.3x, 802.3z, 802.1s, 802.1w, 802.1AX

**OCU/DP Interface\***

Ports	8 Ports for each card
Line Status Indicator	Per Port 1 dual color LED; Red for LOS, Green for SYNC
Network Connector	RJ48S
Electrical network connection	Tip/Ring and Tip1/Ring1
Transmit Source Impedance	135 Ohms +/- 20%
Receive Input Impedance	135 Ohms +/- 20%
Receiver Sensitivity/ Dynamic Range	0 to 43 dB loop loss at 72K & 56K 0 to 34 all other rates Automatic line equalization
Pulse Amplitude	+/- 1.5 V (+/- 10%) peak, all rates except 9.6k +/- 0.75 V (+/- 10%) peak at 9.6k Bipolar Return to zero, 50% duty cycle
Sealing Current	Typically 16 mA DC
Operating Modes	4-wire DDS Switched 56 support is optional.
Circuit Rates	SYNC: 2.4, 4.8, 9.6, 19.2, 56, 72kbps (64k) clear channel Conforms with AT&T Pub 41458
Encoding and decoding rules	Use bipolar violation to indicate control information: Idle, out of service, Zero substitution using unframed loops
Maintenance control	DSU Non-latching loop-back code (for 2.4, 4.8, 9.6, 19.2, 56k circuit rate) DSU Latching loop-back (TIP, LSC, LBE, FEV) code (for 72k circuit rate)

	rate)
	Machine maintenance OCU/DP card* operation: Payload loopback OCU loopback Local loopback Bi-directional loopback V.54 remote loopback code Custom defined remote loopback code BERT test support all ones, all zeros, 2047, 511, 63 pattern. LOS, OOS, ES, SES and UAS alarm. Current, last 96 registry and 7 days performance storage.
Fault and Performance	Operating: 0-50°C Storage: -25-75°C
Environment	Humidity: Up to 90% RH non-condensing
Specification Standard	ANSI T1.410; AT&T Pub 62319, AT&T Pub 62310, ITU-T V.54

**Conference Card**

<b>RS232 Interface</b>	
Data Port	2-ports per card
ASYNCR Data Rate	300, 600, 1.2K, 2.4K, 4.8K, 9.6K, 19.2K
SYNC	not supported
Connector	Two DB9, DCE, female
<b>FXSA Voice Interface</b>	
Connector	Two RJ11
Encoding	G.723
Longitudinal Conversion Loss	> 46dB
Cross Talk Measure	Max -70dBm0
Gain Adjustment	transmit (D/A) gain 0, +6dB receive (A/D) gain +6, 0, -6dB
Signal/ Distortion	> 25dB with 1004 Hz, 0dBm input
Idle Channel Noise	Max. -65 dBm0p
Loop Resistance	Max 1800 ohm
FXS Loop Feed	-48 Vdc with 25mA current limit
FXS Ringing	2 REN 20Hz 76 Vrms 2 sec on / 4 sec off for 1 min, or 1 sec on / 2 sec off for 30 sec (programmable)
Signaling	Loop Start, DTMF
<b>E&amp;M Voice Interface</b>	
Connector	Two RJ45
Encoding	G.723
Impedance	Balanced 600 ohms
Longitudinal Conversion Loss	> 46dB
Gain Adjustment	transmit (D/A) gain 0, +6dB receive (A/D) gain +6, 0, -6dB
Signal/Distortion	> 25dB with 1004 Hz, 0dBm input
Idle Channel Noise	Max. -65 dBm0p
Carrier Connection	Side A = exchange side, Side B = carrier side (Jumper selectable)
Phone line power+12V	Type P (Jumper enable)
Operation mode	Master, standard (Jumper selectable)
Wire Mode	4 wire
Signaling Type	Type 1, Type 4, and Type 5 (Jumper selectable)
EM Ringing	Single rainging for 5 sec only 2 sec on / 4 sec off for 1 min, or 1 sec on / 2 sec off for 30 sec (programmable)

**EoW with VoIP Technology\***

<b>Data Networking</b>	
Router or Bridge Mode of Operation	
<b>Voice Gateway</b>	
SIPv2	Session Initiation Protocol Version 2 (RFC3261, 3262, 3263, 3264)
Voice Algorithms	G.711 (A-law and mu-law)
Attenuation	Gain Adjustments

**Physical Interfaces**

Two RJ-45 Port Ethernet 100BaseT Interface (IEEE 802.3)  
 Two RJ-11 FXS Port For Analog Circuit Telephone Device (Tip/Ring)

**Subscriber Line Interface Circuit(SLIC)**

Ring Voltage 40 – 55 V<sub>RMS</sub> Configurable  
 Ring Frequency 10Hz – 40Hz  
 Ring Waveform Trapezoidal and Sinusoidal  
 Max. Ringer Load 3 REN  
 On-hook/off-hook Characteristics  
 On-hook voltage (tip/ring) : -50 V<sub>NOMINAL</sub>  
 Off-hook current : 20 mA min  
 Terminating Impedance : 600 ohms

**Regulatory Compliance**

FCC Part 15 Class B  
 CE Mark  
 ICES-003  
 ESD level Class B  
 Air: ± 8Kv  
 Contact: ± 4Kv

**Power Supply**

DC Input Voltage: +5 VDC at 2.0 A Max.  
 Power Consumption 5 Watts

**Indicator Lights**

Indicator Lights/LED Power

**Storage Temperature**

Storage Temperature -13°F to 185°F (-25°C to 85°C)

**Unit Dimensions**

W x H x D 122.5mm x 43.7mm x 92.8mm

**System Clock**

Clock Source Internal clock  
 4 aggregate lines clocks (STM-1/4 (OC-3/12))  
 6 tributary clocks  
 1 external input clocks (ITU-T G.703 - 2.048 MHz or E1 or T1)  
 1 PPS\*  
 SyncE\* (over Ethernet interface on PTN10G)

Clock Output 1 external output (E1 or T1)  
 1 ToD/PPS\*

**Management Interface**

LED Multi colors  
 Console Electrical: RS232  
 Connector: DB9S (DCE)  
 Protocol: Menu driven VT-100  
 SNMP SNMPv1, v3 (RFC1213, RFC2863, RFC1493)  
 OSS interface 10/100BaseT FE (IEEE 802.3u )  
 NE/NE interface DCC/HDLC/Ethernet type II

**Alarm Input/Output****Inputs**

Channel 4  
 Connector RJ45  
 Internal Resistance 1K  
 Activation Current 3 mA  
 Deactivation Current 1.5 mA  
 Allowable Current 4 mA

**Outputs**

Channel 4  
 Connector RJ45  
 Initial Insulation Resistance Min. 100M ohm (at 500Vdc)  
 Maximum switching voltage 110 V DC, 125 V AC

**Diagnostics****XCU card**

Loopback Test Local loopback, payload loopback, line loopback  
BERT Test Optical interface Direction: to optical lines

**B155/622 card**

Loopback Test Local loopback, payload loopback, line loopback:  
BERT Test Optical interface Direction: to optical lines

**E1/T1 card**

Loopback Test Local loopback, line loopback:  
BERT Test E1/T1 interface Direction: to optical lines, to tributary lines

**7 FOM card**

Optical Fiber Local and remote loopbacks  
E1 Test Pattern To optical direction or backplane direction

**Performance Monitor**

Performance Reports Performance Parameters: Error Block (EB), Background Block Error (BBE), Error Second(ES), Burst Error Second (BES), Severe Error Second (SES), Unavailable Second(UAS)

Alarm History System Alarm Alarm Cut Off, Power Loss/Uneq, Fan Fail, Fan Module Uneq, Overheat, TS Sync Loss, Logon and Logout, Optical Port Uneq, Card In, Card Out, Card Type Mismatch, Card Port Number Mismatch, Card Fail, Card Registration, SNCP Switch, MSP Switch, Trib Protection Sync, Standby XCU Takeover, Standby Trib Takeover, XCU Sync, SFP Tx Fail, SFP Rx Fail, SFP Temperature, LS Protection, LS ID Mismatch

SDH/SONET  
Line Alarm

SDH Line PI-LOS RS-LOF RS-TIM MS-SD MS-SF MS-AIS MS-RDI MS-REI B1-BIP B2-BIP

Ho-Path AU-LOP AU-AIS HP-SD HP-SF HP-UNEQ HP-PLM HP-TIM HP-RED-P HP-RDI-S HP-RDI-C HP-LOM HP-REI

Lo-Path TU-LOP TU-AIS LP-SD LP-SF LP-UNEQ LP-PLM LP-TIM LP-RDI-P LP-RDI-S LP-RDI-C LP-REI LP-BIP

Alarm History SONET Line LOS-PI, LOF-S, TIM-S, SD-L, SF-L, AIS-L, RDI-L, REI-L UAS, B1-BIP, B2-BIP

STS-Path LOP-P, AIS-P, SD-P, SF-P, UNEQ-P, PLM-P, TIM-P, RDI-P-P, RDI-S-P, RDI-C-P, RDI-P-P, LOM-P, REI-P, B3-BIP-P

VT-Path LOP-V, AIS-V, SD-V, SF-V, UNEQ-V, PLM-V, TIM-V, RDI-P-V, RDI-S-V, RDI-C-V, REI-V, BIP-V

Alarm Queue Contains up to 300 alarm records of latest alarm types, alarm severity, date, and time.

**Electrical**

DC Power Single/ Dual power module, -48 Vdc: -36 to -72 Vdc  
Single/ Dual power module, 48/125 Vdc: 36 to 140 Vdc, 300 Watts max.

**Physical and Environmental**

Dimensions for 6U 433mm x264mm x 223.5mm (W/H/D)  
Temperature 0 to 50°C  
Humidity 0-95%RH (non-condensing)  
Mounting Desk-top stackable, 19/23 inch rack mountable

**Certifications**



EMI/EMC	EN55022 Class A, EN55024 FCC Part 15 Class A,
Safety	IEC60950-1, IEC 61850-3, IEEE 1613

**Note for IEC 61850-3 and IEEE1613:**

- (1) The certification only applies to O9500-R with 48Vdc/150W power module
- (2) The magento card does not support IEC 61850-3 and IEEE 1613
- (3) Use shielding cable with the following modules:

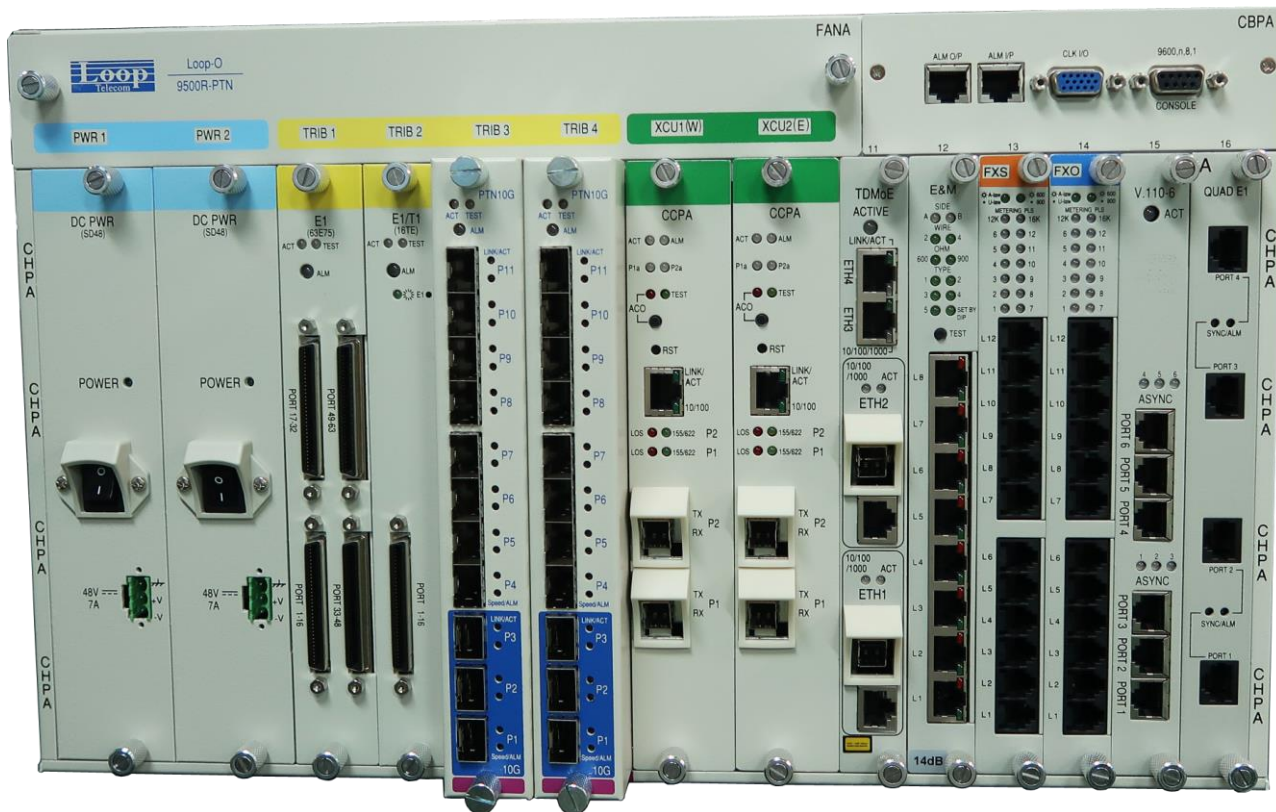
- RS232-X.50 module
- DTE of Conference module
- Input Port of Dry Contact module
- RS232 X.50-8 module
- SNMP of XCU
- Console port of XCU
- Input Port of Dry Contact B module

**Standards Compliance**

ITU-T	G.707, G.7041, G.7042, G.775, G.783, G.806, G.823, G.747, X.86, G.664,
ANSI	T1.105, T1.107
IEEE	802.1q (VLAN), 802.1w (RSTP), 802.1s(MSTP), 802.1ad (stack VLAN), 802.3x (flow control), 802.1p (QoS), 802.1AX

\* Future option

## Front Panel View of O9500R-PTN



High Speed Tributary Cards Without Protection

Slot	Plug-in Card	E1/T1	E3/T3	7FOM	9EoS4SW		4GESW	PTN*		Optical (SFP)		
					FE	GbE	GbE	10G	1G	STM-1/OC-3	STM-4/OC-12	STM-16/OC-48
H S	TRIB 1	63/32/16	3	7	8	1	X	X	X	2	1	X
	TRIB 2	63/32/16	3	7	8	1	X	X	X	2	X	X
	TRIB 3	63/32/16	3	7	8	1	4	3	8	2	1	X
	TRIB 4	63/32/16	3	7	8	1	4	X	X	2	X	X
	XCUI 1	X	X	X	X	X	X	X	X	2	2	2
	XCUI 2	X	X	X	X	X	X	X	X	2	2	2
	Maximum Port of Each Interface	252	12	28	32	4	8	3	8	12	6	4

High Speed Tributary Cards With Protection

Slot	Plug-in Card	E1/T1	E3/T3	7FOM	9EoS4SW		4GESW	PTN*		Optical (SFP)		
					FE	GbE	GbE	10G	1G	STM-1/OC-3	STM-4/OC-12	STM-16/OC-48
H S	TRIB 1	63/32/16	3	7	8	1	X	X	X	2	1	X
	TRIB 2	63/32/16 (B)	3(B)	7 (B)	8 (B)	1 (B)	X	X	X	2 (B)	1 (B)	X
	TRIB 3	63/32/16	3	7	8	1	4	3	8	2	1	X
	TRIB 4	63/32/16 (B)	3(B)	7 (B)	8 (B)	1 (B)	4	3	8	2 (B)	1 (B)	X
	XCUI 1	X	X	X	X	X	X	X	X	2	2	2
	XCUI 2	X	X	X	X	X	X	X	X	2 (B)	2 (B)	2 (B)
	Maximum Port of Each Interface	126	6	14	16	2	4	6	16	6	4	2

(B) backup/protection

\* Future option

## Loop-O9500R Card Type and Capacity Reference Table

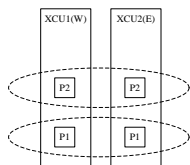
**Table 1 STM-1/4/16 (OC3/12/48) Aggregate Line**

In this table, STM-16 can be OC-48, STM-4 can also be OC-12; STM-1 can also be OC-3; E1 can also be T1; and E3 can also be T3.

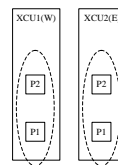
SLOTS	TRIB 1	TRIB 2	TRIB 3	TRIB 4	XCU1(W)	XCU2(E)
GLOBAL PAYLOAD SDH	4 X 155M	N/A	4 X 155M	N/A	2 x 2.5G	2 x 2.5G
	2 x 155M	2 x 155M	2 x 155M	2 x 155M		
Tributary (Plug-in Modules)						
Link without MSP	STM-1 (2 ports)	STM-1 (2 ports)	STM-1 (2 ports)	STM-1 (2 ports)	STM-1/4/16 (2 ports)	STM-1/4/16 (2 ports)
	STM-4	N/A	STM-4	N/A	STM-1/4/16 (2 ports)	STM-1/4/16 (2 ports)
Link with MSP (1+1) <i>See Note 2</i>	STM-1 (2 ports)	STM-1 (2 ports) (B) <sup>Note1</sup>	STM-1 (2 ports)	STM-1 (2 ports) (B) <sup>Note1</sup>	STM-1/4/16 (2 ports)	STM-1/4/16 (2 ports)
	STM-4	STM-4 (B) <sup>Note1</sup>	STM-4	STM-4 (B) <sup>Note1</sup>	STM-1/4/16 (2 ports)	STM-1/4/16 (2 ports)
Max 252 E1 (Single)	63 E1	63 E1	63 E1	63 E1		
Max 126 E1 (Protection)	63 E1	63 E1 (B) <sup>Note1</sup>	63 E1	63 E1 (B) <sup>Note1</sup>		
Max. 12 E3 (Single)	3 E3	3 E3	3 E3	3 E3		
Max 6 E3 (Protection)	3 E3	3 E3 (B) <sup>Note1</sup>	3 E3	3 E3 (B) <sup>Note1</sup>		
Max 32 10/100 BT 4x 1000BT (Single)	8x10/100BT 1 x 1000BT	8x10/100BT 1 x 1000BT	8x10/100BT 1 x 1000BT	8x10/100BT 1 x 1000BT		
Max 16 10/100 BT 2 x 1000 BT (Protection)	8x10/100BT 1 x 1000BT	8x10/100BT 1 x 1000BT (B) <sup>Note1</sup>	8x10/100BT 1 x 1000BT	8x10/100BT 1 x 1000BT (B) <sup>Note1</sup>		
Max 6 PTN 10G	N/A	N/A	3x10G PTN	3x10G PTN		
Max 16 PTN 1G			8x1G PTN	8x1G PTN		
Max 28 FOM (Single)	7 FOM	7 FOM	7 FOM	7 FOM		
Max 14 FOM (Protection)	7 FOM	7 FOM (B) <sup>Note1</sup>	7 FOM	7 FOM (B) <sup>Note1</sup>		

**Note 1:** (B) signifies backup/protection

**Note 2:** With MSP (1+1) protection, the protection pair on XCU (W) and XCU (E) are as follows:

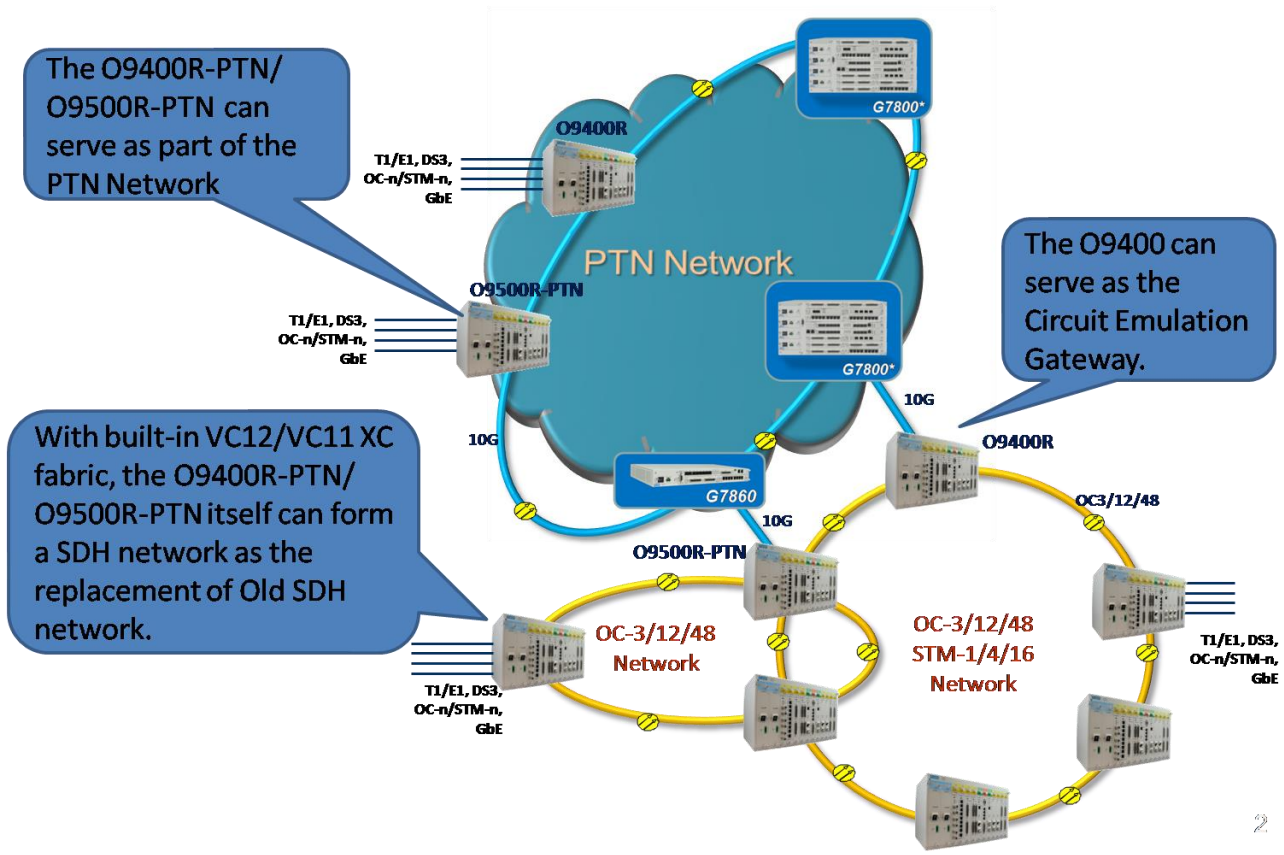


XCU (W) port 1 and XCU (E) port 1  
 XCU (W) port 2 and XCU (E) port 2



XCU (W) port 1 and XCU (W) port 2  
 XCU (E) port 1 and XCU (E) port 2

### Application Illustration



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