



## Description

The Loop-O9500R SDH/SONET IMAP (Integrated Multi-Services Access Platform) is an economical STM-1/4 (OC-3/12) access multiplexer designed to provide integrated access to STM-1/4 (OC-3/12) optical lines. Access is provided through either a non-blocking VC11/VC12/VC3/VC4 cross-connect with HS modules or through an additional non-blocking DS0 cross-connect fabric with LS modules.

## Features

- 6U height, full front access (ETSI) shelf
- TM, ADM and DCS (full cross-connect) at DS0, VC11, VC12, VC3, VC4
- Dual STM-1/4 (OC-3/12) Optical Ring uplinks
- Hot-swappable cross-connect modules, tributary modules and power modules.
- Tributary Modules (See Table 1 below)
  - High-Speed (High Density) access tributary modules (HS)
  - Low-Speed access tributary modules (LS)
- Power Modules
  - DC Module (-48 Vdc)
  - Dual Power (1+1) Protection
- Protection Scheme
  - Tributary protection
    - E1/T1: card, port, line
    - E3/T3: line
    - B155/622: MSP, SNCP/UPSR
    - Ethernet
    - 7 FOM: line
  - Cross-connect unit (XCU) protection
    - MSP
    - SNCP/UPSR
- DS0-SNCP protection
- External/Internal/Line timing source with SSM
- Ethernet supports GFP, LAPS, VCAT, LCAS and non-LCAS
- Full switched Ethernet capability on EoS with built-in L2 switch card
- Ethernet Order Wire (EOW) using VoIP technology
- Alarm suppression, masking and reports
- Management
  - Console port, VT100 menu-driven
  - SNMP Port
  - Telnet
  - Centralized management with Loop's EMS/iNMS over DCC channel
  - LoopView GUI EMS
  - TMN management(Loop-iNMS) with full FCAPS and end-to-end circuit management
  - SSH
- RoHS compliant

The 6U shelf supports:

- 4 HS tributary module slots
- 6 LS tributary module slots

With up to 10 optical STM-1 (OC-3) or 5 optical STM-4 (OC-12) or 10 electrical STM-1 (OC-3) line interfaces, the Loop-O9500R SDH/SONET IMAP offers service providers a versatile protection schemes including SNCP(UPSR) and MSP(1+1) protection for both ring and linear network topologies. The O9500R can work with the Loop-O9100 and Loop-O9400 in the same topology.

The non-blocking VC11/VC12/VC3/VC4 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 and Fast Ethernet over STM-1/4 (OC-3/12). Fast 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 SDH/SONET IMAP provides full Operation, Administration, Maintenance and Provisioning (OAM&P) functionality.

Users can easily operate the O9500R locally or remotely for centralized management with LoopView (EMS) and Loop-iNMS (Integrated NMS).

**Table 1: Loop-O9500R Tributary Modules**

Tributary Type	Plug-in Interface Cards	Maximum Capacity
High-Speed or High Density Access Tributary Modules (HS)	STM-4 (OC-12) tributaries	1 MSP 1 + 1
	STM-1 (OC-3) tributaries	4 MSP 1 + 1 or 3 Sub-ring SNCP or 6 STM-1 without protection
	63 port E1/T1 tributaries	252 E1/T1 without protection, or 126 E1/T1 with 1+1 card protection
	32 port E1/T1 tributaries	
	16 port E1/T1 tributaries	
	3 port E3/T3 tributaries	12 E3/T3 without protection, or 6 E3/T3 with 1+1 card protection
	EoS (8FE+1GbE) Ethernet card with built-in L2 switch	4 GbE + 32 FE
	EoS (8FE or 1GbE) Ethernet card without L2 switch	4 GbE or 32 FE
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>	
	8-port Bridge/Router	48-port Bridge/Router
	4-channel E1/T1	24/24-channel E1/T1
	3-channel E1	18-channel E1
	2-channel G.SHDSL (2 pairs) without line power	12 channel G.SHDSL (2 pairs) without line power
	4-channel G.SHDSL (1 pairs) without line power	24 channel G.SHDSL (1 pairs) without line power
	8-channel G.703 card at 64 Kbps data rate	48-channel G.703 card at 64 Kbps data rate
	1 or 4 channel C37.94 (low speed optical)	6 or 24 channel C37.94 (low speed optical)
	8-channel RS232/V.24	48-channel RS232/V.24
	8-channel Dry Contact I/O	48-channel Dry Contact I/O
	8-channel Dry Contact I/O type B	48-channel Dry Contact I/O type B
	8-channel 2W/4W E&M	48 channel 2W/4W E&M
	12-channel FXS	72 channel FXS
	12-channel FXO	72 channel FXO
	Conference card	Conference card
	12-channel Magneto	72-channel Magneto
	TDMoE	TDMoE
	8-channel Data Bridge	48-channel Data Bridge
	8-channel UDTEA	48-channel UDTEA
	<b>Low Speed Dual-Slot Cards</b>	
	6-channel V.35	18-channel V.35
	6-channel V.36	18-channel V.36
	6-channel X.21/V.11	18-channel X.21/V.11
	6-channel EIA530/RS449	18-channel EIA530/RS449
	24-channel FXS	72-channel FXS
	24-channel FXO	72-channel FXO

**Notes:** Single-Slot Cards plug into singles slots; Dual-Slot Cards plug into two adjacent single slots

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

Plug-in Card		Slot	TRIB 1	TRIB 2	TRIB 3	TRIB 4	XCU 1	XCU 2	11~16 slot/ per card	Total
E1/T1	For HS slots		63	63	63	63	X	X	X	252 E1/T1
	For LS slots		X	X	X	X	X	X	4E1 4T1	21E1 24T1
Ethernet	FE		8	8	8	8	X	X	X	32
	GbE		1	1	1	1	X	X	X	4
Optical (SFP)	STM-1		2	2	2	2(B)	2	2	X	8
	STM-4		1	1(B)	X	X	2	2	X	4
E3/T3			3	3	3	3	X	X	X	12
7 FOM			7	7	7	7	X	X	X	28
Bridge/Router			X	X	X	X	X	X	8	48
G.SHDSL			X	X	X	X	X	X	2/4	12/24
3 E1			X	X	X	X	X	X	3	18
G.703			X	X	X	X	X	X	8	48
C37.94			X	X	X	X	X	X	1/4	4/24
Dry Contact			X	X	X	X	X	X	8	48
Dry Contact type B			X	X	X	X	X	X	8	48
RS232/V.24			X	X	X	X	X	X	8	48
Conference <small>(Note 1)</small>			X	X	X	X	X	X	6	36
12 FXS/FXO			X	X	X	X	X	X	12	72
12 Magneto			X	X	X	X	X	X	12	72
E&M			X	X	X	X	X	X	8	48
V.35/V.36/X.21			X	X	X	X	X	X	6	18
EIA530/RS449			X	X	X	X	X	X	6	18
24 FXS/FXO			X	X	X	X	X	X	24	72
TDMoE			X	X	X	X	X	X	4	24
Data Bridge			X	X	X	X	X	X	8	48
8 UDTA			X	X	X	X	X	X	8	48

**X:** not applicable

**(B)** Backup

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

## 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-CHA-G	6U height Rack chassis for O9500R w/o CPU and power	
<b>Plug-in modules</b>		
Loop-O9500-R-CC4-G	CPU card with cross-connect unit and two STM-1/4 (OC-3/12) interfaces without SFP (mini-GBIC) optical modules	<ul style="list-style-type: none"> <li>• One required for each chassis.</li> <li>• Order two for redundancy.</li> <li>• Please order separately for SFP optical modules from SFP optical brochure</li> </ul>
Loop-O9500-R-CBA-G	Connector Board	<ul style="list-style-type: none"> <li>• CBA or CBB is required for each chassis.</li> <li>• If you need order wire function in CBA, please purchase order wire phone: Loop-O9500-R-OW under accessory section.</li> </ul>
Loop-O9500-R-CBB-G	Connector Board with EoW using VoIP technology	<ul style="list-style-type: none"> <li>• CBA or CBB is required for each chassis.</li> <li>• You can use regular analog phone for order wire function in CBB.</li> </ul>
Loop-O9500-R-FANA-G	Fan Board	One required for each chassis.
<b>High Speed or High Density Tributary Modules</b>		
Loop-O9500-R-16TE-G	16 E1 (120 ohm) or 16 T1 software programmable plug-in card	This card can also be used in the Loop-O9400R.
Loop-O9500-R-32TE-G	32 E1 (120 ohm) or 32 T1 software programmable plug-in card	This card can also be used in the Loop-O9400R.
Loop-O9500-R-63TE-G	63 E1 (120 ohm) or 63 T1 software programmable plug-in card	This card can also be used in the Loop-O9400R.
Loop-O9500-R-16E75-G	16 E1(75 ohm) plug-in card	Order two for redundancy. This card can also be used in the Loop-O9400R.
Loop-O9500-R-32E75-G	32 E1(75 ohm) plug-in card	Order two for redundancy. This card can also be used in the Loop-O9400R.
Loop-O9500-R-63E75-G	63 E1(75 ohm) plug-in card	Order two for redundancy. This card can also be used in the Loop-O9400R.
Loop-O9500-R-B16-G	STM-1/4 (OC-3/12) software configurable plug-in card without SFP (mini-GBIC) optical modules	This card can also be used in the Loop-O9400R.
Loop-O9500-R-9EoS4NSW-G	1 GbE or 8FE software programmable plug-in card without L2 switch	This card can also be used in the Loop-O9400R.
Loop-O9500-R-9EoS4SW-G	1GbE and 8FE plug-in card with L2 switch	This card can also be used in the Loop-O9400R.
Loop-O9500-R-3TE3-G	3 T3 or 3 E3 software programmable interface plug-in card	This card can also be used in the Loop-O9400R.
Loop-O9500-R-7FOM-G	7-port Fiber Optical Interface with 7 SFP housings (SFP not included)	
<b>Software</b>		
Loop-O9500-R-3M13	A software key to activate the 3TE3 module to have M13/Mx3 function for T3 interface only	
Loop-O9500-R-ULSRRing	A software key to activate the ULSR Ring function	<ul style="list-style-type: none"> <li>• Future Option</li> <li>• Used with 4E1, 4T1 cards</li> </ul>

**Low Speed Tributary Modules (Single Slot)**

Loop-O9500-R-4E1-cc- <b>G</b>	4-channel E1 plug-in card.	This card can also be used in the Loop-AM3440-A /B/C. For <b>cc</b> option, please refer to the table below for detail information
Loop-O9500-R-4T1- <b>G</b>	4-channel T1 plug-in card	This card can also be used in the Loop-AM3440-A /B/C.
Loop-O9500-R-3E1-cc- <b>G</b>	3-channel E1 plug-in card with DS0 (64K bps) SNCP protection	For <b>cc</b> option, please refer to the table below for detail information
Loop-O9500-R-2GH- <b>G</b>	2-channel G.SHDSL plug-in card (2 pair)	This card can also be used in the Loop-AM3440-A/B/C.
Loop-O9500-R-4GH- <b>G</b>	4-channel G.SHDSL plug-in card (1 pair)	This card can also be used in the Loop-AM3440-A /B/C.
Loop-O9500-R-8DC- <b>G</b>	8-channel dry contact plug-in card with maximum voltage 100 Vdc or 250 Vac	This card can also be used in the Loop-AM3440-A /B/C.
Loop-O9500-R-8DCB- <b>G</b>	8-channel dry contact type B plug-in card with maximum voltage 220 Vdc or 250 Vac	This card can also be used in the Loop-AM3440-A /B/C.
Loop-O9500-R-8CD- <b>G</b>	8-channel G.703 plug-in card at 64 Kbps data rate	This card can also be used in the Loop-AM3440-A /B/C.
Loop-O9500-R-1C37- <b>G</b>	1- channel C37.94 plug-in card	This card can also be used in the Loop-AM3440-A /B/C
Loop-O9500-R-4C37- <b>G</b>	4- channel C37.94 plug-in card	This card can also be used in the Loop-AM3440-A /B/C.
Loop-O9500-R-8RS232-RJ- <b>G</b>	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	This card can also be used in the Loop-AM3440-A /B/C.
Loop-O9500-R-8RS232-DB- <b>G</b>	8-port RS232 plug-in card with X.50 subrate multiplexing scheme and X.54 encoding, with 2 RJ48 connectors and 2 DB44 connectors for Async and Sync ports	Two conversion cables are included. (Each cable has one DB44 connector to one DB9 and two DB25 connectors). This card can also be used in the Loop-AM3440-A /B/C.
Loop-O9500-R-8DBRA-RJ- <b>G</b>	8-channel data bridge plug-in card, with 8 RJ48 connectors for 8 data bridge Async ports	
Loop-O9500-R-8DBRA-DB- <b>G</b>	8-channel data bridge plug-in card, with 2 RJ48 connectors and 2DB44 connectors for 8 data bridge Async ports	Two conversion cables are included (DB44 connector to two DB25 and one DB9 connector; (Loop-ACC-CAB-DB44M-100-2DB25F-1DB09F-DB).
Loop-O9500-R-RTB- <b>G</b>	8-LAN port/64 WAN ports router/bridge plug-in card	This card can also be used in the Loop-AM3440-A /B/C.
Loop-O9500-R-CONF- <b>G</b>	Conference plug-in card with two RS232 data ports, two FXS ports and two E&M ports	This card can also be used in the Loop-AM3440-A /B/C.
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> </ul>
Loop-O9500-R-8UDTEA- <b>G</b>	8-channel universal data interface card that supports RS232/RS422/RS485 DCE interface via software configurable	This card can also be used in the Loop-AM3440-A /B/C.
Loop-O9500-R-8EM-x- <b>G</b>	8-channel 2W/4W E&M plug-in card with 8 RJ45	"8EM" card with H/W ver. F (and later versions), F/W V4.01.01 (and later versions) can also be used in the Loop-AM3440-A /B/C. For <b>x</b> option, please refer to the table below.

Loop-O9500-R-12MAG-1G-x-G	12-channel Magneto plug-in module w/ L1. GND	12MAG-1G2 includes all function of MAG cards. For <b>x</b> option, please refer to the table below for detail information.
Loop-O9500-R-12MAG-12-x-G	12-channel Magneto plug-in module w/ L1,L2	
Loop-O9500-R-12MAG-1G2-x-G	12-channel Magneto plug-in module w/ L1,L2 and L1. GND	
Loop-O9500-R-12MAG-A-1G-x-G	12-channel Magneto ring-one-time plug-in module w/ L1. GND	12MAG-A-1G2 includes all function of 12MAG-A cards.
Loop-O9500-R-12MAG-A-12-x-G	12-channel Magneto ring-one-time plug-in module w/ L1, L2	
Loop-O9500-R-12MAG-A-1G2-x-G	12-channel Magneto ring-one-time plug-in module w/ L1, L2, and L1. GND	
Loop-O9500-R-12FXS-sn-pt-G	12-channel FXS plug-in card with 600/ 900 Impedance, Battery Reverse, PLAR, without Ground Start and Metering Pulse. Used with 12 RJ11.	12FXS-GMP includes all FXS Card functions.  "12FXS-x" cards with H/W ver. <b>L</b> and F/W V.3.01.01 or newer versions. It can also be used in the Loop-AM3440-A /B/C  For <b>sn</b> option, please refer to the table below for detail information.  <b>pt</b> = power type  For <b>pt</b> option, please refer to the table below for detail information
Loop-O9500-R-12FXS-P-sn-pt-G	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.	
Loop-O9500-R-12FXS-M-pt-G	12-channel FXS plug-in card with 600/ 900 Impedance, Battery Reverse, PLAR, [Metering Pulse]. Used with 12 RJ11.	
Loop-O9500-R-12FXS-MPP-pt-G	12-channel FXS plug-in card with 600/ 900 Impedance, Battery Reverse, PLAR and PLAR bit programmable function, [Metering Pulse]. Used with 12 RJ11.	
Loop-O9500-R-12FXS-GS-pt-G	12-channel FXS plug-in card with 600/ 900 Impedance, Battery Reverse, PLAR, [Ground Start] . Used with 12 RJ11.	
Loop-O9500-R-12FXS-GM-pt-G	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-pt-G	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.	
Loop-O9500-R-12FXO-G	12-channel FXO plug-in card with 600/ 900 Impedance, Battery Reverse, without Ground Start and Metering Pulse. Used with 12 RJ11.	
Loop-O9500-R-12FXO-M-G	12-channel FXO plug-in card with 600/ 900 Impedance, Battery Reverse, [ Metering Pulse ] Used with 12 RJ11.	
Loop-O9500-R-12FXO-GS-G	12-channel FXO plug-in card with 600/ 900 Impedance, Battery Reverse, [ Ground Start ] Used with 12 RJ11.	
Loop-O9500-R-12FXO-GM-G	12-channel FXO plug-in card with 600/ 900 Impedance, Battery Reverse, [ Ground Start, and Metering Pulse ] Used with 12 RJ11.	

#### Low Speed Tributary Modules (Dual Slots)

Loop-O9500-R-6X21A-G	6-channel X.21/V.11 card with DB15 connector	These cards will occupy two slots. These cards can also be used in the Loop-AM3440-A /B/C.
Loop-O9500-R -6V35A-G	6-channel V.35 plug-in card with DB25S connector, for M34. (2Mbits per channel)	



	Please order conversion cable connector below.	
Loop-O9500-R -6V36A-G	6-channel V.36 card with DB25 connector via conversion cable to DB37	
Loop-O9500-R-6E530A-G	6-channel EIA530 plug-in card with DB25 connector	
Loop-O9500-R-6RS449A-G	6-channel EIA530/RS449 plug-in card with DB25 connector via conversion cable to DB37	
Loop-O9500-R-24FXS-sn-pt-G	24-channel FXS plug-in card with 600/900 Impedance, Battery Reverse, Loop Start and PLAR Without Ground Start and Metering Pulse	<p>24FXS-GMP includes all FXS card functions.</p> <p>These cards will occupy two slots. These cards can also be used in the Loop-AM3440-A /B/C</p> <p>For <b>sn</b> option, please refer to the table below for detail information</p> <p><b>pt</b>=power type</p> <p>For <b>pt</b> option, please refer to the table below for detail information</p>
Loop-O9500-R-24FXS-P-sn-pt-G	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	
Loop-O9500-R-24FXS-M-pt-G	24-channel FXS plug-in card with 600/900 Impedance, Battery Reverse, Loop Start, PLAR and [Metering Pulse].	
Loop-O9500-R-24FXS-MPP-pt-G	24-channel FXS plug-in card with 600/900 Impedance, Battery Reverse, Loop Start, PLAR, [PLAR bit programmable] and [Metering Pulse].	
Loop-O9500-R-24FXS-GS-pt-G	24-channel FXS plug-in card with 600/900 Impedance, Battery Reverse, Loop Start, PLAR and [Ground Start].	
Loop-O9500-R-24FXS-GM-pt-G	24-channel FXS plug-in card with 600/900 Impedance, Battery Reverse, Loop Start, PLAR, [Ground Start] and [Metering Pulse].	
Loop-O9500-R-24FXS-GMP-pt-G	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-G	24-channel FXO plug-in card with 600/900 Impedance, Battery Reverse and Loop Start. Without Ground Start and Metering Pulse	<p>24FXO-GM includes all FXO card functions.</p> <p>These cards will occupy two slots. These cards can also be used in the Loop-AM3440-A /B/C</p>
Loop-O9500-R-24FXO-M-G	24-channel FXO plug-in card with 600/900 Impedance, Battery Reverse, Loop Start and [Metering Pulse].	
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].	

### Accessories

#### SFP Optical Modules




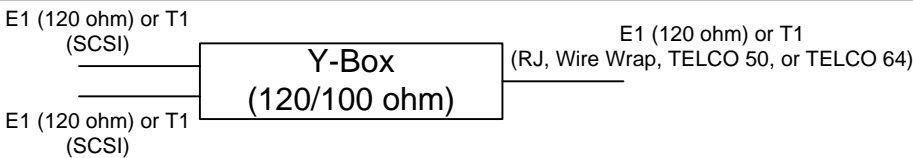
Please place your order using the 5-digit alphanumeric codes listed in the separate SFP Optical Module Brochure.

#### User's Manual

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

#### Power Modules

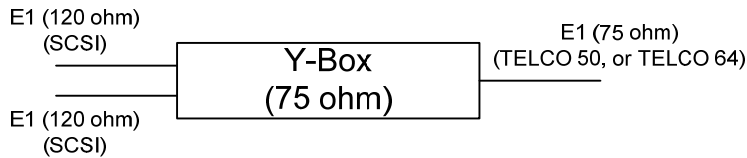
Loop-O9500-R-SD48-G	Single power module -48Vdc	For redundancy purposes, order 2 single DC.
Loop-O9500-R-SD48/125-G	Single power module (300W) Input, 48Vdc/125Vdc (36 to 140Vdc)	For redundancy purposes, order 2 single DC. (Future Option)
Loop-O9500-R-SD125/250-G	Single power module (300W) Input 125Vdc/250Vdc (100 to 260Vdc)	For redundancy purposes, order 2 single DC. (Future Option)

<b>Power Adaptor</b> (All power adaptor are RoHS compliant)		
Loop-ACC-APA-240- <b>G</b>	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-SD48.
Loop-ACC-APE-240- <b>G</b>	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 <b>**</b>	
Loop-ACC-APU-240- <b>G</b>	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 	
<b>FXO BOX</b>		
Loop-ACC-FXOBOX	Support FXO Interface Feed	
<b>Order wire phone is an option for CBA board</b>		
Loop-O9500-R-OW-USA- <b>G</b>	Ethernet Order Wire phone (using VoIP technology) with America power plug	
Loop-O9500-R-OW-EU- <b>G</b>	Ethernet Order Wire phone (using VoIP technology) with Europe power plug	<b>**</b>
<b>SIP Proxy Server</b>		
Loop-O9500-R-SIP	SIP Proxy Server Basic Software  <b>Note:</b> One SIP Proxy Server License supports up to 25 phone lines. Multiple licenses must be purchased if the number of phone lines exceeds 25.	Customer must provide a MAC address so that a license key can be generated to operate the software at that address.
<b>Mounting Ear</b>		
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.	
<b>Conversion Panels</b>		
Loop-ACC-P-1SCSI-16RJ- <b>G</b>	1u panel for one SCSI to 16 RJ connectors without cable 432x44x23mm (WxHxD)	Used for: -16TE, -32TE, -63TE This panel can also be used in the Loop-O9400R.
Loop-ACC-P-1SCSI-16WW- <b>G</b>	1u panel for one SCSI to 16 Wire Wrap without cable 432x44x40mm (WxHxD)	Used for: -16TE, -32TE, -63TE, -16E75, -32E75, -63E75 This panel can also be used in the Loop-O9400R.
Loop-ACC-P-1SCSI-16BNC- <b>G</b>	1.5u panel for one SCSI to 16 BNC connectors without cable 432x66x53mm (WxHxD)	Used for: -16E75, -32E75, -63E75 This panel can also be used in the Loop-O9400R.
<b>Y-box Panels for 120/100 ohm</b>		
		
Loop-ACC-Y-2SCSI-16RJ- <b>G</b>	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	Using with Loop-O9500-R-16TE- <b>G</b> ,
Loop-ACC-Y-2SCSI- 16WW- <b>G</b>	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	Using with Loop-O9500-R-16TE- <b>G</b> ,
Loop-ACC-Y-2SCSI-2T50P8-16TE- <b>G</b>	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	Using with Loop-O9500-R-16TE- <b>G</b> ,
Loop-ACC-Y-2SCSI-2T50P12-16TE- <b>G</b>	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	Using with Loop-O9500-R-16TE- <b>G</b> ,



	first TELCO connector, 4 ports to the second TELCO connector ) without cable	
Loop-ACC-Y-2SCSI-1T64P16-16TE- <b>G</b>	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	Using with Loop-O9500-R-16TE- <b>G</b> ,
Loop-ACC-Y-4SCSI-4T50P8-32TE- <b>G</b>	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	Using with Loop-O9500-R-32TE- <b>G</b> , Loop-O9400-R-63TE- <b>G</b>
Loop-ACC-Y-4SCSI-3T50P12-32TE- <b>G</b>	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	Using with Loop-O9500-R-32TE- <b>G</b> , Loop-O9400-R-63TE- <b>G</b>
Loop-ACC-Y-4SCSI-2T64P16-32TE- <b>G</b>	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	Using with Loop-O9500-R-32TE- <b>G</b> , Loop-O9400-R-63TE- <b>G</b>

**Y-box Panels for 75 ohm**



Loop-ACC-Y-2SCSI-2T50P8-16E75- <b>G</b>	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	Using with Loop-O9500-R-16TE- <b>G</b>
Loop-ACC-Y-2SCSI-2T50P12-16E75- <b>G</b>	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 connector, 4 ports to the second TELCO) straight without cable	Using with Loop-O9500-R-32TE- <b>G</b> , Loop-O9500-R-63TE- <b>G</b>
Loop-ACC-Y-2SCSI-1T64P16-16E75- <b>G</b>	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	Using with Loop-O9500-R-16TE- <b>G</b>
Loop-ACC-Y-4SCSI-4T50P8-32E75- <b>G</b>	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	Using with Loop-O9500-R-16TE- <b>G</b>
Loop-ACC-Y-4SCSI-3T50P12-32E75- <b>G</b>	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	Using for Loop-O9500-R-32TE- <b>G</b> , Loop-O9500-R-63TE- <b>G</b>
Loop-ACC-Y-4SCSI-2T64P16-32E75- <b>G</b>	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	Using with Loop-O9500-R-32TE- <b>G</b> , Loop-O9500-R-63TE- <b>G</b>

<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)	Used with 4E1
Loop-VV-R-G	1 for 1 protection Y-Box with RJ48C connectors (16-E1)	Used with 4E1
Loop-VV-T-G	1 for 1 protection Y-Box with RJ48C connectors (16-T1)	Used with 4T1
<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-O9500-R 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 Loop-O9500-R-8DBRA-DB 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 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>		
30.001397.A00LF	Blank panel for CPU slot	
30.001076.A00LF	Blank panel for power supply slots	Same as that used on O9400R.
30.001077.A00LF	Blank panel for High-speed slots (Slots 1~4)	Same as that used on O9400R.
30.001027.A00LF	Blank Panel for Low-speed slots (Slots 11~16)	Same as that used on AM-3440-CHA.

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

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

<b>cc =</b>	<b>Description</b>	<b>Notes</b>
<b>RJ</b>	RJ48C connector	
<b>BNC</b>	BNC connector	

**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.

<b>sn =</b>	<b>Description</b>	<b>Notes</b>
<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.

<b>pt=</b>	<b>Description</b>	<b>Notes</b>
<b>PWR</b>	complied with -48 Vdc (SD48) power modules	
<b>PWRIE1613</b>	complied with IEEE1613 standard, and with -48 Vdc (SD48) power modules	

**For 8E&M Card:**

- Where **x** is used to select all of voice card signaling bits:

8EM	x =	Description	Notes
	<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>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 refer to SFP brochure or contact your nearest Loop sales representative.

**For Magneto Card:**

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

x=	Description	Notes
16	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.
20	20 Hz ring generator	
25	25 Hz ring generator	
50	50 Hz ring generator	

**Firmware Upgrade**

Loop-O9500-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:

card=	Description	Note
<b>CC4</b>	CPU card	
<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 plug-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>RTB</b>	RTB card	
<b>3E1</b>	3-port E1 card	
<b>2GH</b>	2-port G.SHDSL card	
<b>4GH</b>	4-port G.SHDSL card	
<b>TDMoE</b>	TDMoE 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>6V.36A</b>	6-port V.36 card	
<b>6V.35A</b>	6-port V.35 card	
<b>X.21/V.11</b>	6-port X.21 card	
<b>6EIA530/6RS449</b>	6-port EIA530/RS449 card	

**Example:**

**Loop-O9500-R-CHA-G, Loop-O9500-R-CBA-G, Loop-O9500-R-FANA-G, Loop-O9500-R-CC4-G, Loop-O9500-R-63TE-G, Loop-O9500-4E1-RJ, Loop-O9500-R-4GH, Loop-O9500-R-SD48:**

For model O9500 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 SDH/SONET IMAP Product Specification

### High Speed or High Density Tributary Modules

#### **Max. Number of Aggregate Lines**

4 STM-1/4 (OC-3/12) aggregate optical lines or  
4 STM-1 (OC-3) aggregate electrical lines

#### **Max. Number of Tributary Lines**

4 STM-4 (OC-12) tributaries without protection  
8 STM-1 (OC3) tributaries without protection  
12 E3/T3 tributaries without protection  
252 E1/T1 tributaries without protection  
4 GbE +32 FE EoS with build in L2 switch tributaries without protection  
4 GbE or 32 FE EoS without build in L2 switch tributaries without protection  
28 FOM 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 One connector for 16 ports Two connectors for 32 ports Four connectors for 63 ports
Output Mask	Bellcore GR-499-core		

#### **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 One connector for 16 ports Two connectors for 32 ports Four connectors for 63 ports
Output Mask	ETS 300 689 Sec.4.2.1.2 ITU G.703		

#### **E3 Interface**

Line Rate	34.368 Mbps $\pm$ 20ppm	Jitter	ITU G.823
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		

**T3 interface**

Line Rate	44.736 Mbps $\pm$ 20ppm	Jitter	ITU G.824
Line Code	B3ZS	Framing	Unframed, M13/Mx3 (unframed E1/T1), G.747
Input Signal	ITU G.703	Impedance	75 $\Omega$ 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****Fiber Optical Interface**

Port number	7		
Source	Laser	Line Code	Scrambled NRZ
Wavelength	1310 $\pm$ 50 nm, 1550 $\pm$ 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

**Diagnostics Test**

Optical Fiber	Local and remote loopbacks
E1 Link	Local and remote loopback, send test pattern

**Low Speed Tributary Modules****Network Line Interface – 4E1**

Line Rate	2.048 Mbps $\pm$ 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 $\pm$ 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 $\pm$ 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		

**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

**DTE(X.21/V.11) Interface (6X21A)**

Data Port	Up to six 6-port DTE X.21 card; 1-port DTE X.21 card
Data Rate	56 or 64 Kbps, n = 1 to 32
Connector	DB15

**DTE (V.35/ V.36) Interface (6V35A/6V36A)**

Data Port	Up to six 6-port DTE V.35/ V.36 cards
Data Rate	56 or 64 Kbps, n = 1 to 32
Connector	For V.35 card: DB25S (optional conversion cable DB25S to M34 connector) For V.36 card::DB25S (optional conversion cable DB25S to DB37 connector)

**DTE (EIA530/RS449) Interface (6 EIA530A/6RS449A)**

Data Port	Up to six 6-port EIA530 DTE card
Data Rate	56 or 64 Kbps, n = 1 to 32
Connector	DB25S (optional conversion cable DB25S male to DB37 female connector for RS449)

**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 $n \times 64K$ 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						
	Synchronous	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, 48K, 64K						
	Port Number								
Card Type	1	2	3	4	5	6	7	8	
Eight RJ48	Async	Async	Async	Async	Async	Async	Async	Async	Async
Two DB44 + Two RJ48	Async/Sync	Async/Sync	Async	Async/Sync	Async/Sync	Async	Async	Async	Async
Connector	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.

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

Data Port	8 port UDTE card
ASYNCR 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

**Voice Card- E&M**

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
Longitudinal Conversion Loss	> 46dB
Longitudinal Balance	> 63dB
Gain Adjustment (Per-port setting)	-10 to +7 dB / 0.1dB step for transmit (D/A) gain -10 to +14 dB / 0.1dB step for receive (A/D) gain
I/O voice power range	A/D digital input level: -66 dBm (0.00039 Vrms) ~ + 3 dBm (1.09 Vrms) D/A analog output level: -66 dBm (0.00039 Vrms) ~ + 7 dBm (1.74 Vrms)
Signal/Distortion	> 25dB with 1004 Hz, 0dBm input
Frequency Response	- 0.25 to -1 dB from 300 to 3400 Hz
Carrier connection	Side A ( exchange side) and Side B (carrier side) setup by side switch
Idle Channel Noise	Max. -65 dBm0p
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

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 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 (12FXS, 12FXO, 24FXS, 24FXO)**

12 FXS/FXO Connector	Twelve RJ11
24 FXS/FXO Connector	One RJ21X female 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	$\pm 0.5$ dB
FXO	Ringing REN 0.5B (AC) Detectable Ringing 25 Vrms Loop Resistance $\leq 1800 \Omega$ DC Impedance (ON-HOOK) $> 1M \Omega$ DC Impedance (OFF-HOOK) 235 $\Omega$ @ 25mA feed 90 $\Omega$ @ 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: Battery Reverse, Loop Star, PLAR Optional functions: PLAR ON/PLAR bit programmable, Ground Start, and/or Meter Pulse.
Signaling Bit A,B,C,D	Programmable bit

- 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.

**Conference Card****RS232 Interface**

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

**FXS Voice Interface**

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

**E&M Voice Interface**

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)

**TDMoE****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) entry) 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

**EoW with VoIP Technology****Data Networking**

Router or Bridge Mode of Operation

**Voice Gateway**

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))  
                               External clocks: 2.048MHz or 2.048Mbps for STM-1/4, 1.544M bps for OC-3/12

**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)
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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
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SDH/SONET  
Line AlarmSDH    Line    PI-LOS RS-LOF RS-TIM MS-SD MS-SF MS-AIS  
MS-RDI MS-REI B1-BIP B2-BIPHo-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-REILo-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
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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-PVT-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.
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**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. * Single/ Dual power module, 125/250 Vdc: 100 to 260 Vdc, 300 Watts max.*
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**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:

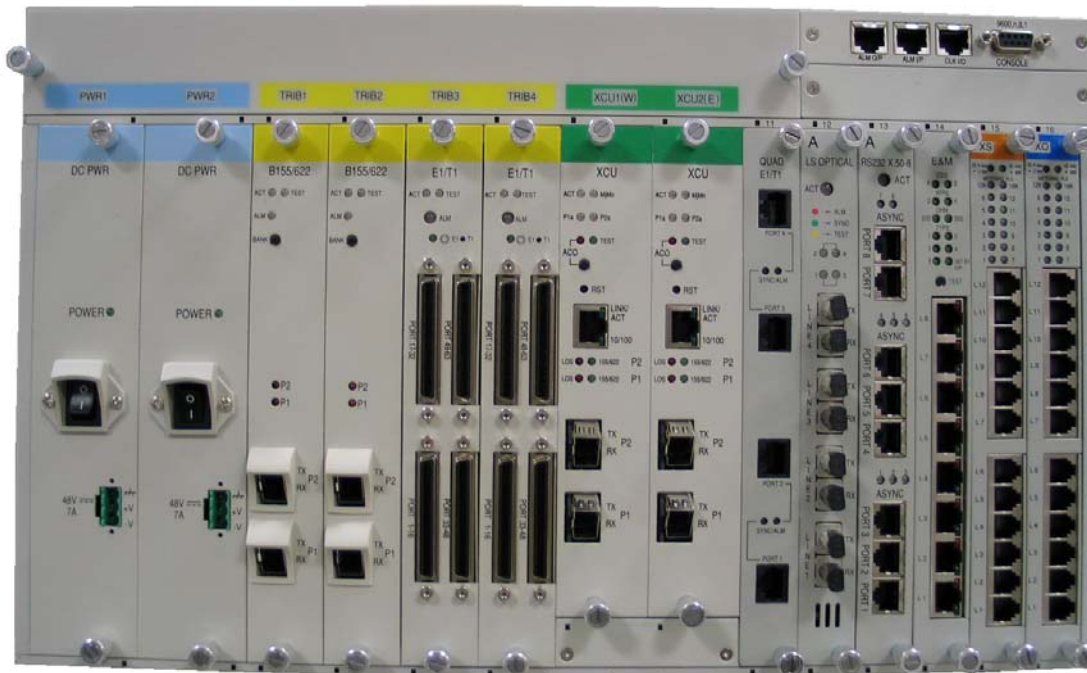
- RS232-X.50 module
- DTE of Conference module
- Input Port of Dry Contact module
- RS232 X.50-8 module
- V.35 module
- V.36/RS449/EIA530 module
- Input Port of Dry Contact B module
- X.21 module
- SNMP of XCU
- Console port of XCU

**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



### O9500R Hardware Configuration Chart on High Speed Slot and CPU

Figure 1: High Speed Tributary Cards Without Protection

Slot	Plug-in Card	E1/T1	E3	7FOM	Ethernet		Optical (SFP)	
					FE	GbE	STM-1/OC-3	STM-4/OC12
HS	TRIB 1	63/32/16	3	7	8	1	2	1 Note 2
	TRIB 2	63/32/16	3	7	8	1	2	
	TRIB 3	63/32/16	3	7	8	1	1	X
	TRIB 4	63/32/16	3	7	7	8	1	1
	XCU 1	X	X	X	X	X	2	2
	XCU 2	X	X	X	X	X	2	2
	Maximum Port of Each Interface	252	12	28	32	4	10	5

Figure 2: High Speed Tributary Cards With Protection

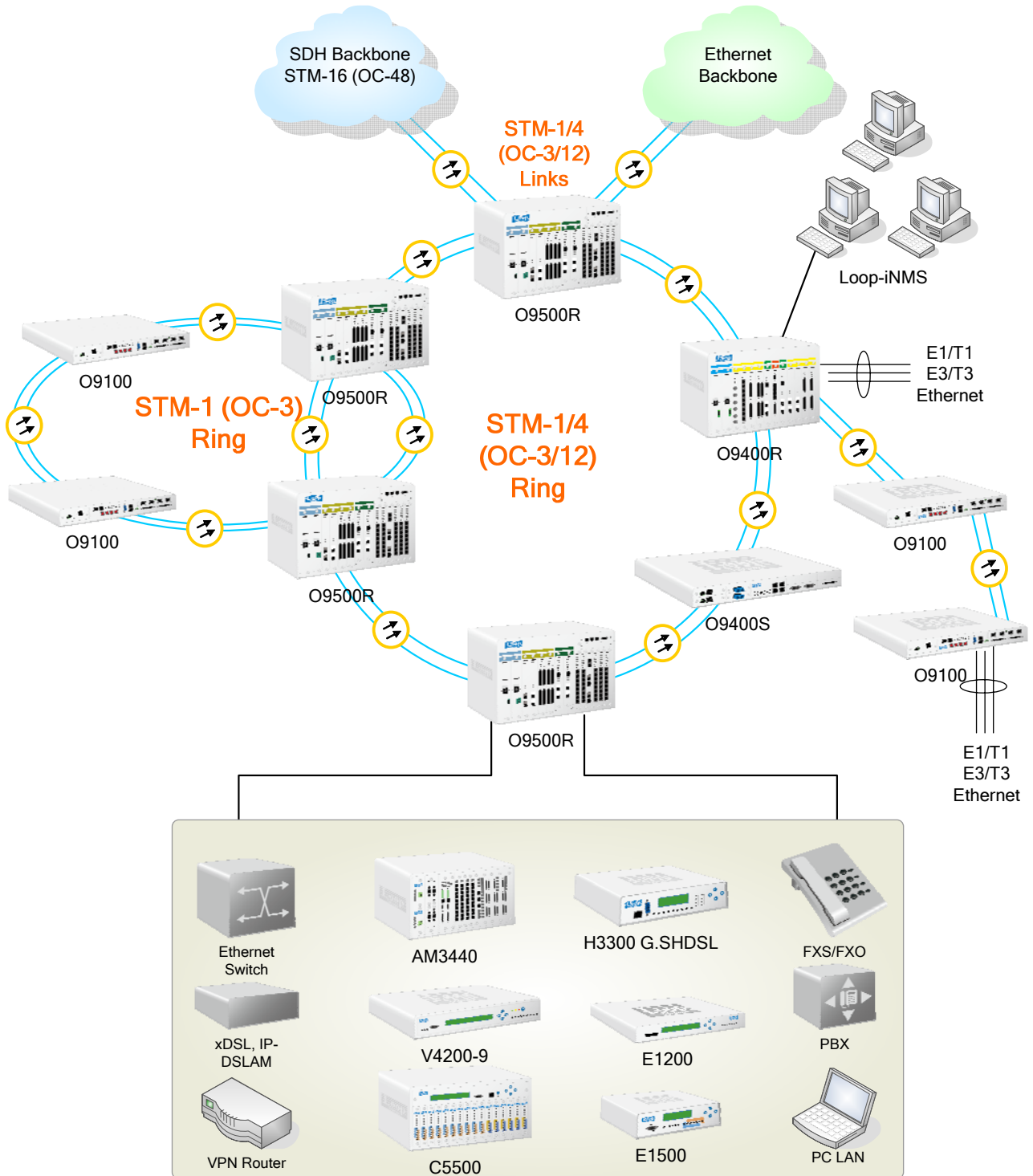
Slot	Plug-in Card	E1/T1	E3	7FOM	Ethernet		Optical (SFP)	
					FE	GbE	STM-1/OC-3	STM-4/OC12
HS	TRIB 1	63/32/16	3	7	8	1	2	1
	TRIB 2	63/32/16 (B)	3(B)	7 (B)	8 (B)	1 (B)	2 (B)	1 (B)
	TRIB 3	63/32/16	3	7	8	1	2	X
	TRIB 4	63/32/16 (B)	3(B)	7 (B)	8 (B)	1 (B)	2 (B)	X
	XCU 1	X	X	X	X	X	2	2
	XCU 2	X	X	X	X	X	2 (B)	2 (B)
	Maximum Port of Each Interface	126	6	14	16	2	6	3

(B) backup/protection

Note 2: To set up STM-4/OC12 without protection, put only one optical-module-with-protection in either TRIB 1 or TRIB2 slot.

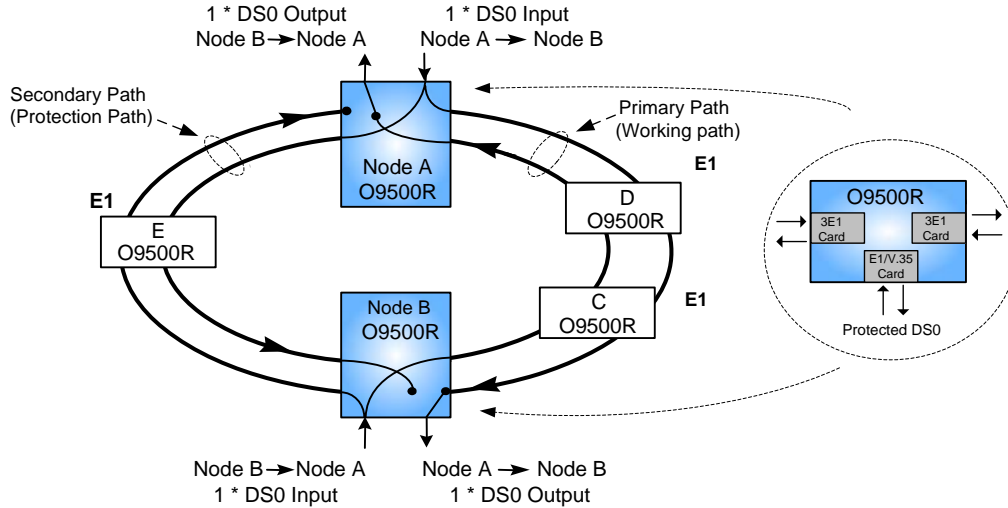
### Application Illustration

The O9500R can be configured as either a Terminal Multiplexer (TM), a Linear Add/Drop Multiplexer (ADM), or as a cross-connect (DACS) within the same enclosure. With UPSR/SNCP and MSP (1+1) protection, the O9500R can easily provide a well-protected transmission path and integrated access in various applications as shown below.

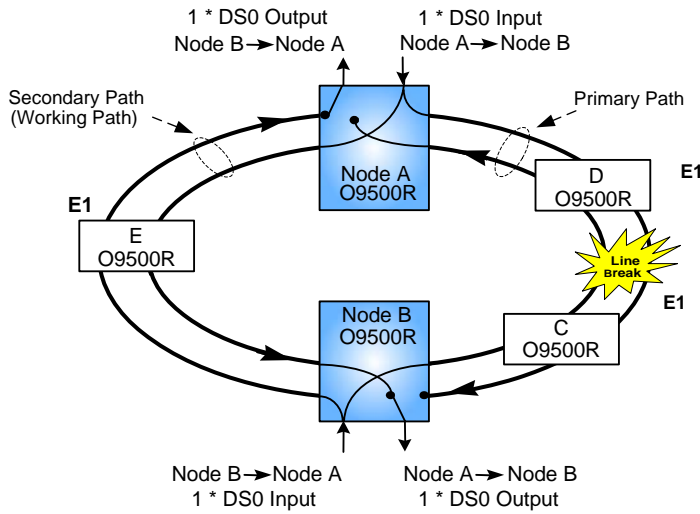


**O9500R with 3E1 cards now can do DS0-SNCP Protection. Below is the DS0-SNCP Protection Architecture.**

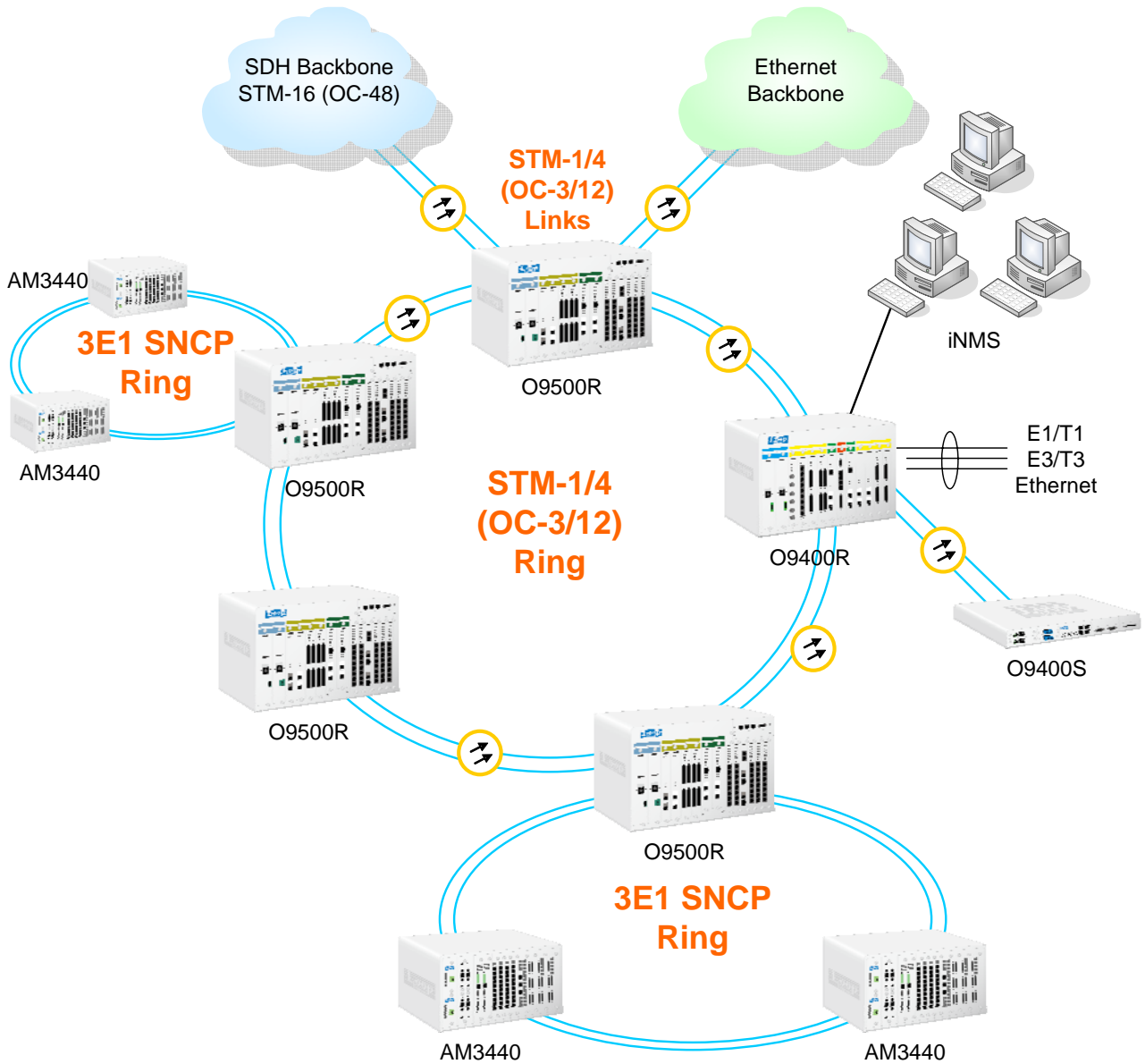
The diagram below illustrates the DS0 signal path in normal condition. The DS0 signal travels on both primary path and secondary path. The primary path is configured to be the working path and the secondary path is configured to be the protection path.



The diagram below illustrates the DS0 signal path in faulty condition. When the primary path is broken, the secondary path will automatically become the working path.



**Circuit Level Protection: O9500R with 3E1 DS0-SNCP ring Protection over ULSR/SNCP ring Application.**



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