DATA COMM FOR BUSINESS

Loop-O9550
SDH/SONET IMAP

Preliminary

Features

- 5U height, full front access (ETSI) shelf
- ADM, TM, and cross-connect
- Single STM-1/4 (OC-3/12) optical ring uplinks
  - Up to four STM-1/4 (OC-3/12) aggregate lines that are software configurable
  - Non-blocking N x 64 Kbps for 252 E1 or 336 T1 for data and voice channel transmission for uplink site
  - Non-blocking N x 64 Kbps for maximum 64 E1 or 52 T1 for data and voice channel transmission for tributary site
- Tributary modules (see Table 1 next page)
- Power Modules:
  - DC Module: (-48Vdc, -24Vdc, -125Vdc)
  - Dual Power: (1+1) Protection
- SSM and CLK hold over function (SDH/SONET and E1/T1)
- Controller protection:
  - MSP (1+1) or SNCP for single controllers
  - MSP (1+1) and SNCP for dual controllers
- Per chassis supports single SDH or SONET Ring only
- A-law to µ-law conversion
- Alarm in/out, clock in/out
- Compatible to a SNMP based GUI network management system and supported by LoopView and Loop iNMS
- SSH V2
- SNMP V1 and V3
- RoHS compliance

The Loop-O9550 SDH/SONET IMAP (Integrated Multi-Service Access Platform) is an economical STM-1/4 (OC-3/12) access multiplexer. It is designed to combine digital access interfaces, including TDM, IP, and voice interfaces into STM-1/4 (OC-3/12) optical lines for convenient transport and switching.

This unit is a full cross-connect; one or more of the WAN ports can be used as a Drop & Insert function with fractional E1/T1 lines, which can be muxed into a full E1/T1 line.

The O9550 provides two optical line signals at STM-1 (OC-3) or STM-4 (OC-12) with protection schemes including MSP (1+1) and SNCP protection in both ring and linear network topologies.

Redundancy is available in dual CPU controllers and power supply options, making the O9550 an excellent fit for critical applications. The chassis does not need or contain fan cooling, though an external fan tray is available.

The O9550 supports local control and diagnostics by using by using a VT-100 terminal connected to the console port. The O9550 also supports Ethernet, Telnet, SSH and SNMP so that it can also be controlled and diagnosed from remote locations. An in-band management channel with GUI is available. LED indicators for all plug-in cards are also available.

Loop-O9550 cards:

The Mini-Slot Cards plug into the Mini-Slots of the O9550. The Single-Slot Cards plug into single slots, and the Dual-Slot Cards plugs into two adjacent single slots.

	Plug-in cards	O9550
Mini-Slot	1-channel E1 (Single E1 interface)	√
	1-channel T1 (Single T1 interface)	√
	Mini Quad E1 (Four E1 interfaces)	√
	Fiber optical interface	√
	2-LAN port.64 WAN port Router-A	√
Single-Slot	3-channel E1	√
	4-channel E1	√
	4-channel T1	√
	2-channel G.SHDSL (2 pairs) w/o line power	√
	4-channel G.SHDSL (1 pair) w/o line power	√
	8-channel G.703 card at 64 Kbps data rate	√
	8-channel Dry Contact I/O type A/B	√
	8-channel 2W/4W E&M	√
	12-channel FXS	√
	12-channel FXO	√
	12-channel Magneto	√
	Conference card	√
	1-channel low speed optical (C37.94)	√
	4-channel low speed optical (C37.94)	√
	8-channel RS232 with X.50 subrate	√
	8-LAN-port/ 64-WAN-port Router-B	√
	4-channel TDMoE	√
	8-channel Data Bridge	√
	1FOMA	√
Dual-Slot	24-channel FXS	√
	24-channel FXO	√
	6-channel X.21/V.11	√
	6-channel V.35	√
	6-channel V.36	√
	6-channel EIA530/RS449 card	√

Note: √ = Supported

× = Not supported

* Future Option

Ordering Information

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

Model (RoHS compliant)	Description	Note
Main Unit		
Loop-O9550-R-CGA-**G**	5U Rack chassis unit without CPU, power and plug-in cards, applicable to use with MSP (1+1), SNCP ring	With O9550-CGA
CPU		
Loop-O9550-R-CC4A-**G**	CPU card with cross-connect unit and two STM-1/4 (OC-3/12) interfaces without SFP (mini-GBIC) optical modules (order two for redundancy) **Single** controller card with MSP 1+1or SNCP ring **Dual** controller cards with SNCP ring and MSP 1+1	One required for each chassis. Order two for redundancy. For **opt** option, please refer to the SFP optical brochure for detail information
Mini Plug-in Module (Select 1 to 4 cards from list below)		
Loop-O9550-R-E75-**G**	1-channel of E1plug-in card w/ 75 ohm	
Loop-O9550-R-E120-**G**	1-channel of E1 plug-in card w/ 120 ohm	
Loop-O9550-R-T1-**G**	1-channel T1 plug-in card	
Loop-O9550-R-M4E75-**G**	Mini Quad E1 plug-in card with 75 ohm	Includes a three meter conversion cable (Loop-ACC-CAB-DB25M-300-8BNCM)
Loop-O9550-R-M4E120-**G**	Mini Quad E1 plug-in card with 120 ohm	Includes a three meter conversion cable (Loop-ACC-CAB-DB25M-300-4RJ48M)
Loop-O9550-R-RTA-**G**	2-LAN ports/64 WAN port router/bridge plug-in card	
Loop-O9550-R-FOM-opt-**G**	Fiber Optical plug-in card	For **opt** option, please refer to the table below for detail information
Single Slot Plug-in Module		
Loop-O9550-R-TDMoE-PPM-**G**	TDMoE card with 2 GbE combo interfaces and 2 Ethernet interfaces (10/100/1000BaseT) plug-in module Support G.823 Traffic	
Loop-O9550-R-TDMoE-PPB-**G**	TDMoE card with 2 GbE combo interfaces and 2 Ethernet interfaces (10/100/1000BaseT) plug-in module Support G.823 Synchronization	
Loop-O9550-R-4E1-cc-**G**	4-channel E1 plug-in card	For **cc** option, please refer to the table below for detail information
Loop-O9550-R-4T1-**G**	4-channel T1 plug-in card	
Loop-O9550-R-2GH-**G**	2-channel G.SHDSL plug-in card (2 pair)	
Loop-O9550-R-4GH-**G**	4-channel G.SHDSL plug-in card (1 pair)	
Loop-O9550-R-8CD-**G**	8-channel G.703 plug-in card at 64 Kbps data rate	
Loop-O9550-R-8DC-**G**	8-channel dry contact plug-in card with maximum voltage 100 Vdc or 250 Vac	
Loop-O9550-R-8DCB-**G**	8-channel dry contact type B plug-in card with maximum voltage 220 Vdc or 250 Vac	
Loop-O9550-R-1C37-**G**	1- channel C37.94 plug-in card	
Loop-O9550-R-4C37-**G**	4- channel C37.94 plug-in card	
Loop-O9550-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	
Loop-O9550-R-8RS232-DB-**G**	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 (DB44 connector to two DB25 and one DB9 connector; (Loop-ACC-CAB-DB44M-100-2DB25F-1DB09F-DB).
Loop-O9550-R-8DBRA-RJ-**G**	8-channel data bridge plug-in card, with 8 RJ48 connectors for 8 data bridge Async ports	
Loop-O9550-R-8DBRA-DB-**G**	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-O9550-R-RTB-**G**	8-LAN ports/64 WAN ports router/bridge plug-in card	

Loop-O9550-R-1FOMA-opt-**G**	1FOMA Fiber Optical Interface with 1x9 optical port	For **opt** option, please refer to the table below for detail information
Loop-O9550-R-CONF-**G**	Conference plug-in card with two RS232 data ports, two FXS ports and two E&M ports	
Loop-O9550-R-8EM-x-**G**	8-channel 2W/4W E&M plug-in card with 8 RJ45	For **x** option, please refer to the table below for detail information
Loop-O9550-R-12FXS-**sn**-**pt**-**G**	12-channel FXS plug-in card with 600/900 Impedance, Battery Reverse, Loop Start and PLAR. Without Ground Start and Metering Pulse. Used with 12 RJ11.	12FXS-GMP includes all FXS card functions For **sn** option, please refer to the table below for detail information **pt**= power type. For **pt** option, please refer to the table below for detail information
Loop-O9550-R-12FXS-P-**sn**-**pt**-**G**	12-channel FXS plug-in card with 600/900 Impedance, Battery Reverse, Loop Start, PLAR and [PLAR bit programmable]. Without Ground Start and Metering Pulse. Used with 12 RJ11.	
Loop-O9550-R-12FXS-M-**sn**-**pt**-**G**	12-channel FXS plug-in card with 600/900 Impedance, Battery Reverse, Loop Start, PLAR and [Metering Pulse]. Used with 12 RJ11.	
Loop-O9550-R-12FXS-MPP-**sn-pt**-**G**	12-channel FXS plug-in card with 600/900 Impedance, Battery Reverse, Loop Start, PLAR, [PLAR bit programmable] and [Metering Pulse]. Used with 12 RJ11.	
Loop-O9550-R-12FXS-GS-**sn-pt**-**G**	12-channel FXS plug-in card with 600/900 Impedance, Battery Reverse, Loop Start, PLAR and [Ground Start]. Used with 12 RJ11.	
Loop-O9550-R-12FXS-GM-**sn**-**pt**-**G**	12-channel FXS plug-in card with 600/900 Impedance, Battery Reverse, Loop Start, PLAR, [Ground Start] and [Metering Pulse]. Used with 12 RJ11.	
Loop-O9550-R-12FXS-GMP-**sn-pt**-**G**	12-channel FXS plug-in card with 600/900 Impedance, Battery Reverse, Loop Start, PLAR, [PLAR bit programmable], [Ground Start] and [Metering Pulse]. Used with 12 RJ11.	
Loop-O9550-R-12FXO-**G**	12-channel FXO plug-in card with 600/900 Impedance, Battery Reverse and Loop Start. Without Ground Start and Metering Pulse. Used with 12 RJ11.	12FXO-GM includes all FXO card functions
Loop-O9550-R-12FXO-M-**G**	12-channel FXO plug-in card with 600/900 Impedance, Battery Reverse, Loop Start and [Metering Pulse]. Used with 12 RJ11.	
Loop-O9550-R-12FXO-GS-**G**	12-channel FXO plug-in card with 600/900 Impedance, Battery Reverse, Loop Start and [Ground Start]. Used with 12 RJ11.	
Loop-O9550-R-12FXO-GM-**G**	12-channel FXO plug-in card with 600/900 Impedance, Battery Reverse, Loop Start, [Ground Start] and [Metering Pulse]. Used with 12 RJ11.	
Loop-O9550-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. For **x** option, please refer to the table below for detail information
Loop-O9550-R-12MAG-A-12-**x** -**G**	12-channel Magneto ring-one-time plug-in module w/ L1, L2	
Loop-O9550-R-12MAG-A-1G2-**x** -**G**	12-channel Magneto ring-one-time plug-in module w/ L1, L2, and L1. GND	
Loop-O9550-R-12MAG-1G-**x**-**G**	12-channel Magneto plug-in module w/ L1. GND	
Loop-O9550-R-12MAG-12-**x**-**G**	12-channel Magneto plug-in module w/ L1, L2	
Loop-O9550-R-12MAG-1G2-**x**-**G**	12-channel Magneto plug-in module w/ L1, L2, and L1. GND	
Dual Slot Plug-in Module		
Loop-O9550-R-6X21A-**G**	6-channel X.21/V.11 plug-in card with DB15S connector	
Loop-O9550-R-6V35A-**G**	6-channel V.35 plug-in card with DB25S connector via conversion cable to M34 (2M bits per channel)	
Loop-O9550-R-6V36A-**G**	6-channel V.36 plug-in card with DB25 connector via conversion cable to DB37	

Loop-O9550-R-6E530A-**G**	6-channel EIA530 plug-in card with DB25 connector	
Loop-O9550-R-6RS449A-**G**	6-channel EIA530/RS449 plug-in card with DB25 connector via conversion cable to DB37	
Loop-O9550-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	24FXS-GMP includes all FXS card functions. **pt**= power type For **sn** option, please refer to the table below for detail information For **pt** option, please refer to the table below for detail information
Loop-O9550-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-O9550-R-24FXS-M-sn-**pt**-**G**	24-channel FXS plug-in card with 600/900 Impedance, Battery Reverse, Loop Start, PLAR and [Metering Pulse].	
Loop-O9550-R-24FXS-MPP-sn-**pt**-**G**	24-channel FXS plug-in card with 600/900 Impedance, Battery Reverse, Loop Start, PLAR, [PLAR bit programmable] and [Metering Pulse].	
Loop-O9550-R-24FXS-GS-sn-**pt**-**G**	24-channel FXS plug-in card with 600/900 Impedance, Battery Reverse, Loop Start, PLAR and [Ground Start].	
Loop-O9550-R-24FXS-GM-sn-**pt**-**G**	24-channel FXS plug-in card e with 600/900 Impedance, Battery Reverse, Loop Start, PLAR, [Ground Start] and [Metering Pulse].	
Loop-O9550-R-24FXS-GMP-sn-**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-O9550-R-24FXO-**G**	24-channel FXO plug-in card with 600/900 Impedance, Battery Reverse and Loop Start. Without Ground Start and [Metering Pulse].	24FXO-GM includes all FXO card functions.
Loop-O9550-R-24FXO-M-**G**	24-channel FXO plug-in card with 600/900 Impedance, Battery Reverse, Loop Start and [Metering Pulse].	
Loop-O9550-R-24FXO-GS-**G**	24-channel FXO plug-in card with 600/900 Impedance, Battery Reverse, Loop Start and [Ground Start].	
Loop-O9550-R-24FXO-GM-**G**	24-channel FXO plug-in card with 600/900 Impedance, Battery Reverse, Loop Start, [Ground Start] and [Metering Pulse].	

Accessories		
Power Module		
Loop-O9550-R-S5-**G**	Single -48 Vdc (-36 to -75 Vdc) Power Module (150W)	
Loop-O9550-R-SD125-**G**	Single -125 Vdc (-40 to -150 Vdc) Power Module (100W)	For shared redundancy, order 2 single DC If the user orders -125 Vdc power module, the maximum number of cards allowed in slot 1 to 12 is: • Four 12-channel FXS • Nine 12-channel Magneto • Eleven 8-channel 2W/4W E&M • Two 4-channel G. SHDSL (1 pair) with line power • Three 2-channel G. SHDSL (2 pairs) with line power There are no limitations for other plug-in cards in slot 1 to 12. There are no limitations for any plug-in cards in slot A to D. For power consumption details, please refer to O9550-A User's Manual.
Loop-O9550-R-S524-**G**	Single -24 Vdc (-18 to -36 Vdc) Power Module (150W)	Cannot be used with MAG card.
Mounting Ear		
19"/23" ear mounts	A pair of 19"/23" ear mounts is supplied as part of standard package. Note: For other sizes, please contact your nearest Loop sales representative.	
User's Manual		
Loop-O9550-R-UMA	User's Manual (optional, paper copy). A CD version of the manual is already included as standard equipment.	For O9550-CGA only
Power Cord(All power cord are RoHS compliant)		
Loop-ACC-PC-USA	AC power cord for Taiwan/America	
Loop-ACC-PC-EU	AC power cord for Europe	
Loop-ACC-PC-UK	AC power cord for UK	
Loop-ACC-PC-AUS	AC power cord for Australia	
Loop-ACC-PC-CH	AC power cord for China	
Power Adaptor(All power adaptor are RoHS compliant)		
Loop-ACC-APA-240-**G**	240 Watt, AC (3.6A, auto sensing) to DC (+48 Vdc, 5A) adaptor for USA	
Loop-ACC-APE-240-**G**	240 Watt, AC (3.6A , auto sensing) to DC (+48 Vdc, 5A) adaptor for Europe	
Loop-ACC-APU-240-**G**	240 Watt, AC (3.6A, auto sensing) to DC (+48 Vdc, 5A) adaptor for UK	
Fan Tray		
Loop-O9550-FAN-**G**	Fan tray	Power supplied from rear of chassis. If total power consumption of device and cards is more than 60 Watts, an additional fan tray is required. For power consumption and fan tray plan, please refer to O9550-A User's Manual.
FXO Box		
Loop-O9550-FXO BOX	Support FXO Interface Battery Feed	
Software		
Loop-O9550-ERING	ULSR-PDH Ring software **Note:** ULSR ring only support E1 framed mode.	Used with 4E1, M4E75, M4E120, 1FOMA and FOM
Loop-O9550-TRING	ULSR-PDH Ring software **Note:** ULSR ring only support T1 framed mode.	Used with 4T1
Conversion Cables(All conversion cables are RoHS compliant)		
Loop-ACC-CAB-DB25M-100-8BNCM	DB25/Male to eight BNC/Male cable; Length: 100 cm	Used in Loop-O9550-M4E75 plug-in card
Loop-ACC-CAB-DB25M-300-8BNCM	DB25/Male to eight BNC/Male cable; Length: 300 cm	Used in Loop-O9550-M4E75 plug-in card

Loop-ACC-CAB-DB25M-100-4RJ48M	DB25/Male to four RJ48C/Male cable; Length: 100 cm	Used in Loop-O9550-M4E120 plug-in card
Loop-ACC-CAB-DB25M-300-4RJ48M	DB25/Male to four RJ48C/Male cable; Length: 300 cm	Used in Loop-O9550-M4E120 plug-in card
Loop-ACC-CAB-DB44M-100-2DB25F-1DB09F-DB	DSUB-44 pin/Male to two DSUB-25 pin/Female- one DSBU-9 pin/Female (8P8C) plug, Length:100cm	Used in Loop-O9550-8RS232-DB, Loop-O9550-8DBRA-DB plug-in card
Loop-ACC-CAB-DB44M-100-2DB25F-1DB09F-TS	DSUB-44 pin/Male to two DSUB-25 pin/Female- one DSBU-9 pin/Female (8P8C) plug, Length:100cm	Used in Loop-O9550-TS 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-O9550-6V35A and Loop-O9550-1V35 plug-in cards
Loop-ACC-CAB-DB25M-30-1DB37F	DSUB-25pin/Male to DSUB-37/Female RS449 Conversion cable Length: 30 cm	Used in Loop-O9550-6V36A and Loop-O9550-6R449A plug-in cards
Y-Box(All Y-Box are RoHS compliant)		
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
Blank Panels(All blank panels are RoHS compliant)		
30.000333.A00-**G**	Blank Panel for Power Supply Slot (flat)	
30.000349.A00-**G**	Blank Panel for Controller Slot (flat)	
30.000335.A00-**G**	Blank Panel for mini Slot A-D (flat)	
30.000331.A00-**G**	Blank Panel for Slot 1-12 (flat)	
30.001028.A00-**G**	Blank Panel for Power Slot (u-shape)	
30.001029.A00-**G**	Blank Panel for Controller (u-shape)	
30.001030.A00-**G**	Blank Panel for mini Slot A-D (u-shape)	
30.001027.A00-**G**	Blank Panel for Slot 1-12 (u-shape)	
SFP Optical Modules		
Please place your order using the 5-digit alphanumeric codes listed in the separate SFP Optical Module Brochure.		

For 4E1 card

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

cc =	**Description**	**Note**
RJ	RJ48C connector	
BNC	BNC connector	

For FOM and 1FOMA card

■ Where **opt** is used to select optical module type (All optical modules are RoHS compliant):

opt =	**Description**	**Note**
SAA	Single optical module with dual uni-directional fiber, 1310 nm, SC optical connector, 30 km ***- S1.1***	Use dual fiber Units delivered ITU-T G.957 application code
SBB	Single optical module with dual uni-directional fiber, 1310 nm, SC optical connector, 50 km ***- L1.1***	
SCC	Single optical module with dual uni-directional fiber, 1310 nm, FC optical connector, 30 km ***- S1.1***	
SDD	Single optical module with dual uni-directional fiber, 1550 nm, SC optical connector, 20 km ***- S1.2***	
SEE	Single optical module with dual uni-directional fiber, 1550 nm, SC optical connector, 100 km ***- L1.2***	
SSM	Single optical module with single bi-directional fiber (master), 1310 nm transmit and 1550 receive, SC optical connector, 30 km ***- S1.1/ S1.2***	1310 nm from master to slave Order **SSM** to use with **SSS** Use 1 fiber ITU-T G.957 application code
SSS	Single optical module with single bi-directional fiber (slave), 1310 nm receive and 1550 transmit, SC optical connector, 30 km ***- S1.1/ S1.2***	1550 nm from slave to master Order **SSS** to use with **SSM** Use 1 fiber ITU-T G.957 application code

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

For voice card(8-channel 2W/4W E&M):

■ 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**
8EM	**E**	Follows ETSI signaling bits	
	A	Follows ANSI signaling bits	Jumper selectable for all channels
	R	Reverse for ON-HOOK and OFF-HOOK signaling bits exchange	
	AR	Follows ANSI signaling bits and reverse bit	
	S	Follows customer's special bit or function assignment	
	S4	Disable the function of the test button	
	S5	Forcing all ports to be OFF-HOOK when an alarm occurs	
	S6	Forcing all ports to be ON-HOOK when an alarm occurs	
	AT	Follows ANSI signaling bits w/ trunk condition OFF-HOOK	
	ST	Follows customer's special bits assignment w/ trunk condition OFF-HOOK	

Note:

1. For S (customer's special bit), please contact your nearest Loop sales representative.
2. 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**
sn = omit	FXS Loop Feed = -48 Vdc with 25 mA current limit; enable alarm tone; ring generator to automatic (power saver) mode	
S1	FXS Loop Feed = -48 Vdc with 35 mA current limit	
S4	Remove alarm tone	
S5	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**
PWR	complied with -48 Vdc(SD, S5, SDB), -125Vdc(SD125) and AC (SAB) power modules	
PWRIE1613	complied with IEEE1613 standard, and with -48 Vdc(S5) power module	For O9550-CHA only
24	complied used with -24 Vdc(S524) power module	

For Magneto Card:

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

x=	**Description**	**Note**
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	

LOOP-O9550 SDH/SONET IMAP Product Specifications

Max. Number of Cross-connect Modules

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

Network Line Interface - T1

Line Rate	1.544 Mbps ± 32ppm	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 - E1

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 - Mini 4E1

Line Rate	2.048 Mbps ± 50 ppm	Framing	ITU G.704
Line Code	AMI or HDB3	Connector	DB25S
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 - 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

Router-A Interface

Number of ports	2 LAN ports, Max. 64 WAN ports, Each WAN port has data rate n x 64K bps, 1≤ n ≤32 (≤ 4Mbps for total of all 64 WAN ports
Physical Interface	10/100 BaseT x 2
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

Router-B Interface

Number of ports	8 LAN ports, Max. 64 WAN ports. Each WAN port has data rate n x 64K bps, 1≤ n ≤32 (≤ 8Mbps 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

Fiber Optical Interface (FOM, 1FOM-A)

Source	MLM Laser	Line Code	Scrambled NRZ
Wavelength	1310 ± 50 nm, 1550 ± 40 nm	Detector Type	PIN-FET
50 Km reach		Protection	Optional 1+1 APS

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

Optical Module	Fiber Direction	Wavelength (nm)	Connector	Distance (km)
SAA	Dual uni-directional	1310	SC (Subscriber Connector)	30
SBB	Dual uni-directional	1310	SC (Subscriber Connector)	50
SCC	Dual uni-directional	1310	FC (Fiber Connector)	30
SDD	Dual uni-directional	1550	SC (Subscriber Connector)	20
SEE	Dual uni-directional	1550	SC (Subscriber Connector)	100
SSM	Single bi-directional (master)	1310/1550	SC (Subscriber Connector)	30
SSS	Single bi-directional (slave)	1550/1310	SC (Subscriber Connector)	30

NOTE: Other fiber optical options available on special order

G.SHDSL Line Interface

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 Interface (X.21)

Data Port	Up to six 6-port DTE X.21 card
Data Rate	56 or 64 Kbps, n = 1 to 32
Connector	DB15S

DTE Interface (V.35)

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

DTE Interface (V.36)

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

DTE Interface (EIA530/RS449)

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)

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

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 [Note 1]	Async [Note 1]	Async	Async [Note 1]	Async [Note 1]	Async	Async	Async
Two DB44 + Two RJ48	Async/Sync	Async/Sync	Async	Async/Sync	Async/Sync	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 connecters (one DB9S and two DB25S)
Electrical	RS232 Interface, DCE

Note 1: Up to 19.2 Kbps achieved by oversampling at 64 Kbps

DTE Interface (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.

RS232/RS422/RS485 data Interface

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
Data bit	5, 6, 7, 8 software configurable
Stop bit	1, 1.5, 2 software configurable
Start bit	0, 1 software configurable
Connector	RJ48C
Interface	DCE only

Flow Control	Hardware (RTS and DTR), none, Xon/Xoff
Loopback function	DTE to DTE loopback
	DTE to Line loopback

Co-directional Interface

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

C37.94 Interface

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

Dry Contact Interface

Inputs -		**Outputs -**	
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

Inputs -		**Outputs -**	
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		

Voice Card (8EM)

Connector	Eight RJ45
Alarm Conditioning	CGA busy after 2.5 seconds of LOS, LOF
Encoding	A-law or μ-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 Noise	＜ -65 dBm0p
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	RJ11 x 12
Alarm Conditioning	CGA busy after 2.5 seconds of LOS, LOF
Encoding	A-law or μ-law, user selectable together for all
Impedance	Balanced 600 or 900 ohms (for magneto telephone impedance)
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

Signaling

Minimum Detectable Ringing Voltage	16 Vrms
Crank Detectable Across	L1 & L2 Mode (Tip and Ring), L1 & GND Mode(Tip and GND)
Crank Detected time	Valid carnk: more than 250 ms Invalid crank: less than 160 ms
Ringing Generation	Voltage: 76 Vrms (sine wave) Frequency: 20Hz (with optional choices of 16, 25, 50 Hz)
Ring duration	Two optional modules are available for your choice: 1. 12MAG Normal operation: Ring duration depends on cranking time PLAR ON operation: when FXS pone off-hooked, the ring duration of the far-end magneto phone could be 0.5, 1.0, 2.0 or 4.0 sec 2. 12MAG-A Normal operation: Crank the phone for one time, and the ring duration of the far-end phone could be 0.7, 1.5 or 2.0 sec PLAR ON operation: when FXS phone off-hooked, the ring duration of the far-end magneto phone could be 0.7, 1.5 or 3.0 sec
Ringing Send Across	L1 & L2 Mode (Tip and Ring), L1 & GND Mode(Tip and GND)
Signaling	Turn Magneto Phone crank (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

Conference Card

RS232 Interface	
Data Port	2-ports per card
ASYNC 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 per port
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)

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

12 FXS/FXO Connector	Twelve RJ11	
24 FXS/FXO Connector	One RJ21X Female	
Alarm Conditioning	CGA busy after 2.5 seconds of LOS, LOF	
Encoding	A-law or μ-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	-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 or -24Vdc with 25mA current limit per port Jumper Selectable: 25mA, 30mA, 35mA	
FXS signalling	Normal / Automatic Ring down	
FXS Ringing	1 REN at 5K meters per port 16.7Hz, 20Hz, 25Hz, 50Hz, user selectable for all ports 38 to 85 Vrms (sine wave), 76 Vrms for default Ring Voltage 2 sec on 4 sec off, or 1 sec on 2 sec off optional for PLAR	
Signaling	Loop Start, DTMF, pulse, PLAR, Battery Reverse	
Optional Signaling (for special order)	Ground Start, Metering pulse (12 KHz, 16 KHz), and P(in PLAR mode, PLAR signalling bits are programmable.	
Signaling Bit A,B,C,D	Programable 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.
- -24Vdc power is for FXS PCB version L and up

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: - Unframed T1: Up to 340 ms - Framed T1: Up to 256 ms - E1:up to 256 ms - Framed T1 with CAS: Up to 192 ms
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: a. From 64 Kbps to 1 Mbps in increments of 64 Kbps b. From 1 Mbps to 100 Mbps in increments of 1 Mbps c. From 100 Mbps to 1000 Mbps in increments of 10Mbps Pause frame issued when the traffic exceeding the limited rate before packet dropped following IEEE802.3X
Link Aggregation	WAN support link aggregation

Jitter & Wander

PPM: per G.823 Traffic

PPB: per G.823 Synchronous

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

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

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)
Management channel	Through DCC or 64Kbps channel for management
Management protocol	Router or bridge mode with HDLC / Ethernet type II
Management function	Telnet, SSH V2, RS232 console or GUI by management system
Internet protocol	IPv4 and IPv6(HDLC supported)

Alarm Input/Output

Inputs		**Outputs**	
Channel	3	Channel	2 (Major and Critical alarm)
Internal Resistance	1K	Fuse	3 (no, com, nc)
Activation Current	3 ma	Initial Insulation Resistance	Min. 100M ohm (at 500Vdc)
Deactivation Current	1.5 ma	Maximum switching voltage	110 V DC, 125 V AC
Allowable Current	4 ma		

Diagnostics

CCA4 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

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/Uneqp, Fan Fail, Fan Module Uneqp, Overheat, TS Sync Loss, Logon and Logout, Optical Port Uneqp, 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
		SONET	Line	LOS-PI, LOF-S, TIM-S, SD-L , SF-L , AIS-L , RDI-L , REI-L UAS, B1-BIP, B2-BIP
Alarm History			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.			

Physical /Electrical

Dimensions	432.4 x 220 x 223.5 mm (W×H×D)
Power	Single/ Dual -48 Vdc: -36 to -75 Vdc, 150 Watts max. Single/ Dual -24 Vdc: -18 to -36 Vdc, 150 Watts max Single/ Dual -125 Vdc: -40 to -150 Vdc, 100 Watts max
Temperature	0-55°C
Humidity	0-95%RH (non-condensing)
Mounting	Desk-top stackable, 19" /23" rack mountable
Line Power Supply	Available only with DC power for G.SHDSL card only
Power Consumption	Max 110 Watts

Certification

O9550-A
EN55022 Class A, EN50024, FCC Part 15 Class A, FCC Part 68, CS-03, IEC60950, UL60950

Compliance

ITU G.664, G.703, G.704, G.706, G.707, G.711, G.712, G.732, G.736, G.747, G.775, G.783, G.806, G.823, G.826, O.151, V.11, V.28, V.54 , X.86.

IETF SNMP v.3 (RFC2571~2575)

Specifications for Loop-VV Y-BOX

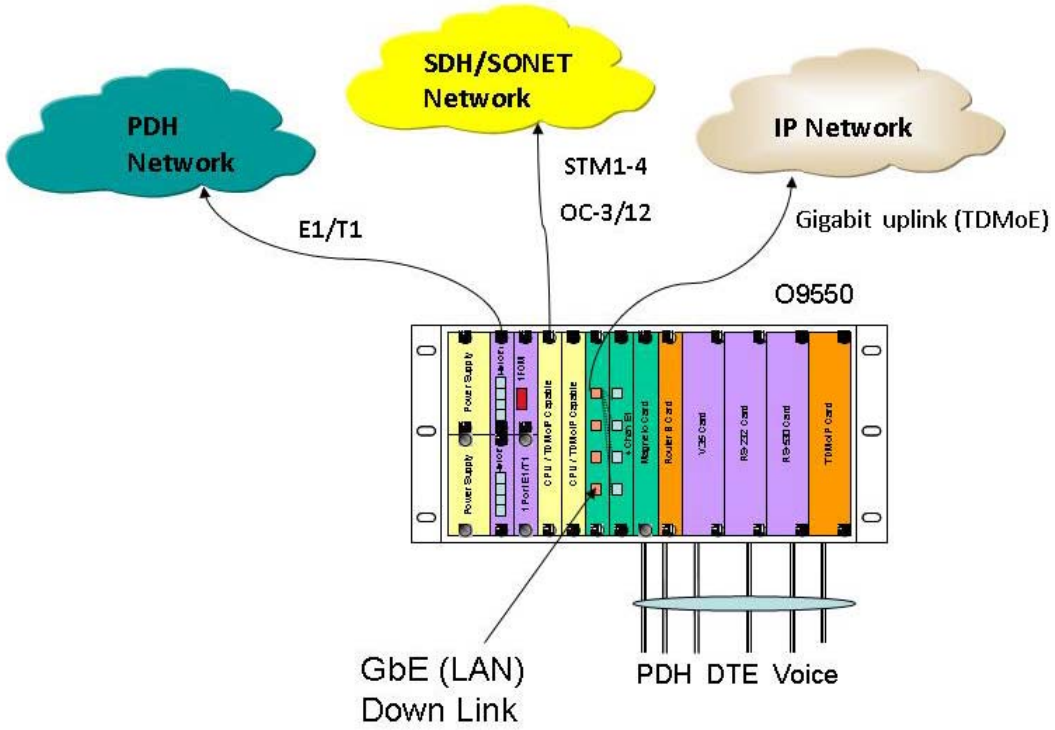
LINE

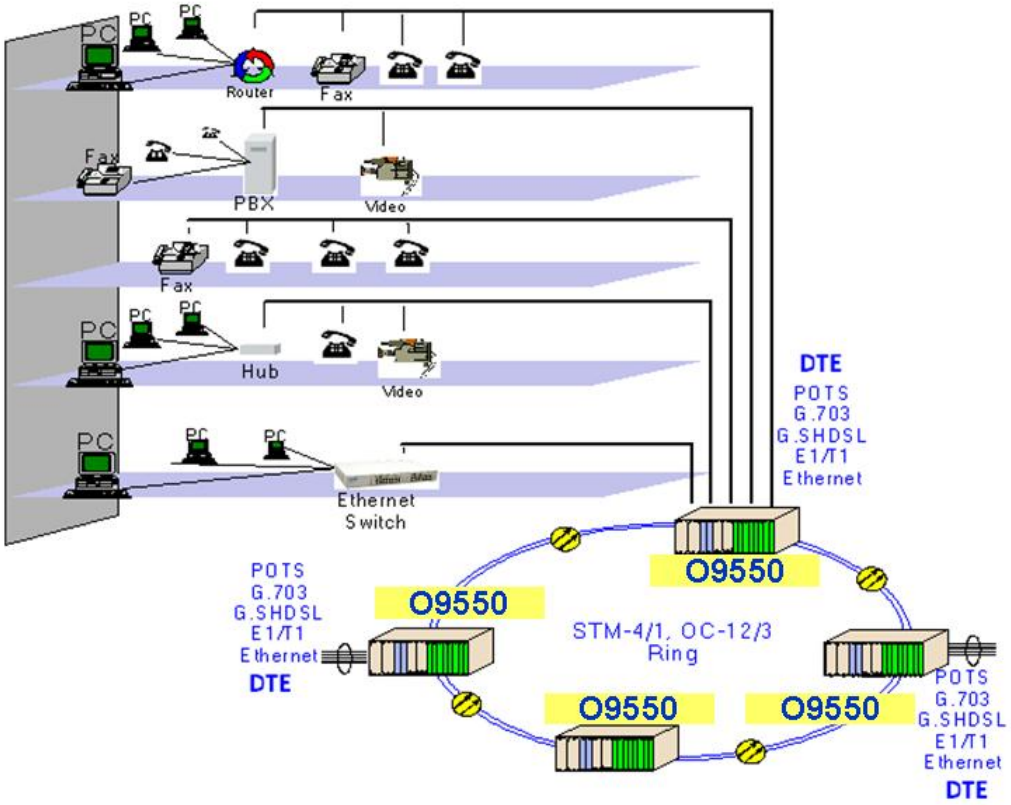
Connector	BNC or RJ48C
Port Number	For Y-BOX with BNC connectors: 4 line ports For Y-BOX with RJ48C connectors: 16 line ports
Protection	For Y-BOX with BNC connectors: support 2 Quad E1 plug-in card, 4 active E1, 4 standby E1 For Y-BOX with RJ48C connectors: support 8 Quad E1 plug-in cards, 16 active E1, 16 standby E1 For Y-BOX with RJ48C connectors: support 8 Quad T1 plug-in cards, 16 active T1, 16 standby T1

Mechanical

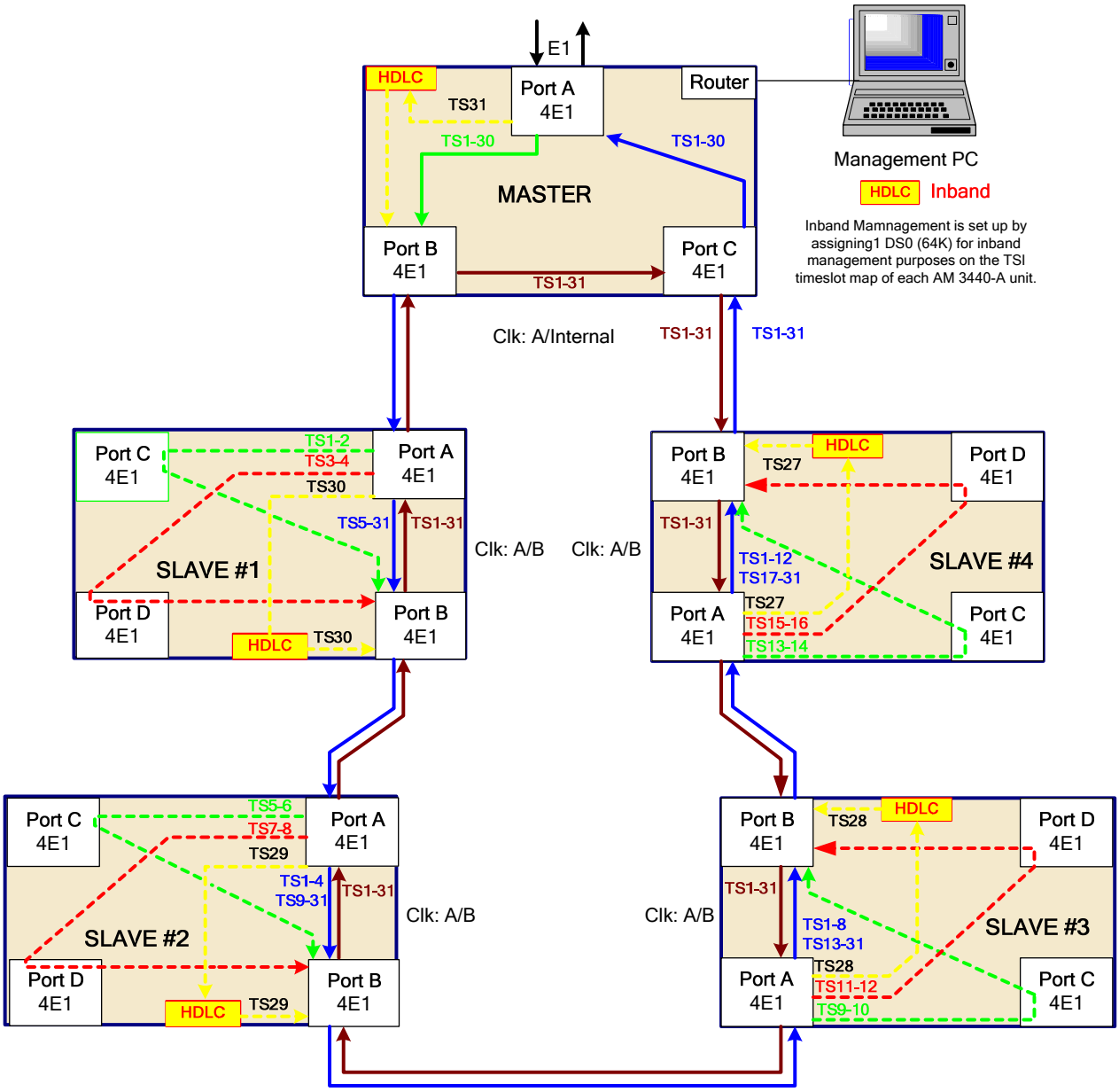
Height	44.5 mm/ 1.75 in
Width	432 mm/ 17 in
Depth	100 mm/ 3.9 in

Application Illustration:





ULSR Ring Application



Note: ULSR ring does not suport E1 unframe mode. Users must use E1 frame mode to set up a ULSR ring.

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