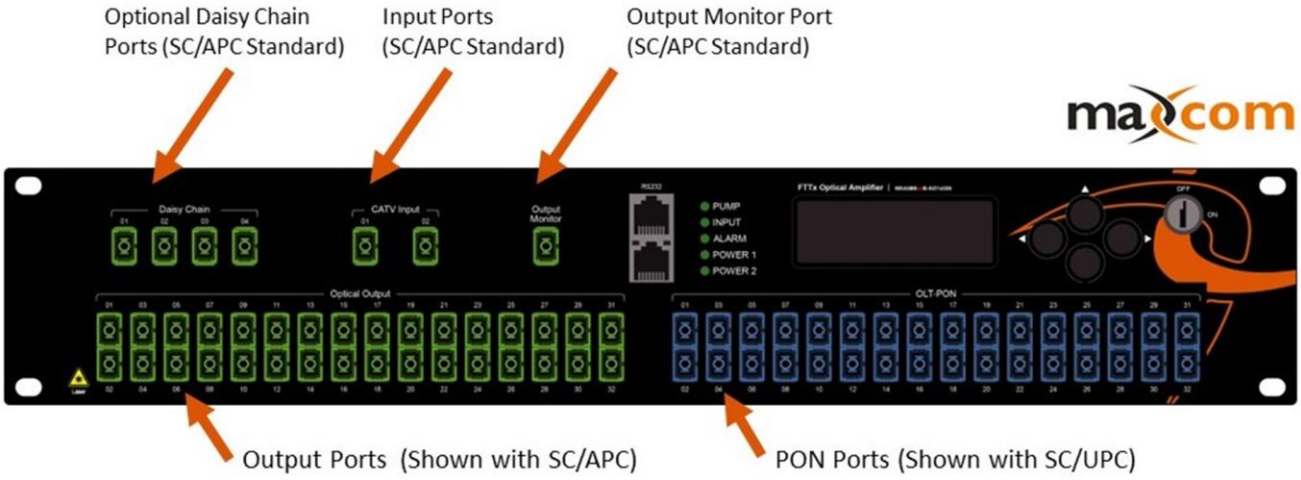
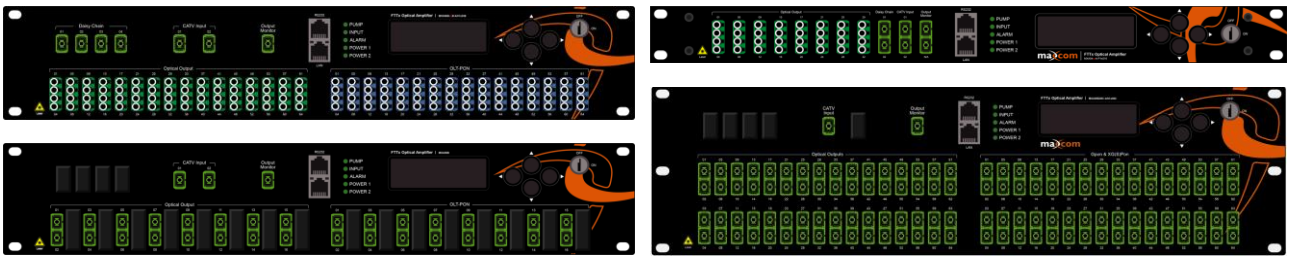
1550 NM CATV EDFA· MXA5 SERIES

Multiple configurations available with PON ports supporting 1270, 1310, 1490, 1577, 1610nm wavelengths



Example Illustrations of Multiple MXA5 EDFA Configurations:



*Also available without PON ports

Legendary Reliability and Performance

PRODUCT SUMMARY

The MXA5 series is a low noise, high performance, FTTx high power multi-port optical amplifier with a gain spectrum band within 1540~1563nm. Each output port for the optical amplifier has built-in high performance CWDM PON port to conveniently connect with an OLT. Each of the 1550nm (CATV)'s output optical ports will multiplex 1310/1490nm and 1270/1577nm wavelengths from an external OLT, reducing the quantity of the components and improving the performance and reliability of the system. Models are also available with an option to pass 1610nm RFoG wavelengths.

The MXA5 Series has an extremely low noise figure. The unit adopts twin-stage amplification, the pre-amplifier adopts a low noise EDFA, and the output cascade adopts high power EYDFA technology. When the input optical power PIN is 0dBm, the noise figure of the unit is: Typ ≤4.5dB, Max ≤5.0dB unlike other manufactures which need higher optical power input to maintain lower noise figures.

The MXA5 Series optical amplifier incorporates world class pump lasers and American made OFS erbium-doped optical fiber. Superb APC, ACC, and ATC control, coupled with excellent design in the ventilation and heat-dissipation ensure a long life and exceptionally reliable operation of the pump laser. RS232 and RJ45 offer serial communication and SNMP network management ports.

The MXA5 Series LCD located on the front panel offers access to all equipment indexes and warning alarms. A WEB GUI interface is also available for operators preferring remote access and visibility.

Maxcom EDFA's offer a flexible wide range optical input between -5 to +10 dBm.

For safety and protection of the laser components, the laser will automatically switch off if input optical power is interrupted.

The MXA5 Series offers carrier-class reliability and network security management, high quality, superb reliability, and excellent cost performance are ideal for system integrators and system operators.

The MXA5 Series optical amplifiers are available with output power of +15 to +23 dBm per output port. Standard units come in 4, 8, 16, 32, and 64 port configurations. Units come with xPON ports to match the number of output ports. Optional daisy chain ports are also available providing for simple scalability as your network grows.

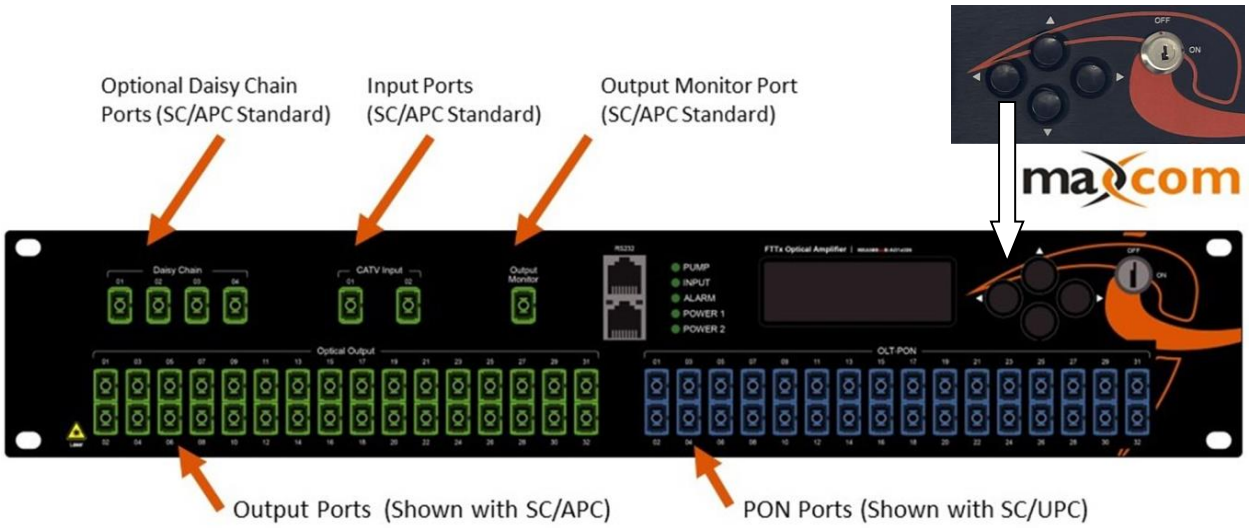
The MXA5 Series is also available with a built in 2x1 optical switch with auto detection and switching when two optical inputs are used in cases where fiber route redundancy is critical.

Fiber connector types may be customized for operator requirements using SC/APC, SC/UPC, LC/APC, and LC/UPC

All MXA5 Series EDFA's come equipped with Dual Hot Swapable AC or DC power supplies.

EDFA CONTROLS, INDICATORS, AND ALARMS

This section of the manual will give you an overview of the available menus in the MXA5 series EDFA and their descriptions. All instructions refer to the representation of the front panel shown in the diagram below. The operator may scroll through the menus by pushing the bottoms found on the front panel of the EDFA, near the LCD screen.



Operation of the panel - Open Menu

A. Connect the power supply

B. Turn on power switch located on the back panel (for AC powered units). Begin with the Front panel display in the "KEY OFF" position. The Laser Status lamp will be Red.

C. Connect a 1550nm optical signal source to the input, then turn on the laser start-up key switch.

Front panel LED shows "**KEY ON…"**,
PUMP- Status lamp is Red when OFF, Green when ON
INPUT- Status lamp will turn from Red to Green once input signal detected
ALARM - Status lamp is Red when alarm condition is met
POWER1 - Status lamp is Green (no light when power is off)
POWER2 - Status lamp is Green (no light when power is off)

Start-up main menu

By pressing the ▲/▼ buttons, the following menu items will be displayed in sequence.

Model
Read-only menu, indicates the model number

S/N
Read-only menu, indicates the serial number of the unit

***For units equipped with a built in Optical Switch, the following 4* menu items are displayed**

Input 01 *
Read-only menu, indicates the input optical power 01 of optical switch
Input 02 *
Read-only menu, indicates the input optical power 02 of optical switch
OP Switch Mode *
Adjustable list, displays the switch mode of the optical switch
OP Switch Point *
Adjustable list, displays the switch point of the optical switch
SET OUTPUT
Adjustable list displays the output optical power in dBm.
TOTAL OUTPUT
Read-only menu, indicates the total optical power in dBm of Internal amplifier.
EACH OUPUT
Read-only menu, indicates the output optical power in dBm at each output.
PA CURRENT
Read-only menu, indicates the pre pump current
PA TEMP
Read-only menu, indicates the pre pump temperature
BA CURRENT
Read-only menu, displays the current of the multi-mode PUMP
Power 1
Read-only menu, displays the status of power 1
Power 2
Read-only menu, displays the status of power 2
UNIT TEMP
Read-only menu, indicates the case temperature
IP
Adjustable list, displays the IP address
SUBMASK
Adjustable list, displays the address of net mask
GATEWAY
Adjustable list, displays the gateway address
TRAP ADDR1
Adjustable list, displays the TRAP1 address
TRAP ADDR2
Adjustable list, displays the TRAP2 address
LCD Contrast Level
Read-only menu, LCD contrast adjustment
RESET SETTINGS
Adjustable list, restores device to factory default settings

Modifying Settings

You may easily navigate the menu by using the arrow buttons to select and modify the settings as desired.

For example, press ▶ key to modify the address menu item that needs to be changed, press ▶ to shift the value, push ▲\▼ to increase/decrease value, then shift the value to the next digit as desired, press ▶ to the save, press ◀ all the way to the left and exit.

For example, modify the IP setup menu, IP: 192.168.000.015; if changing the number 5 to a 6, use ▶ key to choose the place of 5, then press ▲ key to change the 5 to 6, then press ▶ to save modified IP:192.168.000.016

Web Interface

The Maxcom Optical Transmission Platform offers a web interface GUI (Graphic User Interface) for control, display, and monitoring features similar to the front panel LED and control features. The device/equipment management software allows the user to remotely monitor or adjust several parameters simultaneously, such as laser power, optical switch settings, temperature, voltages, etc...

For quick access, simply plug a laptop or PC into the RJ-45 LAN port on the front panel of the chassis. Open a web browser. The default IP address is 192.168.1.50. Enter 192.168.1.50 into the browser and hit enter. The GUI Screen should appear with a log-in box. The default username is admin, the default password is admin. *Note, network settings and IP address on your laptop or other device may need to be adjusted in order to communicate with the device. Standard network protocols should be followed when connecting via a network connection.

Faults

The MXA5 series EDFA will monitor system operation and offer brief warnings. It will correct most of the status alarm detections of the unit, such as: system parameter floating, equipment tolerance, laser aging, RF level changing, and temperature changes. The PUMP laser will continue operating while alarming. The alarm will disappear as the unit continually self-detects, or after the relative system parameters recover into a normal range. Some serious warnings may be eliminated by restarting the power supply. The warning will disappear automatically if related parameters recover to within normal range.

The majority of warnings will be sent out when the correction ability is near or is exceeding the permitted range. During most situations, the operator may not modify the status. Status modification requires special equipment and lab adjustments; hence the modification should only be processed at the Maxcom facility.

Warning status

When the pump laser is in warning status, the status LED will turn red, and a brief notification of the status will be displayed on the screen. The warning will not prevent the EDFA from operating, it only indicates the relative parameter exceeding the normal scope marginally. If the warning ends, it indicates that the relative parameter has returned to the permitted scope. The screen and LED will return to their normal status and there is no need for user to intervene. However, it should be emphasized that the problem originally shown by alarm should be noted, due to the possibility there may be a serious system error occurring.

Table: Warning status:

Working status	Status display	LED color	Explanation
Present laser deflection is low or out of parameter	Key Off	Red	The EDFA is OFF. It is shut down.
Present case temp	Alarm	Red	Warning when the temp ≥60°C.
Input	Input Low	Red	Optical input power is low.
Output	Output Low	Red	Optical output power is low.

Alarm status

When the pump laser issues a warning, it has stopped working. The alarm is due to potential parameters exceeding its safe operating scope, or some other situation that may cause damage to the laser. Some alarm situations may be eliminated by rebooting (restarting the power supply) or resetting the key switch. If user is not able to eliminate the alarm, please contact Maxcom for assistance.

PORT AND CABLE ASSIGNMENTS

The MXA5 series provide the following management port:

RS232 port using RJ45: suitable for examining the MXA5 parameters and some system configurations by attaching to a PC RS232 port.

SNMP: Simple network management protocol

Before connecting the MXA5 series to the RJ45 port, please read the following instructions and port connectivity requirements.

LAN Port (RJ-45)

Port Description the MXA5 series management port connector type is RJ-45.

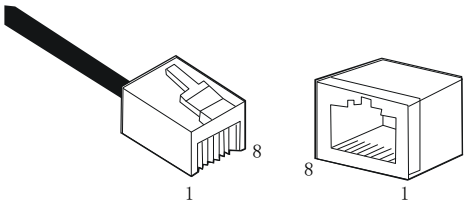


Figure 4.1.1 RJ–45 Connector Plug and Socket

The Management port (RJ-45) may be connected to any device that uses a standard network interface (e.g., a workstation, laptop, server, bridge, switch, or router). RJ-45 MDI may be connected with similar network equipment (such as other MXA5 EDFA's or network hub). Use unshielded twisted-pair (UTP) or shielded twisted-pair (STP) cable for RJ-45 connections: 100-ohm category 3 or 4 cables are suitable for 10 Mbps connections, 100-ohm category 5 is suitable for 100 Mbps connection.

Pin assignments

When a network management cable (RJ-45 connector on each side) connects NMS PC and MXA5 series directly, a straight through cable should be used. See Figure 4.1.2.

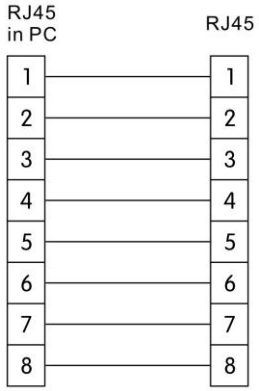


Figure 4.1.2 RJ-45 connector with straight through connection

PIN	Workstation port	MDI
1	Input receive data+	Output transmit data+
2	Input receive data-	Output transmit data-
3	Output transmit data+	Input receive data+
6	Output transmit data-	Input receive data-
4, 5, 7, 8	Nonuse	Nonuse

Table 4-1 RJ-45 Pin assignment

Straight			Cross		
(MXA5)		(Adapter)	(MXA5)		(HUB/ MXA5)
1 IRD+		1 OTD+	1 IRD+		1 IRD+
2 IRD-		2 OTD-	2 IRD-		2 IRD-
3 OTD+		3 IRD+	3 OTD+		3 OTD+
6 OTD-		6 IRD-	6 OTD-		6 OTD-

Table 4-2 Straight and cross cable connection

Port Connections

The MXA5 series may auto detect the Ethernet cable type (Straight-though or Crossover), so either type may be used. An Ethernet twisted pair cable should be connected between the RJ-45 connector (MDI-X) of the MXA5 series and any device with a standard network interface (such as a workstation, laptop, or server), or to a network interconnection device (such as a switch or router).

1) Ensure that the device to be connected has a 10BASE-T or 100BASE-TX network interface card (NIC).

2) Prepare a twisted pair Ethernet cable with RJ-45 plugs on each end. Use Cat 3, 4 or 5 cable for standard 10Mbps Ethernet connections, or Cat 5 or 6 cable for 100Mbps Fast Ethernet connections.

3) Plug one end of the cable into the PC's NIC and plug the other end into any RJ-45 port of the MXA5 series. All the MXA5 RJ-45 port supports both 10Mbps and 100Mbps Ethernet connections.

Note:

1) Connect other compatible MXA5 series or network hub, adopt direct or cross cable to connect MDI port in other devices.

2) Ensure that the twisted pair cable length does not exceed 100 meters.

Connection Management (Out-Band)

Remote management may be performed through the dedicated LAN port (10/100BASE-TX port) on the front of the MXA5 or any 10/100BASE port of MXA5.

Before the Management port may be accessed through LAN port, please configure the IP address and subnet mask by serial port according to network configuration requirement.

RS232 Console port (DB9)

Port Description

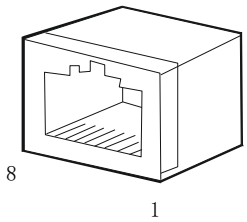


Figure 4-2.1 DB9 interface

DB9 interface is a standard connector used in RS232 in series communication connects. OLT adopt 9 pin standard connector which is the same as the connector of PC Com interface.

Pin assignment

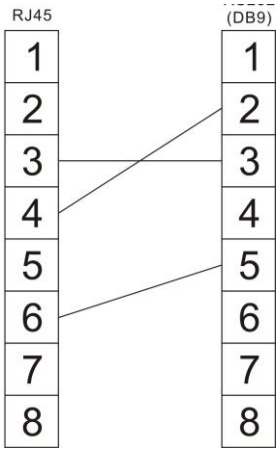


Figure 4-2.2 DB9/RS232 pin assignment

Pin	Distribution
2	RXD: Receive data
3	TXD: transmitter data
5	SG: signal

Table 4-3 Pin information

Port connection

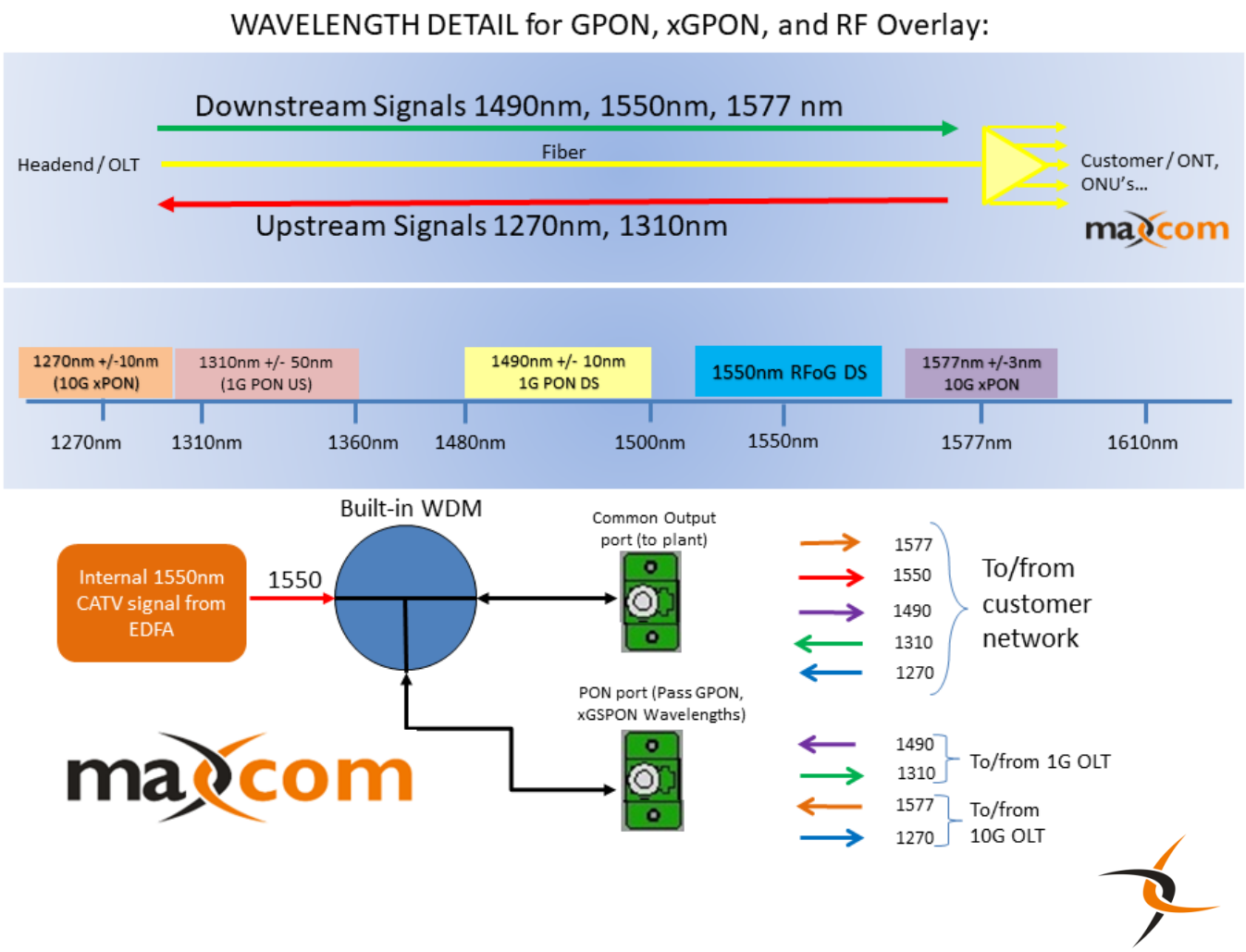
The MXA5 series requires a cable to connect the MXA5 series serial port. This cable has a DB9 connector in the MXA5 series and PC side. Consult figure 4.2.1.

Follow these steps to connect cables:

1) Through an RS232 (DB9) cable, connect a super terminal program PC to RS232 port on the MXA5. For example, connect one COM port in PC (com 1~4) and one RS232 port of MXA5.

2) Setup the terminal to analogue type VT100, distribute a COM (com 1~4) to connect with MXA5 RS232, then setup communication mode as follows:

1. Data bit: 8
2. Stop bit: 1
3. Parity check: No
4. Baud: 9600 bps (applies to initial configuration)
5. Flow control: No



EDFA Model Number Ordering Matrix-North American Market

Fill in the □ boxes with the preferred options from

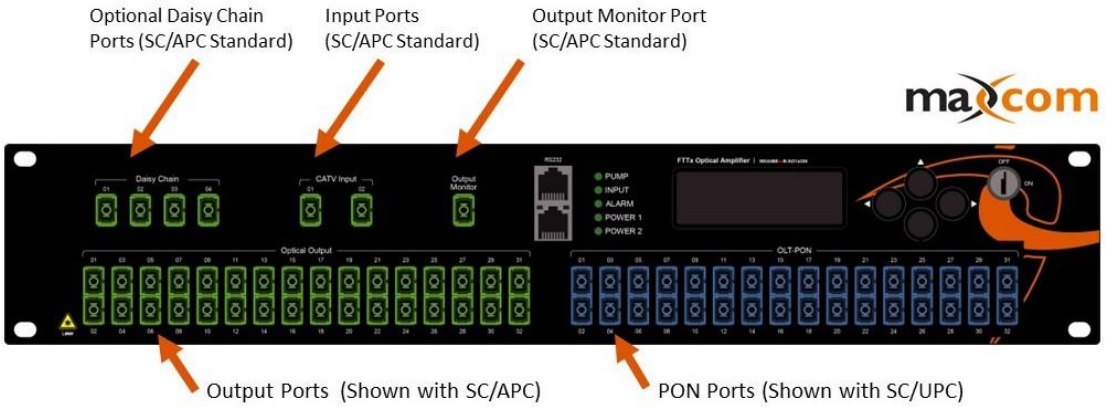
MXA-	5	□	□	□□	□ -	□ X	□□□ -	□□ -	□□ -	□□	- □
Product Series	Operating Wavelength	Production Type	WDM PON Port Configuration	Output Power (dBm) per port	Exterior	Number of Input Ports	Number of output ports	Output Port Connector type	PON Port Connector type	Power Supply	Daisy Chain Ports +12 dBm ea.
Model Series	5 1540-1563nm	8 FTTx PON EDFA	B Combo GPON & XGSPON 1270/1310/1490/1577 Pass	17 17	A 1RU	1 Single Input (without switch)	004 4 ports	LA LC/APC	LP LC/UPC	11 110VAC	D 4 Daisy Chain ports
		4 NO WDM PON ports	C Separate GPON & XGSPON Ports. Port 1 = 1310/1490 Pass Port 2 = 1270/1577 Pass	21 21	B 2RU	2 Dual Input (With Switch)	008 08 ports	SA SC/APC	SP SC/UPC	22 220VAC	Blank No Daisy Chain ports
				** Custom dBm	C 3RU		016 66 ports		LA LC/APC	48 -48VDC	
				Available Output Power Range: +15 to +23 dBm			032 32 ports 064 64 ports		SA SC/APC	42 -48VDC &	

Please consult with your Maxcom Rep for ordering options, *Note - Some options only available of certain chassis or models

*Notes:

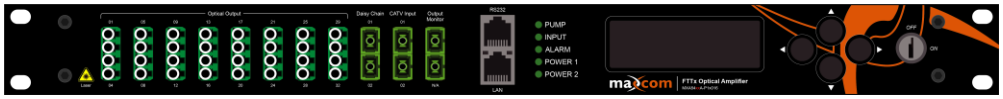
Output Monitor port - Included
Adjustable Output feature - Included
Dual Hot Swappable Power Supplies - Included
SNMP - Web GUI access- Included

All units come standard with SC/APC connectors for **input, monitor, and daisy chain ports**.
Output ports come standard with SC/APC PON ports come standard with SC/APC

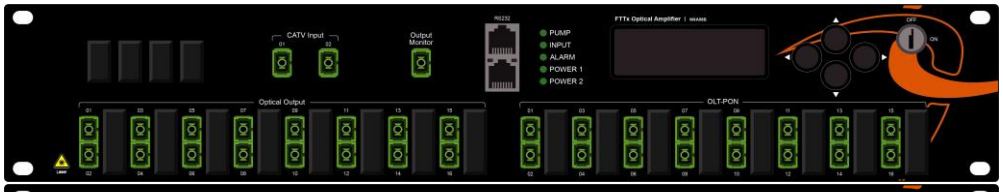


Example Illustrations of various configurations of EDFA's available

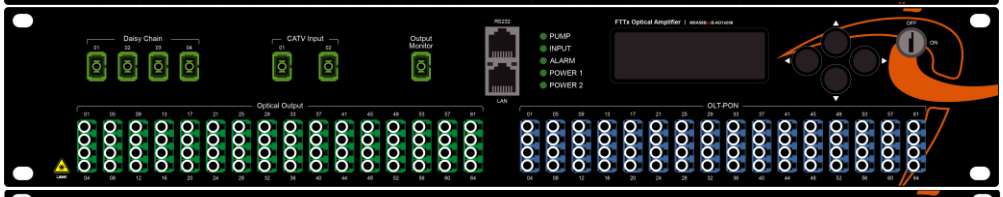
1RU



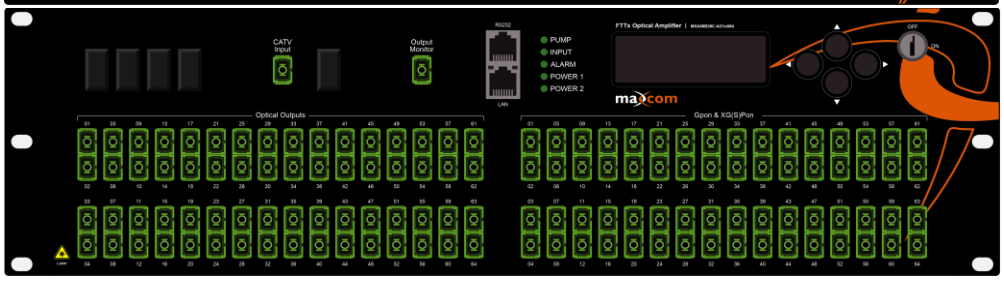
2RU



2RU



3RU



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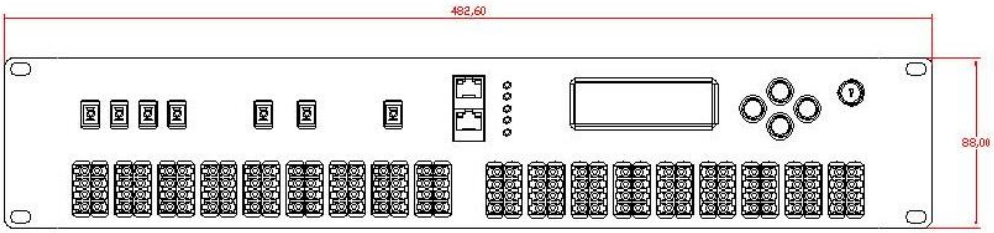
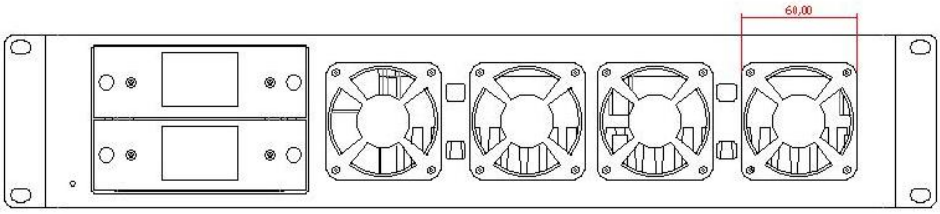
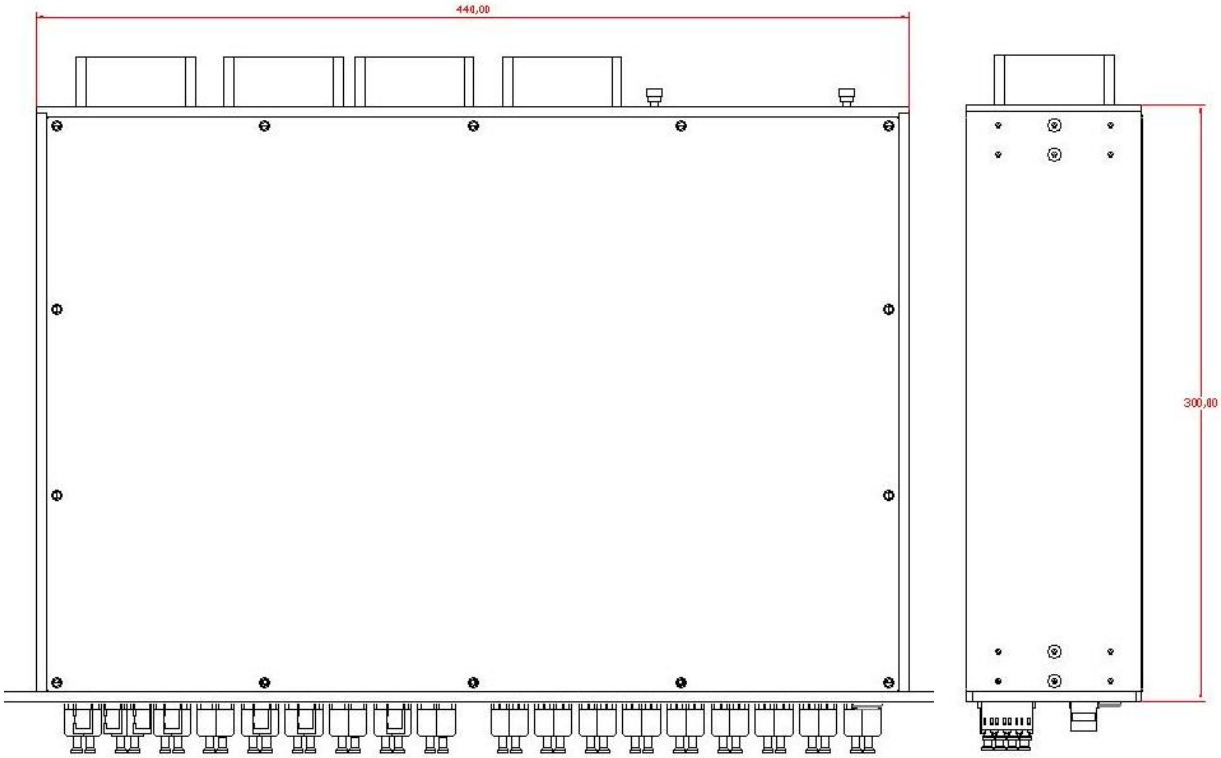
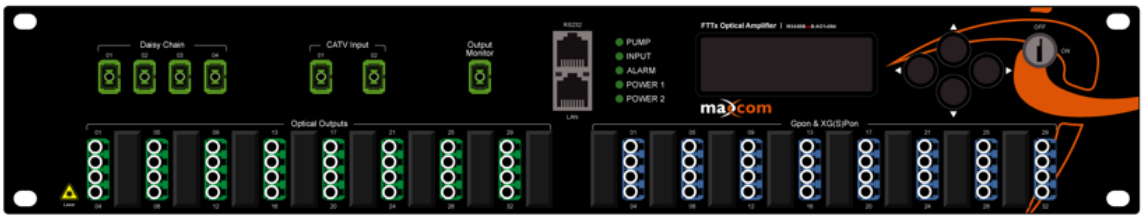
Unit Dimensions:









	Performance Specifications		Index			Supplemental
			Min.	Typ.	Max.	
Optical features	CATV operation wavelength	(nm)	1540		1563	CATV
	OLT pass wavelength	(nm)		1310/1490 1270/1577	1610nm	GPON XGSPON
	CATV pass wavelength loss	(dB)			0.8	1550nm
	OLT pass wavelength loss	(dB)			0.8	1310/1490nm 1270/1577nm
	CATV & OLT isolation	(dB)	40			
	Number of uplink optical ports (for OLT)	(pcs)	4		64	Based on Model
	CATV input power	(dBm)	-5		+10	
	Output power per port	(dBm)	15		23	Based on Model
	Number of output ports	(pcs)	4	32	64	Based on Model
	Difference of each output power	(dB)	-0.5		+0.5	
	Output optical power monitoring	(dB)		-20		
	Output power adjustable range	(dBm)	-6		0	
	Daisy Chain Output Power (per port)	(dBm)	+11	+12	+12.5	Fixed Value, Optional
	Number of Daisy Chain port		1		4	Optional
	Noise figure	(dB)	4.0	4.5/5	6.0	
	Switch time (with auto optical input switch)	(ms)			8.0	
General features	Network management interface		WEB			RJ45, SNMP Optional
	Serial interface		RS232			Optional
	Power supply	(V)	90		265	110VAC
			36		72	-48VDC
	Power consumption	(W)			84	
	Operation temp.	(°C)	-5		65	
	Storage temp.	(°C)	-40		80	
	Relative humidity	(%)	5		95	
	Size (W)×(D)×(H)	(") mm	19×14.7×3.5 482.6x300x88mm			Standard 2 RU Model

Fiber Connections

Cleaning fiber-optic connectors can help prevent interconnect problems and therefore, aid with system performance. When optical connectors are disconnected and reconnected, the fiber surface may become dirty or scratched. The goal of cleaning the fiber optic connectors is to remove all dust and contaminants without leaving any residue.

DO NOT connect or disconnect optical jumpers/connectors when unit is ON and in operation (switched on)! Connector surface may become damaged or burned by HIGH LASER POWER Level. Unit must be switched to OFF position prior to any type of connection being made to unit. In case of accidental damage where levels are displayed normally on screen, but low on the output port, the optical connector may be changed or replaced to restore normal levels.

CAUTION:

For high power optical levels, in particular to high power optical transmitters and EDFA's, extra caution should be used. Fiber connectors may be burned or melted, arcing may occur, damage may occur to any device that a connector comes in contact with. Extreme caution and safety practices should be observed to avoid contact with eyes and skin. To avoid injury and microscopic damage to fiber mating surfaces, turn off optical power before making or breaking optical connections.

Warranty Maxcom provides a 2-year warranty on the MXA5 series EDFA. Warranty is from date of purchase. Additional warranty details are available from Maxcom or your Sales Partner.

www.maxcomcorp.com

USA 1-209-339-2333