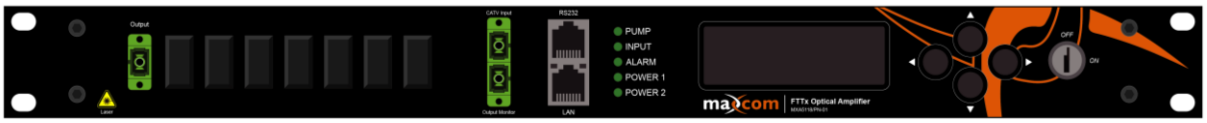
Ver. 5.0sb

1550NM ERBIUM DOPED FIBER AMPLIFIER · MX-A51 SERIES

USER MANUAL



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PRODUCT DESCRIPTION

The Maxcom MX-A51 Erbium Doped Fiber Amplifier (EDFA) has been designed for CATV, FTTH and HFC applications. The EDFA is suitable for long haul transmission networks or FTTH distribution networks. This optical amplifier is packaged in a 19", 1 RU rack mount housing, and can be optionally ordered with an outdoor casing to provide a complete optical communications solution. Maxcom also offers our MX-A54 platform which can be ordered with 4, 8, 16 and 32 output ports.

The output power available is from 13 dBm to 26 dBm.

The EDFA is designed to extend a 1550 nm CATV system fiber without the need to convert back to RF. Combined with our MX-T8500 series externally modulated laser transmitter, system ranges of over 200 km are possible when using multiple EDFA's.

The MX-A51 series is a CATV booster EDFA with a gain spectrum band within 1540~1565nm. The EDFA is designed for the application of single channel, or 1~8 continuous ribbon channels (ITU wavelength). Typically, a fiber CATV system operates in single wavelength in the 1550nm CATV range. The MX-A51 booster amplifier is featured with low NF and high-saturated output power. It is applicable for Primary Headends, Secondary Headends, Hubs, OTN's, as well as other optical communication networks. The MX-A51 is interchangeable and compatible with other 1550nm EDFA's and Transmitters in a CATV system.

The MX-A51 series EDFA's have excellent performance, single wavelength EDFA's designed for analog and digital CATV QAM signals. Maxcom's 1550nm optical amplifiers and EDFA's adopt world class pump lasers and American OFS erbium-doped optical fiber components. Excellent APC, ACC and ATC control, superb design in the ventilation and heat-dissipation ensure long life and reliable operation of the pump laser.

The LCD at the front panel offers equipment status and warning alarms. Equipped with Dual power supplies, adjustable output power, SNMP monitoring, and port monitor. The laser will switch off automatically if optical power is lost offering protection for the laser.

Technical index

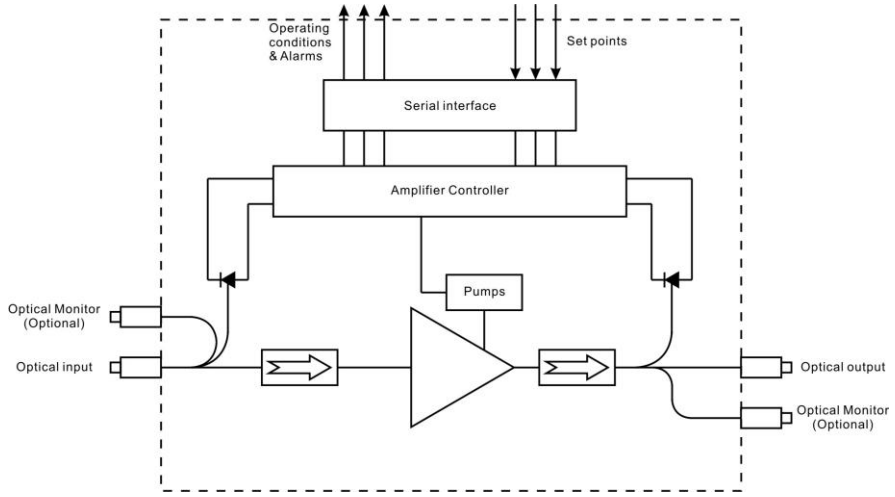
Performance			Index			Supplement
			Min.	Typ.	Max.	
Optical feature	Wavelength range	(nm)	1540		1563	CATV
	Input power	(dBm)	-10	+3	+10	
	Maximum output	(dBm)	+10		+26	Pin=0dBm
	Output power adjustable	(dBm)	-6		0	
	Number of output ports		Standard 1 port (optional 2, 4, 8, 16 ports)			SC/APC (standard)
	Difference of each	(dBm)	-0.5		+0.5	
	Noise figure (Pin=0dBm)	(dB)			6.3	MX-A5126
	Polarization dependence	(dB)			0.3	
	Polarization dependence	(dB)			0.4	
	Polarization mode	(ps)			0.5	
	Input/output isolation	(dB)	30			
	Pump power leakage	(dBm)			-30	
	Echo loss	(dB)	55			APC
General feature	SNMP network		RJ45			
	Serial interface		RS232			
	Power supply	(V)	90		265	AC standard
			30		72	-48VDC optional
	Power consumption	(W)			50	
	Operating temp.	(°C)	-5		55	Extended Operating range option available
	Storage temp.	(°C)	-40		80	
	Operating relative	(%)	5		95	
	Size (W)×(D)×(H)	(")	19×14.5×1.75			1RU (19")

Remark: User may custom order input and output power parameters

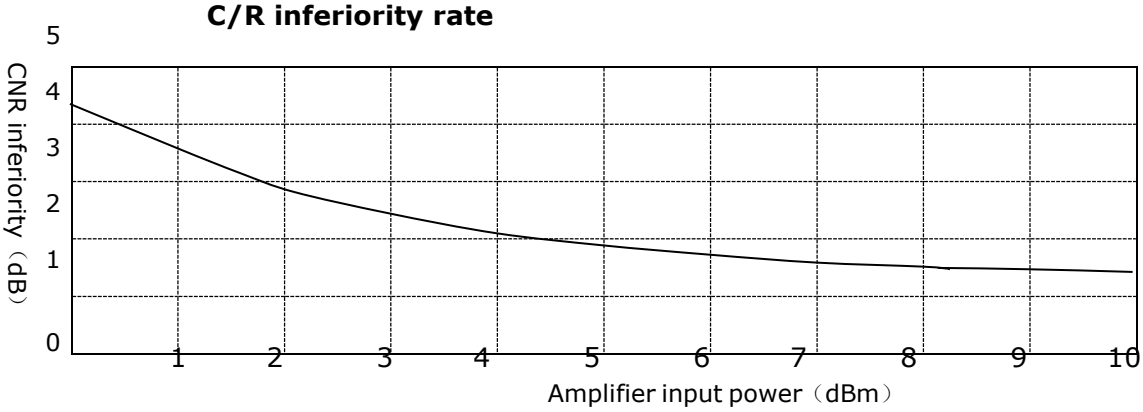
Output Monitor port - Included
Adjustable Output feature (attenuate 0 to -6 dB) - Included
Dual Hot Swappable Power Supplies - Included
SNMP - Web GUI access- Included

Optical/electrical schema

1. Optical port mode (With optional input & output monitor port)



C/R inferiority rate



EDFA Model Number Ordering Matrix

MXA-	5		1		□□		□ -		□ X		□□□ -		□□ -		□□		- □	
Product Series	Operating Wavelength		Production Type		Output Power (dBm) per port		Exterior		Number of Input Ports		Number of output ports		Output Port Connector type		Power Supply		Daisy Chain Ports +12 dBm ea.	
Model Series	5	1540-1563nm	1	Booster Amp	13	13	A	1RU	1	Single Input (without switch)	001	1 port	LA	LC/APC	11	100~240 VAC N. American Plug	D	4 Daisy Chain ports
					21	21			2	Dual Input (With Switch)	004	04 ports	SA	SC/APC	22	100~240 VAC European Plug	Blank	No Daisy Chain ports
					**	Custom dBm					xxx	Custom Port count			48	-48VDC		
					Available Output Power Range: +13 to +26 dBm										42	1 each combo AC and DC		

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

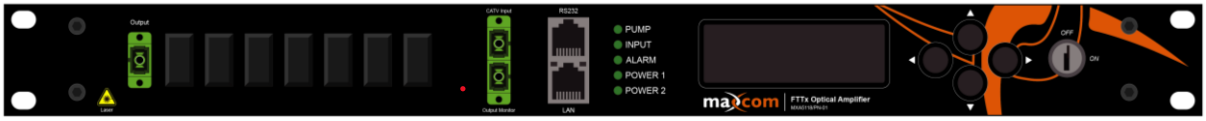
*Notes:

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 Optional daisy chain ports**.
Output ports come standard with SC/APC

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. 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.

B. 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 seque

Model
Read-only menu, indicates the model number
S/N
Read-only menu, indicates the serial number of the unit
Laser CTRL
Adjustable list, allows operator to turn laser on or off
Input
Read-only menu, indicates the input optical power ***In01 ***
Output
Read-only menu, indicates the total optical power in dBm

SET OUTPUT
Adjustable list displays the output optical power in dBm. Allows user to attenuate optical output up to 6 dBm
LASER CURRENT 1
Read-only menu, indicates the laser current in mA
CORE TEMP
Read-only menu, indicates the internal temperature
AMBIENT TEMP
Read-only menu, indicates the outside temperature
FAN
Read-only menu, indicates the fan speed
Power 1
Read-only menu, displays the status of power 1
Power 2
Read-only menu, displays the status of power 2
IP CONFIG
Adjustable list, Allows user to select Static or DHCP
IP
Adjustable list, displays the IP address
SUB
Adjustable list, displays the sub address
GW
Adjustable list, displays the gateway address
TRAP 1
Adjustable list, displays the TRAP1 address
TRAP 2
Adjustable list, displays the TRAP2 address
MAC
Read-only menu, displays the mac address
CONSOLE BAUD
Adjustable list, allows user to set baud rate between 1,200 and 230,400
HW VER
Read-only menu, displays the hardware version
SW VER
Read-only menu, displays the software version
REBOOT OPTIONS
Select Cancel or Confirm. Rebooting will NOT turn off output or change optical power levels. Other settings such as the IP address or switch settings will return to Default.
RESET SETTINGS
Adjustable list, restores device to factory default settings
LCD Brightness
Adjustable list, LCD contrast adjustment, select 0 to 100%

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.

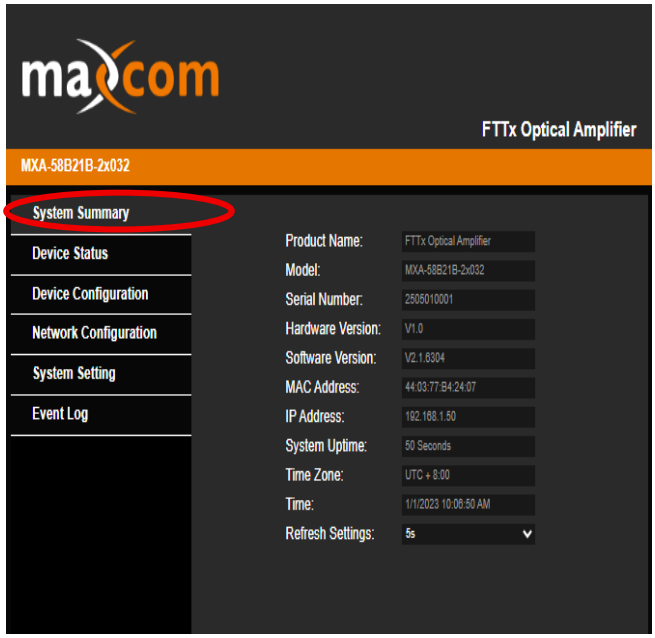
For example, modify the IP setup menu, IP: 192.168.000.015; if changing the number 5 to a 6, use ▶ key to choose the place of 5, then press ▲ key to change the 5 to 6, then press ▶ to save modified IP:192.168.000.016

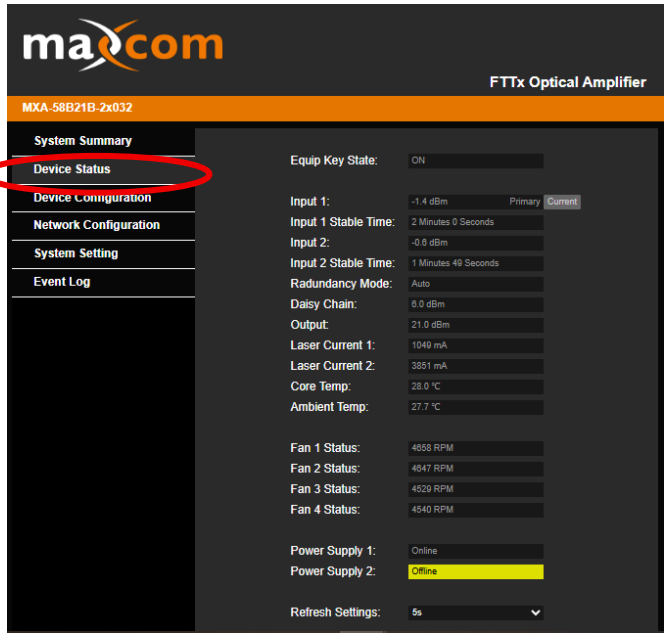
Web Interface

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...

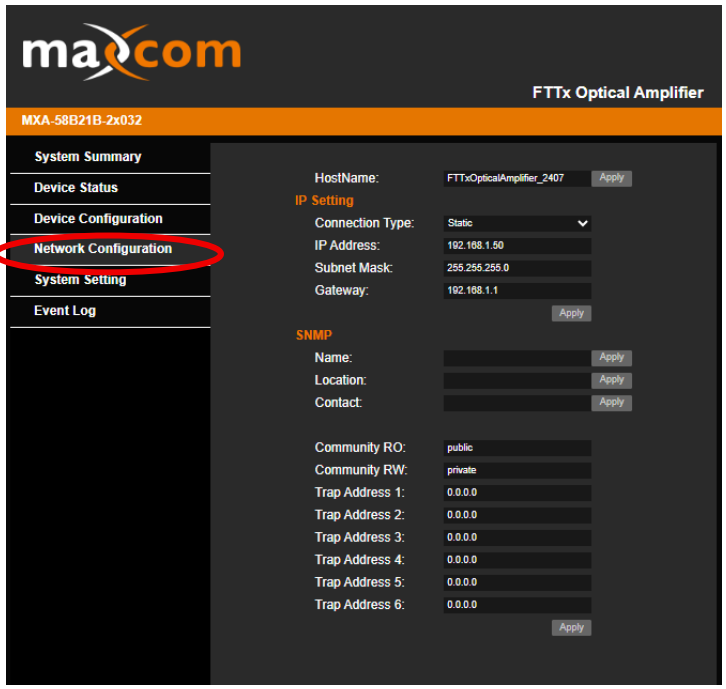
For quick access, simply plug a laptop or PC into the RJ-45 LAN port on the front panel of the chassis. Open a web browser. The default IP address is 192.168.1.50. Enter 192.168.1.50 into the browser and hit enter. The GUI Screen should appear with a log-in box. The default username is admin, the default 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.

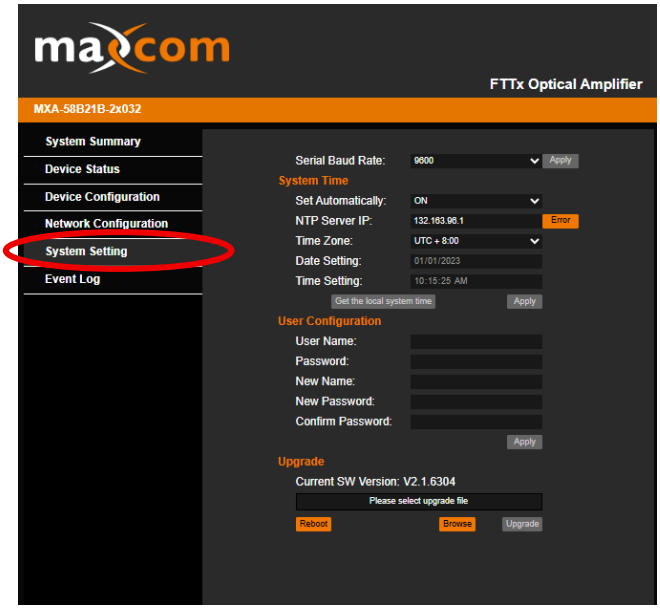
Below are illustrations of category screens available once logged in:

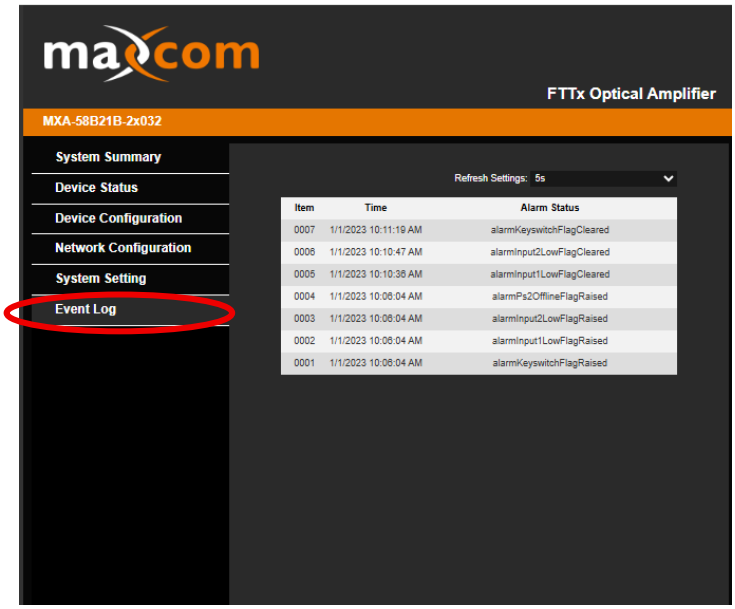





maxcom
FTTx Optical Amplifier
MXA-58B21B-2x032
System Summary
Device Status
Device Configuration
Network Configuration
System Setting
Event Log
Laser Output:
ON
Apply
Control Mode:
APC
Set Daisy Chain:
6.0
dBm
Set Output:
21.0
dBm
Apply


maxcom
FTTx Optical Amplifier
MXA-58B21B-2x032
System Summary
Device Status
Device Configuration
Network Configuration
System Setting
Event Log
HostName:
FTTxOpticalAmplifier_2407
Apply
IP Setting
Connection Type:
Static
IP Address:
192.168.1.50
Subnet Mask:
255.255.255.0
Gateway:
192.168.1.1
Apply
SNMP
Name:
Location:
Contact:
Community RO:
public
Community RW:
private
Trap Address 1:
0.0.0.0
Trap Address 2:
0.0.0.0
Trap Address 3:
0.0.0.0
Trap Address 4:
0.0.0.0
Trap Address 5:
0.0.0.0
Trap Address 6:
0.0.0.0
Apply


maxcom
FTTx Optical Amplifier
MXA-58B21B-2x032
System Summary
Device Status
Device Configuration
Network Configuration
System Setting
Event Log
Serial Baud Rate:
9600
Apply
System Time
Set Automatically:
ON
NTP Server IP:
132.163.96.1
Error
Time Zone:
UTC + 8:00
Date Setting:
01/01/2023
Time Setting:
10:15:25 AM
Get the local system time
Apply
User Configuration
User Name:
Password:
New Name:
New Password:
Confirm Password:
Apply
Upgrade
Current SW Version: V2.1.6304
Please select upgrade file
Reboot
Browse
Upgrade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FTTx Optical Amplifier
MXA-58B21B-2x032
System Summary
Device Status
Device Configuration
Network Configuration
System Setting
Event Log
Refresh Settings:
5s
Item
Time
Alarm Status
0007
1/1/2023 10:11:19 AM
alarmKeyswitchFlagCleared
0006
1/1/2023 10:10:47 AM
alarmInput2LowFlagCleared
0005
1/1/2023 10:10:36 AM
alarmInput1LowFlagCleared
0004
1/1/2023 10:06:04 AM
alarmPs2OfflineFlagRaised
0003
1/1/2023 10:06:04 AM
alarmInput2LowFlagRaised
0002
1/1/2023 10:06:04 AM
alarmInput1LowFlagRaised
0001
1/1/2023 10:06:04 AM
alarmKeyswitchFlagRaised

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.

Fiber Connections

Cleaning fiber-optic connectors can help prevent interconnect problems and therefore, aid 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 cation should be used. Fiber connectors can 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 the eyes and skin. To avoid injury and microscopic damage to fiber mating surfaces, turn off optical power before making or breaking optical connection.

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