

# USER MANUAL

# **EDFA812** 310023

# 8 VAY OPTICAL AMPLIFIER

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# SAFETY INSTRUCTIONS:



EDFA812 high power EDFA, electric power supplied, is a generator of invisible laser radiation in the infrared and optical range, which can be dangerous for the eye and causes burn of the direct irradiation. Operation of the device requires that the personnel must completely understand and meets the required conditions of all laser safety & electrical safety.

#### Electrical Safety

EDFA812 operates from AC power source that supplies 90~132VAC / 176~264VAC or DC power source that supplies 36 to 72 VDC.



EDFA812 must be well grounded in accordance with local and national electrical standards. Before supplying the power to the device, make sure the correct voltage is used. Failure to use the correct voltage could cause damage to the device.

Allow only personnel trained in electrical safety to operate this amplifier. Otherwise, injuries to personnel may occur.

#### Laser Safety

EDFA812 high power EDFA is class 4 laser safety according to the international classification that can burn the skin or cause devastating and permanent eye damage as a result of direct, diffuse or indirect beam viewing. These lasers may ignite combustible materials, and thus may represent a fire risk. These hazards may also apply to indirect or non-specular reflections of the beam, even from apparently matte surfaces-meaning that great care must be taken to control the beam path.





Use appropriate laser safety eye-wear when operating this device.

DO not install or terminate fibers when amplifier is active.

DO not look directly at any fiber end. Always keep your eyes at least 30 cm away from any light-guiding fiber or device.

DO not view an activated fiber with optical instruments (e.g., magnifiers, microscopes)

DO not open the cover! Laser hazard might increase.

Keep in mind that merging multiple light signals will increase the hazard.

Allow only personnel trained in laser safety to operate this amplifier. Otherwise, injuries to personnel may occur.



# **INTRODUCTION:**

#### Description:

EDFA812 high power EDFA is characterized by low noise and high linearity performance to meet the most demanding requirements of CATV and FTTx applications. It offers a flexible, low-cost solution for large area distribution networks.

#### Touch Screen LCD

EDFA812 high power EDFA is the **First Unit** to embed touchscreen LCD in CATV industry.

#### **Output Optical Power**

EDFA812 high power EDFA has standard series that is based on the optical power included 25~40dBm before splitter.

It is available to make special modifications to a specified output power up to 43dBm before splitter.

This optical amplifier has built-in optical power splitter for providing up to 128 output ports. Standard is at 1, 2, 4, 8, 16, 32 or 64 output power port.

#### Control Modes

EDFA812 can be configured in one of three optical output power control modes:

- APC (Automatic Power Control): Output Optical Power Level Stabilization
- ACC (Automatic Current Control): Pump Current Level Stabilization
- AGC (Automatic Gain Control): Optical Gain Level Stabilization

#### Measurement

EDFA812 is equipped with standard measures of input and back reflection optical power and reflected power meter within 60 dB dynamic range. Measurement of reverse reflection is useful function to monitor networks and to configure optimal settings exploitation.

#### Optical Switch (Optional)

EDFA812 can be equipped with automatic redundant input port according to customer request.

Optical power level at each of the two input ports is measured independently, allowing you to instantly switch from the primary input port to the backup input port when the power on signal.

#### WDM PON (Optional)

EDFA812 can be equipped with PON port according to customer request for xPON networks.

#### Management

All EDFA812 series optical amplifiers have a built-in Web server, which can be reviewed by any of the widely used web browser. Controlling and monitoring of the amplifier is used by the menu of interactive Web pages.

On-demand monitoring of the amplifier can also be accessed by our SNMP Manager.

#### Mechanical

All 2000 series amplifiers are in a standard 2U (1U and 3U), 19 ", equipped with 3 reliable cooling fans operating in parallel with microprocessor overheating protection. The Amplifier can work with temperature up to 50°c, and, if necessary, up to 60°c is optional. Standard power operates on AC 90~132V or 176~264V with high efficiency and high reliability.

# Specifications:

Optical Characteristics				
Parameter	Unit	Value		
Optical Input Wavelength	nm	1545 ~ 1565		
Optical Input Power	dBm	-10~+10		
Output Optical Power	dBm	See Ordering Information		
Typical Output Power per port	dBm	≥ 12		
Output Power Stabilization Range	%	30 ~100		
Port Numbers		See Ordering Information		
Output Power Tolerance	dB	± 0.5		
Port Uniformity	dB	± 0.6		
Noise Figure	dB	≤ 5.5		
Optical Test Port	dB	-5~+5		
Return Loss Input/Output	dB	≥ 45		
Isolation Output   Input	dB	≥ 40		
Polarization Dependence	dB	≤ 0.3		

1. Noise figure at 0 dBm input power, nominal output power and signal wavelength 1550 nm.

PON Characteristics (Optional)				
Parameter	Unit	Value		
PON Wavelengths	nm	1260~1360 & 1480~1500		
Insertion Loss	dB	≤1		
Isolation CATV ► PON	dB	50 @ 1545~1565 nm		
Isolation COM ► PON	dB	15 @ 1545~1565 nm		
Return Loss	dB	≥ 50		
Optical Switch for 2 Inputs (Optional)				
Parameter	Unit	Value		
Insertion Loss	dB	< 1		
Crosstalk	dB	≤ -55		
Repeatability	dB	± 0.05		
Switch Time	ms	≤ 10		
Return Loss	dB	≥ 50		

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General Characteristics				
Parameter		Unit	Value	
Power Supply		pcs	2 (1 default, 1 optional)	
Chassis Type			1U, 2U, 3U 19" Rack mounted	
AC Input Voltage		Vac	90~132 or 176~264	
DC Input Voltage		Vdc	36~ 72	
Power Consumption		W	≤75	
Dimension $(V/ \times H \times D)$		mm	484*44*385 (1U)	
		mm	484*88*336 or 484*88*416 (2U)	
Operating Temperature Range		°C	-5~+50	
Management Interface				
Parameter	Value	9		
Data Link Layer	Ethernet 10/100 Base-T (and LLDP optional)			
Network Layer	IPv4, ICMP			
Transport Layer	UDP, TCP			
Application Layer	SNMPv1/v2c, DHCP, Web			
Connectors	10/100 Base-T			
Front Panel Management	3.5" 480 x 320 Color Touch Screen LCD for 2U and 3U 2.4" 320 x 240 Color Touch Screen LCD for 1U			
Control Mode				
Parameter	Value			
	Pump Current			
Stabilization Mode Outp		Output Optical Power		
		Optical Gain		
	Low Input Power (LOS)			
Automatic Pump Shutdown Mode	High Back Reflection			
Ove		Overheating		



# Block Diagram:



2 Inputs Optical Switch (Optional)



# FRONT AND REAR PANEL:

(2U, CATV, SC/APC)



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No.	Description	No.	Description
1	3.2"/2.4" Color Touchscreen LCD	8	Handle
2	RJ45 LAN Port for Management	9	Removable Fan
3	LCD Reset1	10	Hot Plug-gable Power 1:AC Input
4	System Reset2	11	Hot Plug-gable Power 2: DC Input
5	Optical Testing Port	12	Grounding Screw
6	Optical Input Port	13	Removable Fan
	Optical Ports:		
7	PON to OLT	14	Removable Fan
	<ul> <li>COM (GPON + RF overlay).</li> </ul>		

# **INSTALLATION:**

EDFA812 high power EDFA kit includes:

Item	Quantity	Item	Quantity
EDFA Unit	1	Power Cable	1 or 2
User's Manual	1	Testing Report	1
Quick Guide	1	Packing Box	1

#### Unpacking:



To avoid electrical shock, do not operate the unit if it bears any sign of damage to any portion of its exterior surface, such as the outer cover or panels. Wear an anti-static wrist strap and work in an electrostatic discharge (ESD) controlled area.

- 1) Inspect the shipping box for any for any obvious damage.
- 2) Unpack the unit from all packaging boxes.
- 3) Inspect the appearance of the unit for any shipping damage.

4) Read the user's manual thoroughly and become familiar with all safety symbols and instructions to ensure that the unit is operated and maintained safely.

- 5) Document and inform the shipping company, if any damage is found.
- 6) Keep the shipping boxes and their inserts for future shipment in case the product needs repair.

**NOTE:** In the event of a reshipment back to the manufacturer, any additional damage caused by not using the original boxes will be considered the responsibility of the customer.

#### **Operating Environment:**

EDFA812 operates at:

Temperature: 0°C to +50°C (Recommended)

Humidity: 95% maximum (non-condensing conditions)

It is recommend operating in a dust-free environment

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#### EDFA Mounting and Power Connection:

1) Place the unit into a 19-inch wide rack or cabinet.

2) Plug the power cord supplied on the rear panel and place the other end of power source, please note the specification of power supply units.

Power Supply Connection	Description
	AC input: 90~132VAC,50/60 Hz or 176~264VAC, 50/60 Hz
[ <b>••••</b> ]	DC input: 32~72VDC for DC 48V

#### 3) Make sure grounding well

#### **Optical Connections:**



ALWAYS MAKE SURE that all power is removed from EDFA812 before optical connectors are connected

#### Cleaning for Fiber Patch Cord Connectors

- Remove the fiber connector dust cap and wipe the fiber connector tip with high-quality fiber cleaner or a dry lint-free cloth. Check if there are scratches or debris on connector surface by using a fiber scope.

- If no scratches or debris are found that means the connector is now clean and ready for connection.

- If debris or scratches are found, then repeat the fiber patch cord connector cleaning.

#### Cleaning for Fiber Optic Adapter

- Compressed air may be used to clean fiber optic adapter. Use compressed air with at least the following specifications:

- Non-residue, inert gas for precision dust removal
- Ultra-filtered to < 0.2 microns
- Recommended for optical systems

- Using compressed air as listed above, remove the adapter dust cover and hold the can of compressed air about 6 inches from the connector. After spraying a few short bursts into the adapter, the connector is clean and ready for connection.

- If compressed air is not available, the fiber adapter connector can be cleaned by 2.5 mm cotton swap or connector plate may be removed to clean the internal fiber patch cords.

**NOTE:** Use caution when handling fibers. Do not exceed fiber manufacturers pulling tension or bend radius specifications when removing fiber bulkhead connector plate.

#### **EDFA Connections:**

1) Clean all fiber patch cords before connecting.

2) Make sure the laser key switch on the front panel of the transmitter is in the OFF position.



3) Connect a fiber patch cord from the output of the transmitter to the optical power meter, turn key ON position of transmitter laser. Be sure the optical output is in the -10~+10dBm range (**OdBm is recommended**).

4) Turn switch key of transmitter to the OFF position and power OFF.

5) Connect the fiber patch cord to the amplifier input. Power up that transmitter once the fiber connections to the amplifier input are secure.

6) Turn the transmitter laser key switch to the ON position.

**NOTE:** When input power is **out** range of -10~ +10dBm, EDFA812 automatically turns off pump laser to protect itself and installation personnel.



NEVER disconnect any fiber connections to the EDFA while it is powered.

## **TOUCHSCREEN GUI SETTING:**



1) To avoid damaging the touchscreen, do not tap it with anything sharp or apply excessive pressure to it with your fingertips.

2) It is recommended to use fingers when you use the touchscreen.

#### 4.1 Verification

#### 4.1.1 Initial Interface:

When EDFA812 is first powered ON, it turns start-up screen to load system for a few seconds in the following.



And then it turns to Main Menu and reports the current EDFA status after loading as below.

NOTE: When input power is in the range of -10~ +10dBm, EDFA812 automatically turns on pump laser.



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No.	Description
1	Real-time display of details of "Setup", "Network Config" and "About", please see 4.2, 4.3, 4.3
2	"Setup", "Network Config" and "About" which is vertically on the right side of the touchscreen, select any menu by finger tap, please see 4.2, 4.3, 4.4
3	Link Down: RJ45 Ethernet cable is disconnected between EDFA and Computer; Link Up: RJ45 Ethernet cable is well connected between EDFA and Computer
4	Warning signs, see details at 4.1.3
5	System up-time after Power ON
6	3 groups current display for power higher than 38dBm

#### 4.1.2 Status Verification

EDFA812 has built-in power meter to get real value of input power displayed on the touchscreen with the accuracy that is not worse than  $\pm$  0.2 dB (-10dBm to +10dBm). Power output sensor calibrates the optical output power of EDFA812 automatically by MCU. Default factory settings of Amplifier mode is APC.

Set 16X19dBm for example as below: after power on, EDFA812 shows that **Input Power** is 0dBm, **Current** is around 80/80%, **Port Output Power** is 19dBm, Inner temperature is 30°C which means EDFA812 working fine.

Input Power: Amplifier Mode: Current: Port Output Power: Temperature: Back Reflection:	0.0 APC 80 / 80 19.0 30 -27.8	dBm % dBm ℃ dBm	Setup Network About
	*		Back
Link: Up	000	00h 29m	

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When input power is greater or lower than input power range, when high level of Back Reflection or Overheating arise, EDFA812 turns off pump current automatically to shut down optical output power.



If the output power is significantly different from the built-in power meter measured, it is most likely caused

a damage that need to be replaced by the manufacturer.

#### 4.1.3 Warning Signs:

Signs are displayed at the bottom of Touchscreen LCD when EDFA is under abnormal status. Set details at **5.7 Thresholds of Alarm and Warning** 

Warning	Description	Warning	Description
	The measured data is greater than or lower than the critical value		Optical output power activated! Laser Radiation!
	The measured data approaches the critical value (greater or lower than the warning value)	*	Optical output power is shut down. No Laser Radiation!
	No warnings		

#### 4.2 Setup Menu

This menu appears when tap "Setup" from the main menu that is designed to select the operation control mode of EDFA812 and set the values of the relevant parameters. Tap "Back" button to return main menu.



Four modes are (Sub-menu) displayed on touchscreen.

Control Mode	Description	User Level
APC (Automatic Power Control)	Output Optical Power Level Stabilization	Basic User (Recommended)
ACC (Automatic Current Control)	Pump Current Level Stabilization	Only Professional
AGC (Automatic Gain Control)	Optical Gain Level Stabilization	Only Professional
Turn off Pump	Turn Off the Current of Pump Laser	Basic User

Content of control mode is as below

Item	Description	Unit
Input Power	The optical power of the input signal	dBm
Amplifier Mode	The operating control mode : APC,ACC,AGC	
Current	Pump laser current	%
Port Output Power	Optical output power of each output port	dBm
Temperature	Temperature inside of the device	°C
Back Reflection	Back reflection optical power (back direction)	dBm

#### 4.2.1 Enter PIN:

The first time to enter APC, ACC or AGC mode after EDFA power up, it shows "Enter PIN" interface in order to avoid false touch and prevent unauthorized users. Input PIN code to save and run.

The default PIN code is "1111", go web management interface to change PIN code.

The default PIN authorization timeout is "5" minutes (User doesn't touch screen over 5 minutes), go web management interface to change PIN authorization timeout.



#### Keyboard Explanation

Button	Description	Button	Description
Esc	Tap to return to the previous screen menu without saving		Clear up one number
Clear	Allows to clear all input field	Save	Saves specified parameter/ value/ mode to apply

#### 4.2.2 APC Mode (Recommended):

Tap "APC" button to enter APC mode. APC mode is system default control mode. APC (Automatic Power Control) is established and maintained by the output power regardless of the changes of the input signal and temperature. EDFA812 automatically adjusts the current laser diode pumping to ensure stabilization of the desired output power that measured by an internal sensor.

Output power value is appeared at the top of menu as shows its value. Set the desired value by using the touch keyboard to input and then to save, the LCD display as below:



Note1: The desired value of output power cannot higher than the value of EDFA maximum Output power, otherwise, this desired value will not be activated.

Note2: The way to turn output power to "0" at APC mode is to input "0" and save it.



#### 4.2.3 ACC Mode:

Tap "ACC" button to enter ACC mode

ACC mode (Automatic Current Control) provides the direct power, control the device through the management of current laser diode pumping. Current is set as a percentage of the maximum value. The maximum current is set by the manufacturer. Default Value of ACC mode is 80/80% (Recommended).

Current is appeared at the top of menu as shows its value.set the desired value using the touch keyboard to input value



#### 4.2.4 AGC Mode:

Tap "AGC" button to enter AGC mode

AGC mode (Automatic Gain Control) is established and maintained by the fixed value of the input signal gain regardless of the input signal and temperature. The device automatically adjusts the current laser diode-pumped high-power cascade to maintain required gain, which is based on measurement of internal sensor.



Gain is appeared at the top of menu as shows its value. Set the desired value using the touch keyboard to input value.

Note: When input power is 0dBm, the output gain value is same as Port Output Power on touchscreen.



NEVER disconnect any fiber connections to the EDFA while it is powered.

#### 4.3 Network Configuration

This menu appears when you click "Network Config" from the main menu touch graphic display and is designed to control and configure the network settings of EDFA812



Factory Default Network Configuration is as below. The network configuration can be modified by Web remote management.

Item	Default Value
DHCP	Off
IP Address	192.168.1.100
Subnet Mask	255.255.255.0
Default Gateway	0.0.0.0

#### 4.3.1 DHCP ON/OFF:

DHCP is switched on and off by taping DHCP button in this menu



#### 4.3.2 IP Address:

Tap "IP Address" to enter the following interface. IP address is appeared at the top of menu as shows its current value, set the desired value using the touch keyboard to input value.



Note1: In accordance with the version of the Internet Protocol version 4 (IPv4), IP address has a length of 4 bytes. In this version of an IP address is a 32-bit signed number, it is convenient form of writing which is written as four decimal numbers from 0 to 255, separated by comma.

#### 4.3.3 Subnet Mask:

Tap "Subnet Mask" to enter into the following interface. Subnet mask is appeared at the top of menu as shows its value, set the desired value using the touch keyboard



#### 4.3.4 Default Gateway:

Set the default gateway address and define the network gateway to which to send traffic for which you cannot determine a route based on routing tables.

Gateway:0.0.0.0						
7	8	9	Esc			
4	5	6	Clear			
1	2	3				
•	0		Save			

Default Gateway is appeared at the top of menu as shows its value, set the desired value using the



touch keyboard to input value

#### 4.4 About

Tap "About" to enter the following interface. This menu contains the basic information about the device and tap "Back" to go main menu.

Part Number: Serial Number: Location: Description:	XXXXX M50023 XXXXX XXXXX Back
Link: Up	00102h 28m

Item	Default Value
Part Number	The identifier of optical amplifier Model No.
Serial Number	The unique and identifying number of this optical amplifier
Location	This optical amplifier's installed place
Description	The description of this installed place

# Web GUI Setting

EDFA812 high power EDFA supports to monitor and administrate the working status through a webinterface by different OS and any modern browser (Chrome, Mozilla Firefox, Opera, Internet Explorer, Edge, Safari, etc.)



### 5.1 Accessing the Web interface

EDFA812 has an RJ45 interface for connecting remote control by using Cat6 RJ45 cable. When "Link: Down" turns to "Link: Up", RJ45 Ethernet cable is well connected between EDFA and computer. See as below:





Make sure IP address of computer is 192.168.1.x (x=2~255). Input 192.168.1.1 into web browser to get following interface. Username and password are requested.

Note: the default username and password is as below:

Username	Password	Authorization
Admin	PassAdmin	Reading and setting parameters
Read	readonly	Reading parameters Only

□ 192.168.1.1 × +				-		×
$\leftarrow$ $\rightarrow$ $\circlearrowright$   192.168.1.1		☆	ᆕ	I	٩	
Login						^
User	Admin					
Password	•••••					
	Login					
						~

#### 5.2 Management 5.2.1 Amplifier Status

After input correct user name & password, and login, the general page of the web interface is appeared. This home page allows a quick system overview.

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#### 5.2.2 Optical Switch (Option)

Click "Optical Switch" to control optical switch panel.

This optional function is only available for the EDFA equipped with optical switch module inside.

Name	Description
Input1	Force to Input1
Input2	Force to Input2
Auto_delta	Input1 and Input2 have same priority
Auto_input1	Input1 is master, input2 is slave
Auto_input2	Input2 is master, input1 is slave

192.168.1.1	× +								-		×
$\leftarrow \rightarrow \circ$ 0	192.168.1.1/index.html?username=Ad	dmin&p	assword=761540388#osw				□ ☆	₽	I	٩	
	Optical Switch										
High Power EDFA											
	Optical Switch		Optical Switch Threshold	for auto	_delta mode						
V Fiber Optical Amplifier	Name Value	Unit	Name	Value		Unit					
Amplifier Status	Input1Power -20.2	dBm	DeltaInputPowerSwitch	1.0		dB					
Optical Switch	Input2Power -23.8	dBm		-							
Amplifier Setup	ActiveInput input1			Reset	Save						
Information	InputPower -43.8	dBm									
Inresnolas	ActiveInput  input1		Optical Switch Threshold	is for auto	o_input1/auto_inj	out2 modes					
IDV/ Address	○ input2		Name	Value		Unit					
IPV6 Address	○ auto_delta ○ auto_input1		HigherInputPowerSwitch	-2.0		dBm					
SNMP	⊖ auto_input2		LowerInputPowerSwitch	-3.0		dBm					
Time Server	Reset Save										
✓ Security				Reset	Save						
Web Password											
Touch Screen											
✓ Service											
Firmware Update											
1 Admin											
Logout C											
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There are 5 modes of optical switch function for different networks and requirements



Auto\_delta Block Diagram

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User can set the value of delta input power switch for different demands.



#### User can set the value of higher input power switch and the lower input power switch.

#### 5.2.3 Amplifier Setup

Click "Amplifier Setup" to control and change the operating control mode of the device by "Save" button.EDFA812 also can be found in sections by Touchscreen LCD Setting.

192.168.1.1	× +									-		×
$\leftarrow \rightarrow $ 0	192.168.1.1/index.html?use	rname=Admin&passwor	d=76154038	8#setup				☆	=	1	٩	
	Amplifier Setu	p										
High Power EDFA	Amplifier Setup			Automatic Power Shutdow	vn Threshold	& Pump Current On/Off	System Ignore	e Warning//	Alarm S	ettings		
V Fiber Optical Amplifier	Name	Value	Unit	Name	Value	Unit	Name	Value	Unit			
Amplifier Status	InputPower	-43.8	dBm	MinimumInputPowerAPS	-10.0	dBm	IgnorePS1	● no				
Optical Switch	PumpCurrent	0/0	%	APS	on			⊖ ignor	е			
Amplifier Setup	PortOutputPower	-59.0	dBm	PumpCurrentEnable	O disabled		IgnorePS2	● no	0			
Thresholds	PortGain	-15.2	dB		enabled		Ignorolpput1		0			
✓ Network	Mode	O ACC			Reset Sav	/e	ignoremputi	<ul> <li>ignor</li> </ul>	e			
IPV4 Address		APC     ACC					IgnoreInput2	• no				
IPV6 Address	DardQuideudDeuree	O AGC	dDaa					○ ignor	е			
SNMP	PortOutputPower	21.0	dDm					Reset	Save			
Time Server	PortAmount	8	pcs									
✓ Security		Reset Save										
Touch Screen												
v Service												
Firmware Update												
1 Admin												
Logout 🕑												
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There are 3 kinds of control modes of this amplifier are shown in the table below

Control Mode	Description	User Level
APC (Automatic Power Control)	Output Optical Power Level Stabilization	Basic User (Recommended)
ACC (Automatic Current Control)	Pump Current Level Stabilization	Only Professional
AGC (Automatic Gain Control)	Optical Gain Level Stabilization	Only Professional



Warning Alarm for Power Supply and Input Power

Name	Description
Ignore PS 1	When EDFA is equipped 2pcs power supplies, if only one power supply is connected to power source powered or only one is working, the system gives
Ignore PS 2	yellow alarming sign to user. And user can force to turn off alarming sign
Ignore Input1	When EDFA is equipped 2inputs optical switch module, local network only
Ignore Input2	sign.

#### APC mode (Recommended):

System default mode is APC mode that is easy to operate for basic user. Click "PortOutputPower" to set new output power value.

Please note: The new value is adjustable according to customer's request.

For example, when customer ordered a 16x19 high power EDFA (16 ports with 19dBm per port).

The new value of output power is in 30%~100% range of 19dBm. However, It is not available when new value is higher than 19dBm.

192.168.1.1	$\times$ +									-		×
$\leftarrow$ $\rightarrow$ O	192.168.1.1/index.html?use	ername=Admin&password=7	6154038	8#setup				☆	=	2	٩	
	Amplifier Setu	qı										
High Power EDFA	Amplifier Setup			Automatic Power Shutdow	vn Threshold &	& Pump Current On/Off	System Ignore	e Warning	Alarm S	ettings		
v Fiber Optical Amplifier	Name	Value	Unit	Name	Value	Unit	Name	Value	Unit			
Amplifier Status	InputPower	-43.8	dBm	MinimumInputPowerAPS	-10.0	dBm	IgnorePS1	no				
Optical Switch	PumpCurrent	0 / 0	%	APS	on			⊖ igno	re			
Amplifier Setup	PortOutputPower	-59.0	dBm	PumpCurrentEnable	O disabled		IgnorePS2	● no				
Thresholds	PortGain	-15.2	dB		enabled		lanaralmut1	© Igilio				
v Network	Mode	O ACC			Reset Sav	e	ignoremputi	⊖ igno	re			
IPV4 Address		APC     AGC					IgnoreInput2	● no				
IPV6 Address SNMP	PortOutputPower	21.0 ×	dBm					Reset	Save			
Time Server	PortAmount	8	pcs									
✓ Security Web Password		Reset Save										
Touch Screen												
✓ Service												
Firmware Update												
Admin												
Logout 🕑	© Copyright 2017											
L	Copyright 2017.											

#### ACC mode:

Click "ACC" to ACC mode to change Pump Current. Default pump current is 80% which is the best optimization for EDFA812.Click "PumpCurrent" to set new current value. The new value of pump current is from 0% to 80%. It is not available when new value is higher than 80%.

192.168.1.1	× +									-		>
$\leftrightarrow$ $\rightarrow$ 0	192.168.1.1/index.html?u:	sername=Admin&passw	ord=76154038	8#setup				☆	=	l	٩	
	Amplifier Se	tup										
High Power EDFA	Amplifier Setup			Automatic Power Shutdow	vn Threshold	& Pump Current On/Off	System Ignore	Warning	ı/Alarm S	ettinas		
Eiber Optical Amplifier	Name	Value	Unit	Name	Value	Unit	Name	Value	Unit			
Amplifier Status	InputPower	-43.8	dBm	MinimumInputPowerAPS	-10.0	dBm	IgnorePS1	• no	Unit			
Optical Switch	PumpCurrent	0/0	%	APS	on			⊖ igno	ore			
Amplifier Setup	PortOutputPowe	r -59.0	dBm	PumpCurrentEnable	O disable	d	IgnorePS2	• no				
Information	PortGain	-15.2	dB		enabled	ł			ore			
Thresholds	Mode	ACC			Reset Sa	ive	IgnoreInput1	Ino	ne			
IPV4 Address		O APC					lanorelnnut?	<ul> <li>no</li> </ul>				
IPV6 Address		O AGC					ignoremputz	O igno	ore			
SNMP	PumpCurrent	80	× %					Reset	Save			
Time Server	PortAmount	8	pcs									
ecurity		Reset Save										
Web Password												
Touch Screen												
ervice												

#### AGC mode:

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Click "AGC" to AGC mode to change output gain value for each port.

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	Amplifier Setu	qu										
High Power EDFA	Amplifier Setup			Automatic Power Shutdov	vn Threshold &	& Pump Current On/Off	System Ignore	Warning	/Alarm S	ettinas		
<b>≜</b>	Ampliner Setup			Automatic Fower Shatao	in meanora e	ar unp current on/on	System ignore	, manning	Alum 5	cungs		
V Fiber Optical Amplifier	Name	Value	Unit	Name	Value	Unit	Name	Value	Unit			
Amplifier Status	InputPower	-43.8	dBm	MinimumInputPowerAPS	-10.0	dBm	IgnorePS1	no				
Optical Switch	PumpCurrent	0/0	%	APS	on			○ igno	re			
Amplifier Setup	PortOutputPower	-59.0	dBm	PumpCurrentEnable	O disabled		IgnorePS2	no				
Information	PortGain	15.2	dB		enabled			⊖ igno	re			
Thresholds	FortGain	-15.2	ub		Deast Car		IgnoreInput1	• no				
✓ Network	Mode	O ACC			Reset	e		⊖ igno	re			
IPV4 Address		AGC					IgnoreInput2	no				
IPV6 Address	PortGain	(H.O.	dB					O igno	re			
SNMP	- ortouin	[1.0 ×						Reset	Save			
Time Server	PortAmount	8	pcs									
✓ Security		Reset Save										
Web Password												
Touch Screen												
* Service												
Firmware Update												
1 Admin												
Logout 🕒												
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Note: when disabled "PumpCurrentEnable", all pump lasers are shut down immediately.

#### 5.2.4 Information:

Click "Information" to see device information that indicates part number, serial number, system location, SNMP, hardware and firmware details.

USER	MANUAL	EDFA 812
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Information         High Power EDFA         Image: State         Vefber Optical Amptifier         Amgdifier State         Optical Switch         Amgdifier State         Optical Switch         Amgdifier State         Optical Switch         Amgdifier State         Information         Thresholds         Information         Information         Name: Value         PartNumber         Optical Switch         Amgdifier State         Information         Information         Name: Value         PartNumber         Optical Switch         Amgdifier State         Information         Information         Name: Value         Reset: Save         Value         State: Save         State: Save         Value         Value         State: Save:         Value         Value         State: Save:         Value         Value         Towns State:         State: Save:         Value:         Towns State: <td><math>\leftarrow</math> <math>\rightarrow</math> O  </td> <td>192.168.1.1/index.html?username=Admin&amp;pas</td> <td>ssword=761540388#info</td> <td></td>	$\leftarrow$ $\rightarrow$ O	192.168.1.1/index.html?username=Admin&pas	ssword=761540388#info	
High Power EDFA   Verior Optical Amplifier   Amplifier Status   Optical Switch   Amplifier Status   Part Number   Status   Part Address   IPVE Address   SNMP   Inter Saver   Sourd Screen   Sourd Screen   Switch Screen   Admin   Locot IP		Information		
Device information         Version information         NAMP information	High Power EDFA			
<pre></pre>	<b>A</b>	Device information	Version information	SNMP information
Amalfer Status   Optical Switch   Amalfer Status   Optical Switch   Amalfer Status   Optical Switch   Amalfer Status   Optical Switch   Amalfer Status   Internation   Description   Description   Reset Save   VetVork	V Fiber Optical Amplifier	Name Value	Name Value	Name Value
Optical Switch       Amedifier Setue       SerialNumber 3917010097       Ontrol UnitHardware       1-10       ModuleFirmware       3-20-gbb5961e       ModuleFirmware       3-20-gbb5961e       ModuleFirmware       3-20-gbb5961e       ModuleHardware       ModuleHardware       ModuleHardware       ModuleHardware       ModuleHardware <td< td=""><td>Amplifier Status</td><td>PartNumber</td><td>ControlUnitFirmware 3-23-gd76c188-dirty</td><td>sysDescr 3-23-gd76c188-dirty</td></td<>	Amplifier Status	PartNumber	ControlUnitFirmware 3-23-gd76c188-dirty	sysDescr 3-23-gd76c188-dirty
Amodifier Setue   Intensionalion   Thresholds   Thresholds   Network   IPV4 Address   IPV6 Address   SNMP   Time Server   Security Security Veb Password Security	Optical Switch	SerialNumber 3917010097	ControlUnitHardware 1-110	sysObjectID .1.3.6.1.4.1.1385
Information       I       Description       I         Interstolds       Reset       Save       ValueHardware       g2003/2         WebVersion       4.17-g48a7993       BootloaderFirmware       1.7-g0f9fe3f         IPVE Address       SystemCTN       1       OMNumber       0000         * Security       Web Password       OMNumber       0000       Reset       Save         * Security       Value Password	Amplifier Setup	Description Description	ModuleFirmware 3-20-gbb5961e	sysContact
Threabolds     Reset     Reset     Save     WebVersion     WebVersion     WebVersion     WebVersion     BootloaderFirmware     SystemCTN     SystemCTN     OMNumber     OMNumber     Save     SystemCTN     SystemCTN     OMNumber     Output     Save     SystemCTN     OMNumber     Output     Save     SystemCTN     OMNumber     Output     Save     Save <td>Information</td> <td>Description</td> <td>ModuleHardware gz003v2</td> <td></td>	Information	Description	ModuleHardware gz003v2	
VNetwork     Vieroversion     4-17-gacaryss       IPV6 Address     Bootloaderfirmware     1-7-g0f9fe3f       ShMP     SystemCTN     1       OMNumber     0000   Security       Web Password       Touch Screen       Service       Firmware Update       Admin       Location	Thresholds	Reset Save	W-bV-ssize 4 17 - 49-7002	sysName
IPV4 Address     BoolloaderFirmware     1-7-g0t9fe31       SystemCTN     1       SystemCTN     1       OMNumber     0000   Security Web Password        Touch Screen  Service  Eirmware Update       I Admin   Locoul C	✓ Network		Webversion 4-17-g46a7995	sysLocation Location
IPV6 Address     SystemCTN     1       SMMP     OMNumber     0000       Time Server     0000       Veb Pasword     0000       Touch Screen       vService       Einmvare Update       1       Locoul @	IPV4 Address		BootloaderFirmware 1-7-g0f9fe3f	
SINAP   Time Server   Veb Pasword   Touch Screen   vervice   Firmware Updale   A dmin   Locoul @	IPV6 Address		SystemCTN 1	Reset Save
Time Server       Veb Password       Touch Screen       Service       Firmware Updale       & Admin       Loadul @	SNMP		OMNumber 0000	
Veb Password       Jouch Streen       Service       Firmware Updale       Admin       Locout @	Time Server			
Touch Screen       Schreide       Firmware Update       Logeut C	✓ Security			
Touch Screen            Service            Firmware Update             Admin            Locout @	Web Password			
Service Firmware Update Locout G	Touch Screen			
Legoul C	✓ Service			
Logoui @	Firmware Update			
	I Admin			
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#### 5.2.5 Thresholds:

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Click "Thresholds " to control and change the device thresholds by "Save" button. "Threshold" supports customized parameters to monitor working status of this EDFA under different networks and gives alarm on both LCD and Web GUI.

192.168.1.1	× +								-		×
$\leftarrow$ $\rightarrow$ O $\mid$	192.168.1.1/index.html?usern	ame=Admin&p	assword=761540	388#thresholds			□ ☆	=	I	٩	
	Thresholds										
High Power EDFA	Thresholds										
✓ Fiber Optical Amplifier Amplifier Status	Name	Minimal Critical	Minimum Warning	Maximum Warning	Maximum Critical	Unit					
Optical Switch	TemperatureCMax	5	10	60	65	°C					
Amplifier Setup	InputPowerCMax	-10.0	-6.0	9.0	10.0	dBm					
Information Thresholds	PortOutputPowerCMax	9.0	10.0	22.5	22.7	dBm					
✓ Network	PortGainCMax	10.0	12.0	30.0	40.0	dB					
IPV4 Address IPV6 Address	BackReflectionCMax	-50.0	-40.0	-3.0	0.0	dBm					
<u>SNMP</u> Time Server		Reset Save									
* Security											
Web Password											
Touch Screen V Service											
Firmware Update											
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#### Input Power Setting: Input the thresholds value as below

Name	Description	Value
InputPower CMax	Maximum Limit (Failure) of Input Power (CMax), dBm	10
InputPower WMax	Upper Threshold (Degrade) of allowable values of Input Power (WMax), dBm	9
InputPower WMin	Lower Threshold (Degrade) of allowable values of Input Power (WMin), dBm	-6
InputPower CMin	Automatic Pump Shutdown (APS) and Minimum Limit (Failure) of Input Power (CMin), dBm	-10

When input power is higher than 10dBm or lower than -10dBm, which means is out of its maximum limit of input power. In order to avoid failure and damage, system starts self-protection application to shut down pump laser current and closes optical output power. Touchscreen displays as Figure 1.

Note: The value of "InputPower CMax" and "InputPower CMax" is factory default value that cannot be changed.

When input power is between g~10dBm or -10~-6 dBm that is upper than threshold of allowable values of temperature, but is lower than failure value, system provides alarm and warning signs as Figure 2.



Figure 1

Figure 2

When input power is in the range of  $-6 \sim 9$  dBm, such as "8.5" EDFA is in normal working condition as Figure 3.

User can set thresholds value of input power according local environment and customer request. For example, set "InputPower WMax" value into "8", when input power is "8.5", system gives alarm and warning signs as *Figure 4*.



#### USER MANUAL EDFA 812



Figure 3

Figure 4

It is the same setting between Port Output power & Back Reflection and Input Power.

#### 5.3 Network 5.3.1 IPv4 Address:

Click to control and change the network status of the device by "Save" button.



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#### 5.3.2 SNMP:

Click "SNMP" to control and change the network status of the device by "Save" button.

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$\leftarrow$ $\rightarrow$ O	192.168.1.1/index.html?usern	ame=Admin&pass	ord=76	540388#snmp	□ ☆	<u> </u>	I	٩	
	SNMP								
High Power EDFA	SNMP config								
V Fiber Optical Amplifier	Name	Value							
Amplifier Status	SNMPCommunityRead	public							
Optical Switch	SNMPCommunity/Write								
Amplifier Setup	Shim community write	private							
Information	IPSNMPServer1	0.0.0							
V Network	IPSNMPServer2	0.0.0							
IPV4 Address	IPSNMPServer3	0.0.0.0							
IPV6 Address									
SNMP		Reset Save							L.
Time Server									
Web Password									
Touch Screen									
✓ Service									
Firmware Update									
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Logout @									
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### 5.3.3 Time Server:

Click "time server" to control and change the network status of the device by "Save" button.

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$\leftarrow$ $\rightarrow$ O	192.168.1.1/index.html?username=Admin&password=761540388#time	=	ľ	٩	
	Time Server				
High Power EDFA	Time server config				
V Fiber Optical Amplifier	Name Value				
Amplifier Status	NTPServerIP 0.0.0.0				
Optical Switch					
Amplifier Setup	Timezone 4.0				
Information	DateTime 1452				
Thresholds	Recet Save				
V Network					
IPV4 Address					
IPV6 Address					
SNMP					
Time Server					
✓ Security					
Web Password					
Touch Screen					
✓ Service					
Firmware Update					
1 Admin					
Logout @					
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# 5.4 Security

#### 5.4.1 Web Password:

Click "Web Password" to control and change the password of the device by "Save" button.

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$\leftarrow$ $\rightarrow$ O $\mid$ 193	168.1.1/index.html?username=Admin&password=761540388#web_password	□ ☆   =	2	٩	
	Web Password				
High Power EDFA	Web access setup				
V Fiber Optical Amplifier	Change web user/password				
Amplifier Status	Current user Admin				
Amplifier Setup	Current password				
Information Thresholds	Select user role Admin ~				
✓ Network	New password				
IPV4 Address	Repeat new password				
SNMP	Change				
Time Server					
Veb Password					
Touch Screen					
✓ Service					
Firmware Update					
1 Admin					
Logout @					
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#### 5.4.2 Touch Screen:

Click "Touch Screen" to change LCD display Backlight parameters and PIN code for touch LCD screen of the device by "Save" button.

192.168.1.1	$\times$ +						-		×
$\leftarrow$ $\rightarrow$ O	192.168.1.1/index.html?user	mame=Admin&p	assword=761	54038	8#touch_screen	₽	1	٩	
	Touch Screen								
High Power EDFA	Touch screen setup								
	rouch screen setup								
v Fiber Optical Amplifier	Name	Value		Unit					
Amplifier Status	PinCode	1111							
Optical Switch	Din Code Auth Time out			min					
Amplifier Setup	PInCodeAuthTimeout	5		min					
Information	BackLightDeepOn	100		%					
Thresholds	Backl ightTimoout			min					
✓ Network	DackLight Hitleout	3							
IPV4 Address	BackLightDeepOff	10		%					
IPV6 Address	ResetTouchCalibration	no action							
SNMP	Reserrouchoulbrailon	<ul> <li>reset</li> </ul>							
Time Server		Devel Deve							
✓ Security		Reset Save							
Web Password									
Touch Screen									
✓ Service									
Firmware Update									
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PIN Code Setting: Input new PIN code and click "apply", then Power OFF of EDFA812 and Power ON, new PIN code is activated.

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192.168.1.1	× +								_		×	
$\leftarrow$ $\rightarrow$ O	192.168.1.1/index.html?usernam	ne=Admin&password=	761540388	#touch_screen			□ ☆	=	I	٩		
	Touch Screen											
High Power EDFA	Tauch comes actus											
	Touch screen setup											
V Fiber Optical Amplifier	Name	Value	Ur	it								
Amplifier Status	PinCode	1111										
Optical Switch	PinCodeAuthTimeout	(										
Amplifier Setup	TinoodeAdimineout	5	'''									
Information	BackLightDeepOn	100	%									
Thresholds	BackLightTimeout	3	m	n								
✓ Network		5										
IPV4 Address	BackLightDeepOff	10	%									
IPV6 Address SNMP	ResetTouchCalibration	<ul> <li>no action</li> <li>reset</li> </ul>										
Time Server		Deast Sava										
✓ Security		Reset Save										
Web Password												

	DuckLightDeepon	100	/0
Thresholds			
Network	BackLightTimeout	3	min
IPV4 Address	BackLightDeepOff	10	%
IPV6 Address			
SNMP	ResetTouchCalibration	no action	
Time Server			
Security		Reset Save	
Web Password			
Touch Screen			
Service			
Firmware Update			
1 Admin			
Logout 🕒			
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#### 5.5 Service 5.5.1 Firmware Update

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Click "firmware update" to upgrade device by "Start Bootloader" button.

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$\leftarrow$ $\rightarrow$ U	192.168.1.1/index.html?username=Admin&password=761540388#firmware_update	□ ☆	=	I	٩	
	Firmware Update					
High Power EDFA	Firmware update instruction					
✓ Fiber Optical Amplifier Amplifier Status	Press button "Start Bootloader".     Upload firmware file in web form using web form.					
Optical Switch	Start Bootloader					
Amplifier Setup						
Thresholds						
~ Network						
IPV4 Address IPV6 Address						
SNMP						
Time Server						
✓ Security Web Password						
Touch Screen						
✓ Service						
Firmware Update						
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Web browser goes to the interface as below, click "Browse" to find firmware and then click button "Upload Firmware". After finished uploading, click "Go Application" button and then restart the device.



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Ethernet Bootloader × +			
↔ → ひ   192.168.1.1			
Upload New Firmware Firmware File	Installed Firmware Inf Check Firmware	Check Status	
Upload New Firmware       Firmware File	Installed Firmware Int Check Firmware Firmware Information • Status: Normal	Check Status	
Upload New Firmware         Firmware File	Installed Firmware Info           Check Firmware           Firmware Information           • Status: Normal           • Signature: 1-110           • Version: 1-7-g0f9           • Device time: 2016	fe3f 6-01-01 00:41:42	

After upload firmware and restart, EDFA touchscreen LCD goes to calibration mode.

LCD Calibration Mode: Use a pen to point touch screen and follows its steps. Touch the center point of cross according to LCD displayed.



After calibrated, LCD display goes to in the Initial interface, tap "Setup", LCD display restart and run to working status.

#### **6.SNMP Management**

EDFA812 offers MIB document for different network requirement. Download a MIB browser to configure network information.





Address: 19	2.168.118.136 V Advanced OID:	.1.3.6.1.4.1.1385.1.3.0		~	Operations: Get Next 🗸 🌈 Go					
SNMP MIBs			Result Table							
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Name	deviceSerialNumber	^								
OID	.1.3.6.1.4.1.1385.1.3									
Mub Syntax	DISPLAYSTRING									
Access	read-only									
Status	current									
DefVal										
Descr	Device Serial Number; Seriinii nomer ustroistva.									

🚸 iReas	oning MIB Browser					- 0	×
File Edi	it Operations Tools Bookmarks Help						
vddress: 19	92.168.118.136 V Advanced OID: .1.3.6.1.4.1.1385.12	1.0		<ul> <li>Operations:</li> </ul>	Get Next	~ <i>🔿</i>	Go
SNMP MIBs		Result Table					
MIB Tre	e A		Name/OID	Value	Туре	IP:Port	6
Name	mont provide energenergieses energieses						
DID	.1.3.6.1.4.1.1385.12.1						
vud Svntax	INTEGER (emergency(1),alert(2),critical(3),error(4),warning(5).no						
ccess	read-only						
tatus	current						
efVal							
ndexes lescr	Device Common Status; Obschiv status ustroistva.						
iso.org.doo	d.internet.private.enterprises.gz.deviceStatus.status.0			 			

🚸 iReasc	ning MIB Browser											-		×
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Address: 192		Advanced	OID: .1.3.6.1.4.1.138	5.77.7.2	2.5.0					✓ Operatio	ns: Get Next	~	<b>60</b>	,
SNMP MIBs				F	Result Table	1								
SNMP MIBs	deviceSetting manDevices manDevices optic	Dynamic alswitchinputPow alswitchinputPow alswitchinputPow alswitchinputPow alswitchinputPow fineFinabled fineFineAdd fierPumpCurrent filePumpCurrent filePumpCurrent filePumpCurrent filePompCurrent filePompCurrent filePompCurrent filePompCurrent filePompCurrent filePompCurrent filePompCurrent filePompCurrent	wer 1 wer 2 out onPower ant 1 2 - - - - - - 	*	Result Table	 Name	JOID		Value		Туре	IP:F	ort	<ul> <li>З</li> <li>з</li></ul>
	ample and a second	FierRadiator Temp fierRadiator Temp fierAPSbyInputP fierAPSbyBackRe fierAPSbyTempe Setting alSwitchDeltaSet fierAPS fierPoetDeltaSet fierAPS fierPoetDeltaSet fierPerpunpCurrent: fierPunpCurrent: fierOutputPower fierSortDutPower fierSortDutputPower fierPortOutputPo	Jerdure Dremperdure ower rabure entSet 15et 25et 5et 5et	*										
Name	amplifierInputPower													
OID	.1.3.6.1.4.1.1385.77.7.2.	5												
MIB	GZ-MIB			-11-										
Syntax	INTEGER32			-11										
MLCBSS Shahur	current			-11-										
DefVal	carronic			-11										
Indexes														
Descr	InputPower*10, Amplifier I	Input Optical Pov	wer, dBm*10											
.iso.org.dod.	internet.private.enterprises	s.gz.mainDevices	amplifier.amplifierDynamic	amplifi	erInputPower.0			 				_		_