

HOA 7100
MAXLink™
Optical Amplifier
Product Manual

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1

Overview

1.1 About This Manual

This instruction manual is a complete guide to installing and operating the one Rack Unit (1 RU) HOA 7100 MAXLink Optical Amplifier. Please read the entire manual before beginning installation.

- Chapter 1 gives general information about the HOA 7100 MAXLink Optical Amplifier.
- Chapter 2 describes the front panel interface.
- Chapter 3 describes the installation procedures.
- Chapter 4 describes the web interface.
- Chapter 5 tells you how to connect to a network management system.
- Chapter 6 describes maintenance and what to do in the event of problems.
- Appendix A provides complete technical specifications.
- Appendix B provides a list of Harmonic's offices around the world.

1.2 Product Manual Applicability

This manual applies to MAXLink Optical Amplifier models 7114 and 7117. Appendix A, Table A-2, includes specific output power information for each of these models.

1.3 Product Description

The HOA 7100 MAXLink Optical Amplifiers are erbium-doped fiber amplifier (EDFA) modules. Features include:

- Convenient 1RU form factor
- Low noise figure which enables long distance transport with minimal noise degradation.
- Embedded SNMP agent (v1, v2c, v3)
- Support of SCTE HMC MIBs
- Embedded Web (HTTP) server for user-friendly graphical interface

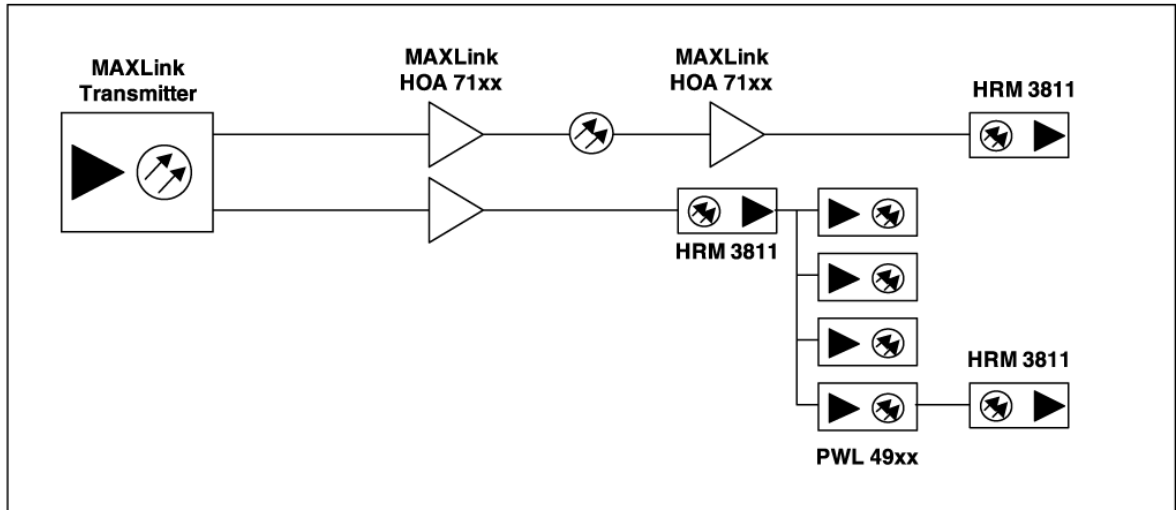
1.4 Product Applications

The HOA 7100 Series of Optical Amplifiers are part of Harmonic's MAXLink Line. This Product Line is designed to meet the economic and technical requirements of Broadband service providers. Typical applications include:

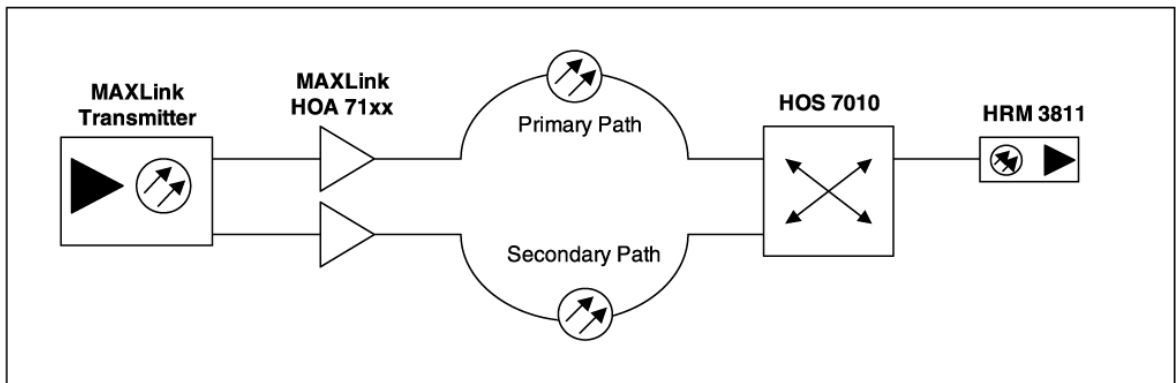
- Medium and long haul applications beyond the reach of 1310 nm transmitters.
- Fiber dense architectures.
- Redundant rings.
- Broadcast layer transmission.
- Hub interconnects.

Typical applications of the Optical Amplifiers are shown in Figure 1-1.

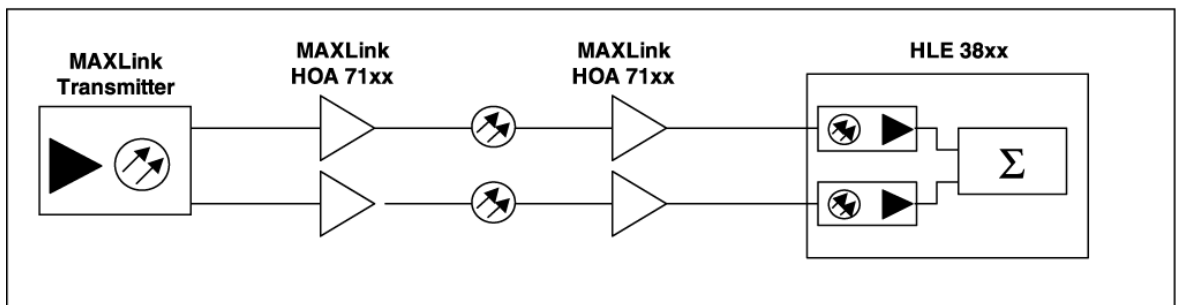
Point-to-Point Interconnect (Long Haul)



Redundant Ring



Repeater Solution with Link Extender



HOA71TYP

Figure 1-1. Typical deployment of the HOA 7100

Front Panel Interface

This chapter introduces the HOA 7100 front panel interface. You can view and adjust settings during installation from the front panel interface as described in Chapter 3, *Installing the HOA 7100 Optical Amplifier*. You can also use the front panel interface to monitor and control the operation of the HOA 7100. The front panel gives you access to all the adjustments and status information for the HOA 7100 via a simple menu system.

Harmonic MAXLink products feature an improved front panel interface that allows you to:

- Enter numeric variables directly
- Scroll and toggle variables
- Perform critical functions with a single keystroke
- View alarm and status information

This chapter describes:

- Front panel features
- The menu system

2.1 Front Panel Features

Figure 2-1 shows the HOA 7100 front panel.

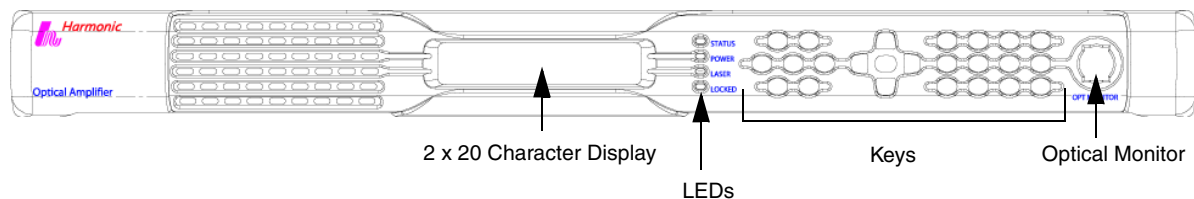


Figure 2-1. HOA 7100 front panel

Figure 2-2 shows the front panel keys and LEDs.

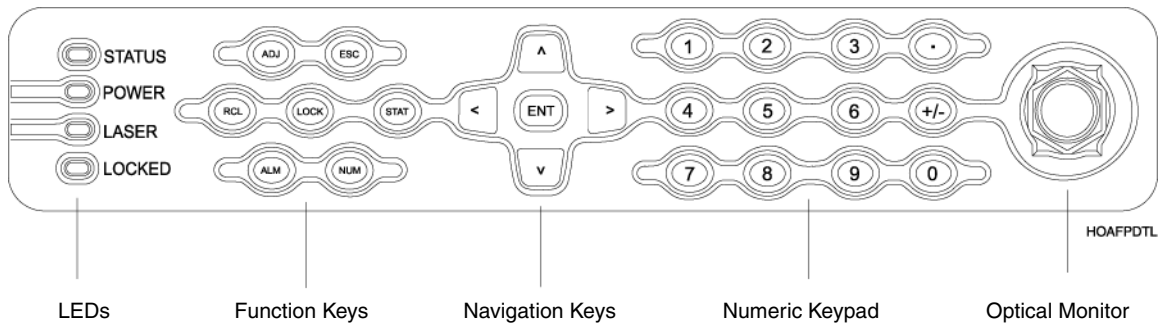


Figure 2-2. HOA 7100 front panel detail

2.1.1 Front Panel LEDs

There are four LEDs on the front panel:

- Status
- Power
- Laser
- Locked

The **Status** LED indicates the alarm state of the HOA 7100. Solid green indicates the unit is operating normally; red indicates an active alarm.

When the **Power** LED is green, the HOA 7100 is turned on.

The **Laser** LED is amber when the lasers are operating.

The **Locked** LED is amber when the front panel interface is locked.

2.1.2 Function Keys

The function keys provide a one-step action for:

- Recalling factory settings.
Press the RCL key to reset the HOA 7100 to factory default settings.
- Entering the Adjustment menu.
Press ADJ to go directly to the HOA Adjustment menu.
- Entering the Status menu.
Press STAT to go directly to the HOA Status menu.
- Entering the Alarm menu.
Press ALM to go directly to the HOA Alarms menu.
- Locking the front panel.
Press LOCK to deactivate the front panel keypad. Press LOCK again to activate the keypad. The Locked LED is amber when the front panel is locked.

There are also two keys used to assist in menu navigation:

- ESC
Press ESC to return to the previous menu level.
- NUM
Press NUM to activate and enter variables from the numeric keypad.

2.1.3 Navigation Keys

The navigation keys allow you to move through the menu system and select variables. The up and down arrow keys move you through the menus. The left and right arrow keys allow you to scroll through adjustment options. The display shows left and right arrow symbols when you can scroll through values for the current menu. The display shows the pound sign (#) when you have pressed NUM, or when you must enter a value from the keypad (such as the IP address).

The ENT key selects menus and saves settings you changed.

2.1.4 Numeric Keypad

The numeric keypad allows you to enter parameters. The display shows the pound sign (#) when in numeric entry mode. Some values can only be entered with the numeric keypad, in which case it is unnecessary to press NUM.

2.2 The Menu System

The menu system has three high-level choices:

- HOA Status
- HOA Adjustment
- HOA Alarms

The Status and Alarms menu provide read-only information. All adjustments to the HOA 7100 are made through the HOA Adjustment menu.

Figure 2-3 shows the first menu level.

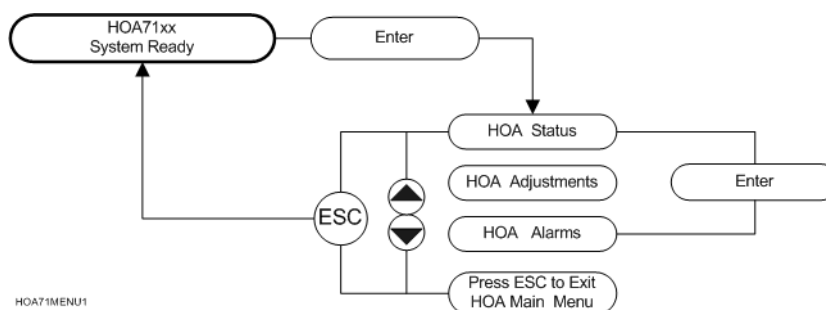


Figure 2-3. HOA 7100 first menu level

2.2.1 HOA Status Menu

The HOA Status menu provides you with basic information on the HOA 7100. Figure 2-4 show the information presented in the HOA 7100 Status menus.

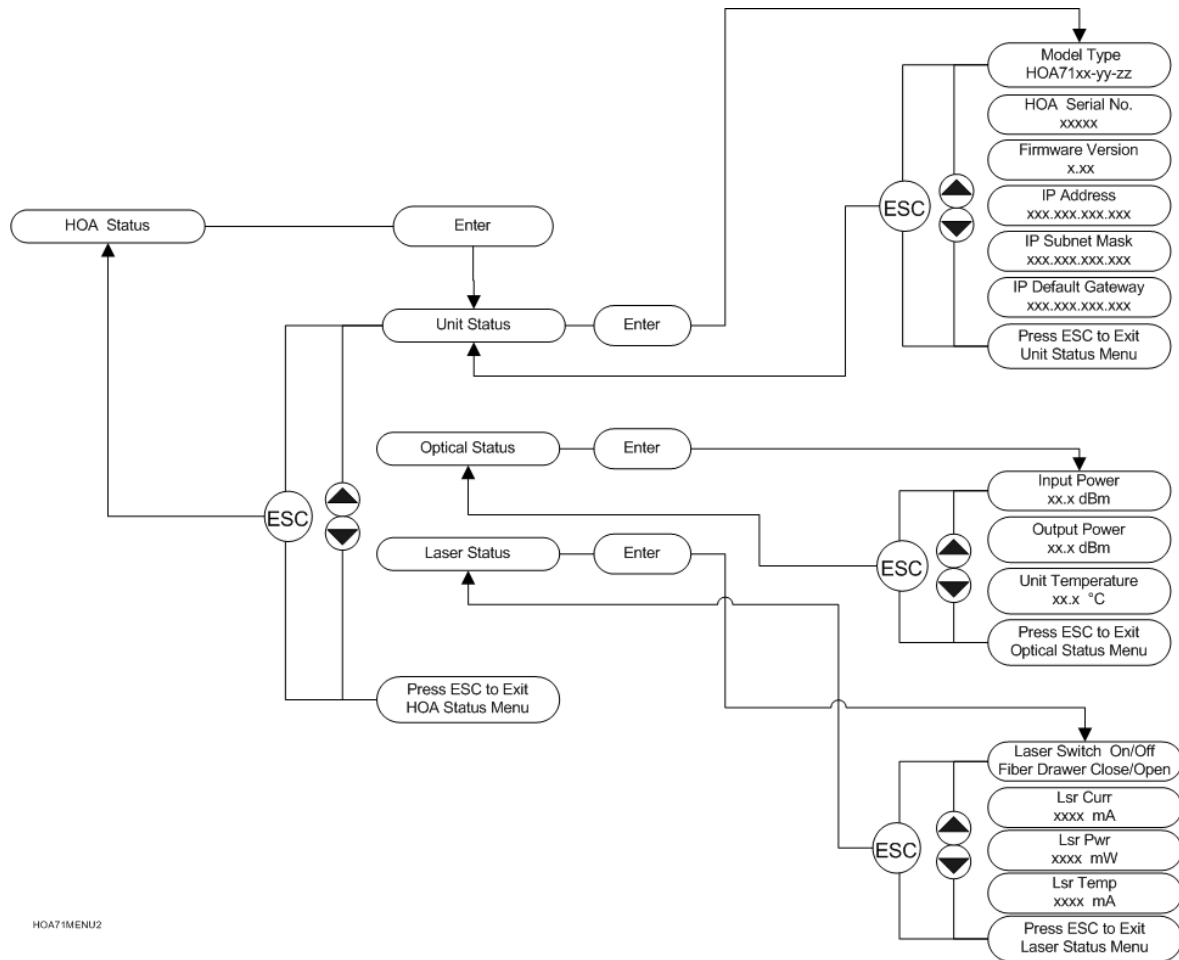


Figure 2-4. HOA 7100 Status menu

2.2.2 HOA Adjustment Menu

You use the HOA Adjustment menu to set up and adjust the HOA 7100. Figure 2-5 shows the HOA 7100 Adjustment menu.

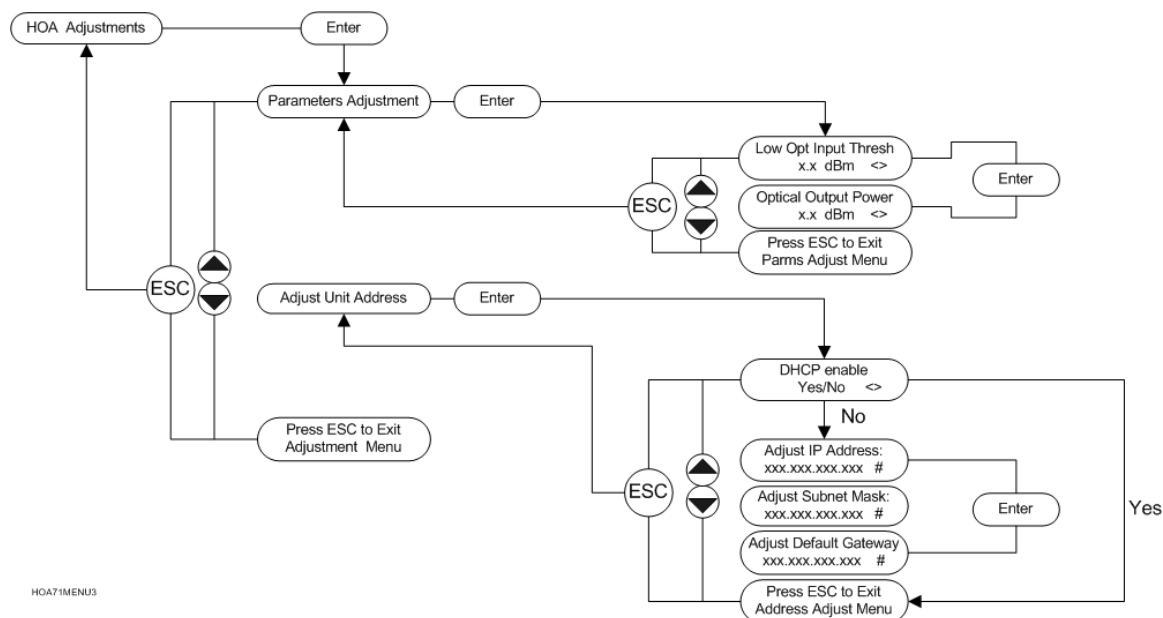


Figure 2-5. HOA 7100 Adjustment menu

2.2.3 HOA Adjustment Options

Table 2-1 describes the adjustment options for the HOA 7100.

Table 2-1: HOA 7100 Adjustment Options

Option	Description
Parameters Adjustment	
Optical Output Power	User settable in increments of 0.1 dB Gain is always positive.
Low Optical Input Threshold	User settable in 1.0 dB steps
Adjust Unit Address	
Adjust IP Address	Enter the IP Address of the HOA 7100. For more information see 3.12 <i>Assigning IP Addresses</i> on page 3-10.
Adjust subnet mask	Enter a subnet mask
Adjust default gateway	Enter a default gateway
Set Unit Address	Press ENT to save your changes
DHCP Enable (Yes/No)	Enables or disables DHCP

2.2.4 HOA Alarms Menu

The front panel Status LED indicates when the HOA 7100 has active alarms. You can check the alarms through the HOA Alarms menu. Figure 2-6 shows all the possible alarms; however, only the active alarms are displayed on the front panel. For detailed information on the alarms, see Section 6.2.

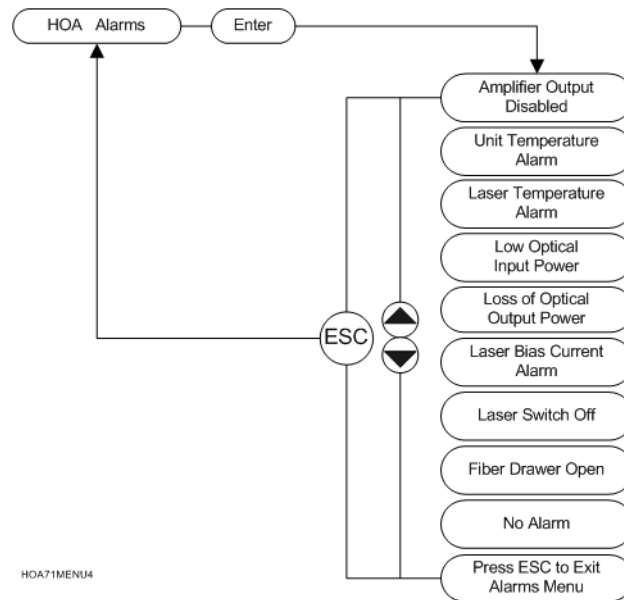


Figure 2-6. HOA 7100 Alarms menu

3

Installing the HOA 7100 Optical Amplifier

This chapter provides information on installing and setting up the HOA 7100 MAXLink Optical Amplifier. Please read all the instructions before beginning installation.

This chapter describes:

- How to receive and inspect the HOA 7100
- Tools and accessories
- Cable requirements
- Cable connections
- Precautions
- How to mount and power the unit
- How to connect the optical fiber cables
- How to assign IP addresses
- How to change the passwords
- How to check the LEDs for normal operation

3.1 Receiving and Inspecting

As you unpack your unit, inspect the shipping container and equipment for damage. Save the shipping material for future use. If the container or the equipment is damaged, notify both the freight carrier and Harmonic. See Appendix B, *Harmonic Inc. – Offices*, for contact information.

CAUTION: To protect yourself from potential injury and to protect the equipment from further damage, do not perform any operational tests if the equipment appears to be damaged.

3.2 Tools and Accessories

The following tools are necessary for installation and are not included with the HOA 7100:

- Phillips screwdriver
- Flat-bladed screwdriver

3.3 Cable Requirements

To install the HOA 7100, the following cables may be needed:

- **One or two DC power cables**, each with two 12 to 18 gauge wires, to connect to one or two DC power sources.
- **18 to 12 gauge wire** to connect to relay alarms or redundant switching.
- **One RJ-11 cable** to connect to a TTL alarm device.
- **One shielded Category 5 Ethernet cable** to connect to a TCP/IP network. The cable must be shielded, so that it can be grounded.

3.4 Rear Panel Diagrams

Figure 3-1 shows the location of the ports on the rear panel. Figure 3-2 shows the rear panel with the fiber tray open.

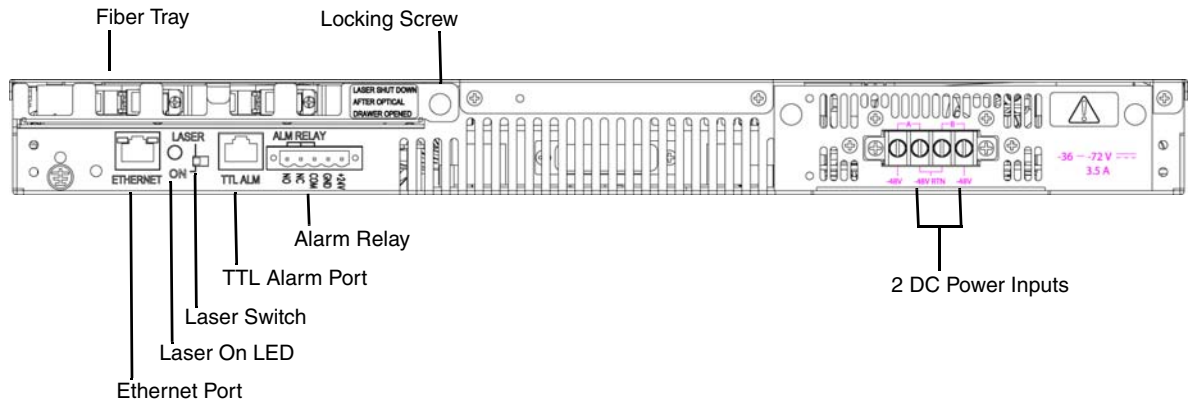


Figure 3-1. HOA 7100 rear panel features

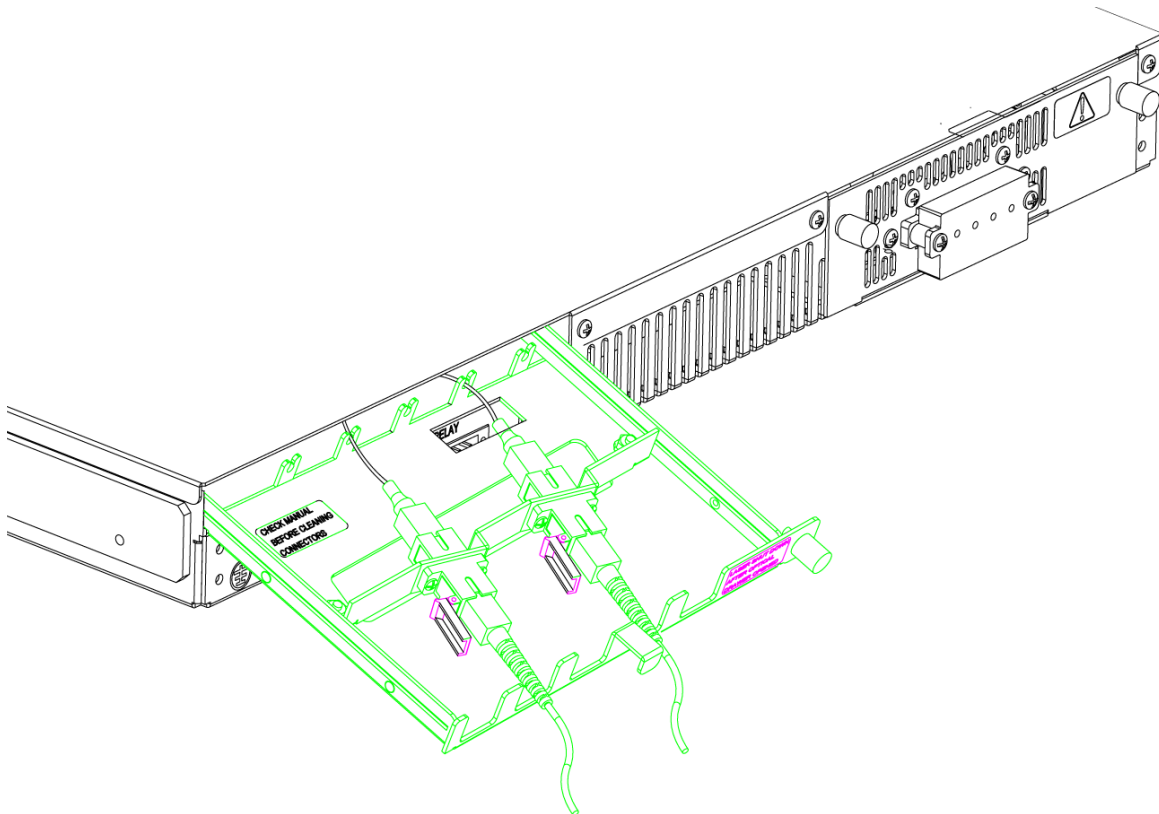





Figure 3-2. HOA 7100 rear panel with fiber tray open


3.5 Precautions

 Warning	Read the installation instructions before connecting the system to the power source.
Attention	Avant de brancher le système sur la source d'alimentation, consulter les directives d'installation.
Warnung	Vor dem Anschließen des Systems an die Stromquelle die Installationsanweisungen lesen.


 Warning	This product relies on the building's installation for short-circuit (overcurrent) protection. Ensure that a fuse or circuit breaker no larger than 120 VAC, 15A U.S. (240 VAC, 10A international) is used on the phase conductors (all current-carrying conductors).
Attention	Pour ce qui est de la protection contre les courts-circuits (surtension), ce produit dépend de l'installation électrique du local. Vérifier qu'un fusible ou qu'un disjoncteur de 120 V alt., 15 A U.S. maximum (240 V alt., 10 A international) est utilisé sur les conducteurs de phase (conducteurs de charge).
Warnung	Dieses Produkt ist darauf angewiesen, daß im Gebäude ein Kurzschluß- bzw. Überstromschutz installiert ist. Stellen Sie sicher, daß eine Sicherung oder ein Unterbrecher von nicht mehr als 240 V Wechselstrom, 10 A (bzw. in den USA 120 V Wechselstrom, 15 A) an den Phasenleitern (allen stromführenden Leitern) verwendet wird.


 Warning	The plug-socket combination must be accessible at all times, because it serves as the main disconnecting device.
Attention	La combinaison de prise de courant doit être accessible à tout moment parce qu'elle fait office de système principal de déconnexion.
Warnung	Vor dem Anschließen des Systems an die Stromquelle die Installationsanweisungen lesen.

Warning	The unit has more than one power supply connection; all connections must be removed to remove all power from the unit.
Attention	Cette unité est équipée de plusieurs raccordements d'alimentation. Pour supprimer tout courant électrique de l'unité, tous les cordons d'alimentation doivent être débranchés.
Warnung	Diese Einheit verfügt über mehr als einen Stromanschluß; um Strom gänzlich von der Einheit fernzuhalten, müssen alle Stromzufuhren abgetrennt sein.

 Warning	<p>To prevent bodily injury when mounting or servicing this unit in a rack, you must take special precautions to ensure that the system remains stable.</p> <p>The following guidelines are provided to ensure your safety:</p> <ul style="list-style-type: none"> • This unit should be mounted at the bottom of the rack if it is the only unit in the rack. • When mounting this unit in a partially filled rack, load the rack from the bottom to the top with the heaviest component at the bottom of the rack. • If the rack is provided with stabilizing devices, install the stabilizers before mounting or servicing the unit in the rack.
Attention	<p>Pour éviter toute blessure corporelle pendant les opérations de montage ou de réparation de cette unité en casier, il convient de prendre des précautions spéciales afin de maintenir la stabilité du système.</p> <p>Les directives ci-dessous sont destinées à assurer la protection du personnel:</p> <ul style="list-style-type: none"> • Si cette unité constitue la seule unité montée en casier, elle doit être placée dans le bas • Si cette unité est montée dans un casier partiellement rempli, charger le casier de bas en haut en plaçant l'élément le plus lourd dans le bas. • Si le casier est équipé de dispositifs stabilisateurs, installer les stabilisateurs avant de monter ou de réparer l'unité en casier.

<p>Warnung</p>	<p>Zur Vermeidung von Körperverletzung beim Anbringen oder Warten dieser Einheit in einem Gestell müssen Sie besondere Vorkehrungen treffen, um sicherzustellen, daß das System stabil bleibt.</p> <p>Die folgenden Richtlinien sollen zur Gewährleistung Ihrer Sicherheit dienen:</p> <ul style="list-style-type: none"> • Wenn diese Einheit die einzige im Gestell ist, sollte sie unten im Gestell angebracht werden. • Bei Anbringung dieser Einheit in einem zum Teil gefüllten Gestell ist das Gestell von unten nach oben zu laden, wobei das schwerste Bauteil unten im Gestell anzubringen ist. • Wird das Gestell mit Stabilisierungszubehör geliefert, sind zuerst die Stabilisatoren zu installieren, bevor Sie die Einheit im Gestell anbringen oder sie warten.
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<p> Warning</p>	<p>Operating the unit in an equipment rack, take the following precautions:</p> <ul style="list-style-type: none"> • Make sure the ambient temperature around the unit (which may be higher than the room temperature) is within the limit specified for the unit. • Make sure there is sufficient airflow around the unit. • Make sure electrical circuits are not overloaded. Consider the nameplate rating of all the connected equipment, and make sure you have over current protection. • Make sure the equipment is properly grounded. • Make sure no objects are placed on top of the unit.
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<p> ESD ALERT</p>	<p>Follow strict Electrostatic Discharge (ESD) precautions when handling or working on Harmonic equipment and related components.</p>
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3.6 Mounting the HOA 7100

The HOA 7100 can be mounted in a 19-inch equipment cabinet or a 19-inch Telco rack. Mounting screws are thread-forming UNC #12-24. For best results, always use screws provided by the rack manufacturer.

To insure the integrity of secondary grounding paths, paint and other non-conductive surface coatings should be removed from the surfaces between the mounting hardware and the framework or cabinet. The surfaces to be joined should be cleaned and an anti-oxidant solution should be applied before joining the surfaces.

3.6.1 Mounting the HOA 7100 in a 19-inch Cabinet

To mount the HOA 7100 in a standard 19-inch equipment cabinet:

1. Place the unit in the cabinet.
2. Remove the bezel from the HOA 7100 by grasping the ends and pulling straight out.
3. Use four mounting screws to attach the mounting ears on the HOA 7100 front panel to the cabinet.
4. Replace the bezel by aligning the springs on the ends of the bezel with the ball studs on the chassis, then snapping the bezel into place.
5. Visually inspect each key (button) on the front panel to ensure it is not trapped under the edge of its hole. If a key is trapped, tap the key to allow it to move freely.

3.7 Connecting Power

The HOA 7100 is available in an AC power model and a DC power model. After mounting the HOA 7100 in a rack, follow the power connection procedure below for the model that you are installing.

3.7.1 Connecting AC Power

The AC-powered HOA 7100 has one 110/220 VAC (50/60 Hz) input connector that requires input voltage from 100 to 240 VAC, at 50 to 60 Hz single phase. Selection switching over this range is automatic. The AC power plug is located on the rear panel.

To connect AC power:

1. Connect the ground contact to ground. This is important for your safety. The ground contact is located on the rear panel, as shown in Section *3.4 Rear Panel Diagrams* on page 3-3.
2. Connect the power cord to a 110 VAC or 220 VAC (50/60 Hz) electrical socket. (The AC-powered HOA 7100 features an auto-sensing power supply.) The HOA 7100 boots up. It takes about 30 seconds for all systems to operate.

CAUTION: To avoid personal injury and damage to the equipment, use a power outlet with a protective ground (third wire) contact.

3.7.2 Connecting DC Power

The DC-powered HOA 7100 has two -48 VDC input connectors that require input voltage from -36 to -72 VDC. The DC input connectors are located on the rear panel, as shown in Section 3.4 *Rear Panel Diagrams* on page 3-3.

The two power plugs allow you to provide redundant (backup) power. If you provide redundant power, the HOA 7100 continues to operate when the primary power source fails. There is no difference between the two DC input connectors. Connect either one to the primary power source and the other to the (optional) backup power source.

To connect DC power:

1. Connect the ground contact to ground. This is important for your safety. The ground contact is located on the rear panel, as shown in Section 3.4 *Rear Panel Diagrams* on page 3-3.
2. Attach a DC power terminal block to the rear panel of the HOA 7100 using a small flat-bladed screwdriver.
3. With the power source off, connect two 18 to 12 gauge power wires from the power source to the DC terminal block.
4. Turn on the power source. The HOA 7100 boots up. It takes about 90 seconds for all systems to operate.
5. If you are providing redundant power, repeat steps 2 and 3 to connect the backup power source to the second power terminal block.

3.8 Connecting the Optical Fiber Cables

The HOA 7100 has two optical connectors, one input and one output, which are located on the fiber tray, as shown in Figure 3-2 on page 3-3. A label in the tray indicates which is input and which is output.

DANGER: Invisible Laser Radiation. **AVOID EXPOSURE TO BEAM.**
Never operate unit with a broken fiber or with a fiber connector disconnected.

To connect the optical fiber cables to the HOA 7100:

1. Unscrew the locking screw on the fiber tray. The fiber tray and the locking screw are located on the rear panel of the HOA 7100, as shown in Section 3.4 *Rear Panel Diagrams* on page 3-3.
2. Gently pull the handle to open the fiber tray and reveal the optical connector adapters inside. You can rotate the fiber tray downward for easier access. *Pressing on the fiber tray may cause damage.*
3. Verify that the type of connector on the fiber cable matches that of the HOA 7100: SC/APC.
4. Verify that the fiber cable connector has been cleaned properly. If the fiber cable connector needs to be cleaned, follow the cleaning procedure outlined in Section 6.1.1 *Cleaning Patch Cord or Pigtail Fiber Optical Connectors* on page 6-2.

5. Verify that the HOA 7100 optical connector has not been exposed to any contamination. If you suspect that the connector may have been exposed to contamination (for example, by a dirty fiber cable connector), follow the cleaning procedure outlined in Section 6.1.2 *Cleaning MAXLink Amplifier Optical Connectors* on page 6-2.

NOTE: Any contamination of either the fiber cable or HOA 7100 receiver connector can significantly degrade optical link performance. This degradation will most likely manifest itself as poor signal-to-noise (SNR) performance.

6. Note the key characteristics of the mating connectors and align them accordingly. Gently insert the fiber cable connector into that of the HOA 7100 until the connector clicks into place.
7. Move the fibers into the groove in the edge of the fiber tray, as shown in Figure 3-2 on page 3-3.
8. Close the fiber tray.
9. Screw the locking screw to secure the fiber tray.

NOTE: The amplifier ships with the lasers turned off. The Laser Off switch on the rear panel is in the Off position.

3.9 Connecting the Alarm Relay

The HOA 7100 has a 5-pin alarm relay that provides the amplifier with redundant switching capability. The alarm relay is located on the rear panel, as shown in Section 3.4 *Rear Panel Diagrams* on page 3-3.

Table 3-1 shows the pin definitions.

Table 3-1: Alarm Relay Pins

Pin	Label	Function
Pin 1	NO	Normally open
Pin 2	NC	Normally closed
Pin 3	COM	Common
Pin 4	GND	Ground
Pin 5	+24	+24 V source for A/B switch

When operating normally with no alarm present, Pin 2 and Pin 3 make electrical contact, while Pin 1 is left open. When an alarm occurs, electrical contact is made between Pin 1 and Pin 3, while Pin 2 is left open. This remains until the alarm condition is removed.

3.10 Connecting the TTL Alarm Cable

The TTL-compatible alarm port is an RJ-11 connector located on the rear panel, as shown in Section 3.4 *Rear Panel Diagrams* on page 3-3.

You can use the TTL alarm port to connect the HOA 7100 to many other devices, in order to monitor alarms on the HOA 7100.

Two pins are used for the alarm:

- Pin 3 is the ground.
- Pin 4 is the TTL alarm output. When an alarm is present in the unit, the level of the signal from Pin 4 goes high, sending a 5-volt signal. When there is no alarm from the HOA 7100, the signal from Pin 4 stays low.

3.11 Connecting the Ethernet Cable

You can connect the HOA 7100 to your TCP/IP network, so that you can monitor and control the amplifier remotely.

After you have completed the installation procedures described in this chapter, you can use a network management system (NMS) or a web browser to monitor and control the HOA 7100.

Use a shielded Category 5 Ethernet cable. The cable must be shielded, and you must ground it.

To connect the Ethernet cable:

1. Connect an Ethernet cable between the amplifier's RJ-45 Ethernet port and your TCP/IP network. The Ethernet port is located on the rear panel of the amplifier, as shown in Section 3.4 *Rear Panel Diagrams* on page 3-3.
2. On both ends of the Ethernet cable, connect the shielding to ground. There is a ground contact on the rear panel of the HOA 7100.
3. Verify that the green Link LED is illuminated, which indicates there is a connection. The Link LED is located above the Ethernet port on the rear panel.

3.12 Assigning IP Addresses

You must assign IP addresses to the HOA 7100 amplifier, so that NMSs and web browsers can communicate with it. Use the front panel to assign the IP address, subnet mask, and default gateway.

NOTE: IP addresses are unique. If you do not know the IP addresses of the HOA 7100, contact your system administrator.

To assign an IP address:

1. Press until the display reads **HOA Adjustment**, then press [ENT] to enter the HOA Adjustment menu.
2. Press until the display reads **Adjust Unit Address**, then press [ENT]. The display reads **DHCP Enable**.

3. Press **[>]** once. The display reads **Yes**, to have an IP address assigned automatically by DHCP, press **[ENT]**.
4. To assign an IP address manually, press **[>]** once more. The display reads **No**, then press **[ENT]**.
5. The display reads **Adjust IP Address: xxx.xxx.xxx.xxx #**
6. Use the number keys to type the IP address of the HOA 7100, then press **[ENT]**.
7. Press **[v]** once.
The display reads **Adjust Subnet Mask: xxx.xxx.xxx.xxx #**
8. Use the number keys to type the subnet mask of the HOA 7100, then press **[ENT]**.
9. Press **[v]** once.
The display reads **Adjust Default Gateway: xxx.xxx.xxx.xxx #**
10. Use the number keys to type the default gateway of the HOA 7100, then press **[ENT]**.

3.13 Checking the LEDs for Normal Operation

Once you finish installing and setting up the unit, verify that the Status, Power, and Laser LEDs on the front panel appear in these colors, from top to bottom:

LED	Color	Description
Status	Green	System operating normally without an alarm.
Power	Green	Power to the amplifier is on.
Laser	Amber	Lasers are operating.

Web Interface

This chapter introduces the HOA 7100 web interface. Once the amplifier is operating, the web interface provides a convenient means to manage it. MAXLink products have an embedded HTTP server, which allows you to remotely view the status of alarms and settings, or make adjustments to the amplifier. However, for security reasons, a password is required to change any settings.

This chapter describes:

- Requirements
- HTTP access control
- How to access and use the web interface
- How to change your access level and adjust the amplifier
- Web interface tips

The following features are available through the web interface, but are not available through the front panel interface:

- Assigning a name, location, and contact
- Viewing the hardware version of the HOA 7100

The following features are available through the front panel interface, but are not available through the web interface:

- Assigning IP addresses to the amplifier
- Locking and unlocking the keypad

4.1 Requirements

You can access the MAXLink web interface from any computer that is connected to the same IP network and has a web browser.

To use the web interface, the HOA 7100 must be properly installed, as described in Chapter 3, *Installing the HOA 7100 Optical Amplifier*, and you need to know the amplifier's IP address. Specifically, the HOA 7100 must be connected to your IP network as described in Section 3.11 *Connecting the Ethernet Cable* on page 3-10, and IP addresses must have been assigned to the HOA 7100 as described in Section 3.12 *Assigning IP Addresses* on page 3-10.

4.2 MAXLink HTTP Access Control

There are two levels of access to the MAXLink web interface:

- Status—for monitoring the amplifier
- Adjustments—for monitoring and adjusting the amplifier

Your company can provide different levels of access to different people based on their job function or other criteria. Some staff members can monitor the amplifier, while others may adjust the settings.

The web client is, by default, *read only*. User name and password are not required for read-only access.

You can change the access level by clicking the CHANGE ACCESS LEVEL link at the bottom of the displayed page. When prompted, enter the proper user name and password. Once verified, you are given the read-write capability to configure the unit remotely as needed. The user name and default password are given in section 4.4 *Adjusting the Amplifier* on page 4-5.

NOTE: To maintain network security, Harmonic recommends that you change the password immediately after logging in for the first time. Contact Harmonic customer support for more information on changing the user name and password.

4.3 Accessing and Using the Web Interface

You can access the web interface for the HOA 7100 from your browser.

To access the web interface:

1. Using a computer that is connected to the same TCP/IP network as the HOA 7100, launch a web browser.
2. In the web browser's Address (URL) field, type the IP address of the amplifier, then press Enter. Your browser connects to the amplifier, and the System Status page of the web interface appears, as shown in Figure 4-1. The Alarm information for the system appears to the right of the System Status information.
3. The three menu tabs labeled System, Optics and Lasers allow you to select which of the three pages is shown. The active menu tab is gray, while the inactive tabs are blue. Figure 4-1 through Figure 4-3 show examples of the Optics and Lasers Status pages.

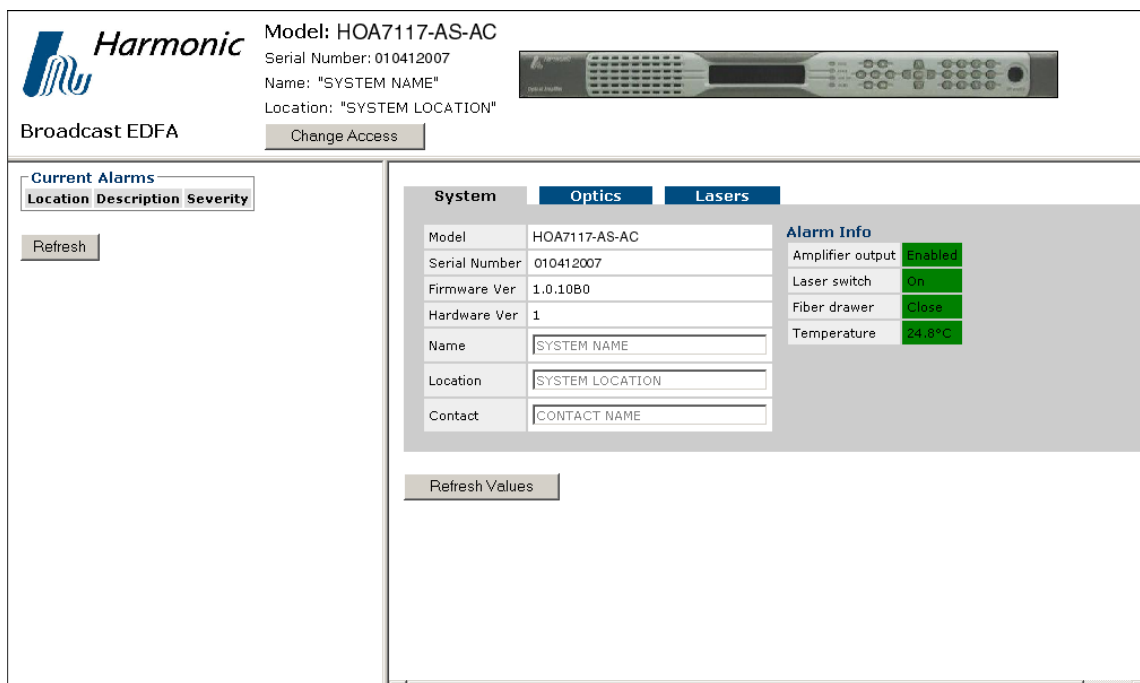


Figure 4-1. System status page of HOA 7100 web interface

Harmonic Model: HOA7117-AS-AC
 Serial Number: 010412007
 Name: "SYSTEM NAME"
 Location: "SYSTEM LOCATION"

Broadcast EDFA

Current Alarms
 Location Description Severity

System **Optics** **Lasers**

Input Power	2.7 dBm	Low Optical Input Threshold	-15.0 dBm
Output Power	14.3 dBm	Set Optical Output Power	14.3 dBm

Figure 4-2. Optics status page of HOA 7100 web interface

Harmonic Model: HOA7117-AS-AC
 Serial Number: 010412007
 Name: "SYSTEM NAME"
 Location: "SYSTEM LOCATION"

Broadcast EDFA

Current Alarms
 Location Description Severity

System **Optics** **Lasers**

Laser	Bias Current	Power	Temperature
1	207 mA	128 mW	-5.0°C

Figure 4-3. Lasers status page of HOA 7100 web interface

4.4 Adjusting the Amplifier

To change any of the amplifier's settings, you must navigate to the Adjustments web page.

To adjust the amplifier:

1. Enter the web interface (follow the instructions above). The System Status web page appears, as shown in Figure 4-1 on page 4-3.
2. Click the Change Access Level link at the bottom of the Status page. The Change Access Level (log on) page appears, as shown in Figure 4-4.

Harmonic Model: HOA7117-AS-AC
Serial Number: 010412007
Name: "SYSTEM NAME"
Location: "SYSTEM LOCATION"

Broadcast EDFA

Current Alarms

Location	Description	Severity
Refresh		

User Name:
Password:
Log On Cancel

Figure 4-4. Change Access Level page

3. Type the user name and password, then click Log On. The default user name is `Config` and the default password is `config`. The user name and password are case sensitive.

NOTE: To maintain network security, Harmonic recommends that you change the password immediately after logging in for the first time. Contact Harmonic customer support for more information on changing the user name and password.

At this point, you have entered the Adjustments mode. All available adjustments will be viewable under the appropriate tab. For the HOA 7100, the Low Optical Input Threshold and Optical Output Power adjustments will be viewable under the Optics tab as shown in Figure 4-5.

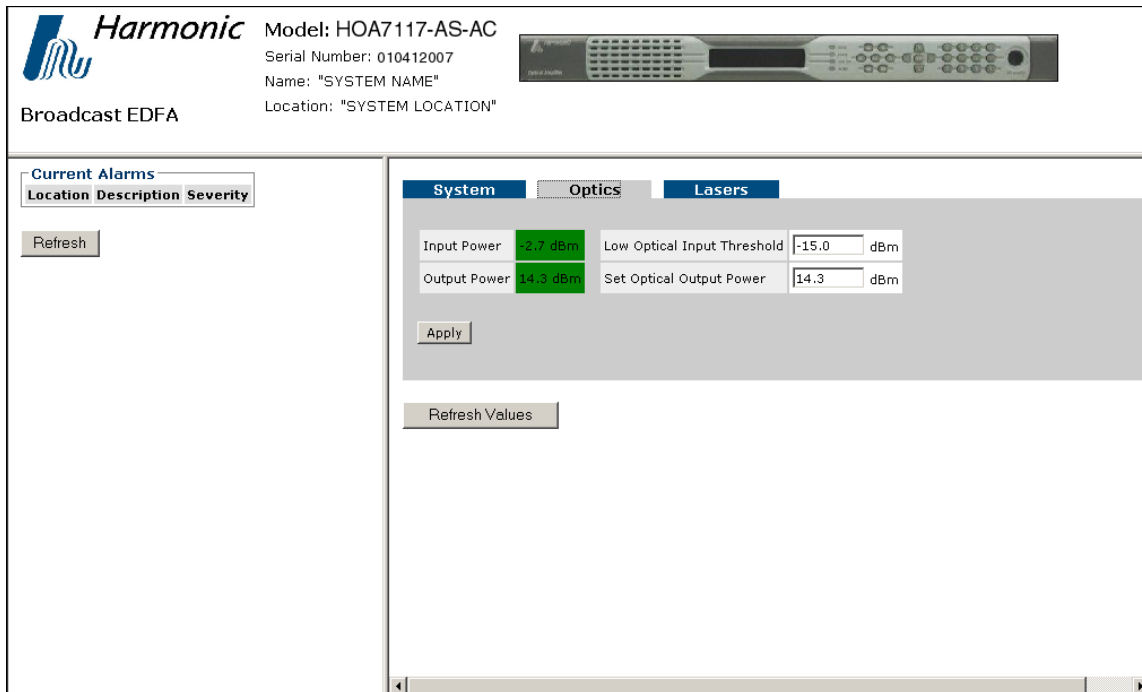


Figure 4-5. Optics adjustments page

4. You can edit the settings by typing the new values. After changing values, click Apply for your changes to take effect. If you want to clear your changes without saving them, you can revert to the previous settings by clicking Refresh Values.

4.5 Web Interface Tips

This section provides some tips that will help you use the MAXLink web interface.

Grayed-out Values

In a text field, values that appear as gray text are read only and cannot be changed.

Set Values Button

After you change one or more parameters on a page, you must click Set Values to have the changes take effect.

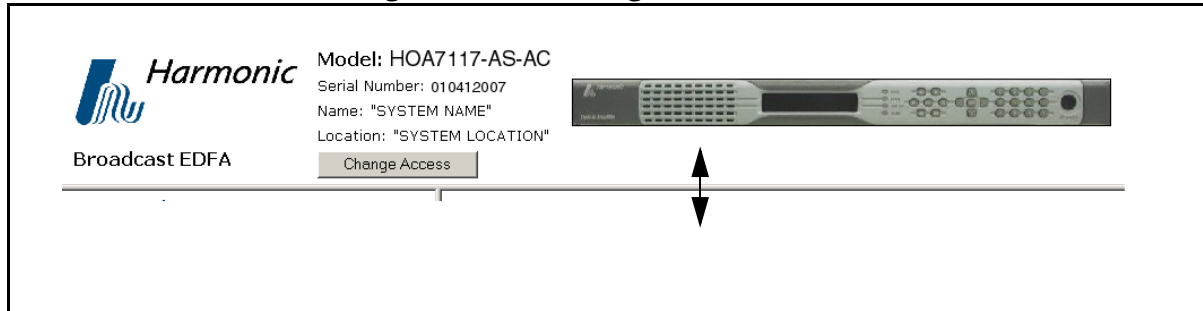
Refresh Values Button

Clicking Refresh Values refreshes the web page you are viewing. The new page shows the current settings.

Resizing Frames

If the full list of alarms is not visible at the top of the web interface, you can expand the top frame so that you can see the full list. To resize the two frames, drag the frame border downward, as shown in Figure 4-6.

Figure 4-6. Resizing frames in the web interface



5

Connecting the HOA 7100 to an NMS

Once the HOA 7100 is operating, you can use a network management system (NMS) to monitor and control it. This chapter tells you how to connect the HOA 7100 to an NMS.

For instructions on installing, configuring, and operating an NMS, please refer to the documentation for the NMS.

MAXLink amplifiers have an embedded SNMP agent that enables communication between the HOA 7100 and any devices that support SNMP versions 1, 2, or 3.

To connect the HOA 7100 to an NMS:

1. Complete the installation procedures described in Chapter 3, *Installing the HOA 7100 Optical Amplifier*. To connect to an NMS, the HOA 7100 must be connected to your IP network as described in Section 3.11 *Connecting the Ethernet Cable* on page 3-10, and IP addresses must have been assigned to the HOA 7100 as described in Section 3.12 *Assigning IP Addresses* on page 3-10.
2. Determine the IP address of the HOA 7100.
3. Determine your default access rights for different versions of the SNMP protocol. The default access rights for SNMP versions 1, 2, and 3 are shown in Table 5-1 and Table 5-2.
4. Locate and compile the Harmonic MIB (management information base) files for the HOA 7100. Feed the MIBs for the HOA 7100 into your NMS's MIB compiler.
5. Add the HOA 7100 as an SNMP trap target in your NMS, so that the NMS receives SNMP notifications from the HOA 7100.

Table 5-1: Default Access Rights for SNMPv1 and SNMPv2

Community String(s)	Rights	To/From MIBs/Objects
public, admin	Will not read, Will not write	snmpFrameworkMIBObjects snmpProxyMIB snmpUsmMIB snmpVacmMIB snmpCommunityMIB enterprise factory MIB
public	Will not write	Any object
admin	Will write	Any enterprise user MIB object with the maximum access read-write

Table 5-2: Default Access Rights for SNMPv3¹

User	Authentication & Privacy	Rights	To/From MIBs/Objects
public	None	Will not read, Will not write	snmpFrameworkMIBObjects snmpProxyMIB snmpUsmMIB snmpVacmMIB snmpCommunityMIB enterprise factory MIB
public	None	Will not write	Any object
admin	MD-5 & DES with pass phrase <i>config</i>	Maximum access	Any supported object excluding any enterprise factory MIB
intialmd5	MD-5 & DES with pass phrase <i>intialmd5</i>	(Provided only as a template so that you can create your own users)	
intialsha	SHA-1 & DES with pass phrase <i>intialsha</i>	(Provided only as a template so that you can create your own users)	

1. Password-to-key conversions are computed according to RFC 2574, A.2.1 and A.2.2.

Maintenance and Troubleshooting

This chapter describes:

- How to clean fiber optic connectors
- Alarms for the HOA 7100
- How to troubleshoot the HOA 7100
- How to return the unit for service
- Manufacturer disclaimer
- Warranty summary
- Limitations of the warranty
- Exclusive legal remedies

NOTE: The HOA 7100 does not include any customer-serviceable components.

6.1 Cleaning Fiber Optic Connectors

DANGER: The fiber cable carries invisible laser radiation. **AVOID EXPOSURE TO THE BEAM.** Never operate a unit that has a broken fiber or a disconnected fiber connector.

Dirty optical connectors are the leading source of poor performance in a broadband optical fiber network. Dirty optical connectors lead to optical signal loss and reflections, which in turn can seriously degrade signal-to-noise (SNR) performance and, in some cases, distortion performance.

Harmonic recommends that you clean all mating fiber connectors, before connecting them to an optical amplifier.

In addition, if you suspect that the optical connector of an HOA 7100 may have been exposed to contamination (by a dirty fiber cable connector, for example), you should properly clean the HOA 7100 optical connector before connecting the optical fiber.

CAUTION: Improper cleaning of an optical connector can do more harm than good. Never spray a clean-air product onto the surface of an optical connector. Spraying air onto an optical connector can cause condensation on the connector surface, leaving water spots and trapping dust. Failing to wipe a connector on dry lens paper immediately after wiping on paper wet with isopropyl alcohol can also lead to condensation on the connector. Using low-grade cleaning paper or other cloth to wipe an optical connector can leave microscopic fibers on the optical connector surface.

6.1.1 Cleaning Patch Cord or Pigtail Fiber Optical Connectors

To clean optical connectors, Harmonic recommends using a fiber optic connector cleaning cartridge (such as NTT Cletop). If a cleaning cartridge is not available, follow these steps.

To clean the optical connector of a patch cord or pigtail:

1. Fold a piece of unused dry lens cleaning paper twice, for a four-ply thickness.
2. Use a drop of high-grade isopropyl alcohol to wet part of the paper.
3. Lay the connector on the lens cleaning paper with the tip touching the paper.
4. In one continuous motion, pull the connector from the wet part of the paper to the dry part.

6.1.2 Cleaning MAXLink Amplifier Optical Connectors

To clean the optical connector of a MAXLink amplifier:

1. Unscrew the locking screw on the fiber tray.
The fiber tray and locking screw are located on the rear panel of the amplifier, as shown in Section 3.4 *Rear Panel Diagrams* on page 3-3.
2. Pull the handle to open the fiber tray.
3. Disengage spiral tubing from u-clip on fiber tray.
4. Release the internal optical connector from the internal bulkhead adaptor.
The end of the internal fiber connector can now be cleaned.

CAUTION: When releasing the optical connector from the bulkhead adaptor, take care to keep the spiral tubing from sliding into the chassis.

CAUTION: When the fiber connector is extended from the unit, take care to prevent twisting or rotating the connector in order to prevent possible fiber damage.

5. Fold a piece of unused dry lens cleaning paper twice, for a four-ply thickness.
6. Use a drop of high-grade isopropyl alcohol to wet part of the paper.

7. Lay the connector on the lens cleaning paper with the tip touching the paper.
8. In one continuous motion, pull the connector from the wet part of the paper to the dry part.
9. Once the cleaning is complete, re-insert the internal fiber connector into the bulkhead adaptor and press the two parts together carefully.
10. Close the fiber tray.
11. Screw the locking screw to secure the fiber tray.

6.2 Alarms

Table 6-1 describes the alarms for the HOA 7100 MAXLink Optical Amplifier.

Every alarm is reported via the display on the front panel, via SNMP, and via the web interface. In addition, any alarm triggers the alarm relay, and the Status LED on the front panel illuminates red. For information on accessing the front panel alarms displays, see Section 2.2 *The Menu System* on page 2-3.

Table 6-1: MAXLink Amplifier Alarms

Alarm	Description
Amplifier Output Disabled	Pumps have shut down
Unit Temperature Alarm	Unit temperature is below -20° C or exceeds 75° C
Laser Temperature Alarm	Laser temperature has exceeded +/- 3° C from setpoint
Low Optical Input Alarm	Optical input has dropped below user adjustable threshold
Loss of Optical Output Alarm	Optical output is > 2 dB from setpoint
Laser Bias Current Alarm	Laser bias current has exceeded 95% EOL for pump
Laser Switch Off	Indicates that lasers have been disabled manually via the Laser Off switch
Fiber Drawer Open	Fiber Drawer is open, triggering laser safety interlock, laser(s) are disabled

6.3 Troubleshooting

Should a problem occur, see if the symptoms are listed in Table 6-2.

Table 6-2: Troubleshooting Solutions

Symptom	Solution
Amplifier Output Disabled alarm	Check for other alarms
Laser temperature alarm	<p>Verify that the unit is operating within the proper temperature range (-20° to +60° C).</p> <p>Verify that nothing is obstructing airflow through the openings in the front and back of the unit.</p> <p>Recall factory settings by pressing the RCL function key on the front panel (see Section 2.1.2).</p> <p>If none of the above corrects the problem, contact Customer Service (see Section 6.4).</p>
Unit temperature alarm	<p>Verify that the unit is operating within the proper temperature range (-20 to +60 deg C).</p> <p>Verify that nothing is obstructing airflow through the openings in the front and back of the unit.</p> <p>Recall factory settings by pressing the RCL function key on the front panel (see Section 2.1.2).</p> <p>If that does not correct the problem, contact Customer Service (see Section 6.4).</p>
Low Optical Input Power alarm	<p>Confirm Input Power Level (see Section 2.2).</p> <p>Go through connector cleaning procedure (see Section 6.1).</p> <p>Recall factory settings by pressing the RCL function key on the front panel (see Section 2.1.2).</p> <p>If that does not correct the problem, contact Customer Service (see Section 6.4).</p>
Loss of Optical Output Power alarm	<p>Check Fiber drawer.</p> <p>Go through connector cleaning procedure (see Section 6.1).</p> <p>Recall factory settings by pressing the RCL function key on the front panel (see Section 2.1.2).</p> <p>If that does not correct the problem, contact Customer Service (see Section 6.4)</p>

Table 6-2: Troubleshooting Solutions

Symptom	Solution
Laser Bias Current alarm	<p>Check loss of optical power alarms.</p> <p>Check low input alarm threshold. See <i>Figure 2-6. HOA 7100 Alarms menu</i> on page 2-6.</p> <p>Recall factory settings by pressing the RCL function key on the front panel (see Section 2.1.2).</p> <p>If that does not correct the problem, contact Customer Service (see Section 6.4).</p>
Laser Switch Off alarm	Verify that the Laser Switch located on the rear panel (see Section 3.4) is in the "on" position
Fiber Drawer Open alarm	Verify that the fiber drawer has been closed completely
Power LED on the front panel does not illuminate	<p>Verify that that supply power has been connected properly.</p> <p>If that does not correct the problem, contact Customer Service (see Section 6.4).</p>

6.4 In Case of Problems

If you continue to have a problem, contact Customer Service (see Appendix B). A service technician will assist you in determining whether a fault exists with the unit.

If the service technician determines that you need to return the unit, she or he will issue you a Return Material Authorization (RMA) Number. You must include this RMA number on the shipping container when returning the unit, and with all correspondence regarding the unit.

To return the unit, send it to one of the addresses listed in Appendix B. Please add the note:

Attn: Customer Service
RMA no. _____

6.5 Disclaimer

Harmonic Inc. reserves the right to change any products described herein at any time, and without prior notice. Harmonic assumes no responsibility or liability arising from the use of the products described herein, except as expressly agreed to in writing by Harmonic. The use and purchase of this product does not convey a license under any patent rights, copyrights, trademark rights, or any intellectual property rights of Harmonic. Nothing hereunder constitutes a representation or warranty that using any products in the manner described herein will not infringe any patents of third parties.

6.6 Warranty Summary¹

This Harmonic Inc. product is warranted against defects in material and workmanship for twelve (12) months from the date of shipment. Harmonic Inc. will, at its option, either repair or replace products that prove to be defective.

We shall have no liability or responsibility to the customer or any other person with respect to any loss or damage caused or alleged to be caused directly or indirectly by equipment or software sold or furnished by us. Read instructions carefully. No liability will be assumed for any damage caused by improper installation.

The information in this document is subject to change without notification. The content of this document is protected by copyright. No part of this document may be reproduced or copied by any means without the permission of Harmonic Inc.

For warranty or repair, return this product to a service facility designated by Harmonic Inc. The Buyer shall prepay shipping charges to Harmonic Inc., and Harmonic Inc. shall pay shipping to return the product to the buyer. However, buyer shall pay all shipping charges, duties and taxes for products returned to Harmonic Inc. from outside the U.S.

Harmonic Inc. warrants that its software, as well as firmware designated by Harmonic Inc. for use with the product, will execute its programming instructions when installed properly for ninety (90) days. Harmonic Inc. does not warrant that the operation of the product or software or firmware will be uninterrupted or error free.

6.7 Limitations of Warranty

The foregoing warranty shall not apply to defects resulting from abuse, neglect by the Buyer, improper installation or application by the Buyer, the Buyer-supplied software or interfacing, unauthorized modification or misuse, operation outside of the environmental specifications for the product or improper site penetration or maintenance.

No other warranty is expressed or implied. Harmonic Inc. specifically disclaims the implied warranties of merchantability and fitness for a particular purpose.

6.8 Exclusive Remedies

The remedies provided herein are the Buyer's sole and exclusive remedies.

Harmonic Inc. shall not be liable for any direct, indirect, special, incidental or consequential damages, whether based upon contract, tort or any other legal theory.

1. See Order Acknowledgment for complete warranty details.

Appendix A

Technical Specifications

A.1 Optical Output

Table A-1: Noise Performance

Model	7114	7117
Noise Figure (dB) ¹	4.3	4.3

¹ With 0 dBm optical input power

Table A-2: Output Power

Model	Total Optical Output Power (dBm)	Total Optical Output Power (mW)	Input Power (dBm)	Gain Tilt (dB)	Wavelength Range (nm)
7114	14	25	-5 to +10	N/A	1540-1564
7117	17	50	-5 to +10	N/A	1540-1564

Optical power adjustment range: 3 dB down from max in 0.3 dB increments

Optical return loss: > 40 dB

Polarization sensitivity: < 0.5 dB

Polarization Mode Dispersion (PMD): < 1 psec

Laser shutdown: Interlock on Fiber Tray

Connector type: SC/APC or E2000

A.2 User Interface

Front panel

Full numeric keypad

Two-line alphanumeric display (vacuum fluorescent)

Rear panel

Laser on/off switch

Optical fiber drawer

RJ-45 connector for network management

TTL alarm contacts

Network Management

SNMP v1, v2c, v3

Web interface via HTTP 1.1

A.3 Electrical

Power requirements:

- AC Version: 110/220 V, 50/60 Hz
- DC Version: -48 V

Power consumption: 60 W maximum

A.4 Environmental

Operating temperature range: -20° to +60° C

Storage temperature range: -40° to +70° C

Relative humidity: 85% maximum, non-condensing

A.5 Physical

Dimensions: 19" W x 1.7" (1 RU) H x 11" D

Weight: 7 kg

A.6 Laser Radiation Warning

Complies with 21 CFR 1040.10 and 1040.11 except for deviations pursuant to Laser Notice No. 50, dated (July 26, 2001) as applicable to Class 1M Laser Products.



This light emission device is classified to IEC 60825-1:1993 + A1 + A2

WARNING:INVISIBLE LASER RADIATION. DO NOT VIEW DIRECTLY WITH MAGNIFIERS. CLASS 1M LASER PRODUCT

Viewing the laser output with optical instruments (e.g. magnifier, microscopes) within a distance of 100mm may pose an eye hazard.

WARNUNG:UNSICHTBARE LASERSTRAHLUNG. NICHT DIREKT MIT LUPE BETRACHTEN. KLASSE 1M LASER PRODUKT.

Das betrachten des Laser Ausgangs mit optischen Instrumenten (z.B. Vergrößerungsglas, Mikroskope) innerhalb eines Abstandes von 100mm kann eine Augenverletzungs-Gefahr darstellen.

ATTENTION:RADIATION LASER INVISIBLE. NE PAS OBSERVER À LA LOUPE DIRECTEMENT. PRODUIT LASER CLASSE 1M

L'observation des effets lasers à l'aide d'un appareil optique (comme loupe, microscope...) à une distance jusqu'à 100 mm peut poser un danger à l'œil.

A.7 Agency Certifications

UL60950, CSA60950 (cTUVus)
 FCC Part 15 Class A, VCCI, CDRH
 EN60950, EN60825-1 (TUV GS-mark)
 EN55022 Class A, EN55024 (TUV EMC-mark, CE)

A.8 Management Parameters

A.8.1 HOA 7114/7117 Management Parameters

Model Number: HOA7114 (HOA7117 Parameters are the same except for Model Number)
Product Description: MAXLink Optical Amplifier
Product Application MIB: HMS111; HMS118; hIEdfaNG

HOA 7114/7117 General Parameters

Generic Parameter Description	Front Panel Label	HTTP Label	SNMP MIB Variable
General			
1 EDFA model number	HOA7114 Unit Ready	System; Model	entPhysicalModelName.1
2 EDFA serial number	HOA Serial No. xxxx	System; Serial Number	entPhysicalSerialNum.1
3 Firmware version	Firmware Version x.xx	System; Firmware Ver	entPhysicalFirmwareRev.1
4 Laser switch ON/OFF	Laser Switch On/Off Fiber Drawer Close/Open	System; Laser switch	hIEdfaNGUnitLaserSwitch.1
5 Fiber drawer optical sensor	Laser Switch On/Off Fiber Drawer Close/Open	System; Fiber drawer	hIEdfaNGUnitFiberDrawer.1
6 IP address	IP Address xxx.xxx.xxx.xxx	n/a	n/a
7 Subnet mask	IP Subnet Mask xxx.xxx.xxx.xxx	n/a	n/a
8 Default gateway	IP Default Gateway xxx.xxx.xxx.xxx	n/a	n/a
Laser system, optics			
9 Optical input power	Input Power xx.x dBm	Optics; Input Power	heOpAmpInputPower.1.1
10 Unit temperature	Unit Temperature xx.x °C	System; Temperature	heCommonTemperature.1
11 Laser(s) temperature	Lsr Temp xxxx mA	Lasers; Temperature	heOpAmpLaserTemp.1.1
12 Laser(s) bias current	Lsr Cur xxxx mA	Lasers; Bias Current	heOpAmpLaserBiasCurrent.1.1
13 Laser(s) power	Lsr Pwr xxxx mW	Lasers; Power	heOpAmpLaserOutputPower.1.1
14 Optical output power	Output Power xx.x dBm	Optics; Output Power	heOpAmpOutputPower.1.1
15 Low optical input threshold	Low Opt Input Thresh xx.x dBm	Optics; Low Optical Input Threshold	analogAlarmLOLO.18.heOpAmpInputPower.1.1

HOA 7114/7117 Alarm Parameters

Alarm Parameter Description	Front Panel Label	HTTP Label	SNMP MIB Variable
General			
16 Laser switch off alarm	Laser switch off	System; Laser switch off	discreteAlarmState.15.hIEdfaNGUnitLaserSwitch.1.0
17 Fiber drawer optical sensor alarm	Fiber Drawer Open	System; Fiber drawer open	discreteAlarmState.15.hIEdfaNGUnitFiberDrawer.1.0
Laser system, optics			
18 Optical input power alarm	Low Optical Input Power	Optics; Low optical input power	currentAlarmState.18.heOpAmpInputPower.1.1
19 Unit temperature alarm	Unit Temperature Alarm	System; Unit temperature out of range	currentAlarmState.18.heCommonTemperature.1
20 Laser(s) temperature alarm	Laser Temperature Alarm	Laser 1; Temperature	currentAlarmState.18.heOpAmpLaserTemp.1.1
21 Laser(s) bias current alarm	Laser Bias Current Alarm	Laser 1; Bias current	currentAlarmState.18.heOpAmpLaserBiasCurrent.1.1
22 Optical output power alarm	Loss of Optical Output Power	Optics; Loss of optical output power	currentAlarmState.18.heOpAmpOutputPower.1.1
23 Amplifier Output Disabled alarm	Amplifier Output Disabled	System; Amplifier output disabled	discreteAlarmState.17.heOpAmpUnitOutputStatus.1

HOA 7114/7117 Alarm Thresholds

Alarm Parameter Description	Alarm HiHi SNMP MIB Variable	Default Alarm HiHi Threshold	Alarm LoLo SNMP MIB Variable	Default Alarm LoLo Threshold	Alarm Description	
General						
16	Laser switch off alarm	n/a	n/a	n/a	The laser switch is off.	
17	Fiber drawer optical sensor alarm	n/a	n/a	n/a	The fiber drawer is not closed completely.	
Laser System, Optics						
18	Optical input power alarm	n/a	analogAlarmLOLO.18.heOpAmplnputPower.1.1	-7 dBm	Optical input power is below threshold.	
19	Unit temperature alarm	analogAlarmHIHI.18.heCommonTemperature.1	75 C	analogAlarmLOLO.18.heCommonTemperature.1	-20 C	Unit temperature measured at EDFA module is outside of threshold range.
20	Laser(s) temperature alarm	analogAlarmHIHI.18.heOpAmpLaserTemp.1.1	28 C	analogAlarmLOLO.18.heOpAmpLaserTemp.1.1	22 C	Laser(s) temperature is outside of threshold range.
21	Laser(s) bias current alarm	analogAlarmHIHI.18.heOpAmpLaserBiasCurrent.1.1	0, cannot report it	n/a	n/a	At least one pump is operating at or above 95% of its end of life value.
22	Optical output power alarm	n/a	n/a	analogAlarmLOLO.18.heOpAmpOutputPower.1.1	2 dBm below the set output power	Optical output power is below threshold.
23	Amplifier Output Disabled alarm	n/a	n/a	n/a	The amplifier output is disabled.	

HOA 7114/7117 Alarm Troubleshooting

Alarm Parameter Description	Alarm Description	Alarm Troubleshooting
General		
16	Laser switch off alarm	The laser switch is off. Verify that the Laser Switch located on the rear panel (see Section 3.4) is in the "on" position.
17	Fiber drawer optical sensor alarm	The fiber drawer is not closed completely. Verify that the fiber drawer has been closed completely.
Laser System, Optics		
18	Optical input power alarm	Optical input power is below threshold. Confirm Input Power Level (see Section 2.2). Go through connector cleaning procedure (see Section 6.1). Recall factory settings by pressing the RCL function key on the front panel (see Section 2.1.2). If that does not correct the problem, contact Customer Service (see Section 6.4).
19	Unit temperature alarm	Unit temperature measured at EDFA module is outside of threshold range. Verify that the unit is operating within the proper temperature range (-20 to +60 deg C). Verify that nothing is obstructing airflow through the openings in the front and back of the unit. Recall factory settings by pressing the RCL function key on the front panel (see Section 2.1.2). If that does not correct the problem, contact Customer Service (see Section 6.4).
20	Laser(s) temperature alarm	Laser(s) temperature is outside of threshold range. Verify that the unit is operating within the proper temperature range (-20° to +60° C). Verify that nothing is obstructing airflow through the openings in the front and back of the unit. Recall factory settings by pressing the RCL function key on the front panel (see Section 2.1.2). If none of the above corrects the problem, contact Customer Service (see Section 6.4).
21	Laser(s) bias current alarm	At least one pump is operating at or above 95% of its end of life value. Check loss of optical power alarms. Check low input alarm threshold. See Figure 2-6. HOA 7100 Alarms menu on page 2-6. Recall factory settings by pressing the RCL function key on the front panel (see Section 2.1.2). If that does not correct the problem, contact Customer Service (see Section 6.4).
22	Optical output power alarm	Optical output power is below threshold. Check Fiber drawer. Go through connector cleaning procedure (see Section 6.1). Recall factory settings by pressing the RCL function key on the front panel (see Section 2.1.2). If that does not correct the problem, contact Customer Service (see Section 6.4)
23	Amplifier Output Disabled alarm	The amplifier output is disabled. Check for other alarms .



Appendix B

Harmonic Inc. – Offices

Assistance

For technical support and customer service, call toll free: 800.730.4099.

Harmonic's web address is www.harmonicinc.com.

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