



Cisco OptoStar II

1550 nm DWDM Forward Direct Modulation Transmitter Module (1550 nm DMT)

Installation and Operation Guide

For Your Safety

Explanation of Warning and Caution Icons



Avoid personal injury and product damage! Do not proceed beyond any symbol until you fully understand the indicated conditions.

The following warning and caution icons alert you to important information about the safe operation of this product:

 **This symbol indicates important operating or maintenance instructions.**

 You may find this symbol affixed to the product. This symbol indicates a live terminal where a dangerous voltage may be present; the tip of the flash points to the terminal device.

 You may find this symbol affixed to the product. This symbol indicates a protective ground terminal.

 You may find this symbol affixed to the product. This symbol indicates a chassis terminal (normally used for equipotential bonding).

 You may find this symbol affixed to the product. This symbol warns of a potentially hot surface.

 You may find this symbol affixed to the product and in this document. This symbol indicates an infrared laser that transmits intensity-modulated light and emits invisible laser radiation or an LED that transmits intensity-modulated light.

Important

Please read this entire guide. If this guide provides installation or operation instructions, give particular attention to all safety statements included in this guide.

Notices

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Important Safety Instructions

Read and Retain Instructions

Carefully read all safety and operating instructions before operating this equipment, and retain them for future reference.

Follow Instructions and Heed Warnings

Follow all operating instructions. Pay attention to all warnings and cautions in the operating instructions, as well as those that are affixed to this equipment.

Terminology

The terms defined below are used in this document. The definitions given are based on those found in safety standards.

Service Personnel-The term service personnel applies to trained and qualified individuals who are allowed to install, replace, or service electrical equipment. The service personnel are expected to use their experience and technical skills to avoid possible injury to themselves and others due to hazards that exist in service and restricted areas.

User and Operator-The terms user and operator apply to persons other than service personnel.

Ground(ing) and Earth(ing)-The terms ground(ing) and earth(ing) are synonymous. This document uses ground(ing) for clarity, but it can be interpreted as having the same meaning as earth(ing).

Electric Shock Hazard

This equipment meets applicable safety standards. Refer to this equipment's data sheet for details about regulatory compliance approvals.



WARNING:

Avoid electric shock! Opening or removing the equipment cover may expose you to dangerous voltages. Refer all servicing to qualified service personnel only.

Electric shock can cause personal injury or even death. Avoid direct contact with dangerous voltages at all times.

Know the following safety warnings and guidelines:

- Only qualified service personnel are allowed to perform equipment installation or replacement.
- Only qualified service personnel are allowed to remove equipment covers and access any of the components inside the chassis.

Continued on next page

Important Safety Instructions, Continued

Grounding

- Do not violate the protective grounding by using an extension cable, power cable, or autotransformer without a protective ground conductor.
- Take care to maintain the protective grounding of this equipment during service or repair and to re-establish the protective grounding before putting this equipment back into operation.

Installation Site

When selecting the installation site, comply with the following:

- **Protective grounding** - The protective ground lead of the building's electrical installation should comply with national and local requirements.
- **Environment Condition** - The installation site should be dry, clean, and ventilated. Do not use this equipment where it could be at risk of contact with water. Ensure that this equipment is operated in an environment that meets the requirements as stated in this equipment's technical specifications, which may be found on this equipment's data sheet.

Installation Requirements

 **WARNING:**

Allow only qualified service personnel to install this equipment. The installation must conform to all local codes and regulations.

Continued on next page

Important Safety Instructions, Continued

Equipment Placement

 **WARNING:**

Avoid personal injury and damage to this equipment. An unstable mounting surface may cause this equipment failure.

To protect against equipment damage or injury to personnel, comply with the following:

- Install this equipment in a restricted access location.
- Do not install near any heat sources such as radiators, heat registers, stoves, or other equipment (including amplifiers) that produce heat.
- Place this equipment close enough to a mains AC outlet to accommodate the length of this equipment's power cord.
- Route all power cords so that people cannot walk on, place objects on, or lean objects against them. This may pinch or damage the power cords. Pay particular attention to power cords at plugs, outlets, and the points where the power cords exit this equipment.
- Use only with a cart, stand, tripod, bracket, or table specified by the manufacturer, or sold with this equipment.
- Make sure the mounting surface or rack is stable and can support the size and weight of this equipment.
- The mounting surface or rack should be appropriately anchored according to manufacturer's specifications. Ensure this equipment is securely fastened to the mounting surface or rack where necessary to protect against damage due to any disturbance and subsequent fall.

Ventilation

This equipment has openings for ventilation to protect it from overheating. To ensure equipment reliability and safe operation, do not block or cover any of the ventilation openings. Install the equipment in accordance with the manufacturer's instructions.

Rack Mounting Safety Precautions

Mechanical Loading

Make sure that the rack is placed on a stable surface. If the rack has stabilizing devices, install these stabilizing devices before mounting any equipment in the rack.

 **WARNING:**

Avoid personal injury and damage to this equipment. Mounting this equipment in the rack should be such that a hazardous condition is not caused due to uneven mechanical loading.

Continued on next page

Important Safety Instructions, Continued

Reduced Airflow

When mounting this equipment in the rack, do not obstruct the cooling airflow through the rack. Be sure to mount the blanking plates to cover unused rack space. Additional components such as combiners and net strips should be mounted at the back of the rack, so that the free airflow is not restricted.



CAUTION:

Installation of this equipment in a rack should be such that the amount of airflow required for safe operation of this equipment is not compromised.

Elevated Operating Ambient Temperature

Only install this equipment in a humidity- and temperature-controlled environment that meets the requirements given in this equipment's technical specifications.



CAUTION:

If installed in a closed or multi-unit rack assembly, the operating ambient temperature of the rack environment may be greater than room ambient temperature. Therefore, install this equipment in an environment compatible with the manufacturer's maximum rated ambient temperature.

Handling Precautions

When moving a cart that contains this equipment, check for any of the following possible hazards:



WARNING:



Avoid personal injury and damage to this equipment! Move any equipment and cart combination with care. Quick stops, excessive force, and uneven surfaces may cause this equipment and cart to overturn.

- Use caution when moving this equipment/cart combination to avoid injury from tip-over.
- If the cart does not move easily, this condition may indicate obstructions or cables that may need to be disconnected before moving this equipment to another location.
- Avoid quick stops and starts when moving the cart.
- Check for uneven floor surfaces such as cracks or cables and cords.

Grounding

This section provides instructions for verifying that the equipment is properly grounded.

Continued on next page

Important Safety Instructions, Continued

Safety Plugs (USA Only)

This equipment is equipped with either a 3-terminal (grounding-type) safety plug or a 2-terminal (polarized) safety plug. The wide blade or the third terminal is provided for safety. Do not defeat the safety purpose of the grounding-type or polarized safety plug.

To properly ground this equipment, follow these safety guidelines:

- **Grounding-Type Plug** - For a 3-terminal plug (one terminal on this plug is a protective grounding pin), insert the plug into a grounded mains, 3-terminal outlet.
Note: This plug fits only one way. If this plug cannot be fully inserted into the outlet, contact an electrician to replace the obsolete 3-terminal outlet.
- **Polarized Plug** - For a 2-terminal plug (a polarized plug with one wide blade and one narrow blade), insert the plug into a polarized mains, 2-terminal outlet in which one socket is wider than the other.
Note: If this plug cannot be fully inserted into the outlet, try reversing the plug. If the plug still fails to fit, contact an electrician to replace the obsolete 2-terminal outlet.

Grounding Terminal

If this equipment is equipped with an external grounding terminal, attach one end of an 18-gauge wire (or larger) to the grounding terminal; then, attach the other end of the wire to a ground, such as a grounded equipment rack.

Safety Plugs (European Union)

- **Class I Mains Powered Equipment** - Provided with a 3-terminal AC inlet and requires connection to a 3-terminal mains supply outlet via a 3-terminal power cord for proper connection to the protective ground.
Note: The equipotential bonding terminal provided on some equipment is not designed to function as a protective ground connection.
- **Class II Mains Powered Equipment** - Provided with a 2-terminal AC inlet that may be connected by a 2-terminal power cord to the mains supply outlet. No connection to the protective ground is required as this class of equipment is provided with double or reinforced and/or supplementary insulation in addition to the basic insulation provided in Class I equipment.
Note: Class II equipment, which is subject to EN 50083-1, is provided with a chassis mounted equipotential bonding terminal. See the section titled Equipotential Bonding for connection instructions.

Equipotential Bonding

If this equipment is equipped with an external chassis terminal marked with the IEC 60417-5020 chassis icon ()¹, the installer should refer to CENELEC standard EN 50083-1 or IEC standard IEC 60728-11 for correct equipotential bonding connection instructions.

Continued on next page

Important Safety Instructions, Continued

AC Power

Important: If this equipment is a Class I equipment, it must be grounded.

- If this equipment plugs into an outlet, the outlet must be near this equipment, and must be easily accessible.
- Connect this equipment only to the power sources that are identified on the equipment-rating label normally located close to the power inlet connector(s).
- This equipment may have two power sources. Be sure to disconnect all power sources before working on this equipment.
- If this equipment does not have a main power switch, the power cord connector serves as the disconnect device.
- Always pull on the plug or the connector to disconnect a cable. Never pull on the cable itself.
- Unplug this equipment when unused for long periods of time.

Connection to -48 V DC/-60 V DC Power Sources

If this equipment is DC-powered, refer to the specific installation instructions in this manual or in companion manuals in this series for information on connecting this equipment to nominal -48 V DC / -60 V DC power sources.

Circuit Overload

Know the effects of circuit overloading before connecting this equipment to the power supply.



CAUTION:

Consider the connection of this equipment to the supply circuit and the effect that overloading of circuits might have on overcurrent protection and supply wiring. Refer to the information on the equipment-rating label when addressing this concern.

General Servicing Precautions



WARNING:

Avoid electric shock! Opening or removing the equipment cover may expose you to dangerous voltages. Refer all servicing to qualified service personnel only.



CAUTION:

These servicing precautions are for the guidance of qualified service personnel only. To reduce the risk of electric shock, do not perform any servicing other than contained in the operating instructions unless you are qualified to do so. Refer all servicing to qualified service personnel.

Continued on next page

Important Safety Instructions, Continued

Be aware of the following general precautions and guidelines:

- **Servicing** - Servicing is required when this equipment has been damaged in any way, such as power supply cord or plug is damaged, liquid has been spilled or objects have fallen into this equipment, this equipment has been exposed to rain or moisture, does not operate normally, or has been dropped.
- **Wristwatch and Jewelry** - For personal safety and to avoid damage of this equipment during service and repair, do not wear electrically conducting objects such as a wristwatch or jewelry.
- **Lightning** - Do not work on this equipment, or connect or disconnect cables, during periods of lightning.
- **Labels** - Do not remove any warning labels. Replace damaged or illegible warning labels with new ones.
- **Covers** - Do not open the cover of this equipment and attempt service unless instructed to do so in the instructions. Refer all servicing to qualified service personnel only.
- **Moisture** - Do not allow moisture to enter this equipment.
- **Cleaning** - Use a damp cloth for cleaning.
- **Safety Checks** - After service, assemble this equipment and perform safety checks to ensure it is safe to use before putting it back into operation.

Electrostatic Discharge

Electrostatic discharge (ESD) results from the static electricity buildup on the human body and other objects. This static discharge can degrade components and cause failures.

Take the following precautions against electrostatic discharge:

- Use an anti-static bench mat and a wrist strap or ankle strap designed to safely ground ESD potentials through a resistive element.
- Keep components in their anti-static packaging until installed.
- Avoid touching electronic components when installing a module.

Fuse Replacement

To replace a fuse, comply with the following:

- Disconnect the power before changing fuses.
- Identify and clear the condition that caused the original fuse failure.
- Always use a fuse of the correct type and rating. The correct type and rating are indicated on this equipment.

Continued on next page

Important Safety Instructions, Continued

Batteries

This product may contain batteries. Special instructions apply regarding the safe use and disposal of batteries:

Safety

- Insert batteries correctly. There may be a risk of explosion if the batteries are incorrectly inserted.
- Do not attempt to recharge ‘disposable’ or ‘non-reusable’ batteries.
- Please follow instructions provided for charging ‘rechargeable’ batteries.
- Replace batteries with the same or equivalent type recommended by manufacturer.
- Do not expose batteries to temperatures above 100°C (212°F).

Disposal

- The batteries may contain substances that could be harmful to the environment
- Recycle or dispose of batteries in accordance with the battery manufacturer’s instructions and local/national disposal and recycling regulations.



廢電池請回收

- The batteries may contain perchlorate, a known hazardous substance, so special handling and disposal of this product might be necessary. For more information about perchlorate and best management practices for perchlorate-containing substance, see www.dtsc.ca.gov/hazardouswaste/perchlorate.

Modifications

This equipment has been designed and tested to comply with applicable safety, laser safety, and EMC regulations, codes, and standards to ensure safe operation in its intended environment. Refer to this equipment’s data sheet for details about regulatory compliance approvals.

Do not make modifications to this equipment. Any changes or modifications could void the user’s authority to operate this equipment.

Modifications have the potential to degrade the level of protection built into this equipment, putting people and property at risk of injury or damage. Those persons making any modifications expose themselves to the penalties arising from proven non-compliance with regulatory requirements and to civil litigation for compensation in respect of consequential damages or injury.

Accessories

Use only attachments or accessories specified by the manufacturer.

Continued on next page

Important Safety Instructions, Continued

Electromagnetic Compatibility Regulatory Requirements

This equipment meets applicable electromagnetic compatibility (EMC) regulatory requirements. Refer to this equipment's data sheet for details about regulatory compliance approvals. EMC performance is dependent upon the use of correctly shielded cables of good quality for all external connections, except the power source, when installing this equipment.

- Ensure compliance with cable/connector specifications and associated installation instructions where given elsewhere in this manual.

Otherwise, comply with the following good practices:

- Multi-conductor cables should be of single-braided, shielded type and have conductive connector bodies and backshells with cable clamps that are conductively bonded to the backshell and capable of making 360° connection to the cable shielding. Exceptions from this general rule will be clearly stated in the connector description for the excepted connector in question.
- Ethernet cables should be of single-shielded or double-shielded type.
- Coaxial cables should be of the double-braided shielded type.

Restriction of Hazardous Substances Directive (RoHS) Requirements

The equipment conforms to the restriction of hazardous substances directive in electrical and electronic equipment (RoHS) requirements.

Continued on next page

Laser Safety

Introduction

This equipment contains an infrared laser that transmits intensity-modulated light and emits invisible radiation.

Warning: Radiation

 **WARNING:**

- Avoid personal injury! Use of controls, adjustments, or procedures other than those specified herein may result in hazardous radiation exposure.
- Avoid personal injury! The laser light source on this equipment (if a transmitter) or the fiber cables connected to this equipment emit invisible laser radiation. Avoid direct exposure to the laser light source.
- Avoid personal injury! Viewing the laser output (if a transmitter) or fiber cable with optical instruments (such as eye loupes, magnifiers, or microscopes) may pose an eye hazard.

- Do not apply power to this equipment if the fiber is unmated or unterminated.
- Do not stare into an unmated fiber or at any mirror-like surface that could reflect light emitted from an unterminated fiber.
- Do not view an activated fiber with optical instruments (for example, eye loupes, magnifiers, microscopes).
- Use safety-approved optical fiber cable to maintain compliance with applicable laser safety requirements.

Warning: Fiber Optic Cables

 **WARNING:**

Avoid personal injury! Qualified service personnel may only perform the procedures in this manual. Wear safety glasses and use extreme caution when handling fiber optic cables, particularly during splicing or terminating operations. The thin glass fiber core at the center of the cable is fragile when exposed by the removal of cladding and buffer material. It easily fragments into glass splinters. Using tweezers, place splinters immediately in a sealed waste container and dispose of them safely in accordance with local regulations.

Continued on next page

Laser Safety, Continued

Safe Operation for Software Controlling Optical Transmission Equipment

If this manual discusses software, the software described is used to monitor and/or control ours and other vendors' electrical and optical equipment designed to transmit video, voice, or data signals. Certain safety precautions must be observed when operating equipment of this nature.

For equipment specific safety requirements, refer to the appropriate section of the equipment documentation.

For safe operation of this software, refer to the following warnings.

 **WARNING:**

- Ensure that all optical connections are complete or terminated before using this equipment to remotely control a laser device. An optical or laser device can pose a hazard to remotely located personnel when operated without their knowledge.
- Allow only personnel trained in laser safety to operate this software. Otherwise, injuries to personnel may occur.
- Restrict access of this software to authorized personnel only.
- Install this software in equipment that is located in a restricted access area.

Continued on next page

Laser Power and Warning Labels

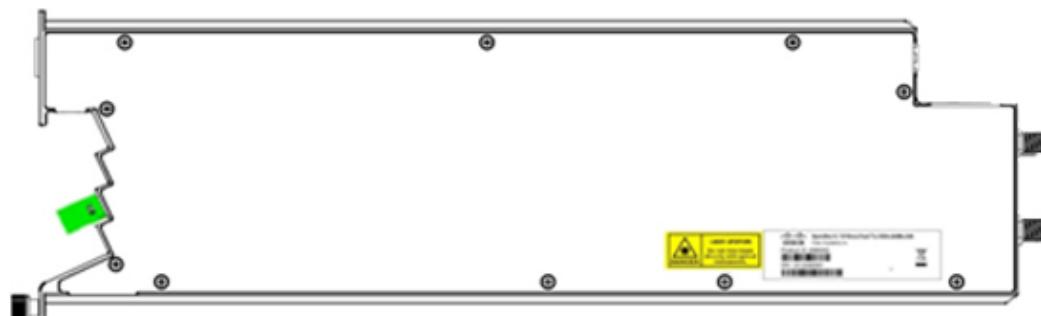
Warning Labels

The following labels are located on this product.



Location of Labels on Equipment

The following illustrations display the location of warning labels on this equipment.



Chapter 1 Introduction

Overview

The OptoStar II optical platform is an advanced transmission system, designed to optimize network architectures and increase reliability, scalability, and cost effectiveness.

This chapter introduces the features and structure of the OptoStar II 1550 nm DWDM forward direct modulation transmitter module.

Purpose

This document provides information about the installation, configuration, operation, and troubleshooting of the OptoStar II 1550 nm DWDM forward direct modulation transmitter module.

Who Should Use This Document

This document is intended for authorized service personnel who have experience working with similar equipment. The service personnel should have appropriate background and knowledge to complete the procedures described in this document.

Qualified Personnel



CAUTION:

Allow only qualified and skilled personnel to install, operate, maintain, and service this product. Otherwise, personal injury or equipment damage may occur.

Only appropriately qualified and skilled personnel should attempt to install, operate, maintain, and service this product.

Scope

This document discusses the following topics.

- 1550 nm DWDM forward direct modulation transmitter module description
- Installation and configuration
- Operating instructions
- Troubleshooting
- Customer support information

Document Version

This is the second release of this document.

Continued on next page

Overview, Continued

In This Chapter

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Introduction

Description

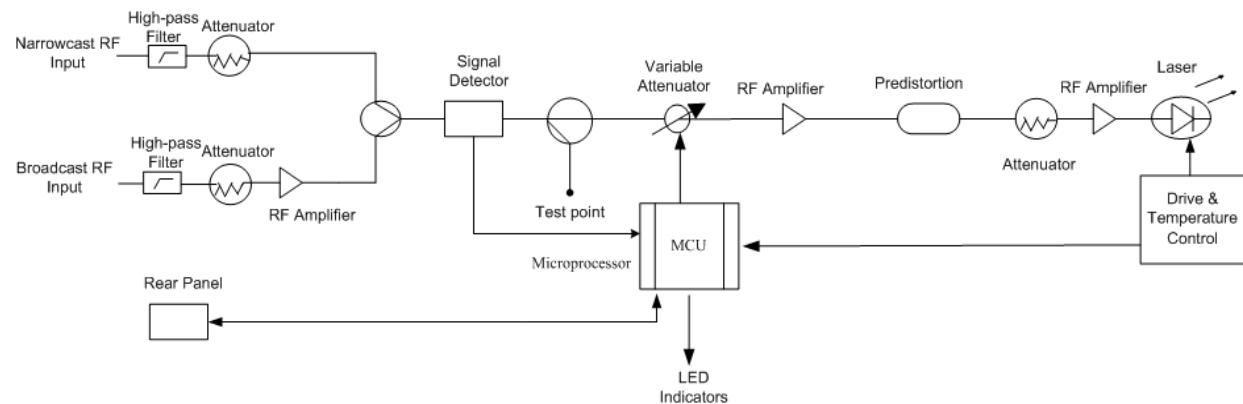
The OptoStar II 1550 nm DWDM forward direct modulation transmitter module uses a standard 19-in OptoStar II chassis. The flexibility of the platform is greatly improved by the fact that a single chassis can hold both optical transmitter modules and other OptoStar II modules. 14 transmitter modules can be placed in one standard 3 RU OptoStar II chassis. The transmitter module has a bandwidth of 1 GHz and is designed to facilitate the deployment of HDTV and other value-added services.

Features

- The 1 GHz transmitter module provides sufficient bandwidth for new services
- Advanced pre-distortion circuit increases cost effectiveness
- RF overdrive protection feature protects the laser
- Dual RF input for broadcast and narrowcast signals
- LED on the front panel indicates the working status of the module, with RF input test point
- Automatic Gain Control (AGC) and Manual Gain Control (MGC) available
- Intelligent Communications Interface Module (ICIM) provides various configuration and control options
 - Local monitoring and control on the ICIM LCD screen
 - Local monitoring and control with ICIM Mini-USB interface connecting to the console on PC
 - Remote status monitoring (SNMP) with ICIM RJ-45 interface
- Firmware is upgradeable
- Hot-swap capability

Block Diagram

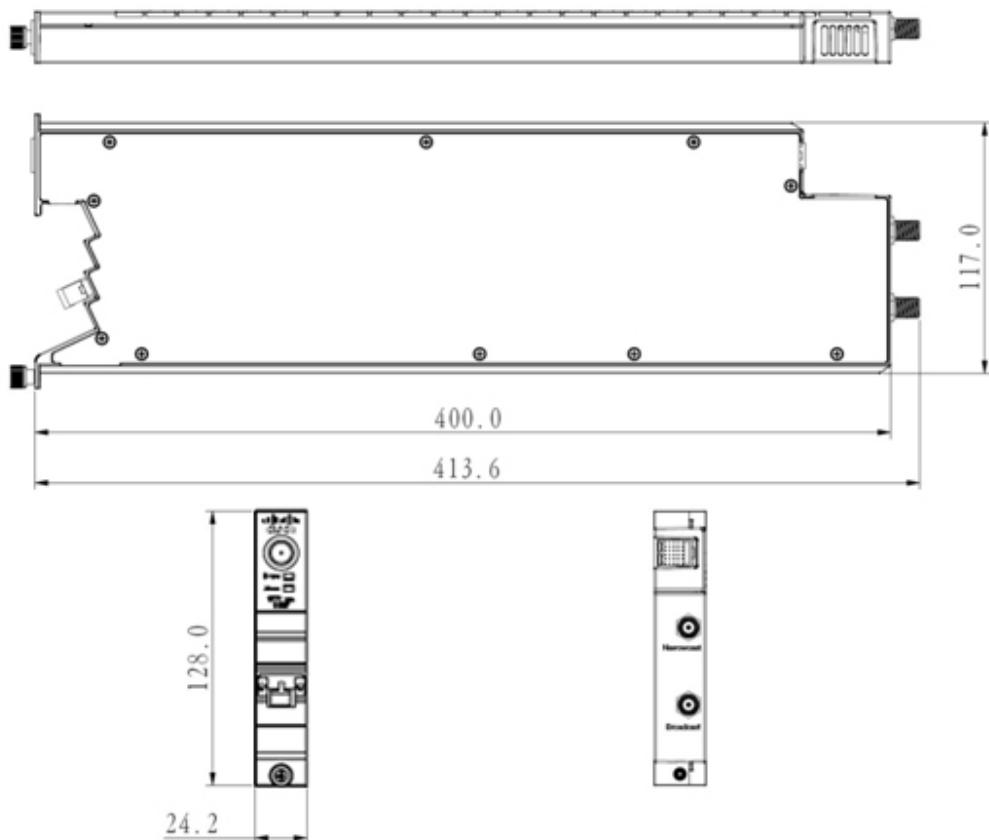
The following block diagram shows the signal pathway of the 1550 nm DWDM forward direct modulation transmitter module.



Structure

Dimension

The dimensions of the 1550 nm DWDM forward direct modulation transmitter are shown below. (Unit: mm)



Module Parts

The following table lists the parts of the 1550 nm DWDM forward direct modulation transmitter module.

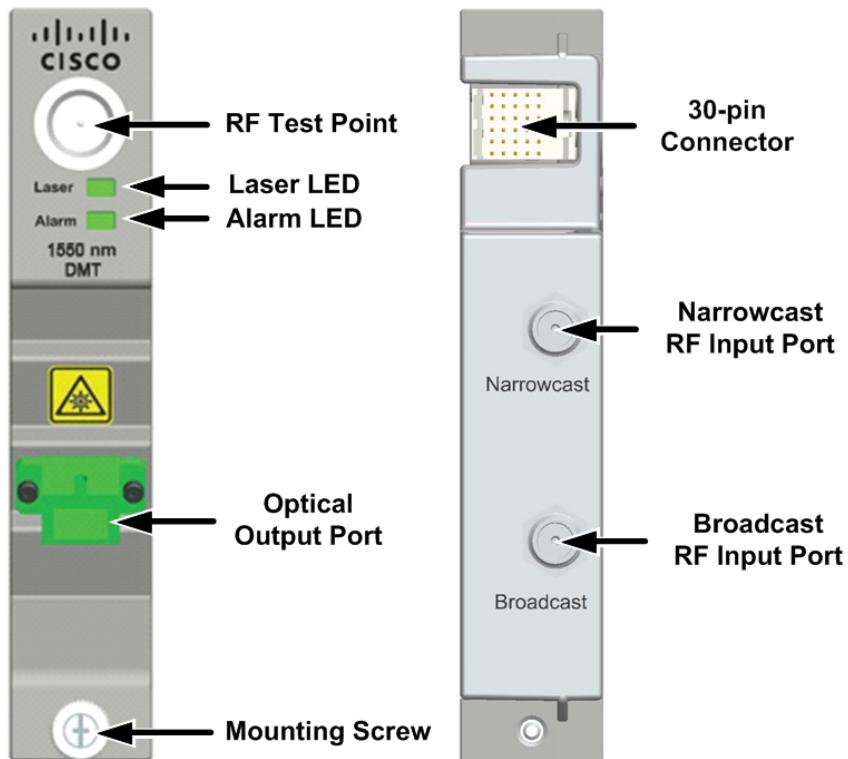
Part	Function
Module Housing	Includes side panels, front panel, and rear panel.
Front Panel	Includes RF test point, LEDs, optical output port, and mounting screw.
Rear Panel	Includes a 30-pin connector and RF input.

Continued on next page

Structure, Continued

Panel Illustration

The following illustration shows the panels of the 1550 nm DWDM forward direct modulation transmitter module.



Continued on next page

Structure, Continued

Panel Functions

The following table lists the functions of the front panel indicators on the 1550 nm DWDM forward direct modulation transmitter module.

Description	Function	
Laser LED	Red/Green Indicator	Blinks in red and green when the module is starting up.
		Green: laser is in normal working condition.
		Red: laser is not working properly, alarm occurs.
		OFF: laser is switched off.
Alarm LED	Red/Green Indicator	Green: module is in normal working condition.
		Red: module is not working properly, alarm occurs.

The following table lists other functions of the 1550 nm DWDM forward direct modulation transmitter module front panel.

Description	Function
RF Test Point	RF input test point, with G-type male (1/2-24 UNEF thread)
Optical Output	Optical output with SC/APC optical connector
Mounting Screw	Mounts the module in the chassis

The following table lists the functions of the 1550 nm DWDM forward direct modulation transmitter module rear panel.

Description	Function
30-pin Connector	Power and communication connector of the module, and provides module ID information.
Narrowcast RF Input Port	Narrowcast RF input, with F-type female (3/8-32 UNEF thread)
Broadcast RF Input Port	Broadcast RF input, with F-type female (3/8-32 UNEF thread)

Chapter 2 Installation and Configuration

Overview

This chapter provides instructions for installing the OptoStar II 1550 nm DWDM forward direct modulation transmitter.

Qualified Personnel

Only appropriately qualified and skilled personnel should attempt to install, operate, maintain, and service this product. Otherwise, personal injury or equipment damage may occur.

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Installing/Removing the Modules	2 - 4
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Care and Cleaning of Optical Connectors	2 - 8

Before You Begin

Before you begin the installation procedure, make sure you have all the tools and the module ready.

Tools

The following tools and equipment are needed to install the module.

- Flat-head or round-head screws and washers
- Flat-head or Phillips-head screwdriver

Unpacking and Inspecting the Module

Please follow the steps below to unpack and inspect the module for any damage:

1. Inspect the shipping boxes for any damage;
2. Unpack all boxes and confirm that the contents are complete. Remove the module.

Note: Items in the packaging box include:

- One OptoStar II 1550 nm DWDM forward direct modulation transmitter module
 - One factory test report
 - One Mounting Instruction
3. Inspect the appearance of the module for any shipping damage. In case of damage, document it and inform the shipping company and our customer support. See *Customer Support Information* (on page 5-1) for details.
 4. Keep the shipping boxes and their inserts for any future shipment for upgrade or repair.

Note: In the event that the module must be returned to the manufacturer, any shipment damage resulting from improper packaging will be the responsibility of the customer. Inspect the boxes and equipment for any damage upon receipt.

Installing the Chassis

Mount the empty chassis in the equipment rack, using flat or round head screws and washers in the four front panel corner mounting locations. This enables a secure mount of the unit on the chassis. You must use screws matching your rack.

Chassis Location in Rack

The chassis can be placed anywhere within the rack. Hot air discharged from other equipment must not be directed at the chassis front panel. Dust from the surrounding environment should not be ingested in the input airflow. The chassis can be mounted without any gap, directly above or below another chassis or other equipment that does not discharge hot air directly at the front panel of the chassis.

Operating Temperature

Make sure the unit is operated in a temperature and humidity-controlled environment. See the temperature specifications in the datasheet.

Note: The maximum operating ambient temperature is 50°C (122°F).

Long-term reliability is best obtained with consistently cool environments. Never place a unit near a heat source. Do not install a unit in areas of high humidity or where there is any chance of water or condensation dripping into or on the unit.

Verify Rack Dimensions

It is important to verify the rack dimensions to guarantee proper installation of the chassis. The minimum Telco rack dimensions needed for installation are as follows.

- The chassis weighs 6.6 kg and can be installed into a 19-in. rack. The maximum width of the chassis is 481 mm, and the width without mounting ears is 437 mm.

Installing / Removing the Modules

To Install the Module

Install the ICIM module and power supply module first. See *Cisco OptoStar II Intelligent Communications Interface Module (ICIM) Installation and Operation Guide*, part number: OL-29660 and *Cisco OptoStar II Chassis (CH) and Power Supply (PS) Installation and Operation Guide*, part number: OL-29659 for details.

Now you may start to install the OptoStar II 1550 nm DWDM forward direct modulation transmitter module. Connect it to the rear panel connector of the chassis. Install the module as shown in the following illustration.



1. Select Slot 4 – Slot 17.
2. Inspect all the pins on the rear panel and confirm that they are not bent.
3. Hold module vertically with module front towards you.
4. Align the rib on lower side of the module with a guide slot in the chassis and align top rib with matching guide slot in the top of the chassis.
5. Slide module in smoothly until you feel slight resistance, then continue to push gently until the module connector seats completely.
Note: Check alignment if you feel significant resistance. Do not press hard, otherwise the connector may be damaged. When installing the module in the slot, ensure the proper connector alignment.
6. Tighten the mounting screws on the lower front panel of the module by hand or screwdriver, to secure the module in the chassis.
Note: The torque of mounting screw is 5 - 6 kgf·cm.
7. Repeat the steps above if more modules need to be installed.
8. Connect the fiber and RF cables.

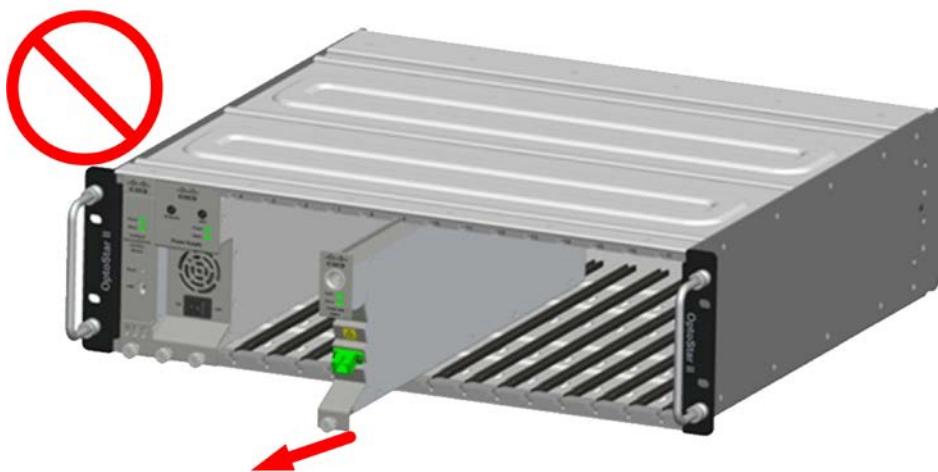
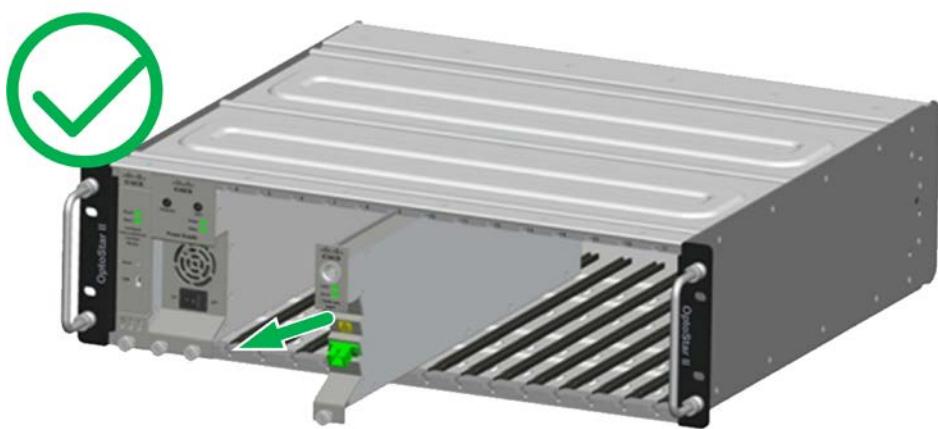
Continued on next page

Installing/Removing the Modules, Continued

To Remove the Module

1. Remove the fiber connector from the front panel of the module, and cover the fiber and module connector with dust caps immediately.
2. Remove the RF cables from the rear panel of the module.
3. Loosen the mounting screws on lower front panel of the module by hand or screwdriver, to release the module from the chassis.
4. Pull the module slightly to unseat the connector.
5. Hold the module and gently remove it from the chassis.

Note: Do not use the mounting screws as a handle when removing the module. Follow the steps as shown in the following illustration.



Connections

Fiber Connections

Although the modules may be hot-swapped when service must be restored, it is recommended that the chassis and modules are installed prior to powering up the chassis.

It is also recommended to connect fibers to the front panel before powering up the system. If fibers must be removed, it is recommended to disconnect power prior to removal to minimize possible exposure to laser radiation.



CAUTION:

Use only SC/APC terminated fiber cables to connect to modules. Clean the connector using recognized industry practices before connecting to any module to prevent performance degradation.

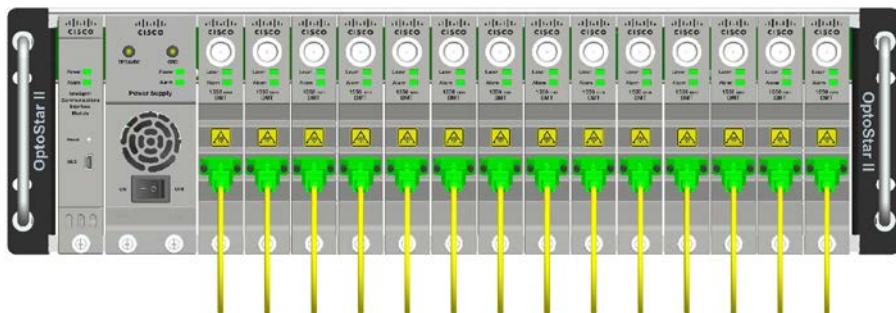
For fiber cleaning information, see *Care and Cleaning of Optical Connectors* (page 2-8).



CAUTION:

Optical transmitters may be powered on once installed in a powered chassis. Do not remove the dust cap on the front panel optical output port until it is ready to terminate the fiber cable, in order to reduce the risk of unintentional access to laser output.

See the illustration below for fiber connections.

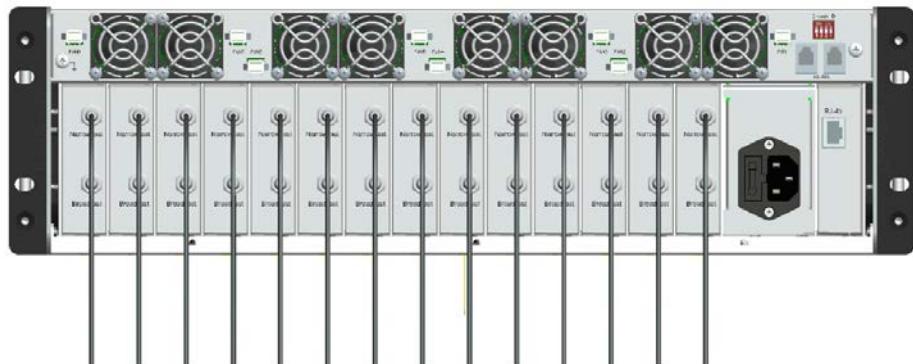


Continued on next page

Connections, Continued

RF Cable Connections

Use a cable with F-type male RF connector (3/8-32 UNEF thread) to connect the RF input port on the rear panel of the module. See the illustration below for RF cable connections.



Care and Cleaning of Optical Connectors

Cleaning of Optical Connector Overview

Cleaning optical connectors can help prevent interconnect problems and maintain system performance. When optical connectors are disconnected or reconnected, the fiber surface can become dirty or scratched. The purpose of cleaning the optical connector is to remove all dusts and contaminants without leaving any residue.

Recommended Equipment

The following equipment is recommended to clean the mating surface of fiber connectors.

- CLETOP or OPTIPOP ferrule cleaner (CLETOP Type A for SC connectors, and Type B for LC connectors)
- Compressed air (also called “canned air”)
- Lint-free wipes moistened with optical-grade (99%) isopropyl alcohol
- Bulkhead swabs for LC or SC connectors (choose the appropriate type)
- Optical connector scope

Tips for Optimal Optical Connector Performance

Follow the instructions below to ensure stable performance from optical connectors.

- Do not connect or disconnect optical connectors with optical power present.
- Always use compressed air before cleaning the optical connectors.
- Always install end caps on connectors when they are not in use.
- Always use compressed air to clean the connector end caps.
- If you have any degraded signal problems, clean the optical connector.
- Advance a clean portion of the ferrule cleaner reel for each cleaning.
- Turn off optical power before making or breaking optical connections to avoid microscopic damage to fiber mating surfaces.

Continued on next page

Care and Cleaning of Optical Connectors, Continued

To Clean Optical Connector



Warning:

Avoid personal injury. Use of controls, adjustments, or procedures other than those specified herein may result in hazardous radiation exposure.

Avoid personal injury. The laser light source on this module or the fiber cables connected to this module emits invisible laser radiation.

Avoid personal injury. Viewing the laser output or fiber cable with optical instruments (such as eye loupes, magnifiers, or microscopes) may pose an eye hazard.

- Do not apply power to this equipment if the fiber is unmated or unterminated.
- Do not stare into an unmated fiber or at any mirror-like surface that could reflect light emitted from an unterminated fiber.
- Do not view the fiber in use with optical instruments (such as eye loupes, magnifiers, or microscopes).
- Use safety-approved fiber cable to maintain compliance with applicable laser safety requirements.

Important: Ensure that no optical power is present prior to this procedure.

1. Turn optical power off from the connector.
2. Inspect the connector for scratches, burns, or other signs of damage using an optical connector scope.
Note: If the connector is damaged, replace the jumper.
3. If the connector requires cleaning, swipe it across the surface of appropriate ferrule cleaner several times.
Result: This will remove dust and some films.
Note: You may hear a slight "squeak" while cleaning the connector, indicating that it is clean.
4. Inspect the connector again. If the connector requires further cleaning, clean it using 99% isopropyl alcohol and a lint-free wipe.
5. Swipe the connector across the surface of the appropriate ferrule cleaner several more times to remove any film left by the alcohol.
6. Repeat all the steps above as needed until the connector is clean.

Chapter 3 Operation

Overview

This chapter provides information on the 3 options to operate the OptoStar II 1550 nm DWDM forward direct modulation transmitter module.

- Using the OptoStar II ICIM LCD to configure.
- Using the OptoStar II console to configure on PC.
- Using the OptoStar II network management system to configure on PC.

Qualified Personnel

Only appropriately qualified and skilled personnel should attempt to install, operate, maintain, and service this product. Otherwise, personal injury or equipment damage may occur.

In This Chapter

Topic	Page
Starting up the Module	3 - 2
Operating using ICIM LCD	3 - 5
Operating using Console Software	3 - 19
Operating using NMS Software	3 - 26

Starting up the Module

Initialization

When the OptoStar II 1550 nm DWDM forward direct modulation transmitter module is powered on, the module will perform a self-test.

Follow these steps to perform the self-test:

1. Turn the front panel switch of the OptoStar II power supply module to ON position.
2. When the 1550 nm DWDM forward direct modulation transmitter module starts up, it will perform a booting initialization for about 5 seconds.
3. During the initialization, the laser LED and the alarm LED on the front panel will be illuminated, and the communication status is shut off.
4. Once the initialization is completed, the status indicator will return to normal. Communication is enabled and the module is operational.

CAUTION:

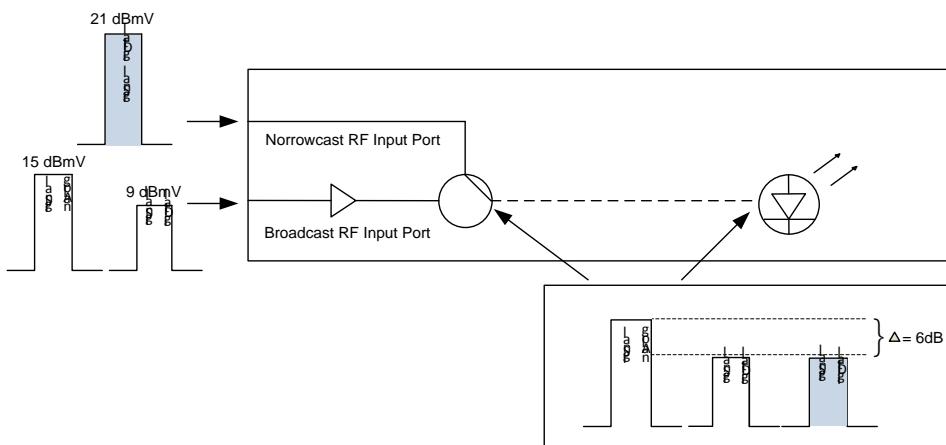
- The module must be initialized; any equipment that cannot be initialized must be returned to the manufacturer for repair.
- When everything becomes stable, the module still needs to warm up for at least one hour to make sure that its performance is normal.

Continued on next page

Starting up the Module, Continued

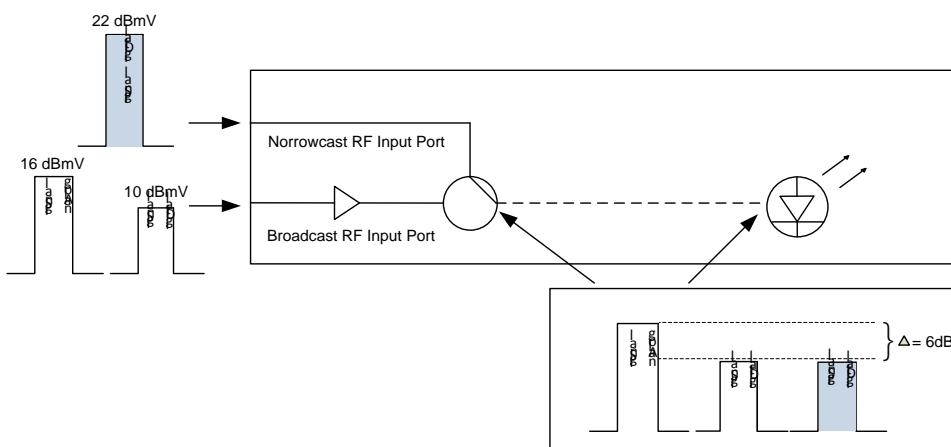
Signal Inspection

- To ensure optimum performance, use a DB meter or spectrum analyzer to measure the RF level that will be input into the module and confirm the input signal is within range.
- In NTSC system, the analog signal input level is 15 dBmV/channel at the broadcast RF input port; the digital signal input level is 9 dBmV/channel at the broadcast RF input port; and the digital signal input level is 21 dBmV/channel at the narrowcast RF input port. The relationship between signal levels is shown below.



If the RF signal contains only digital signal, the digital signal input level will be 13 dBmV/channel at the broadcast RF input port.

- In PALD/K system, the analog signal input level is 16 dBmV/channel at the broadcast RF input port; the digital signal input level is 10 dBmV/channel at the broadcast RF input port; and the digital signal input level is 22 dBmV/channel at the narrowcast RF input port. The relationship between signal levels is shown below.



If the RF signal contains only digital signal, the digital signal input level will be 13 dBmV/channel at the broadcast RF input port.

Continued on next page

Starting up the Module, Continued

- A DB meter or spectrum analyzer can be used to measure the RF input level via the test point on the front panel. The RF input level can be adjusted if necessary. When it is set to broadcast RF input, the actual value of the input level (dB) is equal to the measurement value $+20.0 \pm 1.0$. When it is set to narrowcast RF input, the actual value of the input level (dB) is equal to the measurement $+32.0 \pm 1.0$.
 - Check whether the optical output power is within the specifications with an optical power meter. The optical output power lower limit (dB) equals to the standard value - 0.2; and the optical output power upper limit (dB) equals to the standard value + 0.5. Make sure the mating surface is clean when testing.
-

Operating using ICIM LCD

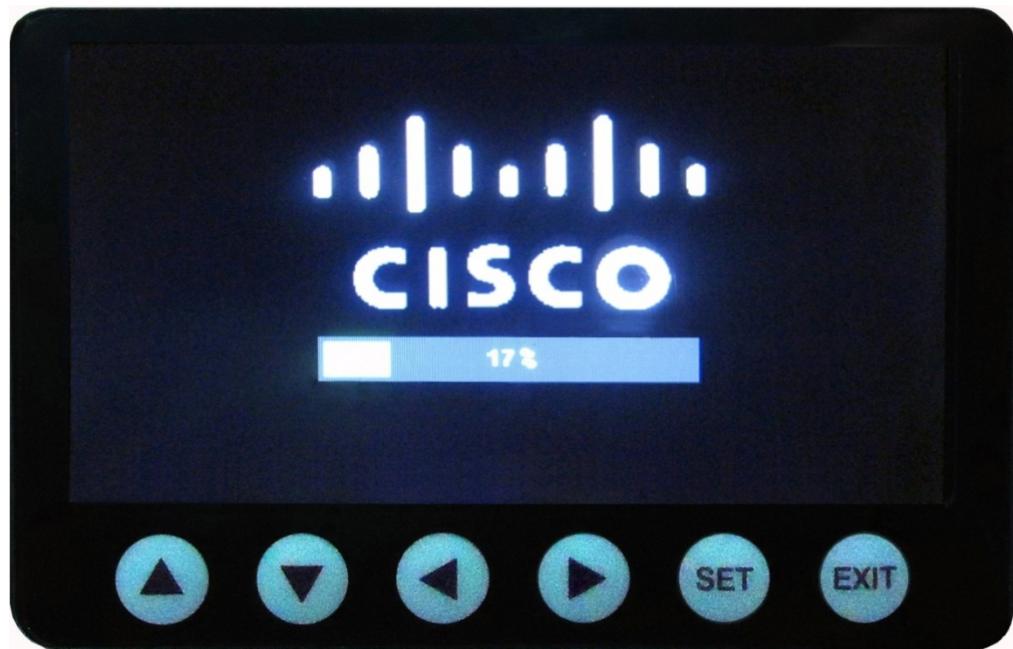
This section describes how to use the OptoStar II ICIM LCD to operate the OptoStar II 1550 nm DWDM forward direct modulation transmitter module.

Start

1. Make sure that the fiber and RF cables of the OptoStar II 1550 nm DWDM forward direct modulation transmitter module are connected.
2. Turn the front panel switch of the OptoStar II power supply module to ON position. The power supply module and the 1550 nm DWDM forward direct modulation transmitter module will initialize for about 5 seconds, and the ICIM will load for about 25 seconds.

Note: The system will achieve optimal working condition after one hour's warm-up.

The LCD now displays ICIM loading screen as shown below.



3. When the device initialization is complete, remove the ICIM display and begin operation.

Continued on next page

Operating using ICIM LCD, Continued

Standby Screen

OptoStar II ICIM uses a 4.3-inch color LCD screen. Below is the standby screen after the module has loaded.



Keypad Operations

The table below lists each key on the OptoStar II ICIM screen and its function.

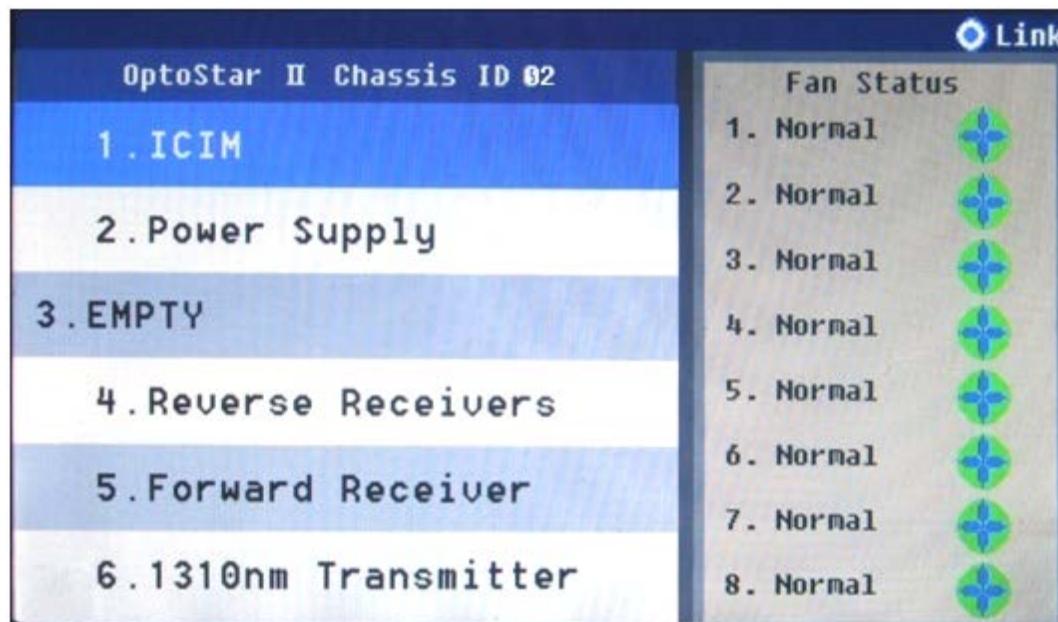
Button	Function	
▲	In menu view, mode selection and function switch screens	Moves the cursor up
	In reading configuration screen	Increases numerical readings
▼	In menu view, mode selection and function switch screens	Moves the cursor down
	In reading configuration screen	Decreases numerical readings
◀	Moves to the previous page/Moves the cursor to the left	
▶	Moves to the next page/Moves the cursor to the right	
SET	Configure/Save/Enter	
EXIT	Cancel/Return	

Continued on next page

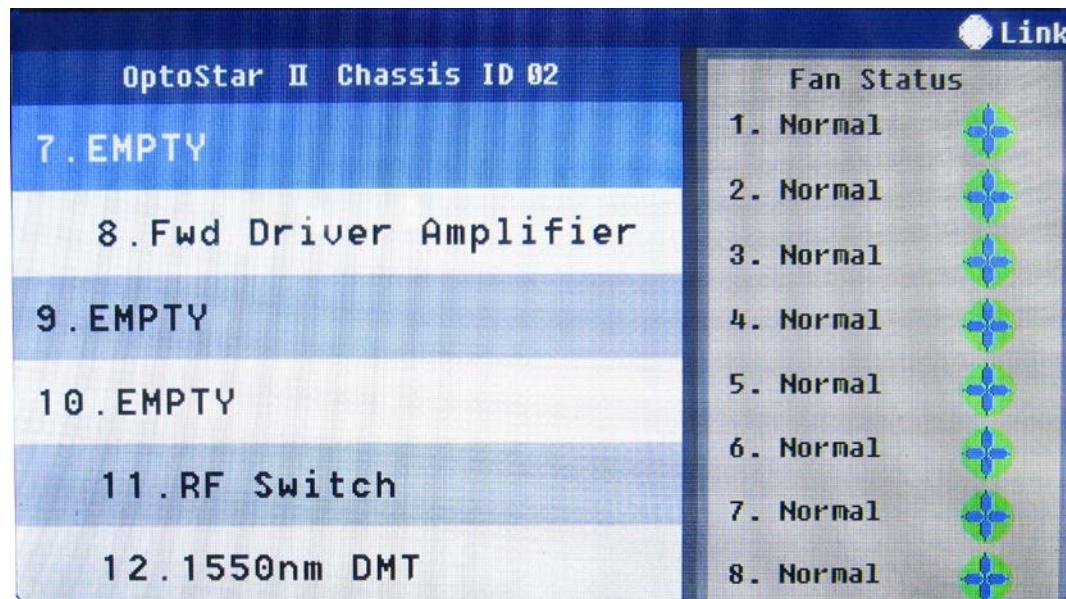
Operating using ICIM LCD, Continued

Module Main Menu

The illustration below shows the module main menu of the OptoStar II ICIM:



As shown in the illustration, all the local modules are located on the left side of the screen, you can press ► button to move to the next page, and view modules in other slots. The statuses of 8 fans are located on the right side of the screen.



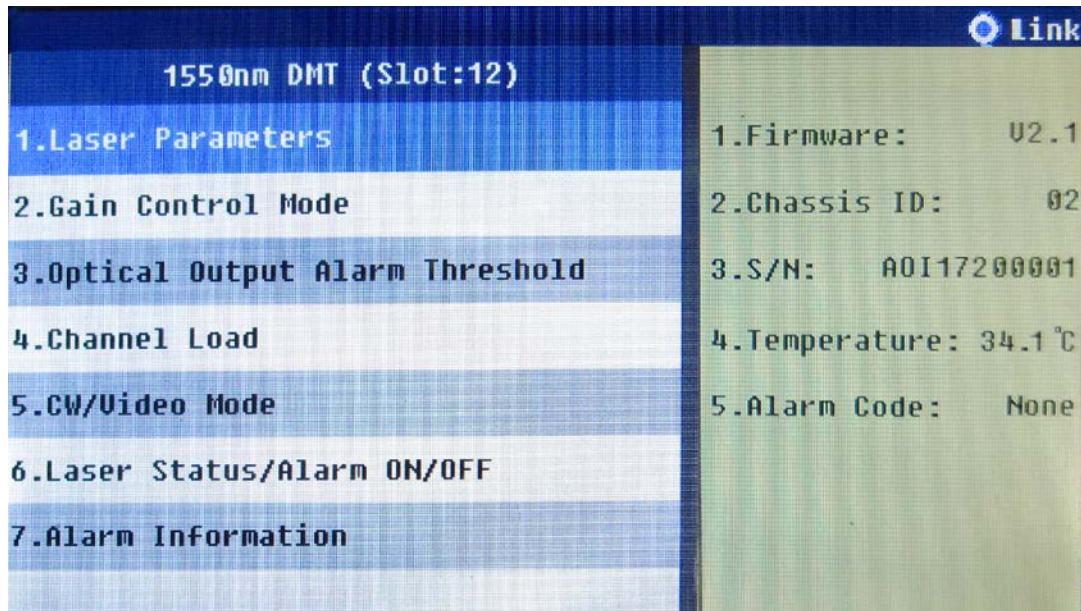
Press ▼ button to move the cursor down to 1550 nm DMT (OptoStar II 1550 nm DWDM forward direct modulation transmitter module), and press the SET button to enter the sub-menu of the 1550 nm DMT.

Continued on next page

Operating using ICIM LCD, Continued

Module Sub-Menu

The illustration below shows the sub-menu of the OptoStar II 1550 nm DWDM forward direct modulation transmitter module:



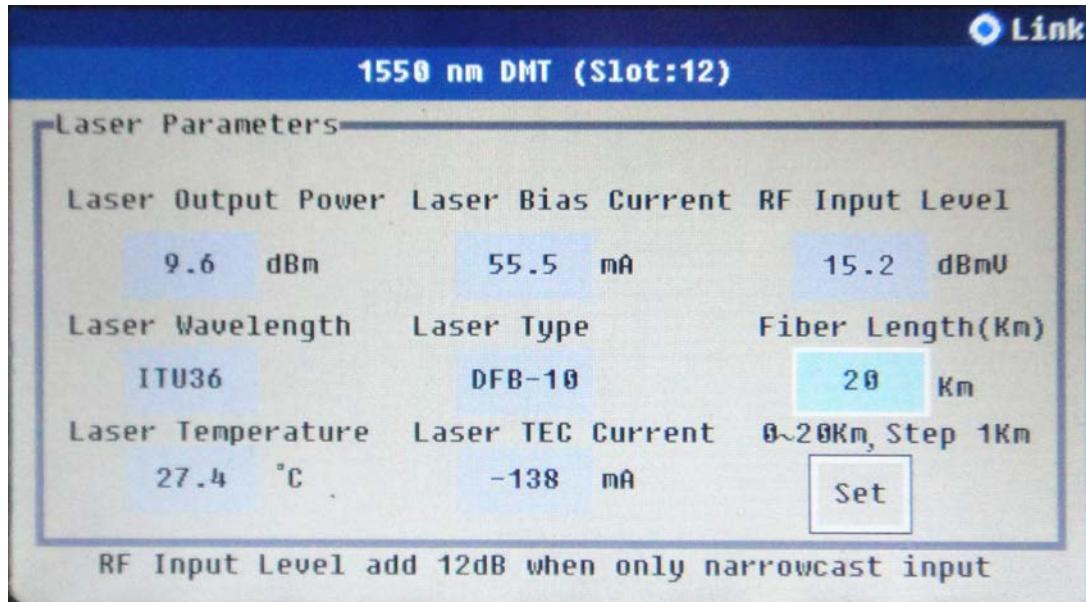
- The left side of the screen shows the sub-menu of the OptoStar II 1550 nm DWDM forward direct modulation transmitter module. By default the cursor is on sub-menu 1. Press ▼ button to move the cursor down. Press SET button to enter the item on the sub-menu.
- The right side of the screen shows basic information of the module, including firmware version, chassis ID, S/N, module temperature, and alarm code.

Continued on next page

Operating using ICIM LCD, Continued

Sub-Menu 1 -- Laser Parameters

The illustration below shows sub-menu 1 of the OptoStar II 1550 nm DWDM forward direct modulation transmitter module – Laser Parameters:



You may view the laser parameters including output power, laser bias current, RF input level, output wavelength, laser type, laser temperature, and TEC current.

For the display of RF input level, there are two situations:

1. If the RF input signal contains analog signal and digital signal, RF input level displays the average level of the single channel analog signal at the broadcast RF input port. Forward transmitter detects the total power of RF signal. The average level of single channel digital signal is calculated according to the actual channel number and the D-value of analog and digital channels as set by the customer.

For example: Input 30 channels in the analog signal, 15 dBmV/channel at the broadcast RF input port, 85 channels in the digital signal, 9 dBmV/channel at the broadcast RF input port, the D-value between digital signal and analog signal is set to 6 dB, RF input level displays 15 dBmV, the digital signal level is the displayed RF input level minus 6 dB.

Continued on next page

Operating using ICIM LCD, Continued

2. The RF input signal contains only digital signal. When the RF signal is input from the broadcast RF input port, the RF input level equals to the average level of the single channel digital signal at the broadcast RF input port. When the RF signal is input from the narrowcast RF input port, the RF input level plus 12dB equals to the average level of the single channel digital signal at the narrowcast RF input port. The forward transmitter detects the total power of the RF signal. The average level of single channel digital signal is calculated according to the actual channel number and the D-value of analog and digital channels as set by the customer.

For example: Input 0 channel in the analog signal, 114 channels in the digital signal, 13 dBmV/channel at the broadcast RF input port, the D-value between digital signal and analog signal is set to 0 dB, RF input level displays 13 dBmV.

The fiber length is 20km by default (with a selection range of 0 to 20km). The cursor stays in the fiber length field by default:

1. Press SET button to start the configuration;
2. Press **▲▼** buttons to change the value, and press SET button to confirm;
3. Press **▼** button to move the cursor to "Set" ;
4. Press SET button to save the configuration.

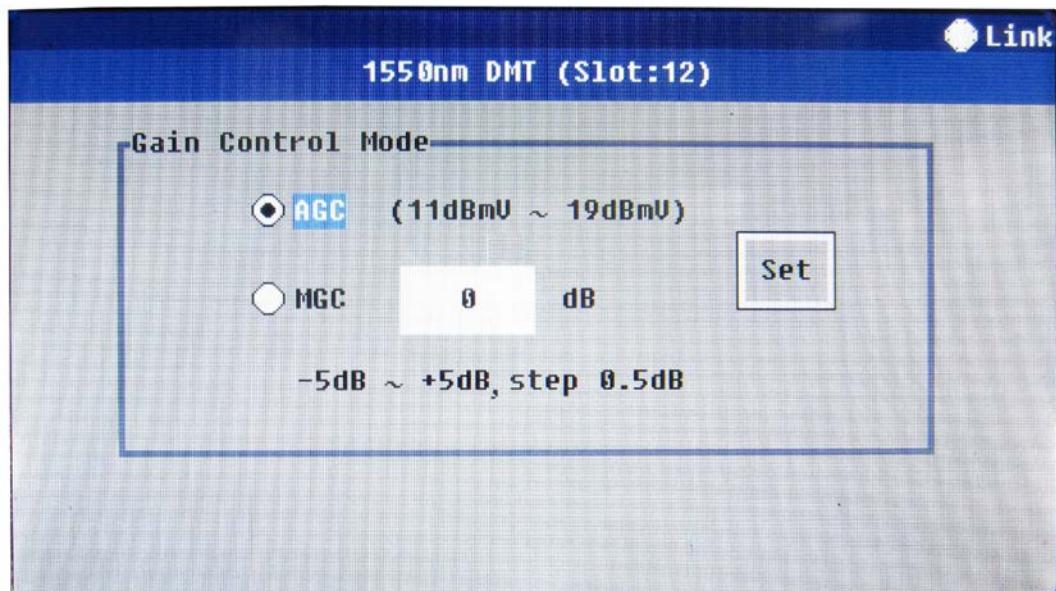
Note: For the module with a transmission distance of 10km, the fiber length is 10km by default (with a selection range of 0 to 10km). See steps 1 to 4 above for configuration procedures.

Continued on next page

Operating using ICIM LCD, Continued

Sub-menu 2 -- Gain Control Mode

The illustration below shows sub-menu 2 of the OptoStar II 1550 nm DWDM forward direct modulation transmitter module – Gain Control Mode.



The gain control mode is set to AGC by default. The cursor stays on the selection field of AGC/MGC by default. Press **▲▼** button to select the gain control mode.

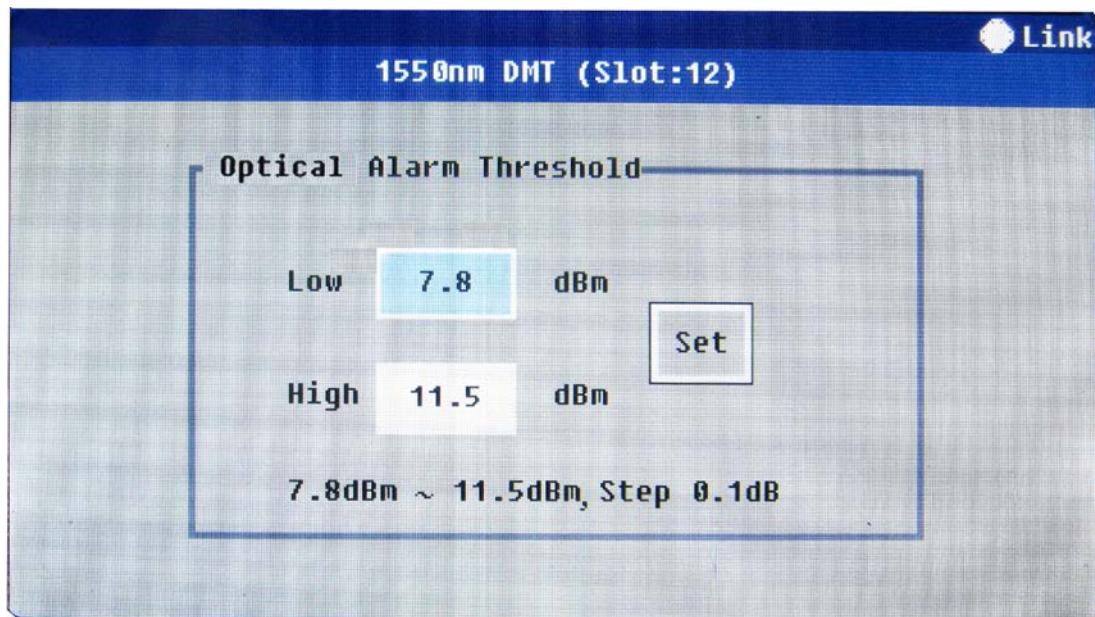
- To select AGC mode (with a gain range of 11 to 19 dBmV)
 1. Press **▲▼** button to keep the ● symbol on AGC option;
 2. Press **▶** button to move the cursor to "Set";
 3. Press SET button to save the configuration.
- To select MGC mode (with a gain range of -5 to +5 dB, with 0.5 dB step)
 1. Press **▲▼** button to keep the ● symbol on MGC option;
 2. Press **▶** button to move the cursor in the value field;
 3. Press SET button to start the configuration;
 4. Press **▲▼** buttons to change the value, and press SET button to confirm;
 5. Press **▶** button to move the cursor to "Set";
 6. Press SET button to save the configuration.

Continued on next page

Operating using ICIM LCD, Continued

Sub-menu 3 -- Optical Output Alarm Threshold

The illustration below shows sub-menu 3 of the OptoStar II 1550 nm DWDM forward direct modulation transmitter module – Optical Output Alarm Threshold.



The optical output alarm threshold lower limit is (standard value - 2.2) dBm; and upper limit is (standard value + 1.5) dBm. The cursor stays in the "Low" field by default.

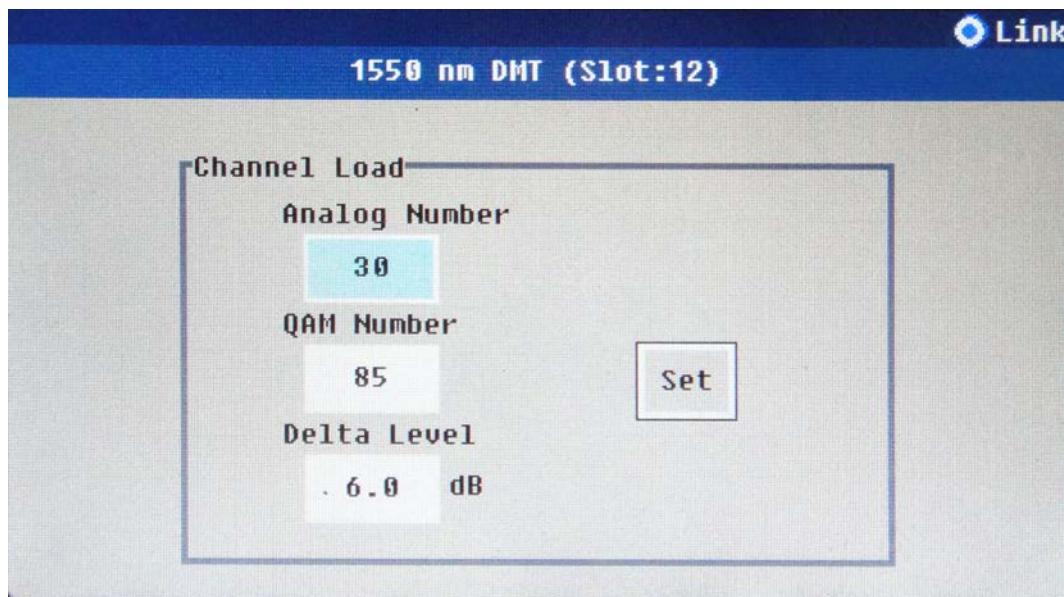
- To configure the lower limit of the optical alarm threshold (minimum output power is no less than (standard value - 2.2) dB):
 1. Press SET button to start the configuration;
 2. Press $\blacktriangle\blacktriangledown$ buttons to change the value, and press SET button to confirm;
 3. Press \blacktriangleright button to move the cursor to "Set";
 4. Press "SET" button to save the configuration.
- To configure the upper limit of the optical alarm threshold (maximum output power is no more than (standard value + 1.5) dB):
 1. Press \blacktriangledown button to move the cursor to the "High" field;
 2. Press SET button to start the configuration;
 3. Press $\blacktriangle\blacktriangledown$ buttons to change the value, and press SET button to confirm;
 4. Press \blacktriangleright button to move the cursor to "Set";
 5. Press SET button to save the configuration.

Continued on next page

Operating using ICIM LCD, Continued

Sub-menu 4 -- Channel Load

The illustration below shows sub-menu 4 of the OptoStar II 1550 nm DWDM forward direct modulation transmitter module - Channel Load.



Channel number range:

- In NTSC system, the range of analog channel number is 0 to 30; the range of QAM channel number is 0 to 153; and the range of delta level is 0 to 10.
- In PAL D/K system, the range of analog channel number is 0 to 30; the range of QAM channel number is 0 to 114; and the range of delta level is 0 to 10.

Please enter the correct analog and QAM channel numbers and delta level based on the actual application, otherwise the RF input value of the 1550 nm DWDM forward direct modulation transmitter module will be inaccurate, and the AGC function won't work properly. If the digital signal contains broadcast RF input port input and narrowcast RF input port input, the QAM number is equal to the broadcast RF input port input signal channel number plus the narrowcast RF input port input signal channel number.

The channel load default settings are: 30 for analog channel number; 85 for QAM channel number; and 6.0 dB for delta level. The cursor stays in the "Analog Number" field by default.

Continued on next page

Operating using ICIM LCD, Continued

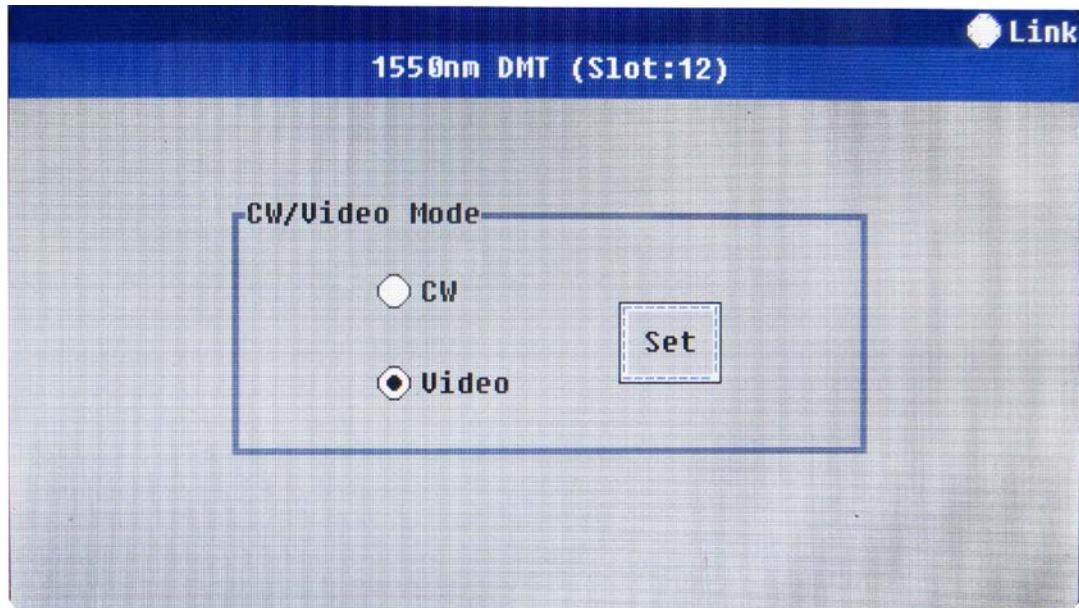
- To setup the channel load:
 1. Press SET button to start the configuration;
 2. Press ▲▼ buttons to change the analog channel number to its actual value, and press SET button to confirm;
 3. Press ▼ button to move the cursor in the QAM channel number setup field;
 4. Press SET button to start the configuration;
 5. Press ▲▼ buttons to change the QAM channel number to its actual value, and press SET button to confirm;
 6. Press ▼ button to move the cursor to the delta level setup field;
 7. Press SET button to start the configuration;
 8. Press ▲▼ buttons to change the delta level to its actual value, and press SET button to confirm;
 9. Press ► button to move the cursor to “Set”;
 10. Press SET button to save the configuration.

Continued on next page

Operating using ICIM LCD, Continued

Sub-menu 5 -- CW/Video Mode

The illustration below shows sub-menu 5 of the OptoStar II 1550 nm DWDM forward direct modulation transmitter module – CW/Video Mode.



By default, the mode is set to Video, the cursor stays on “Set”.

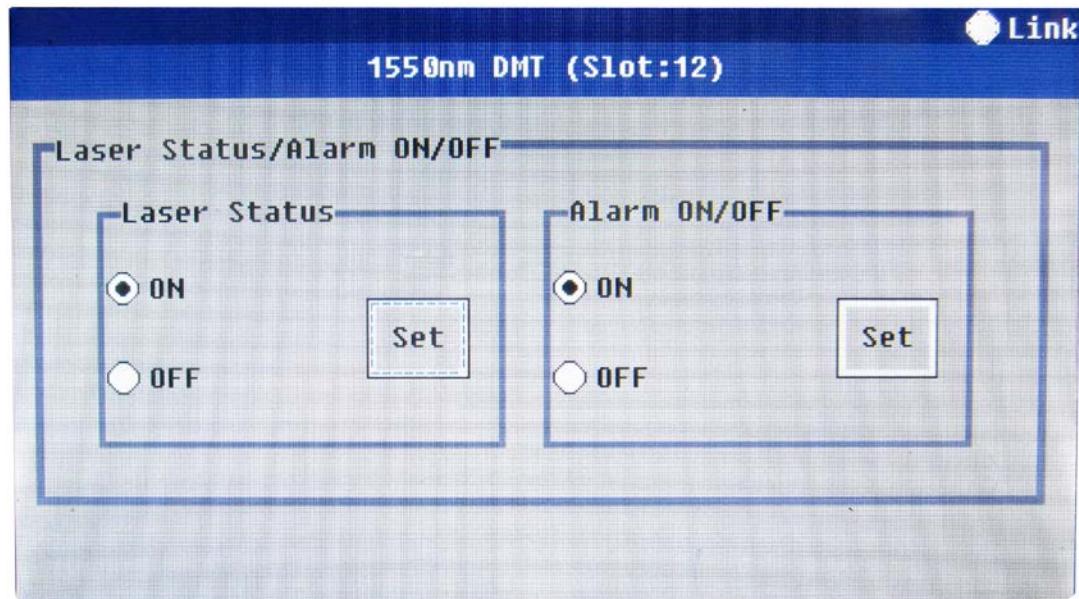
- To change the default mode:
 1. Press **▲▼** buttons to select the mode, and the cursor stays on “Set”;
 2. Press SET button to save the configuration.

Continued on next page

Operating using ICIM LCD, Continued

Sub-menu 6 -- Laser Status/Alarm ON/OFF

The illustration below shows sub-menu 6 of the OptoStar II 1550 nm DWDM forward direct modulation transmitter – Laser Status/Alarm ON/OFF.



The laser status and alarm are set to ON by default. The cursor stays on “Set” on the left side of the screen by default.

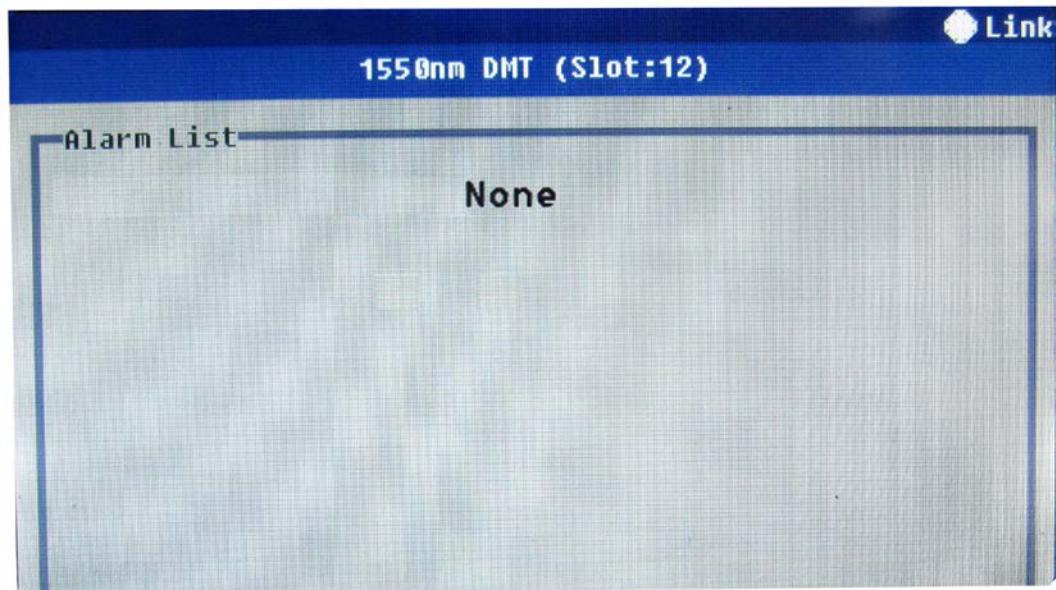
- To change the laser status:
 1. Press ▲▼ buttons to select laser status ON or OFF. The cursor stays on the “Set” on the left side of the screen;
 2. Press SET button to save the configuration.
- To change the alarm ON/OFF:
 1. Press ► button to move the cursor to the “Set” on the right side of the screen;
 2. Press ▲▼ buttons to select alarm ON or OFF. The cursor stays on the “Set” on the right side of the screen;
 3. Press SET button to save the configuration.

Continued on next page

Operating using ICIM LCD, Continued

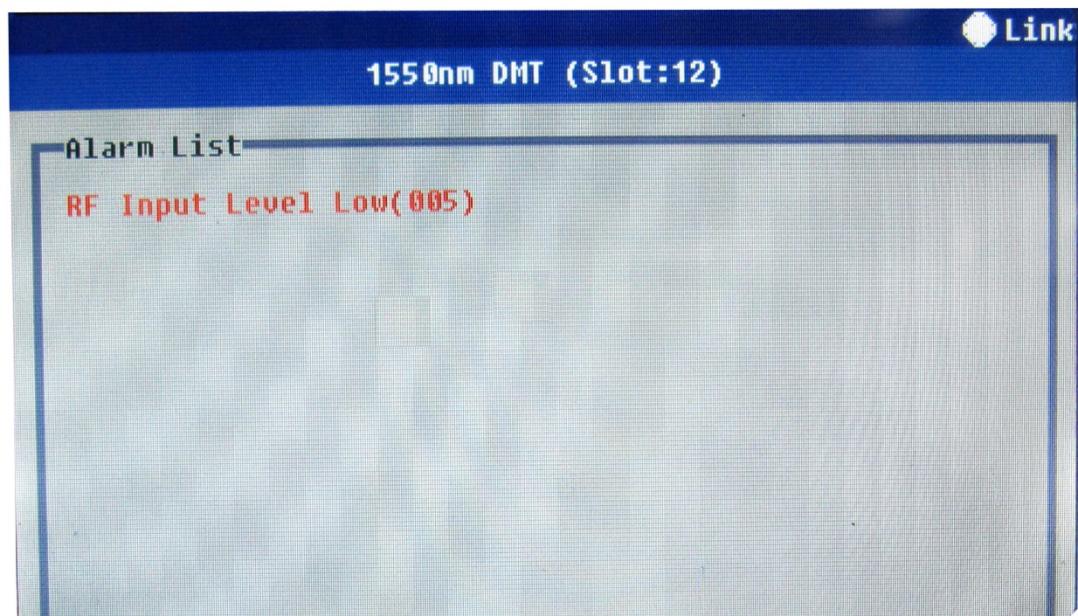
Sub-menu 7 -- Alarm List

The illustration below shows sub-menu 7 of the OptoStar II 1550 nm DWDM forward direct modulation transmitter module – Alarm List.



You can view the alarm information of the OptoStar II 1550 nm DWDM forward direct modulation transmitter module.

- If there is no alarm, the Alarm List shows “None”.
- If there is any alarm, the Alarm List shows the alarm information and its code, as shown in the illustration below. See *Alarm Code List* (on page 3-18) for detailed alarm codes.



Continued on next page

Operating using ICIM LCD, Continued

Alarm Code List

The table below lists the alarm information of the OptoStar II 1550 nm DWDM forward direct modulation transmitter module.

Code	Item	Condition	LED
001	Low Optical Output Power	Output power is 2.2 dB lower than standard value (factory setting)	Alarm LED is red
002	High Optical Output Power	Output power is 1.5 dB higher than standard value (factory setting)	Alarm LED is red
003	High Laser Bias Current	Laser bias current more than 120 mA	Alarm LED is red
004	High Laser Temperature	Laser temperature higher than 35°C	Alarm LED is red
005	Low RF Input	<ul style="list-style-type: none">RF input lower than 15 dBmV/channel (3 channels)RF input lower than 10 dBmV/channel	Alarm LED is red
006	High Module Temperature	Module temperature higher than 85°C	Alarm LED is red
007	High TEC Current	TEC current higher than 1.5 A	Alarm LED is red
008	High RF Input	RF input higher than 20 dBmV/channel	Alarm LED is red
009	High RF Input Level into the Laser	RF input signal into the laser higher than 50 dBmV/channel	Alarm LED is red
		When the RF input signal into the laser is higher than 60 dBmV/channel, the laser is switched OFF automatically. When the value is lower than 50 dBmV/channel, it's switched ON automatically.	Alarm LED is red

Operating using Console Software

This section introduces the procedures to use the OptoStar II console to manage the OptoStar II 1550 nm DWDM forward direct modulation transmitter module.

Before You Begin

- One PC
- Mini-USB data cable
- OptoStar II console software installation package

System Requirements

- **Supported operation system:** Windows 7, Windows Vista, Windows Server 2003, and Windows XP
- **Processor:** 400 MHz Pentium or equivalent processor (minimum requirement); 1 GHz Pentium or equivalent processor (recommended)
- **Memory:** 96 MB (minimum requirement); 256 MB (recommended)
- **Hard drive:** 500 MB free space required
- **Monitor:** 800 x 600, 256-color (minimum requirement); 1024 x 768 high color, 32-bit (recommended)

Start

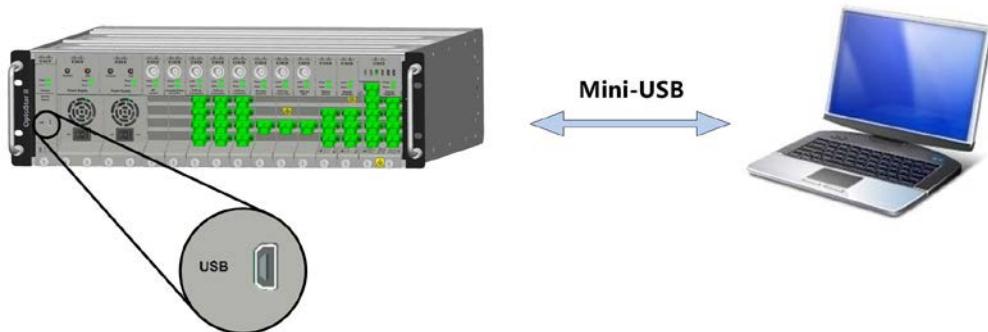
1. Make sure that the fiber and RF cables of the OptoStar II 1550 nm DWDM forward direct modulation transmitter module are connected.
2. Turn the front panel switch of the OptoStar II power supply module to ON position. The power supply module and the 1550 nm DWDM forward direct modulation transmitter module will initialize for about 5 seconds, and the ICIM will load for about 25 seconds.

Note: The system will achieve optimal working condition after one hour's warm-up.

Continued on next page

Operating using Console Software, Continued

3. When the device initialization is complete, connect the Mini-USB side of the USB cable provided with the ICIM to the Mini-USB interface of the ICIM front panel. The other side of the USB cable should be connected to the USB interface on the PC. Now the LCD screen shows USB connected, and the keypads below the LCD screen are temporarily unavailable. The illustration below shows the connection method.



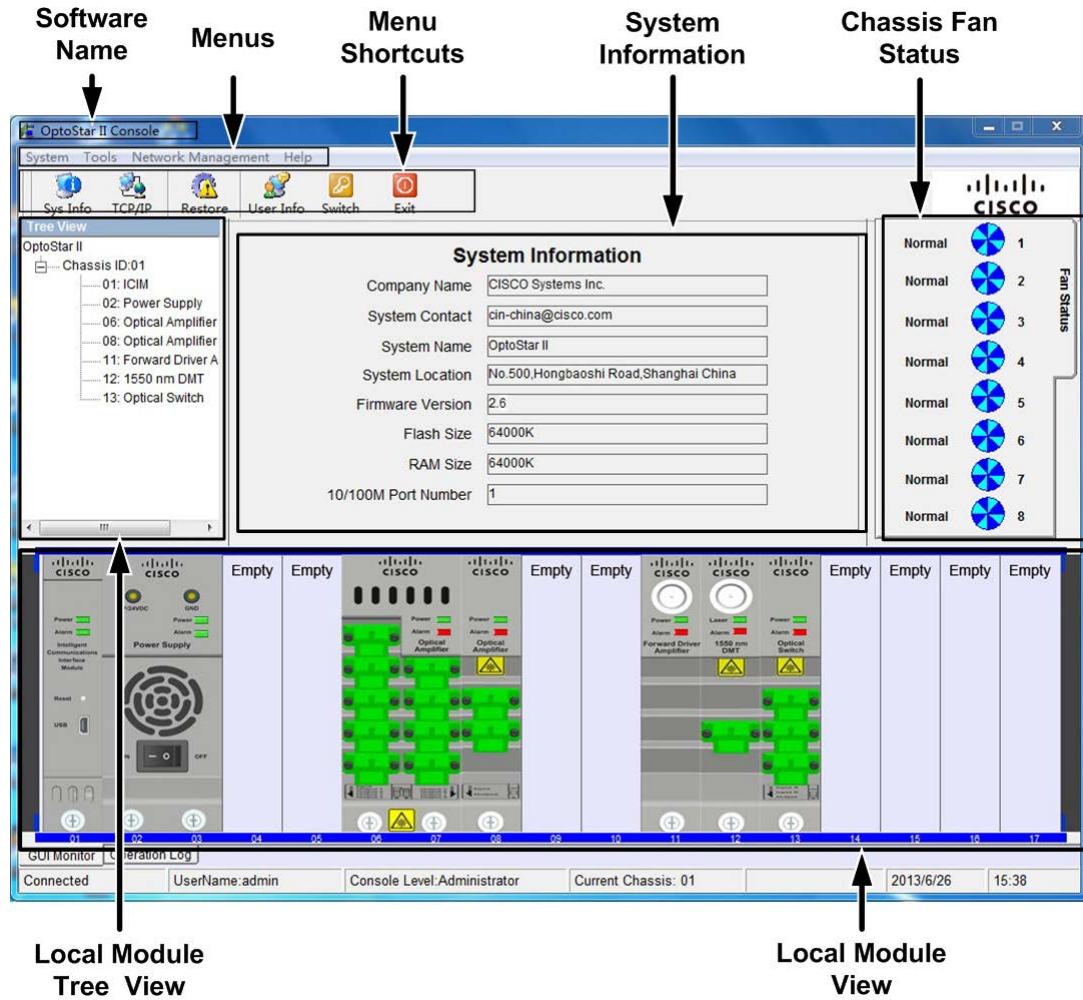
4. Install and start the OptoStar II console software. See *Cisco OptoStar II Console Installation and Operation Guide*, P/N OL-29664 for detailed installation procedures.

Continued on next page

Operating using Console Software, Continued

Software Main Interface

The illustration below shows the main interface of the OptoStar II console.



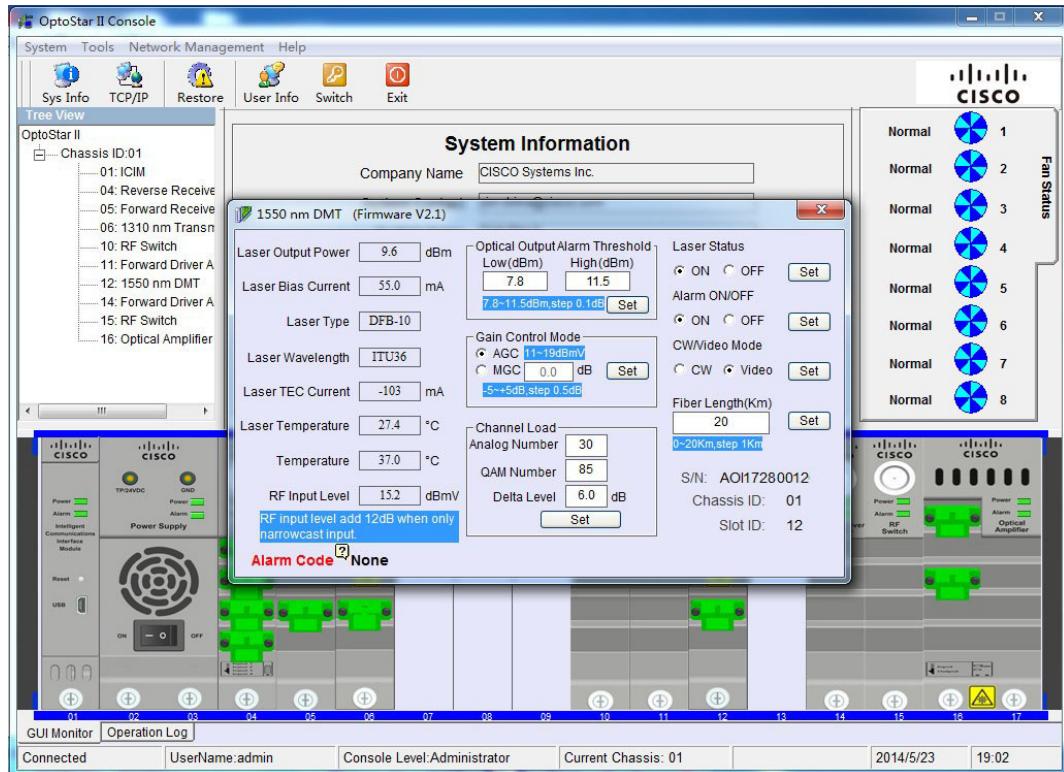
The OptoStar II console main interface shows the software name, menus, menu shortcuts, local module tree view, system information, chassis fan status, and local module view.

Continued on next page

Operating using Console Software, Continued

Local Module View

Click to select the OptoStar II 1550 nm DWDM forward direct modulation transmitter module in the Local Module Tree View on the left side of the screen, or in the Local Module View on the bottom of the screen. The parameter setting window of the 1550 nm DWDM forward direct modulation transmitter module will pop up as shown below.

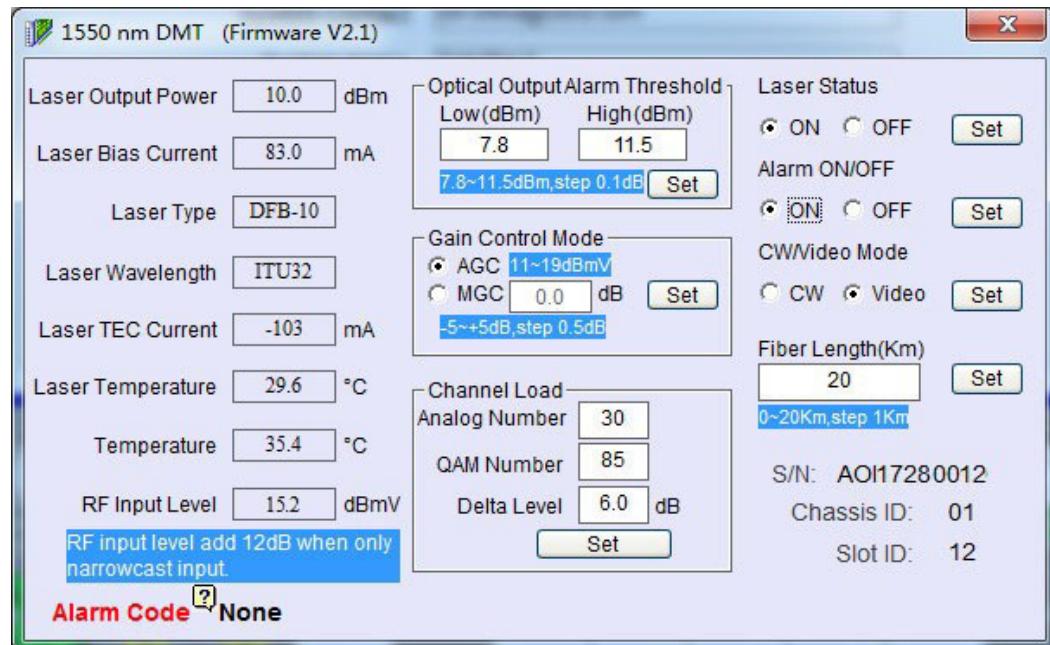


Continued on next page

Operating using Console Software, Continued

View Basic Parameters

The illustration below shows the parameter setting interface of the OptoStar II 1550 nm DWDM forward direct modulation transmitter module.



Continued on next page

Operating using Console Software, Continued

The table below lists the basic parameters of the OptoStar II 1550 nm DWDM forward direct modulation transmitter module.

Basic Parameter	Description
Module Name and Firmware Version	Shows the module name and its firmware version
Optical Output Power	Shows optical output power (dBm)
Laser Bias Current	Shows laser bias current (mA)
Laser Type	Shows laser type
RF Input Level	Shows RF input level (dBmV)
Wavelength	Shows ITU wavelength
Cooling Current	Shows cooling current (mA)
Laser Temperature	Shows laser temperature (°C)
Module Temperature	Shows the current module temperature (°C)
S/N	Shows module serial number
Rack ID	Shows the ID of the rack where the chassis is placed
Slot ID	Shows the ID of the slot where the module is placed
Alarm Code	Shows the current module alarm code; See <i>Alarm Code List</i> (on page 3-18)

Continued on next page

Operating using Console Software, Continued

Setup Parameters

The table below lists the setup parameters of the OptoStar II 1550 nm DWDM forward direct modulation transmitter module.

Setup Parameters	Description	Factory Default
Optical Alarm Threshold	Shows/sets optical alarm upper limit and lower limit	Lower limit: 2.2 dB lower than standard value Upper limit: 1.5 dB higher than standard value
Gain Control Mode Selection	Shows/sets AGC or MGC gain control mode	AGC mode
Channel Load	Shows/sets analog channel number, QAM channel number, and delta level (dB)	Analog channel number: 30; QAM channel number: 85; Delta level: 6.0 dB
Laser Status	Shows/sets laser status: ON/OFF	Laser status: ON
Alarm ON/OFF	Shows/sets module alarm status: ON/OFF	Alarm status: ON
CW/Video Mode Selection	Shows/sets CW/Video mode: CW/Video	Video mode
Fiber Length	Sets fiber length	20 km 1550 nm DMT default: 20 km; 10 km 1550 nm DMT default: 10 km

Continued on next page

Operating using NMS Software

This section introduces the procedures to use the OptoStar II network management system (OptoStar II NMS) to manage the OptoStar II 1550 nm DWDM forward direct modulation transmitter module.

Before You Begin

- One PC
- A network cable
- OptoStar II NMS software installation package

System Requirements

- **Supported operation system:** Windows 7, Windows Server 2008, Windows Vista, and Windows Server 2003
- **Processor:** 400 MHz Pentium or equivalent processor (minimum requirement); 1 GHz Pentium or equivalent processor (recommended)
- **Memory:** 512 MB (minimum requirement); 1 GB (recommended)
- **Hard drive:** 500 MB free space required
- **Monitor:** 800 x 600, 256-color (minimum requirement); 1024 x 768 high color, 32-bit (recommended)

Start

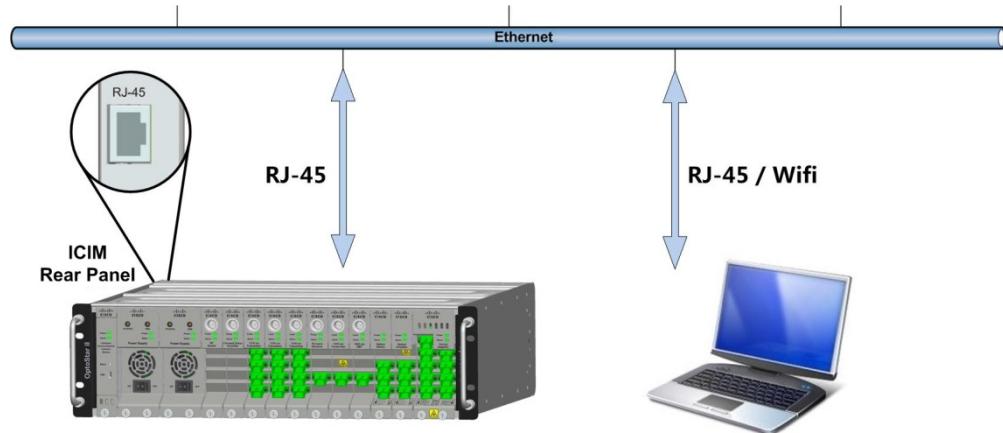
1. Make sure that the fiber and RF cables of the OptoStar II 1550 nm DWDM forward direct modulation transmitter module are connected.
2. Turn the front panel switch of the OptoStar II power supply module to ON position. The power supply module and the 1550 nm DWDM forward direct modulation transmitter module will initialize for about 5 seconds, and the ICIM will load for about 25 seconds.

Note: The system will achieve optimal working condition after one hour's warm-up.

Continued on next page

Operating using NMS Software, Continued

3. When the device initialization is complete, connect to the Ethernet with the RJ-45 connector on the rear panel of the ICIM. Connect the PC to the Ethernet. The illustration below shows the connection method.



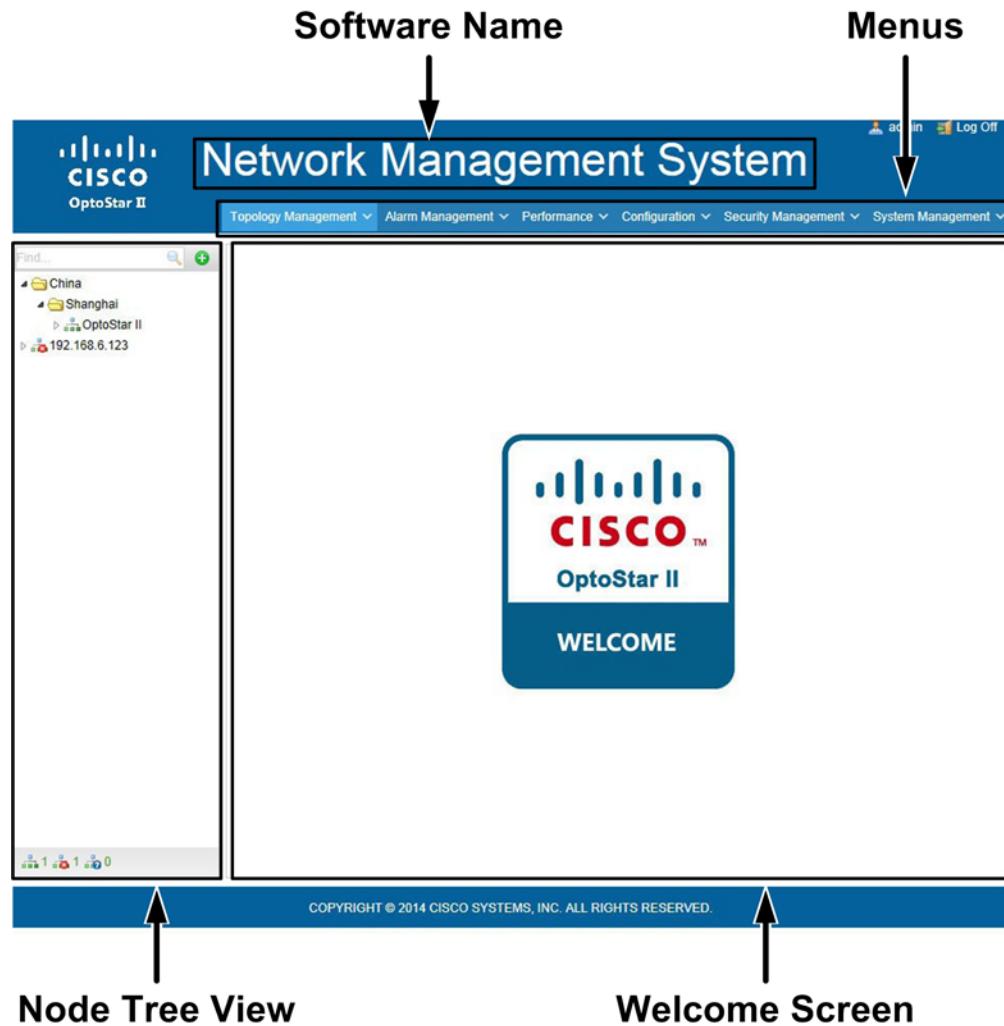
4. Install and start the OptoStar II NMS software. See *Cisco OptoStar II NMS Installation and Operation Guide*, P/N OL-29665 for detailed installation procedures.

Continued on next page

Operating using NMS Software, Continued

Software Main Interface

The illustration below shows the main interface of the OptoStar II NMS.



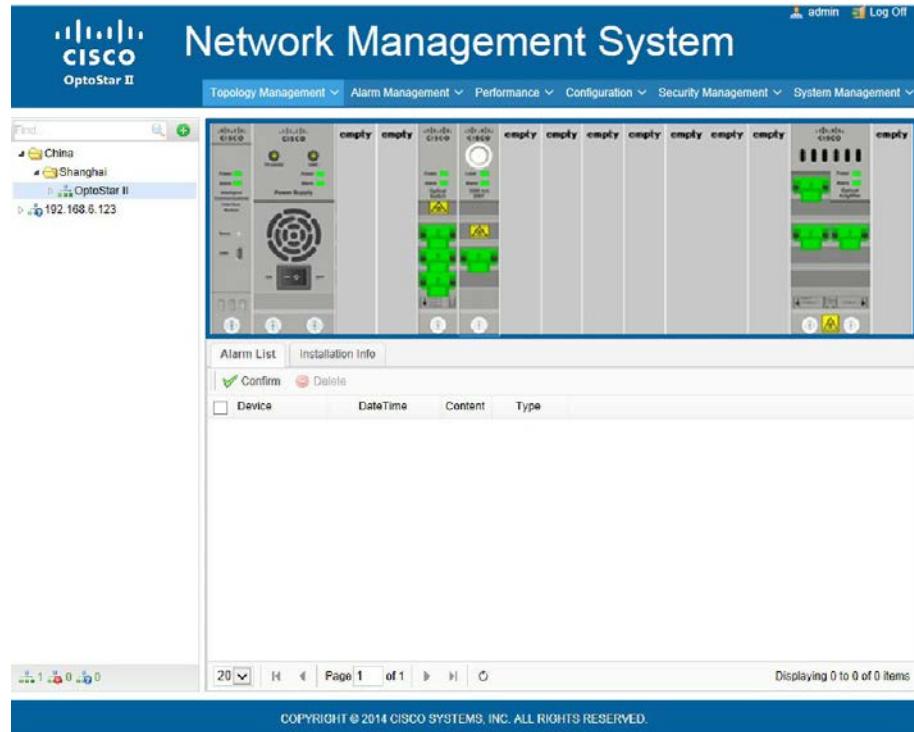
The OptoStar II NMS main interface shows the software name, menus, node tree view, and welcome screen.

Continued on next page

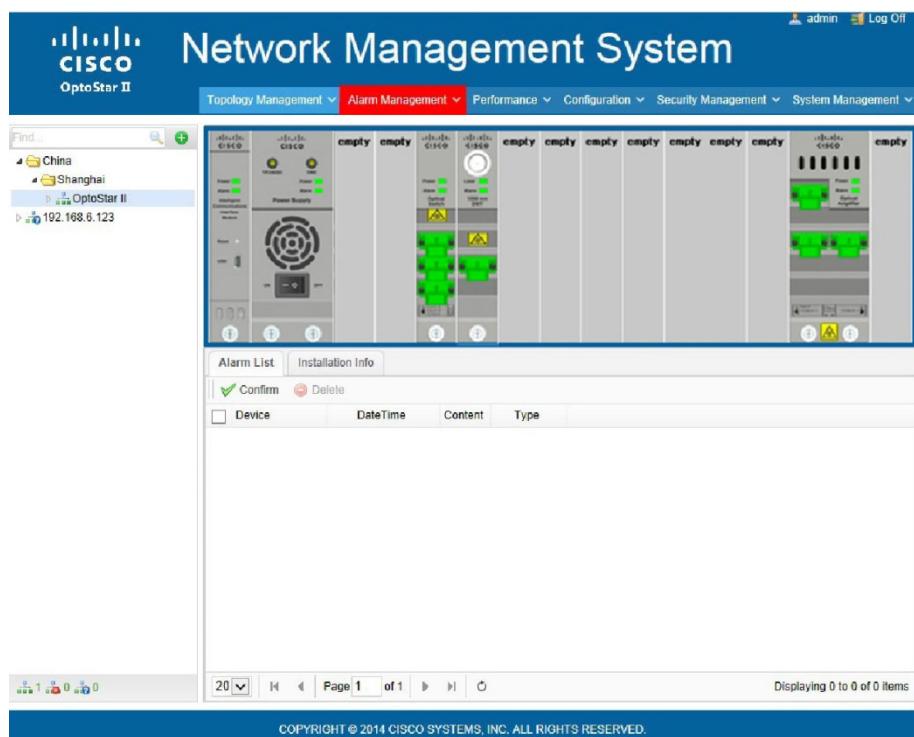
Operating using NMS Software, Continued

Local Module View

Select the topology tree view and view the corresponding node. The interface shows all the local modules as illustrated below.



Note: When there is alarm, the Alarm Management menu turns to red. The system interface is shown as below.



Continued on next page

Operating using NMS Software, Continued

View Basic Parameters

Click to select the OptoStar II 1550 nm DWDM forward direct modulation transmitter module in the interface which shows all the local modules. The parameter setting interface of the 1550 nm DWDM forward direct modulation transmitter module will display as illustrated below.

The screenshot shows the NMS software interface for managing network equipment. At the top, there is a rack-level view of various modules, including Cisco Intelligent Interface Modules, Power Supplies, and a Laser module. Below this, a specific module configuration window is open:

Module Information		Input RF	
Serial Number:	AOI17200005	Input RF Level:	15.2 dBmV
Slot ID:	7	Gain Control Mode:	AGC
Firmware Version:	V2.0	Input RF Attenuator:	-2 dB
Temperature:	35 °C		

Laser			
Laser Type:	DFB-10	Laser Output Power:	10.1 dBm
Laser Temperature:	24 °C	Laser Bias Current:	73 mA
Laser Wavelength:	1550.12 nm	Laser TEC Current:	-127 mA
		Laser On/Off Control:	ON

Comment	
Comment 1:	Type Comment Text Here.

Continued on next page

Operating using NMS Software, Continued

The table below lists the basic parameters of the OptoStar II 1550 nm DWDM forward direct modulation transmitter module.

Basic Parameter	Description
Module Basic Information	
Module Node Location	Shows the IP of the node where the module is located
S/N	Shows module serial number
Slot ID	Shows the ID of the slot where the module is placed
Module Firmware Version	Shows module firmware version
Module Temperature	Shows the current module temperature (°C)
RF Input Information	
RF Input Level	Shows RF input level (dBmV)
Laser Information	
Laser Type	Shows laser type
Laser Temperature	Shows laser temperature (°C)
Wavelength	Shows ITU wavelength
Optical Output Power	Shows optical output power (dBm)
Bias Current	Shows laser bias current (mA)
Cooling Current	Shows cooling current (mA)

Continued on next page

Operating using NMS Software, Continued

Setup Parameters

The table below lists the setup parameters of the OptoStar II 1550 nm DWDM forward direct modulation transmitter.

Setup Parameters	Description	Factory Default
RF Input Information		
Gain Control Mode Selection	Shows / sets AGC or MGC gain control mode	AGC mode
RF attenuation	Shows / sets RF attenuation (dB) (In AGC mode the field is grayed out; In MGC mode the function is available: gain range -5 to +5 dB, with 0.5 dB step)	0 dB (In AGC mode)
Laser Information		
Laser ON/OFF switch	Shows / sets laser status: ON/OFF	Laser status: ON
Comment		
Comment	You may add applicable comments as required.	None

Chapter 4 Troubleshooting

Overview

This chapter provides instructions for maintaining and repairing the OptoStar II 1550 nm DWDM forward direct modulation transmitter.

Qualified Personnel

Only appropriately qualified and skilled personnel should attempt to install, operate, maintain, and service this product. Otherwise, personal injury or equipment damage may occur.

In This Chapter

Topic	Page
Maintenance	4 - 2
General Troubleshooting Information	4 - 3

Maintenance

The following maintenance is recommended to ensure optimal performance.

Frequency	Maintenance Required
Yearly	Check all parameters and test points
	Make sure all cables are mated properly
	Inspect cables for stress and deformation
	Make sure all retaining screws are tight
	Ensure good ventilation
	Record data
When Needed	Carefully clean the module with a soft cloth

Maintenance Record

It may be helpful to establish a maintenance record or log for this module. You may want to record optical output power, laser temperature, laser bias current, and power supply voltages.

Significant variation in any of the parameters above should be investigated to prevent failure.

General Troubleshooting Information

This troubleshooting information describes the most common alarms and gives typical troubleshooting procedures and causes.

Equipment Needed

You may need the following equipment to troubleshoot the module.

- DB meter or spectrum analyzer
- Optical power meter
- Fiber connector cleaning materials

Additional Assistance

If you need additional assistance, please contact our customer support team or your local service center. See *Customer Support Information* (on page 5-1) for more details.

Continued on next page

General Troubleshooting Information, Continued

Troubleshooting

If the red alarm indicator on the front panel of the module is illuminated, check the OptoStar II ICIM display, the OptoStar II console, or the OptoStar II NMS for alarm code. See *Alarm Code List* (on page 3-18) to determine the cause of the alarm. See the table below.

Alarm	Possible Cause	Servicing Instruction
High Bias / TEC Current	Automatic power control circuit failure	Contact the manufacturer for servicing
High Laser Temperature	<ul style="list-style-type: none">• Laser failure• High ambient temperature leading to insufficient heat dissipation	Contact the manufacturer for servicing
High Module Temperature	<ul style="list-style-type: none">• High ambient temperature leading to insufficient heat dissipation• Poor chassis ventilation• Chassis fan failure	<ul style="list-style-type: none">• Ensure good ventilation• Put the chassis in a place with good ventilation• In case of fan failure, repair or replace the fan, or contact the manufacturer for servicing
Low or High Optical Output Power	<ul style="list-style-type: none">• Laser failure• Optical connector mismatch• Optical connector contains dusts or contaminants	<ul style="list-style-type: none">• Check whether the laser has been switched on• Check whether the optical connector matches• Make sure all the mating surfaces of the fiber are clean• Check whether the optical output power is between (standard value - 0.2) dBm and (standard value + 0.5) dBm with an optical power meter.• If the problem persists, contact the manufacturer for servicing

Continued on next page

General Troubleshooting Information, Continued

Low or High RF Input Level	<ul style="list-style-type: none">• RF source failure• RF cable or connector failure	<ul style="list-style-type: none">• Make sure the RF connector matches• Make sure the cable works properly• Inspect whether the input RF signal level meets the specifications below: In NTSC system:<ol style="list-style-type: none">1. The analog signal input level is 15 dBmV/channel at the broadcast RF input port; and the digital signal input level is 21 dBmV/channel at the narrowcast RF input port; or the digital signal input level is 9 dBmV/channel at the broadcast RF input port.2. If it contains only digital signal, the signal input level is 13 dBmV/channel at the broadcast RF input port. In PAL system:<ol style="list-style-type: none">1. The analog signal input level is 16 dBmV/channel at the broadcast RF input port; and the digital signal input level is 22 dBmV/channel at the narrowcast RF input port; or the digital signal input level is 10 dBmV/channel at the broadcast RF input port.2. If it contains only digital signal, the signal input level is 13 dBmV/channel at the broadcast RF input port. If the input level is normal, contact the manufacturer for servicing
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CAUTION:

Do not open the enclosure of this module in any case. Opening the enclosure may result in equipment damage, and you may lose the warranty eligibility.

Chapter 5 Customer Support Information

Overview

This chapter contains information on obtaining product support.

In This Chapter

Topic	Page
Obtaining Product Support	5 - 2
Return for Repairing	5 - 4

Obtaining Product Support

IF...	THEN...
you have general questions about this product	Contact your distributor or sales agent for product information or refer to product data sheets on www.cisco.com .
you have technical questions about this product	Call the nearest Technical Service center or Cisco office.
you have customer service questions or need a return material authorization (RMA) number	Call the nearest Customer Service center or Cisco office.

Support Telephone Numbers

This table lists the Technical Support and Customer Service numbers for your area.

Region	Centers	Telephone and Fax Numbers
North America	Atlanta, Georgia United States	<i>For Technical Support</i> , call: Toll-free: 1-800-722-2009 <i>For Customer Service</i> , call: Toll-free: 1-800-722-2009 Local: 678-277-1120 (Press 2 at the prompt) Fax: 770-236-5477 E-mail: customer-service@cisco.com
Europe, Middle East, Africa	Belgium	<i>For Technical Support</i> , call: Telephone: 32-56-445-197 or 32-56-445-155 Fax: 32-56-445-061 <i>For Customer Service</i> , call: Telephone: 32-56-445-444 Fax: 32-56-445-051 E-mail: service-elc@cisco.com
Japan	Japan	Telephone: 82-2-3429-8800 Fax: 82-2-3452-9748 E-mail: songk@cisco.com

Continued on next page

Obtaining Product Support, Continued

Region	Centers	Telephone and Fax Numbers
Korea	Korea	Telephone: 82-2-3429-8800 Fax: 82-2-3452-9748 E-mail: songk@cisco.com
China (mainland)	China	Telephone: 86-21-2401-4433 Fax: 86-21-2401-4455 E-mail: repaircentercn@external.cisco.com
All other Asia-Pacific countries & Australia	Hong Kong	Telephone: 852-2588-4746 Fax: 852-2588-3139 E-mail: support.apr@sciatl.com
Brazil	Brazil	Telephone: 11-55-08-9999 Fax: 11-55-08-9998 E-mail: fattinl@cisco.com or ecavalhe@cisco.com
Mexico, Central America, Caribbean	Mexico	For <i>Technical Support</i> , call: Telephone: 52-3515152599 Fax: 52-3515152599 For <i>Customer Service</i> , call: Telephone: 52-55-50-81-8425 Fax: 52-55-52-61-0893
All other Latin America countries	Argentina	For <i>Technical Support</i> , call: Telephone: 54-23-20-403340 ext 109 Fax: 54-23-20-403340 ext 103 For <i>Customer Service</i> , call: Telephone: 770-236-5662 Fax: 770-236-5888 E-mail: keillov@cisco.com

Return for Repairing

Introduction

Before returning your product, you must obtain a Return Material Authorization (RMA) number. Call the nearest Customer Service center and follow their instructions.

Procedures of returning your product to Cisco for repairing:

- Obtain RMA number and mailing address
- Package and mail the product to be repaired

Obtain RMA number and mailing address

Before return your products, you must obtain a RMA number.

RMA number is valid for 60 days. If your RMA number expires, you must call your customer service representative to update it before returning your equipment. You can return your product after updating the RMA number. Otherwise, your RMA application may be postponed.

Follow the procedures below to obtain your RMA number and mailing address:

1. Contact your customer service representative to apply for a new RMA number, or update an existing RMA number. Obtain customer service numbers for your area in *Obtaining Product Support* (on Page 5-2).
2. Provide the following information to your customer service representative:
 - Company name, contact person, telephone number, e-mail address and fax number.
 - Product name, model, part number, SN (if any)
 - Number of returned products
 - Return reason and Repairing/Maintenance Permissions
 - Any related service detail
3. When your customer service representative sends a RMA number to you, you will be required to fill in a purchase order or make advance payment to cover estimated repair costs.

Note: Users who pay by credit card or cash will receive a proforma invoice after the repair work is completed, which lists breakdown of repair costs.

Within 15 days upon your receipt of the proforma invoice, the customer service center must receive a purchase order number. During the warranty period, product subject to destruction, misuse, modification, or no problems found would generate costs. The product with additional generated costs will not be returned to the customer until valid P/O number is received.

Continued on next page

Return for Repairing, Continued

4. Users can confirm receipt of the RMA number via e-mail or fax. The RMA will list details such as RMA number, verified products to be returned and number of returned products, mailing address and RMA clauses.

Note: Also, users can obtain and complete a RMA application form, and send it to customer service representative via fax, or
e-mail: repaircentercn@external.cisco.com

Packaging and Mailing

Follow the steps below to package and return your product to Cisco.

Do you have the original packaging boxes and packaging materials?

- Yes: use the original packaging boxes and packaging materials to package your product
- No: use sturdy corrugated cardboard box meeting transportation requirements to package your product, and fill with packing materials.

Important: Users are responsible for safely mailing products to Cisco without any damage. Products with damage caused during transportation and due to improper packaging will be refused and returned to the user. In such case, the costs will be borne by the user.

Note: Do not return any power cable, accessory cable, or other accessories. Your customer service representative will provide specific instructions on how to order and replace any power cable, accessory cable, or other accessories.

Please fill in the following information on the external surface of the shipping box:

- RMA number
- User name
- Full address of the user
- Telephone number of the user
- "Attention: Factory Service"

Important: RMA number must be clearly marked on all returned products, packaging boxes, and accompanying documents. If the RMA number received by the factory service department is illegible, the RMA handling procedures will be delayed. The recipient for all returned products must be "Factory Services".

Returned products must be mailed to the address specified on the confirmation email or fax sent by the customer service representative.

Continued on next page

Return for Repairing, Continued

Note: Cisco does not accept Freight Collect. Make sure that you choose freight prepaid method and purchase transportation insurance. The user should bear both freights to Cisco and all related import and export tariffs for any returned product, whether it's within the warranty period or not. For the product within the warranty period, Cisco will pay the freight when shipping repaired product to the user.

International Transportation: Fill in Cisco as International Transport Recipient, and state the notified party on the waybill as "international freight transport clearance contact".

Upon delivery of the equipment with complete RMA number, the receiving department will notify the user via fax or e-mail, and confirm the received products and the quantity. Please carefully check the confirmation letter to ensure that the products and the quantity received by Cisco are consistent with your shipment information.



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