



# Cisco Compact EGC GAN Segmentable Node A90201 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:

-  You may find this symbol in the document that accompanies 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.

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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 and use 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 access 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.



**To reduce risk of electric shock, perform only the instructions that are included in the operating instructions. 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. The protective ground connection, where provided, is essential to safe operation and must be verified before connecting the power supply.

Know the following safety warnings and guidelines:

- **Dangerous Voltages**
  - Only qualified service personnel are allowed to perform equipment installation or replacement.
  - Only qualified service personnel are allowed to remove chassis covers and access any of the components inside the chassis.
- **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 Ground** - The protective ground lead of the building's electrical installation should comply with national and local requirements.
- **Environmental 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.**

## Equipment Placement



**WARNING:**

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

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.**

### 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.

### 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 () , the installer should refer to CENELEC standard EN 50083-1 or IEC standard IEC 60728-11 for correct equipotential bonding connection instructions.

## 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 this equipment's cover may expose you to dangerous voltages.

Be aware of the following general precautions and guidelines:

- **Servicing** - Refer all servicing to qualified service personnel. 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.

### **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.



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- 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](http://www.dtsc.ca.gov/hazardouswaste/perchlorate).

## Electromagnetic Compatibility Regulatory Requirements

This equipment meets applicable electromagnetic compatibility (EMC) regulatory requirements. 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.

## EMC

Where this equipment is subject to USA FCC and/or Industry Canada rules, the following statements apply:

### FCC Statement for Class A Equipment

This equipment has been tested and found to comply with the limits for a Class A digital device, pursuant to Part 15 of the FCC Rules. These limits are designed to provide reasonable protection against harmful interference when this equipment is operated in a commercial environment.

This equipment generates, uses, and can radiate radio frequency energy and, if not installed and used in accordance with the instruction manual, may cause harmful interference to radio communications. Operation of this equipment in a residential area is likely to cause harmful interference in which case users will be required to correct the interference at their own expense.

### Industry Canada – Industrie Canadienne Statement

This apparatus complies with Canadian ICES-003.

Cet appareil est conforme à la norme NMB-003 du Canada.

## **CENELEC/CISPR Statement with Respect to Class A Information Technology Equipment**

This is a Class A equipment. In a domestic environment this equipment may cause radio interference in which case the user may be required to take adequate measures.

### **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.

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.

# Laser Safety

## Introduction

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

### Warning: Radiation



#### WARNINGS:

- **Avoid personal injury!** Use of controls, adjustments, or performance of procedures other than those specified herein may result in hazardous radiation exposure.
  - **Avoid personal injury!** The laser light source on this equipment emits invisible laser radiation. Avoid direct exposure to the laser light source.
  - **Avoid personal injury!** Viewing the laser output with optical instruments (such as eye loupes, magnifiers, or microscopes) within a distance of 100 mm 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 that is emitted from an unterminated fiber.
  - Do not view an activated fiber with optical instruments (e.g., 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.

### Safe Operation for Software Controlling Optical Transmission Equipment

If this manual discusses software, the software described is used to monitor and/or control Scientific-Atlanta and other vendors' electrical and optical equipment designed to transmit video, voice, or data signals. Certain safety precautions should 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.



**WARNINGS:**

- 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.

# Chapter 1 Preface

## About This Guide

### Introduction

This guide describes how to operate, install and configure the node.

### Qualified Personnel

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



**WARNING:**

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

### Who Should Read This Guide

This guide is intended for personnel who are responsible for installing, setting up, monitoring and maintaining this product.

### In This Guide

This guide is divided into the following chapters.

Topic	See Page
Chapter 1: General Information	1-1
Chapter 2: Installation	2-1
Chapter 3: Operation	3-1
Chapter 4: Customer Support Information	4-1

# Chapter 2

## General Information

### Overview

#### Introduction

This chapter describes general information about the node.

#### In This Chapter

This chapter contains the following topics.

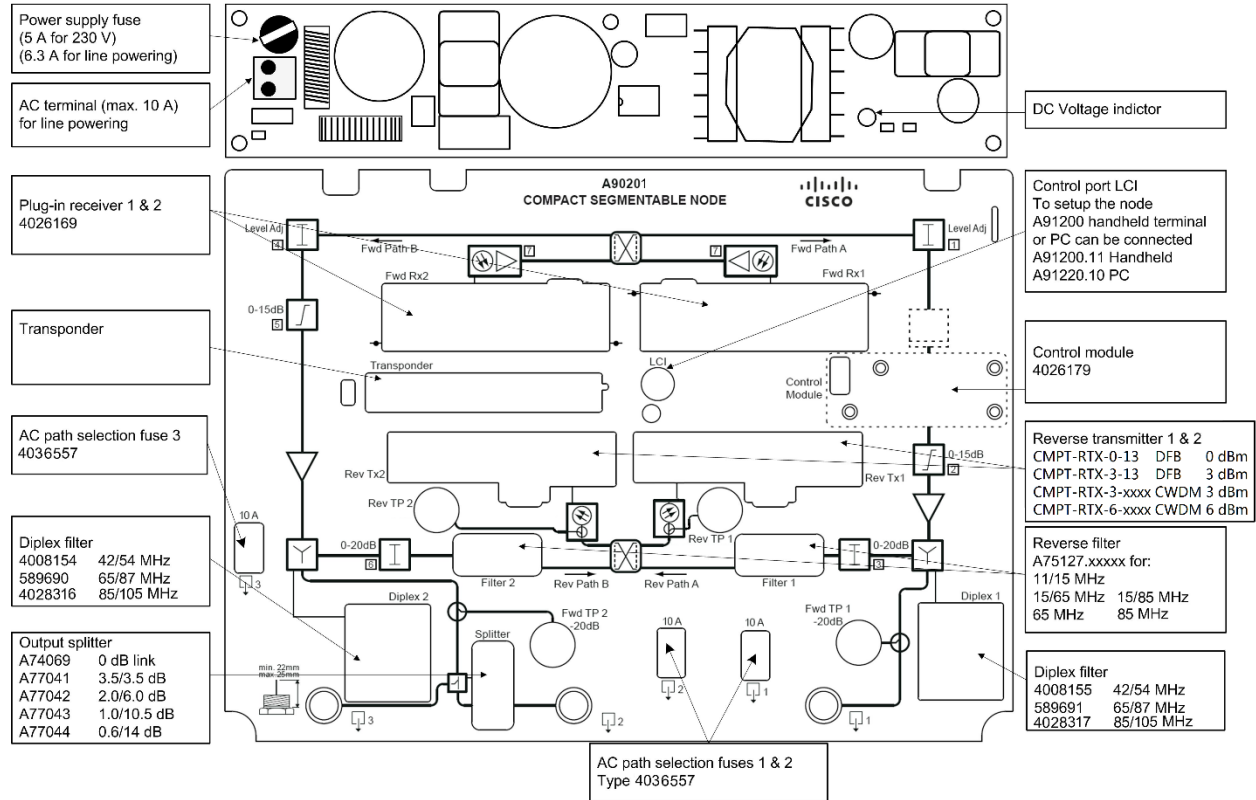
Topic	See Page
Overview Diagram	1-2
Power Supply	1-3
Plug-in Modules	1-5
Power Saving Modes	1-7



# Overview Diagram

## Overview Diagram

The following illustration is the block diagram of the node.



# Power Supply







## Power Supply

### For Product Rated 100-240 VAC

When the node is delivered with a 100-240 VAC power supply for mains supply, the correct voltage is labeled on the side of the node.

On delivery, the node is mounted with a mains cable and mains plug, and it is not legitimate to make any changes. The power supply is double-isolated and supplies only this node. However, independent current loop-through of the remote supply between the RF ports is possible.

### Rating labels of mains power supply





 <b>COMPACT EGC SEGMENTABLE GAN NODE</b> Cisco Systems, Inc PN: A90201.102 SN: ***** Input: 100-240V~, 50/60Hz, 64W max (mains port) Input: 24-65V~, 50/60Hz, 8A max (RF port) Output: 24-65V~, 8A max pass-through per port, total not exceeding 8A	 	<b>FC</b> This device complies with part 15 of the FCC Rules. Operation is subject to the following two conditions : (1) this device may not cause harmful interference and (2) this device must accept any interference received, including interference that may cause undesired operation. This Class B digital apparatus complies with Canadian ICES-003.   <b>IP67</b> Made in *** YYWW 
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### For Product Rated 24-65 VAC

When the node is delivered with a 24-65 VAC power supply for remote supply, the correct voltage is labelled on the side of the node.

The node is supplied power either via coax cables or directly from the power supply input. The node is equipped with 3 fuses in the fiber tray. The required AC loop-through is achieved by mounting the fuse in the corresponding fuse holder.

### Rating label of network power supply

 <b>COMPACT EGC SEGMENTABLE GAN NODE</b> Cisco Systems, Inc PN: A90201.103 SN: ***** Input: 24-65V~, 50/60Hz, 8A max (RF port), 15A max (local insertion port) Output: 24-65V~, 8A max pass-through per port, total not exceeding input current	 	<b>CE</b>  <b>IP67</b> Made in *** YYWW
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For all power supplies, the following is valid:

When the DC voltage indicator in the switch mode of the power supply is lighted, the unit is supplied with DC voltage from the power supply.



**Permanently exceeding the maximum remote current draw may result in damage to the unit.**

## Fuses

The node comes with the fuses type 4036557, which are used to control the AC bypass function on each of the 3 outputs. When an AC bypass function is needed, move the fuse from the holder in the fiber tray to the desired fuse holder.

## Plug-in Modules

### Modules

The node is equipped with different plug-in locations for the reverse transmitter, transponder, jumpers, diplex filters, and output splitters.

The following plug-in units are necessary.

- **Output splitter** type 77041 through 77043. If an asymmetric splitter (bridger) is used, the largest attenuation at the output 3 (OUT 3) is obtained. If only a signal at output 2 (OUT 2) is requested, jumper type 74069 is used.

Splitter	Out 2	Out 3
A77041.10	3.5 dB	3.5 dB
A77042.10	2.0 dB	6.0 dB
A77043.10	1.0 dB	10.5 dB
A74069.10	0 dB	N/A

- **Diplex filter.** Two diplex filters with the required split frequency are used to select the split frequency. By exchanging these filters, the reverse frequency range can be altered.

#### Diplex filter

Frequency	Left	Right
42/54 MHz	4008154	4008155
65/87 MHz	589690	589691
85/105 MHz	4028316	4028317

- **Reverse filter.** Four reverse filters, type 75127 are available for Single Low Pass 85 MHz, Single Low Pass 65 MHz, Single High Pass 11/15 MHz, or Single Band Pass 15/65 MHz.

- Low pass – for suppressing unwanted signals from the forward path.
- High pass – for suppressing ingress noise from the reverse path.
- Band pass – which is a combination of the above mentioned.

**Note:** When no filter is inserted in the plug-in field as an auto jumper function, a filter with low pass function must be used at output levels above 100 dB $\mu$ V.

Reverse filter	Stop band	Pass band
A75127.1115	Below 11 MHz	Above 15 MHz
A75127.1565	Below 11 MHz Above 87 MHz	Above 15 MHz Below 65 MHz

A75127.1065	Above 87 MHz	Below 65 MHz
A75127.1585	Below 11 MHz Above 105 MHz	Above 15 MHz Below 85 MHz
A75127.1085	Above 105 MHz	Below 85 MHz

- **Analog Reverse transmitter or EDR™ transmitter.** The reverse transmitter, type CMPT-RTX-x is used to set up a reverse path of the node. For more information about the reverse transmitters, see *Cisco Optical Reverse Transmitter Module for Compact Nodes Installation and Operation Guide*.

Reverse transmitter	Type	Output level
CMPT-RTX-0-13	DFB	0 dBm
CMPT-RTX-3-13	DFB	3 dBm
CMPT-RTX-3-xxxx	CWDM	3 dBm
CMPT-RTX-6-xxxx	CWDM	6 dBm

The EDR transmitter is intended for digital transmission of reverse path signals over a fiber optic link from the node to the headend. It expands the functionality of the node by increasing the performance, reach, and efficiency of the reverse path transmissions. For more information about the EDR transmitter, see *Cisco Enhanced Digital Return (EDR™) C2185 Transmitter for Compact Segmentable Nodes Installation and Operation Guide*, part number 7023683.

- **Transponder.** SMC transponder, type A91051, HMS transponder, type A91065, or EURO-DOCSIS/DOCSIS transponder for remote control and monitoring.
- **Optical receiver.** Up to two receivers, type 4026169 can be installed in the unit. The standard version is equipped with one receiver that is placed in the Fwd Rx 1 plug-in field.  
The optical receiver has an LED to indicate the presence of optical power. For LED descriptions, see “Starting Up,” page 3-4.
- **Control module.** This optional pushbutton & display module, type 4026179 serves to monitor the operation status and set up a limited number of parameters of the node.

## Power Saving Mode

### Power Saving

The node provides four options for reducing power consumption:

- **Power Saving On:** If the node is running at an output level below 112 dBμV, enable this function to reduce the power consumption of the output gain blocks while good distortion performance can still be maintained. This mode can be activated for Path A and Path B independently.

- **Single Output Mode:** If only one active output is needed, this mode can be selected, and Path A will be powered down. Path B still has an option to add an output signal splitter or directional coupler.
- **Redundancy Mode:** The non-active receiver is powered down when the node is used in Redundant Mode and Single Output mode.
- **Dynamic Power Saving:** The node will automatically power down one of the internal gain blocks when the node is running at a low output level while a high optical power is input.

See the following table for power reductions of four power saving modes.

<b>Conditions</b>	<b>Power reduction (W)</b>
Saving on	2.2 per path
Single output mode	21.3
Redundancy mode	2.2
Dynamic power saving	6.8 per path

# Chapter 3 Installation

## Overview

### Introduction

This chapter describes the requirements and procedures for mounting the node A90201.

### Qualified Personnel

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



**WARNING:**

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

### In This Chapter

This chapter contains the following topics.

Topic	See Page
Tools and Accessories	2-2
Site Requirements	2-3
Housing Dimensions	2-4
Mounting the Node	2-5

## Tools and Accessories

### Tools Required

Before you start the installation, make sure you have the following tools and equipments to connect and configure the Compact EGC GAN Segmentable Node A90201.

You need a...	To...
5 mm Allen wrench	Tighten and loosen the lid.
5 mm flat-tip screwdriver	Tighten and loosen the grounding bolt.
3 mm flat-tip screwdriver	Tighten and loosen the RF stinger inner conductor.
M5 screws	Mount the node.
Ø 1.0 mm grounding wire	Connect Protective Earth (PE) to the PE terminal

The following table lists the required tools for IP test with referenced mounting requirements.

Fastener	Torque Specifications
5 mm Allen screw in lid	Tighten from 5 Nm to 6.5 Nm (44 in-lb to 58 in-lb)
RF I/O port blanking plugs	Tighten to 2 Nm (18 in-lb)
RF output port stinger	Tighten from 4 Nm to 6 Nm (35 in-lb to 53 in-lb)
PE terminal	Tighten to 0.9 Nm (8 in-lb)

## Site Requirements

### Introduction

Before you install the node, make sure the installation site meets the requirements discussed in this section.

### Qualified Personnel

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



**WARNING:**

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

### Operating Temperature Requirements

The external operating temperature range is  $-40$  to  $+55^{\circ}\text{C}$  ( $-40$  to  $+131^{\circ}\text{F}$ ). Before you install, make sure the environment is within the range specified.



**WARNING:**

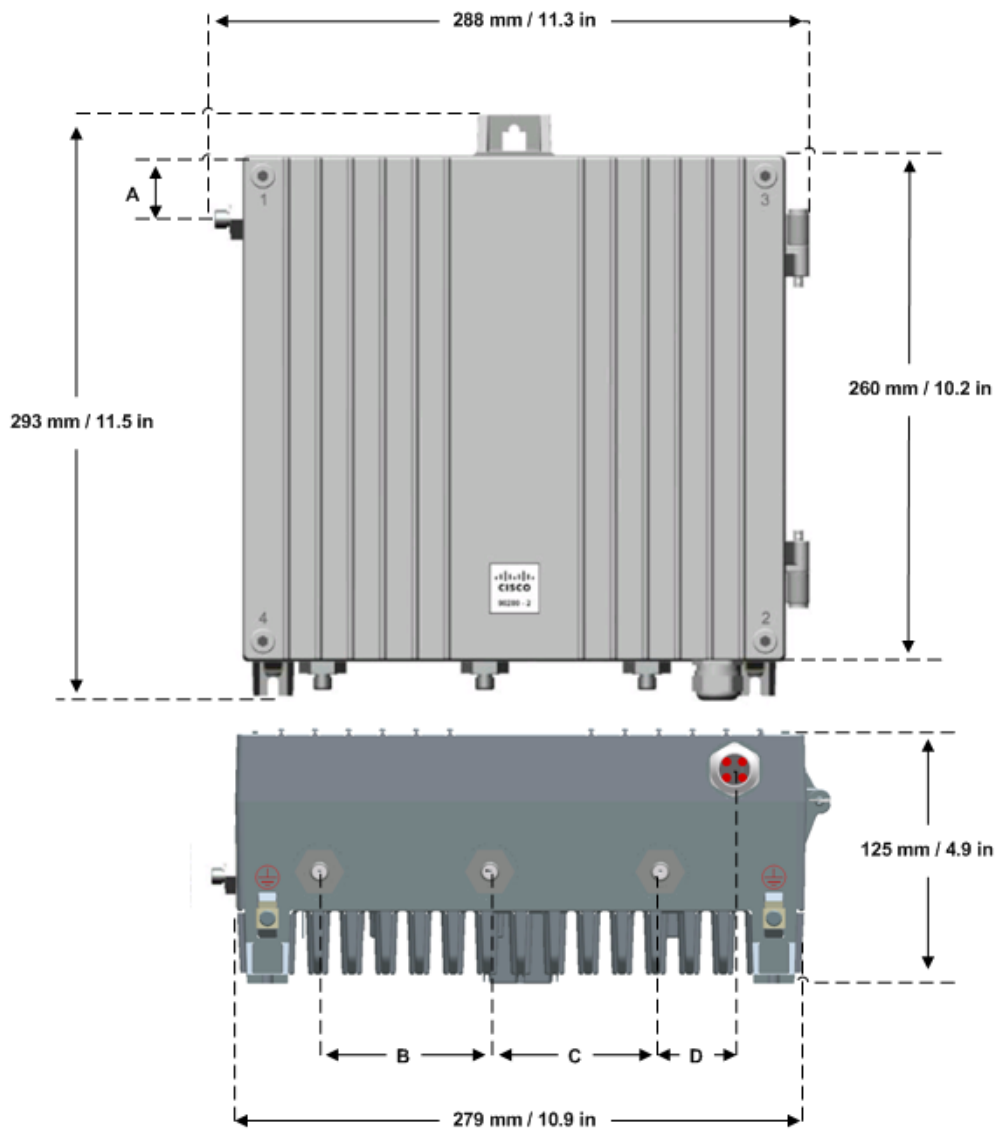
Avoid damage to the node. Operating the node above the maximum operating temperature specified will result in damage to the product.

## Housing Dimensions

The following illustrations show the dimensions, in millimeters and inches, of the node A90201.

Use these measurements to calculate clearance before installing the amplifier and its accessories. Letters A-D represent some useful distance specs between ports and housing edges.

A = 32.7 mm / 1.3 in.; B = C = 83.3 mm / 3.3 in.; D = 36.3 mm / 1.4 in.



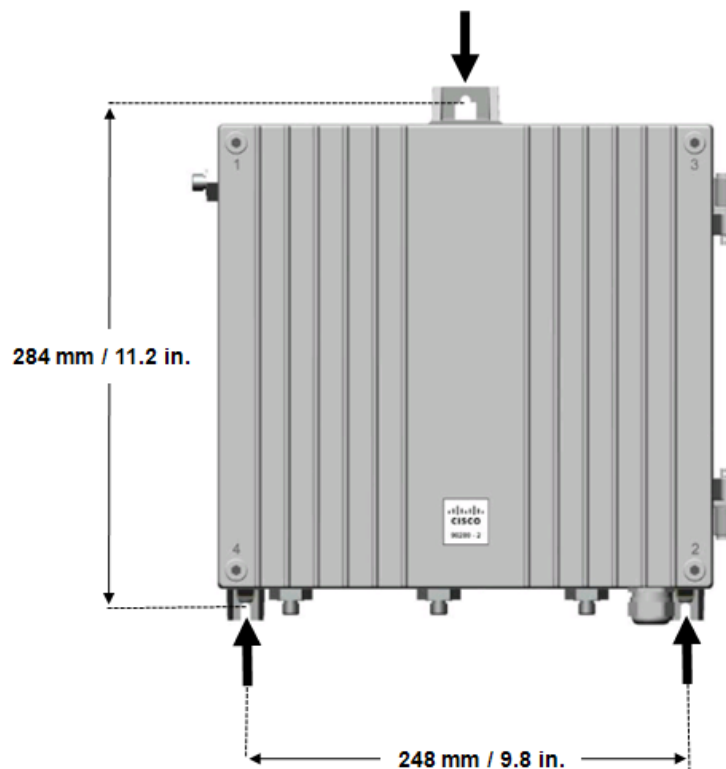


## Mounting the Node

### To Mount the Node

The node is mounted perpendicularly with the cable inlet at the bottom in order to allow natural ventilation during operation. The node can be mounted on the wall of concrete, brick, wood, metal, etc., or in the cabinet. All require different types of screws and screwdrivers. You may use three screws to mount the node. The following illustration shows the arrows that indicate the mounting bolt positions and the distance between the top and the bottom mounting bolts.

1. Mounting screw size is M5.
2. The distance between the top screw and the bottom screws, and the distance between the two bottom screws are shown in the following figure.

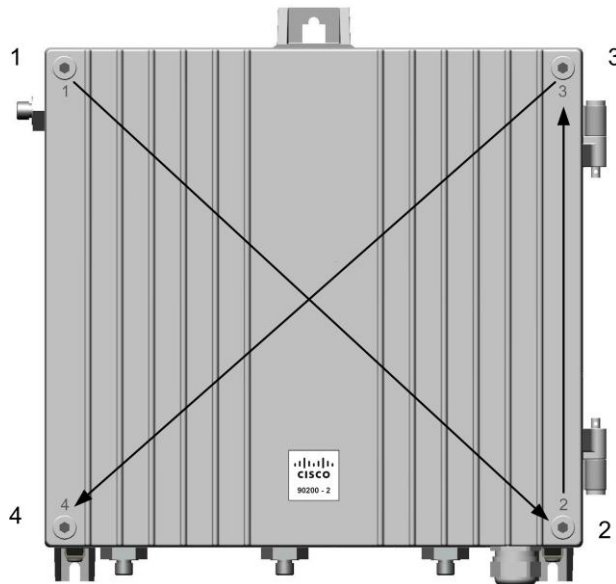


### ⚠ CAUTION!

Be aware of the size and weight of the node when mounting. Ensure that the mounting location has a stable flat surface, and can safely support the node's maximum weight. Please use the appropriate type of screws and screwdrivers, depending on the mounting method.

### To Open and Tighten the Housing

Use a 5 mm Allen wrench to tighten or loosen the closure bolts. To ensure a proper seal, tighten or loosen the bolts in sequence 1, 2, 3, and 4 as shown in the following diagram.



The pin length of the PG11 cable connector at input and output is shown on the cover plate of the node. If needed, trim the connector with a wire cutter.

### To Mount Other Modules

#### Optical Receiver

For more information about the optical receiver, see the *Optical Receiver Mounting Instructions*, part number 7018633.

#### Reverse Transmitter or EDR

For more information about the reverse transmitter or EDR, see the *Cisco Optical Reverse Transmitter Module for Compact Nodes Installation and Operation Guide* and *Cisco Enhanced Digital Return (EDR™) C2185 Transmitter for Compact Segmentable Nodes Installation and Operation Guide*, part number 7023683.

#### Transponder

For more information about the HMS, see *Model 9106x HMS Transponder Installation Instructions*, part number 4012401.

For more information about the SMC, see the *Compact Transponder 91051 Mounting Instructions*, part number 744610.

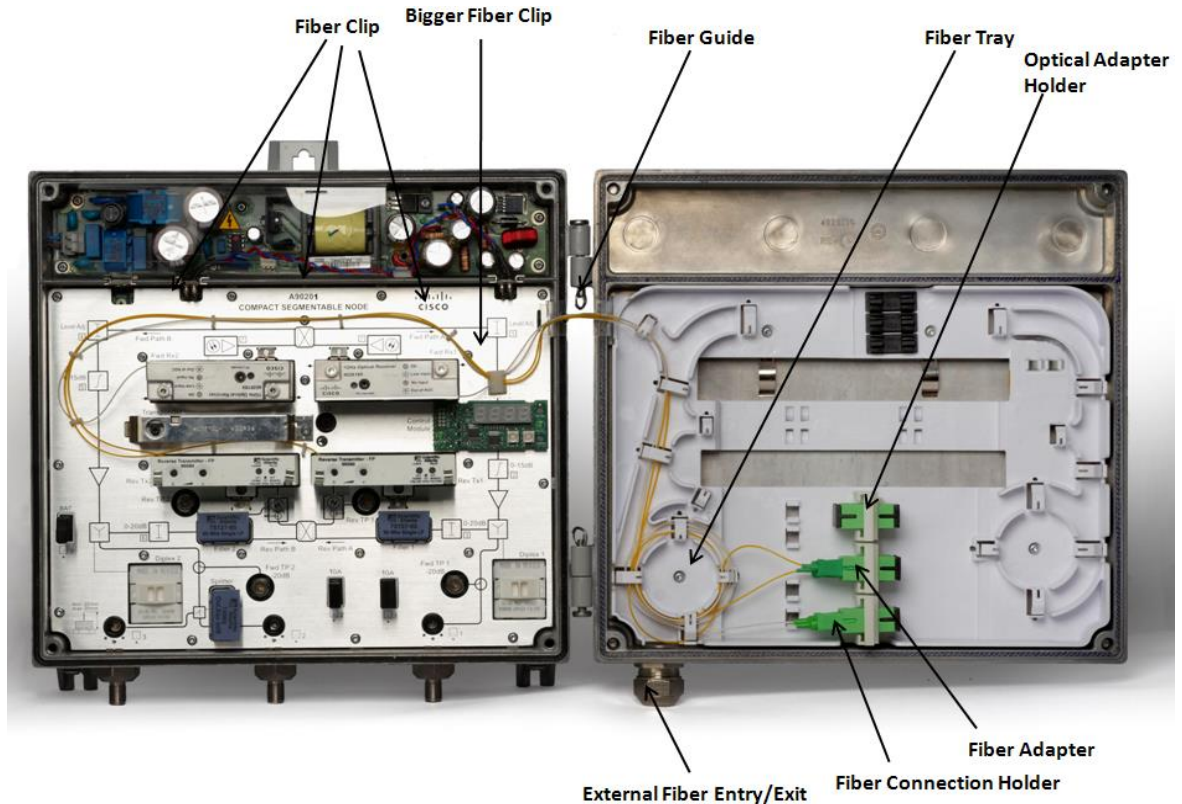
For more information about the Euro-DOCSIS/DOCSIS Transponder, see the *Euro-DOCSIS/DOCSIS Transponder Installation and Operation Guide*, part number 4038488.

### To Mount Fiber

External and internal fibers should be mounted very carefully. Use care so that the fiber does not break. To avoid unwanted attenuation, the radius of the curvature shall be greater than 25 mm.

## Fiber Management

On the metal cover, a number of fiber clips are used to hold the optical fibers in place. In general, the fibers are routed clockwise on the cover, then routed to the fiber tray on the lid through the fiber guide. Routing the fiber for each transmitter/receiver is different, depending on the slot in which the module is mounted. See the illustration below.



### Notes:

1. All internal fibers must go through the bigger fiber clip, located above the control module.
2. The fiber of module "Fwd Receiver 1" must be routed through the bigger fiber clip located above the control module only, and then to the fiber tray through the fiber guide.
3. The fiber of module "Rev Transmitter 1" must be routed through the two fiber clips between module "Rev Transmitter 2" and the transponder.

The fiber tray is designed to allow different fiber routings, to compensate for the difference in fiber length. The illustration above shows an example of optimized routings. As an alternative to connecting the fiber connectors to the fiber adapter, fiber connector holders are available to hold the fiber connectors when there is no fiber adapter mounted. The optical adapter holder is designed to hold SC-type optical adapters such as SC/APC to E2018, SC/APC to FC/APC, SC/APC to SC/APC, etc.

There is a fiber entry/exit in the lid that can hold up to four 3 mm external fiber cables. The fibers from outside should be routed clockwise on the fiber tray. A splice protector holder mounted on the fiber tray provides 6-slot capability for holding splice tubes in a diameter of 3 mm, or optical passive components, such as optical splitters and combiners. The center area of the fiber tray is designed to hold optical passive components that are more than 3 mm in diameter, using a tie strap. The fibers can be routed in the center area of the fiber tray accordingly.

### Grounding the Node

There is a PE terminal for PE GND connection to the chassis. Connect the PE GND wire ( $\varnothing$  1.0 mm or larger) or bare CU wire ( $\varnothing$  1.0 mm or larger) to this terminal on the unit. If insulated PE GND wire is used, it will be green with yellow stripe. Use provided wire gauge and torque to 0.9 Nm.

 CAUTION!

**Do not remove the PE GND wire while servicing the unit. Keep the PE GND wire connected to the chassis.**

If the unit is network powered, connect the unit to the equipotential bonding bar or frame before connecting power. Disconnect power to the unit before removing from the equipotential bonding bar or frame.

# Chapter 4 Operation

## Overview

### Introduction

This section describes the procedures for setting up and operating the node.



**WARNING:**

**This product should be operated by qualified personnel only. Non-authorized personnel are not allowed in the site area, otherwise physical injury or equipment damage may occur.**

### In This Chapter

This chapter contains the following topics.

Topic	See Page
Setup Procedures	3-2
Configuration Modes	3-3
Starting Up	3-6
Setting Output Level with Level Adjust	3-7
Alarms	3-9
Setting Up with a Computer	3-10
Setting Up with a Handheld Terminal	3-12
Setting Up Through the Control Module	3-18
Reverse Setup	3-20
ROSA Element Management System	3-21

## Setup Procedures

The node can be set up using a computer with an LCI software kit, or a handheld terminal. A control module is also available to set up the node, however it only sets up a limited number of parameters.

## Configuration Modes

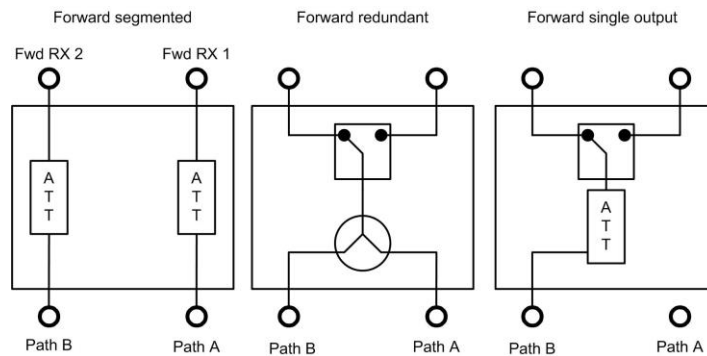
### Introduction

This section describes three forward and two reverse configuration modes.

### Forward Configuration

The following illustrations show the three forward configuration modes. These modes are set electronically with on-board switches.

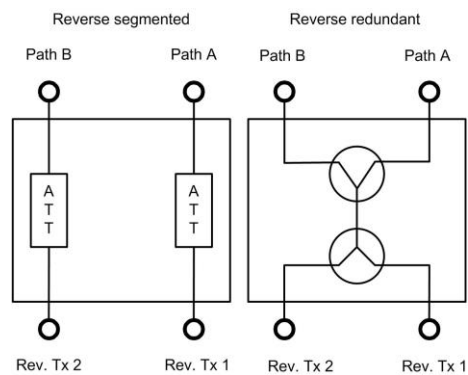
#### Forward configuration illustrations



### Reverse Configuration

The following illustrations show the two reverse configuration modes.

#### Reverse configuration illustrations



### Redundant Mode Transponder Path

The transponder has the redundant (Auto) mode option for the reverse configuration. In the redundant mode, the transponder is connected with an active forward receiver (RX) and both of the active reverse transmitters (TX1 and TX2).

### Transponder Rx Signal Pick-Off

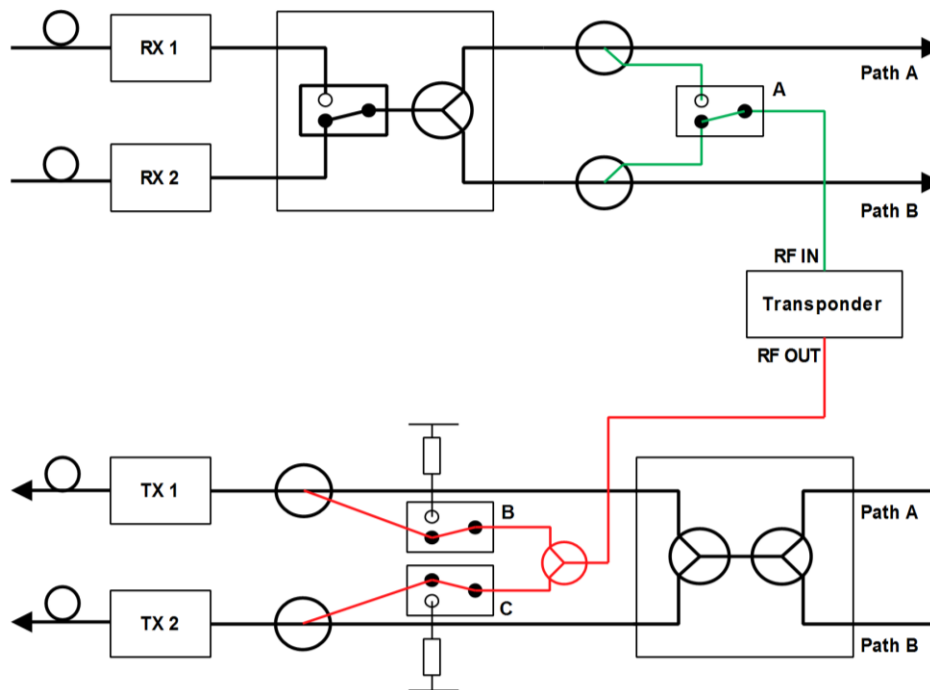
The transponder Rx signal can be picked off from either path A or path B, by means of turning switch A. In redundant mode, both paths are carrying the same signal at all times.

The transponder pick-off points are at the output of the node with a insertion loss of about -32 dB (from output port to the transponder Rx)

### Transponder Tx Signal Injection

In redundant mode the transponder Tx signal will be split and fed into both reverse transmitter (TX1 and TX2).

The following illustrations show the block diagram of redundant mode configuration modes.



### Segmented Mode Transponder Path

The transponder also has the segmented mode option for the reverse configuration. In the segmented mode, the transponder is connected with an active forward receiver (RX) and either of the active reverse transmitter (TX1 or TX2).

### Transponder Rx Signal Pick-Off

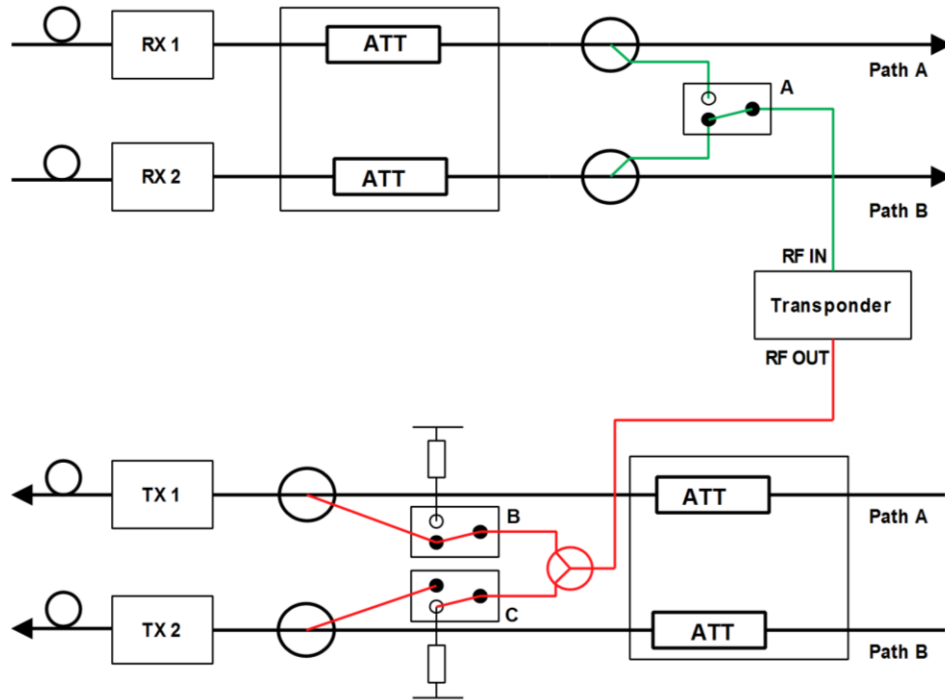
The transponder Rx signal can be picked off from either path A or path B, by means of turning switch A. In segmented mode it should be set to the path that carries the management feed.

The insertion loss to the input of the transmitter is 30 dB. Note that attenuation applied in the reverse transmitter influence the level of the transponder Tx signal.

### Transponder Tx Signal Injection

In segmented mode the transponder Tx signal can be injected in either reverse transmitter TX1 or TX2, depending where the management feed need to be sent to.

The following illustrations show the block diagram of segmented mode configuration modes.



## Starting Up

When the node is powered up, LEDs on the forward receiver 1 or 2 will indicate status. The following table lists LED status and description.

LED Status	Description
Green	Receiver is active and the optical input signal level is OK.
Green, flashing	The optical input level has dropped 3 dB below the default optical reference input level set by the user.
Red	The optical input level has dropped to -11 dBm or lower.
Red, flashing	The optical input level is out of AGC range.

The same signaling applies to receiver 2 if it has been installed. If a red and green alarm occurs at the same time, the red alarm appears.

To ensure that receiver 1 or 2 is receiving the correct optical signal level, measure the optical signal level with a voltmeter. The measurement is carried out on the test point on the receiver front panel. The voltage measured corresponds to 1V/mW.



## Setting Output Level with Level Adjust

The node has a built-in AGC function that holds the output level at the adjusted value even if the optical input signal changes. The AGC range is defined from -7 to +2 dBm, which means that within this range, the node can hold any RF output level between 94 and 116 dB $\mu$ V (at 3.25% transmitter OMI).

The node output level is set by means of the Level Adjust function. There is a separate Level Adjust function for each path (A Level Adj and B Level Adj). For the full AGC input range, the Level Adjust function ranges from -24.5 to 0 dB. At a 3.25% transmitter OMI, a Level Adjust of 0 dB will yield the maximum RF output level (116 dB $\mu$ V). In case of a transmitter OMI lower than 3.25%, the Level Adjust can be set up to +3 dB to maintain the highest output level. However, using a Level Adjust greater than 0 dB will result in a reduced AGC range. See the following table.

Optical Input Level (dBm)	Dynamic Level Adj Range (dB)
-7.0 to +2	-24.5 to 0
-6.75 to +2	-24.5 to +0.5
-6.5 to +2	-24.5 to +1.0
-6.25 to +2	-24.5 to +1.5
-6.0 to +2	-24.5 to +2.0
-5.75 to +2	-24.5 to +2.5
-5.5 to +2	-24.5 to +3.0

### Redundant Mode Setup

In the Redundant mode, A Level Adj and B Level Adj can each store two values, one using receiver 1 and the other using receiver 2.

The factory default is Prefer Rx1. Under normal operation, receiver 1 will be active (the LED on the Rx1 module lights green while the LED on the Rx2 module turns off) when the Redundant mode is selected.

To set up the output levels in the Redundant mode, follow these steps:

1. Connect test equipment to the output test point of path A.
2. Adjust A Level Adj until the desired node output level (using Rx1) is reached.
3. Select Prefer Rx2, and the Rx1 LED now turns off while the Rx2 LED lights green.
4. Adjust A Level Adj until the desired node output level (using Rx2) is reached.
5. Move the test equipment to the output test point of path B.
6. Adjust B Level Adj until the desired node output level (using Rx2) is reached.
7. Select Prefer Rx1, and the Rx2 LED now turns off while the Rx1 LED lights green.
8. Adjust B Level Adj until the desired node output level (using Rx1) is reached.

The node output levels in the Redundant mode are now set.

**Note:** If Force Rx1 or Force Rx2 is used during setup, set back to Prefer Rx1 or Prefer Rx2 to activate the Redundancy function.

### Segmented Mode Setup

In the Segmented mode, A Level Adj and B Level Adj each stores one value, A Level Adj using receiver 1 and B Level Adj using receiver 2. In this mode, both receiver LEDs light green to indicate they are active.

To set output levels in the Segmented mode, follow these steps:

1. Connect test equipment to the output test point of path A.
2. Adjust A Level Adj until the desired node output level (using Rx1) is reached.
3. Move test equipment to the output test point of path B.
4. Adjust B Level Adj until the desired node output level (using Rx2) is reached.

The node output levels in the Segmented mode are now set.

### Alarms

The node has the following alarm states which are indicated by the receiver LED.

LED Status	Description
Green	Receiver is active and input level is okay.
Green flashing	Low Optical Input. The measured optical input level is x dB lower than the optical reference level. (x=optical threshold.)
Red	No Optical Input. This alarm occurs when optical input level drops below -11 dBm.
Red flashing	Out of AGC. This alarm occurs when the optical input is out of the AGC range.
Off	Receiver is active (Only applicable for Redundant and Single Output Modes).

### Low Optical Input Level Alarm

A low optical alarm is determined by two parameters: optical reference level (desired input level) and optical threshold (accepted drop in input level).

The optical reference level equals the actual measured input level at the time of setup. An update of the optical reference level to the actual measured input level is triggered by exiting the Level Adjust menu. The factory default is -1 dBm but will be overwritten as soon as a Level Adjust happens.

The optical threshold is the amount of dB that the user can accept the input level to drop below the reference level before signaling a low optical alarm. The factory default is 3 dB and can be reset by the user. A low optical alarm is indicated by a flashing green LED on the receiver module.

## No Optical Input Alarm

A No Optical Alarm occurs when optical input level drops below  $-11$  dBm. This is a fixed setting, and cannot be changed.

## Out of AGC Alarm

If the optical input signal is below the lower AGC limit, the node will no longer be able to keep the RF output level which drops 2 dB for every 1 dB reduction in optical input level. An AGC alarm (Red flashing Receiver LED) will occur.

If the optical input signal is above the upper AGC limit, the node still adjusts the attenuation to keep the output level constant. However, the performance will not be guaranteed.

**Note:** Permanently exceeding the maximum optical input power may damage the receiver module.

## Setting Up with a Computer

Before setting up with a computer, ensure that the LCI software kit has been installed on your computer. For detailed information about the software installation and requirements, see “LCI Software Installation Instructions,” part number 4033113.

### Operation

To set up the node via the LCI software, you must connect the node either to a USB port with an LCI-USB cable or to a serial port. Follow the steps to set up the node:

1. Start the LCI software.

**Result:** An **LCI Detect Configuration** window appears.

**Note:** If you use a serial port on the computer, input the serial port name into the **COM Port** box such as COM1, which depends on your choice.

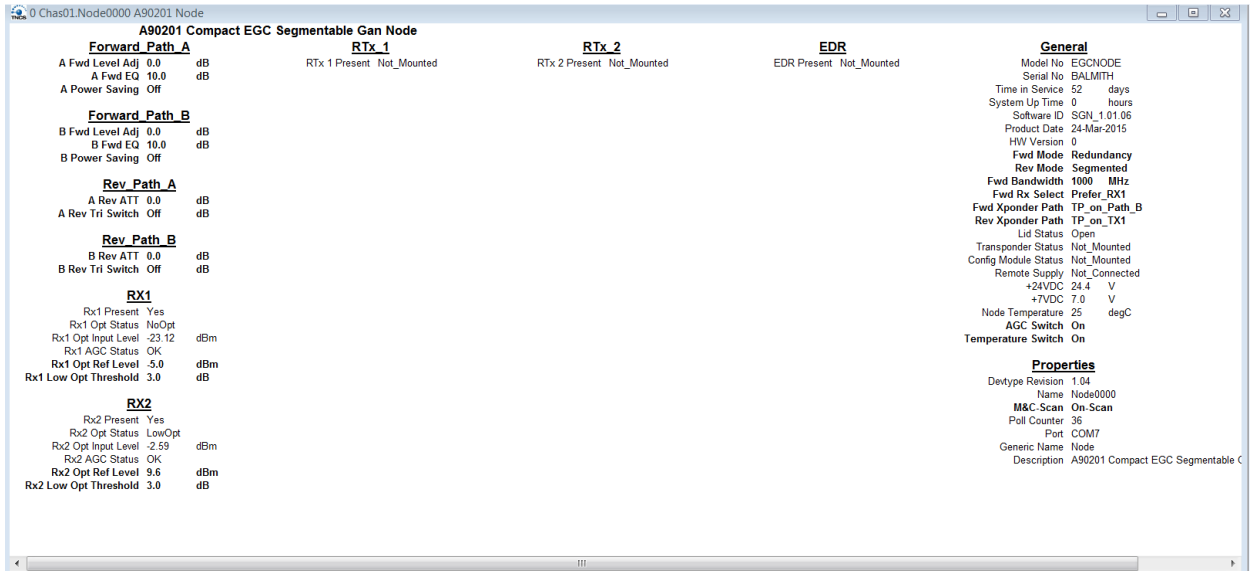
2. Click **Node Products**, and then Click **Start** to find the node.

**Result:** A **Refresh** dialog box appears.

3. Click **OK** to finish.

4. Double click the node in the left tree to display the node configuration window.

**Result:** A configuration window appears to display all settings of the node.



5. Double click the parameter you want to set up in the configuration window.

**Result:** A Change Value Dialog box appears.

6. Type a value or select one in the dialog box.

7. Click **Execute** to validate the change.

**Result:** The change is effective right away.

All parameters of the node are listed in the preceding window. The following table lists the parameters that are configurable via the LCI software.

Category	Adjustable Item	Notes
Forward Path A	A Fwd Level Adj	-24.5 to 0 dB, 0.5 dB step <sup>1</sup>
	A Fwd EQ	0 to 15 dB, 0.5 dB step
	A Power Saving	Off or On; the default is Off
Forward Path B	B Fwd Level Adj	-24.5 to 0 dB, 0.5 dB step <sup>1</sup>
	B Fwd EQ	0 to 15 dB, 0.5 dB step
	B Power Saving	Off or On; the default is Off
Rev Path A	A Rev ATT	0 to 20 dB, 0.5 step
	A Rev Tri Switch	0 dB, -6 dB, or Off
Rev Path B	B Rev ATT	0 to 20 dB, 0.5 step
	B Rev Tri Switch	0 dB, -6 dB, or Off
RX1	Rx1 Opt Ref Level	-6 to 0 dBm, the default is -1 dBm
	Rx1 Low Opt Threshold	0 to 6 dB, the default is 3 dB
RX2	Rx2 Opt Ref Level	-6 to 0 dBm, the default is -1 dBm
	Rx2 Low Opt Threshold	0 to 6 dB, the default is 3 dB
RTX 1	RTx 1 Laser	Off or On
	RTx 1 ATT	0 to 10 dB, 0.1 dB step
	RTx 1 Pilot	Off or On
	RTx 1 Pilot Setting	-15 to -5 dB, 0.2 dB step

RTX 2	RTx 2 Laser	LaserOff or LaserOn
	RTx 2 ATT	0 to 10 dB, 0.1 dB step
	RTx 2 Pilot	Off or On
	RTx 2 Pilot Setting	-15 to -5 dB, 0.2 dB step
General	Fwd Mode	Single, Redundant or Segmented
	Rev Mode	Segmented or Redundant, the default is Segmented
	Fwd Bandwidth	862 MHz to 1 GHz
	Fwd Rx Select	Prefer_RX1, Prefer_RX2, Force_RX1 or Force_RX2
	Fwd Xponder Path	TP_on_Path_A or TP_on_Path_B
	Rev Xponder Path	TP_on_RTX1 or TP_on_RTX2
	AGC Switch	Off or On (Default: On)
	Temperature Switch	Off or On (Default: On)
Properties	M&C-Scan	Off-Scan or On-Scan






**Note:**

1. Dynamic level adj range -- refer to the table on page 3-7.
2. AGC Switch and Temperature Switch can switch off optical AGC and temperature compensation respectively, which are used to stabilize the RF output level of the node. Only switch off these functions for test and debug purposes. If optical input power has changed when AGC is switched off, the RF output level is adjusted when turning on AGC.

## Setting Up with a Handheld Terminal

### Keypads

This product can be setup with a handheld terminal, type **A91200.10**. The following table lists the terminal keypads and their definitions.

	Navigate to the submenus, to open a menu for editing. The value can then be changed. The button can also be used to reject a value entered by the keypad.
	Navigate to the root menus, to delete wrong digits when a menu is open for editing. The button can also be used to reject a value entered by the keypad.
	All numbers, '.' and '-' are used to enter values. The numbers can also be used as short cuts.
	Navigate through menus at the same level, to select the settings in some menus. These buttons can also be used to fine-tune some values.
	Confirm a setting or a change.

For detailed information, see “Operation Instructions Handheld Programming Terminal, type 91200,” part number A541365.

## Shortcuts

The menu item numbers can be used as short cuts. To enter a menu, you can press the item number which presents the menu. For example, if you want to enter the submenu Reverse Mode, press number keys 3 and 1 continuously, 31 presents the Reverse Mode menu. See the menus structure to determine the number for a required menu.

Seven shortcuts are specially designed to help the user directly enter 6 menus to set parameters, which are indicated on the cover:

- Press and hold “1” on keypad to set forward path A Level Adj directly.
- Press and hold “2” on keypad to set forward path A EQ directly.
- Press and hold “3” on keypad to set reverse path A ATT directly.
- Press and hold “4” on keypad to set forward path B Level Adj directly.
- Press and hold “5” on keypad to set forward path B EQ directly.
- Press and hold “6” on keypad to set reverse path B ATT directly.
- Press and hold “7” on keypad to select active Rx1 or Rx2 directly.

## Menu Structures & Operations

The number before each menu name is the menu item number.

Menus & Descriptions			
1 General	Submenu1	Submenu2	Actions
	11 Fwd Configuration	111 Fwd Mode	Read-write Select Redundant, Segmented, or Single Output.
		112 Fwd Bandwidth	Read-write Select 862 MHz or 1 GHz.
		113 Fwd Rx Select <sup>1</sup>	Read-write Select Force to/Prefer Rx1 or Force to/Prefer Rx2. Displays Rx1 or Rx2 in the Segmented mode.
		114 Fwd Xponder Path	Read-write Select on FwdPathA or on FwdPathB.
		121 Rev Mode	Read-write

	12 Rev Configuration		Select Redundant or Segmented.
		122 Rev Xponder Path	Read-write Select on TX1/EDR1, on TX2/EDR2, or AUTO <sup>2</sup> .
	13 Mounted Modules	131 RX1	Read-only Displays Mounted or Not mounted.
		132 RX2	Read-only Displays Mounted or Not mounted.
		133 TX1	Read-only Displays Mounted or Not mounted.
		134 TX2	Read-only Displays Mounted or Not mounted.
		135 Transponder	Read-only Displays Mounted or Not mounted.
		136 Display Module	Read-only Displays Mounted or Not mounted.
		137 EDR	Read-only Displays Mounted or Not mounted.
		14 Power Supply	141 Remote Supply
142 24VDC	Read-only Displays current measured value of 24 VDC power supply.		
143 7VDC	Read-only Displays current measured value of 7 VDC power supply.		

Notes:

1. When the handheld terminal or PC is disconnected, the Fwd Rx Select is automatically switched to the primary receiver (Rx1).

2. See section **Reverse Transponder Path Redundant Mode** on page 3-3.

2 Forward	Submenu1	Submenu2	Actions
2 Forward Mode	21 RX1  (Only accessible when RX1 is mounted)	211 Optical Level	Read-only  Displays the current optical input power, unit in 0.01 dBm.
		212 Opt Ref. Level	Read-only  Displays the current optical reference power, unit in 0.1 dBm.
		213 Low Opt. Alarm <sup>1</sup>	Read-write  Set low optical alarm threshold.
	22 RX2  (Only accessible when RX2 is mounted)	221 Optical Level	Read-only  Displays current optical input power, unit in 0.01 dBm.
		222 Opt Ref. Level	Read-only  Displays the current optical reference power, unit in 0.1 dBm.
		223 Low Opt. Alarm <sup>1</sup>	Read-write  Set low optical alarm threshold.
	23 Fwd Path A  (Set parameters for primary channel)	231 Forward Level Adj.	Read-write  Display and set the current forward level setting, unit in 0.1 dB.
		232 Forward EQ	Read-write  Set forward EQ from 0 to 15 dB, 0.5 dB step.
		233 Power Saving	Read-write  Select On or Off. The default is Off.
	24 Fwd Path B	251 Forward Level Adj.	Read-write  Display and set the current forward level setting, unit in 0.1 dB.



	(Set parameters for secondary channel)	252 Forward EQ	Read-write Set forward EQ from 0 to 15 dB, 0.5 dB step.
		253 Power Saving	Read-write Select On or Off. The default is Off.

Notes:

1. Low Opt Threshold. Default value is 3 dB. This value is used to determine a low optical alarm which occurs when the actual input level drops more than 3 dB below the Opt Ref Level. The Low Opt Threshold value can be changed by the user in the range 0 to 6 dB.

3 Reverse	Submenu1	Submenu2	Actions
3 Reverse Mode	31 Rev Path A	311 Reverse ATT	Read-write Set reverse ATT from 0 to 20 dB, 0.5 dB step.
		312 TriStatSwitch	Read-write Select a reverse tri-state switch value from 0 dB, -6 dB or off.
	32 Rev Path B	321 Reverse ATT	Read-write Set reverse ATT from 0 to 20 dB, 0.5 dB step.
		322 TriStatSwitch	Read-write Select a reverse tri-state switch value from 0 dB, -6 dB or off.
	33 RTX1 (Only accessible when RTX1 is mounted)	331 Laser	Read-write Select On or Off.
		332 Attenuator	Read-write Set reverse transmitter attenuation from 0 to 10 dB.
		333 Pilot	Read-write Select On or Off.
		334 Pilot Level	Read-write Display pilot level.

		335 Pilot Setting	Read-write Set current pilot level from 35 to 45 dB $\mu$ V.
		336 Bias	Read-only Displays the bias current (mA) of the reverse transmitter.
		337 Bias Factory	Read-only Displays the factory bias current of the reverse transmitter.
	34 RTX2 (Only accessible when RTX2 is mounted)	341 Laser	Read-write Select On or Off.
		342 Attenuator	Read-write Set reverse transmitter attenuation from 0 to 10 dB.
		343 Pilot	Read-write Select On or Off.
		344 Pilot Level	Read-write Display pilot level.
		345 Pilot Setting	Read-write Set current pilot level from 35 to 45 dB $\mu$ V.
		346 Bias	Read-only Displays the bias current (mA) of the reverse transmitter.
		347 Bias Factory	Read-only Displays the factory bias current of the reverse transmitter.

3 Reverse	Submenu1	Submenu2	Actions
3 Reverse Mode	35 EDR	351 Laser	Read-write Select On or Off.

(Only accessible when EDR is mounted)	352 Power	Read-only Display power consumption, unit in uW.
	353 OPM TOS	Read-only Display the time in service.
	354 WaveLength	Read-only Display the wavelength, unit in nm.
	355 OPM Temp	Read-only Display the temporary OPM, unit in degC.
	356 OPM Type	Read-only Display the OPM type, DWDM/CWDM/DFB.
	357 OPM Compliance	Read-only Display compliance status, Compliant/Non-compliant.
	358 LaserBiasStatus	Read-only Display the bias current of the laser, Normal/High/Low.
	359 LaserTempStatus	Read-only Display the temporary Status of the laser, Normal/High/Low.
	3510 OPM Bias	Read-only Display the bias current of the OPM, unit in uA.
	3511 OPM Status	Read-only Display the status of the OPM, Warning/Alarm/Normal.

4 Parameters	Copy	Submenu1	Submenu2	Actions
		41 From Product	411 Setting 1	

4 Copy Parameters	(Copy parameters from one product into the handheld Memory)	412 Setting 2	<p>Nine Node settings can be configured.</p> <p>If a Setting position is available, it displays Empty; If not available, it displays nothing.</p>
		413 Setting 3	
		414 Setting 4	
		415 Setting 5	
		416 Setting 6	
		417 Setting 7	
		418 Setting 8	
		419 Setting 9	
	42 To Product (Restore settings to a node from the handheld Memory)	421 Setting 1	<p>Select and copy a Setting to product.</p> <p>If no valid setting exists, you cannot enter the menu and No Data displays.</p>
		422 Setting 2	
		423 Setting 3	
		424 Setting 4	
		425 Setting 5	
		426 Setting 6	
		427 Setting 7	
428 Setting 8			
43 Restore Default (Restore default settings)	431 Restore Node	Restore default parameters of the node. The parameter for node includes 2 forward paths + 2 rev paths + 2 RTXs.	
	432 Fwd Path A	Restore default parameters for forward path A.	
	433 Fwd Path B	Restore default parameters for forward path B.	
	434 Rev Path A	Restore default parameters for reverse path A.	
	435 Rev Path B	Restore default parameters for reverse path B. The parameter for node includes reverse path and RTX.	

5 Identification	Submenu1	Submenu2	Actions
5 Identification	51 Node	511 Model Number	Read-only Displays product model number.
		512 Serial Number	Read-only Displays product serial number.
		513 Time In Service	Read-only Displays service time.
		514 Software ID	Read-only Displays Node software ID.
		515 Product Date	Read-only Displays product date.
		516 HW Version	Read-only Displays hardware version.

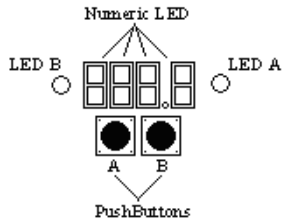
5 Identification	Submenu1	Submenu2	Actions
5 Identification	52 TX1  (Only accessible when TX1 is mounted)	521 TX Model	Read-only Displays TX model number.
		522 Serial Number	Read-only Displays TX module serial number.
		523 Pilot Freq.	Read-only Displays TX pilot frequency.
	53 TX2  (Only accessible when TX2 is mounted)	531 TX Model	Read-only Displays TX model number.
		532 Serial Number	Read-only Displays TX module serial number.
		533 Pilot Freq.	Read-only Displays TX pilot frequency.

54 EDR	541 EDR Product Type	Read-only Displays product type of the EDR.
	542 EDR Serial Number	Read-only Displays serial number of the EDR.
	543 EDR SW Version	Read-only Displays software version of the EDR.
	544 OPM MFGR	Read-only Displays OPM manufacturer of the EDR.
	545 FPGA Version	Read-only Displays the FPGA version.
	546 OPM PN	Read-only Displays the OPM part number.
	547 OPM SN	Read-only Displays the OPM serial number.
55 Terminal SW	–	Read-only Displays handheld application software ID.
56 Lid Status	–	Read-only Displays Lid Open or Lid Closed.

## Setting Up Through the Control Module

### Overview

The module can be used to monitor the operation status of the node and set up some parameters. The following illustration shows the module buttons and LEDs.



The following table lists 4-digit numeric LED descriptions.

Position	Description
First digit	<p>Presents one of parameters F, E, P, A, C, S, or L</p> <p>F: Forward Level Adjust Value            E: Forward Equalizer Value            P: Forward Optical Input Power            A: Reverse Attenuation Value            C: Temperature            S: Reverse Tri-state Switch Status            L: Alarm</p>
Second to four digits	<p>Presents a value for F, E, P, A, C, S, or L:</p> <p>F: 0 to 20 dB, 0.5 dB step            E: 0 to 15 dB, 0.5 dB step            P: 0.5 dBm step            A: 0.5 dB step            C: -40 to +85°C            S: On, 6 dB or Off</p> <p>L:    ---       No alarm                  P02       Optical input power above +2 dBm                  P-7       Optical input power below -7 dBm                  C85       temperature above 85°C                  SOF       Reverse Tri-state switch is at OFF</p>

## Operation

### For Monitor mode:

In this mode, you can view parameters and values.

Follow the steps to view parameters and values:

- Press A to scroll up through parameters and values, and press B to scroll down through them.

Follow the steps to switch between two paths.

- Press and hold B for two seconds, then the path chosen is switched to another.

#### **For Edit mode:**

In this mode, you can set up the parameter that you choose.

**Note:** The parameters that you can adjust in this mode are Forward Level Adjust, Forward Equalizer, Reverse Attenuation, and Reverse Tri-state Switch Status.

Follow the steps to set up a parameter and its value:

- Select a parameter in the Monitor mode and then press and hold A for 2 seconds to enter the Edit mode.
- Press A or B to scroll through values and then select the one you want.
- Press and hold A for 2 seconds to save and validate your setting right away.

**Note:** If you don't want to save your setting, press and hold B for 2 seconds to quit the Edit mode. The previous setting is saved.

If you want to set up another parameter and its value, repeat the steps above.

## **Reverse Setup**

In order to connect Reverse Transmitter CMPT-RTX-x to the reverse path of the Coax Network, diplex filters 4028316/4028317, 589690/589691 or 4008154/4008155 must be mounted. The diplex filters determine the reverse path bandwidth.

#### **Reverse Setup with Reverse Transmitter**

The reverse input signals for Path A and Path B are aligned to the desired transmitter input levels. This is achieved by configuring the Reverse Attenuator A and B on the RF module in 0.5 dB step or by configuring the attenuator inside the Reverse Transmitter in 0.1 dB step respectively. A reverse test point is provided alongside the Reverse Transmitter to verify the laser drive level.

An RF level of 50 dB $\mu$ V at the test point equals to 10% transmitter OMI. See *Cisco Optical Reverse Transmitter Module for Compact Nodes Installation and Operation Guide* for further details on how to select a different Reverse Transmitter OMI.

The default configuration for the reverse path is segmented mode, i.e. RF inputs from Rev Path A and Rev Path B are connected to Rev Tx1 and Rev Tx2 respectively.

**Note:** The settings of a previous reverse transmitter are stored on the mainboard and copied to the new one when a faulty reverse transmitter is replaced.

#### **Reverse Setup with Transponder**

The transmit level of the transponder is adjusted to an appropriate range automatically. For certain cases, it is allowed to use the handheld at the USB port of the Transponder to check and adjust the transmit level.



**Note:** HMS and DOCSIS transponder allows automatic level alignment, but when the SMC transponder is installed, in order to perform manual level calculation, you need to take into consideration the 30 dB insertion loss of Transponder Injection Point together with the ATT inside the reverse transmitter of 5 dB factory default. For more information about the transponders, see the reference of I&O guides listed on page 2-6 of each transponder.

### **Reverse Setup with EDR**

The EDR transmitter is intended for digital transmission of reverse path signals over a fiber optic link from the node to the headend.

For more information about the Compact EDR transmitter, see Cisco Enhanced Digital Return (EDR™) C2185 Transmitter for Compact Segmentable Nodes Installation and Operation Guide, part number 7023683.

## **ROSA Element Management System**

An SMC transponder type 91051, HMS transponder type A91065 or Euro-DOCSIS/DOCSIS Transponder can all be used in the unit to monitor the node.

This transponder will communicate back to the headend by means of the reverse path. The transponder signal is received at the test point at output. The level measured by the transponder will be attenuated by approximately 33 dB relative to the output signal at output. The transponder transmitter level is adjusted to the same level as the other reverse signals. The level from the transponder will be attenuated by approximately 20 dB at the reverse path since it is inserted with a 20 dB coupler.

With a transponder, it is possible to monitor and control different parameters in the node. The built-in reverse path switch can be controlled in order to locate ingress noise in the reverse path. This can be useful in the search for errors in larger networks.

The transponder can be set up with a handheld terminal 91200.

For complete information about operating the transponder and ROSA management, see the *ROSA Element Manager User's Guide*, part number 4005743, *EURO-DOCSIS/DOCSIS Transponder Installation and Operation Guide*, part number 4038488 and user documents for HMS transponder and SMC transponder on Cisco.com at

[http://www.cisco.com/en/US/products/ps9066/products\\_user\\_guide\\_list.html](http://www.cisco.com/en/US/products/ps9066/products_user_guide_list.html)

# Chapter 5

## Customer Support Information

### If You Have Questions

If you have technical questions, call Cisco Services for assistance. Follow the menu options to speak with a service engineer.

Access your company's extranet site to view or order additional technical publications. For accessing instructions, contact the representative who handles your account. Check your extranet site often as the information is updated frequently.



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