CISCO

Model GS7000 GainMaker Node Seg2Way Status Monitor/Local Control Module

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.

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 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.

> ⚠ **WARNING:**
>
> **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.

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 chassis covers and access any of the components inside the chassis.

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 (access restricted to service personnel).

■ Make sure the mounting surface or rack is stable and can support the size and weight of this equipment.

Strand (Aerial) Installation

⚠ **CAUTION:**

Be aware of the size and weight of strand-mounted equipment during the installation operation.

Ensure that the strand can safely support the equipment's weight.

Pedestal, Service Closet, Equipment Room or Underground Vault Installation

⚠ **WARNING:**

Avoid the possibility of personal injury. Ensure proper handling/lifting techniques are employed when working in confined spaces with heavy equipment.

■ 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.

■ Ensure the mounting surface or rack is appropriately anchored according to manufacturer's specifications.

■ Ensure the installation site meets the ventilation requirements given in the equipment's data sheet to avoid the possibility of equipment overheating.

■ Ensure the installation site and operating environment is compatible with the equipment's International Protection (IP) rating specified in the equipment's data sheet.

Connecting to Utility 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, which is 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.

Connection to Network Power Sources

Refer to this equipment's specific installation instructions in this manual or in companion manuals in this series for connection to network ferro-resonant AC power sources.

AC Power Shunts

AC power shunts may be provided with this equipment.

Important: The power shunts (where provided) must be removed before installing modules into a powered housing. With the shunts removed, power surge to the components and RF-connectors is reduced.

> ⚠ **CAUTION:**
>
> **RF connectors and housing seizure assemblies can be damaged if shunts are not removed from the equipment before installing or removing modules from the housing.**

Grounding (Utility AC Powered Equipment in Pedestals, Service Closets, etc.)

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.

General Servicing Precautions

> ⚠ **WARNING:**
>
> **Avoid electric shock! Opening or removing this equipment's cover may expose you to dangerous voltages.**

> ⚠ **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 that contained in the operating instructions unless you are qualified to do so. Refer all servicing to qualified service personnel.**

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.

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.

■ 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.

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.

EMC Compliance Statements

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 Canadiene Statement

This apparatus complies with Canadian ICES-003.
Cet appareil est confome 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.

1

Overview

Introduction

This manual describes the installation, configuration, operation, and troubleshooting of the Seg2Way™ Status Monitor/Local Control Module for the Model GS7000 GainMaker® Scaleable 4-Port Node.

In This Chapter

Model GS7000 Node Description

Overview

This section contains a brief physical and functional description of the Model GS7000 Node.

For complete information about the Model GS7000 Node, refer to *Model GS7000 GainMaker Scaleable 4-Port Node Installation and Operation Guide*, part number 4013584.

Physical Description

The Model GS7000 Node is the latest generation 1 GHz optical node platform which uses a completely new housing designed for optimal heat dissipation. The housing has a hinged lid to allow access to the internal electrical and optical components. The housing also has provisions for strand, pedestal, or wall mounting.

The base of the housing contains:

- an RF amplifier module
- AC power routing
- forward and reverse configuration modules (configuration will vary)

The lid of the housing contains:

- a fiber management tray and track (included in all nodes)
- optical receiver and transmitter modules (configuration will vary)
- power supplies (one is included; second is optional)
- a status monitor/local control module (optional)

Not every Model GS7000 Node will contain all of these modules. The Model GS7000 Node is a versatile node that can be configured to meet network requirements.

The following illustration shows the external housing of the Model GS7000 Node.

Strand Clamps
Housing Lid
Fiber Port
Power/RF Port
Housing Base
Power/RF Port
Power/Return AUX Port
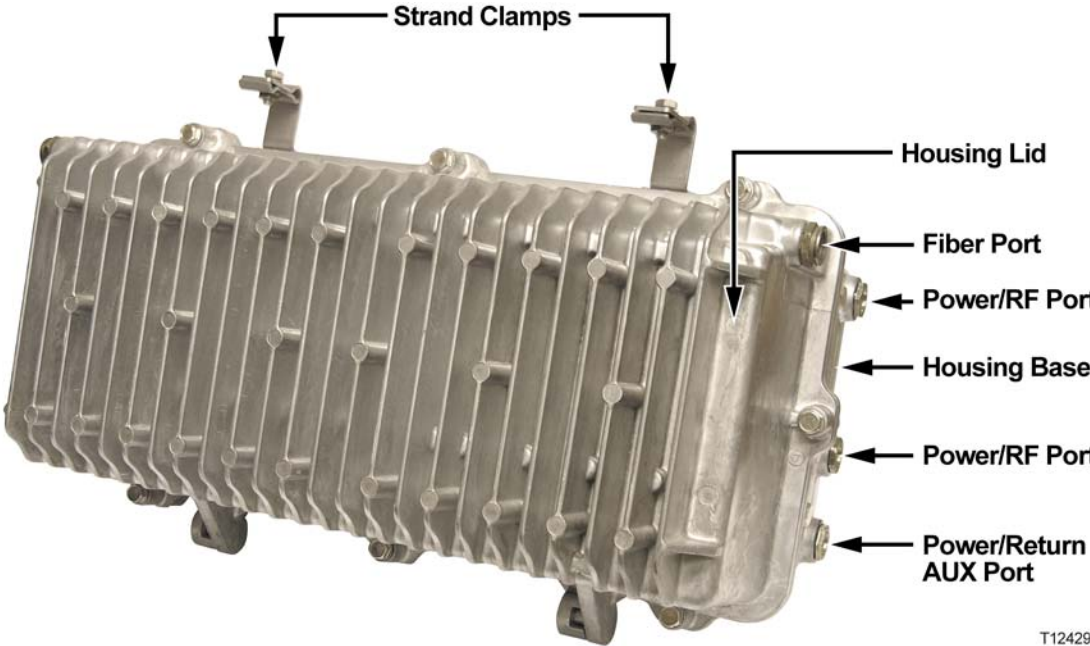
T12429

The following illustration shows the Model GS7000 Node internal modules and components. This model is the 4-way forward segmentable node. The 2-way forward segmentable node has a different RF amplifier module.
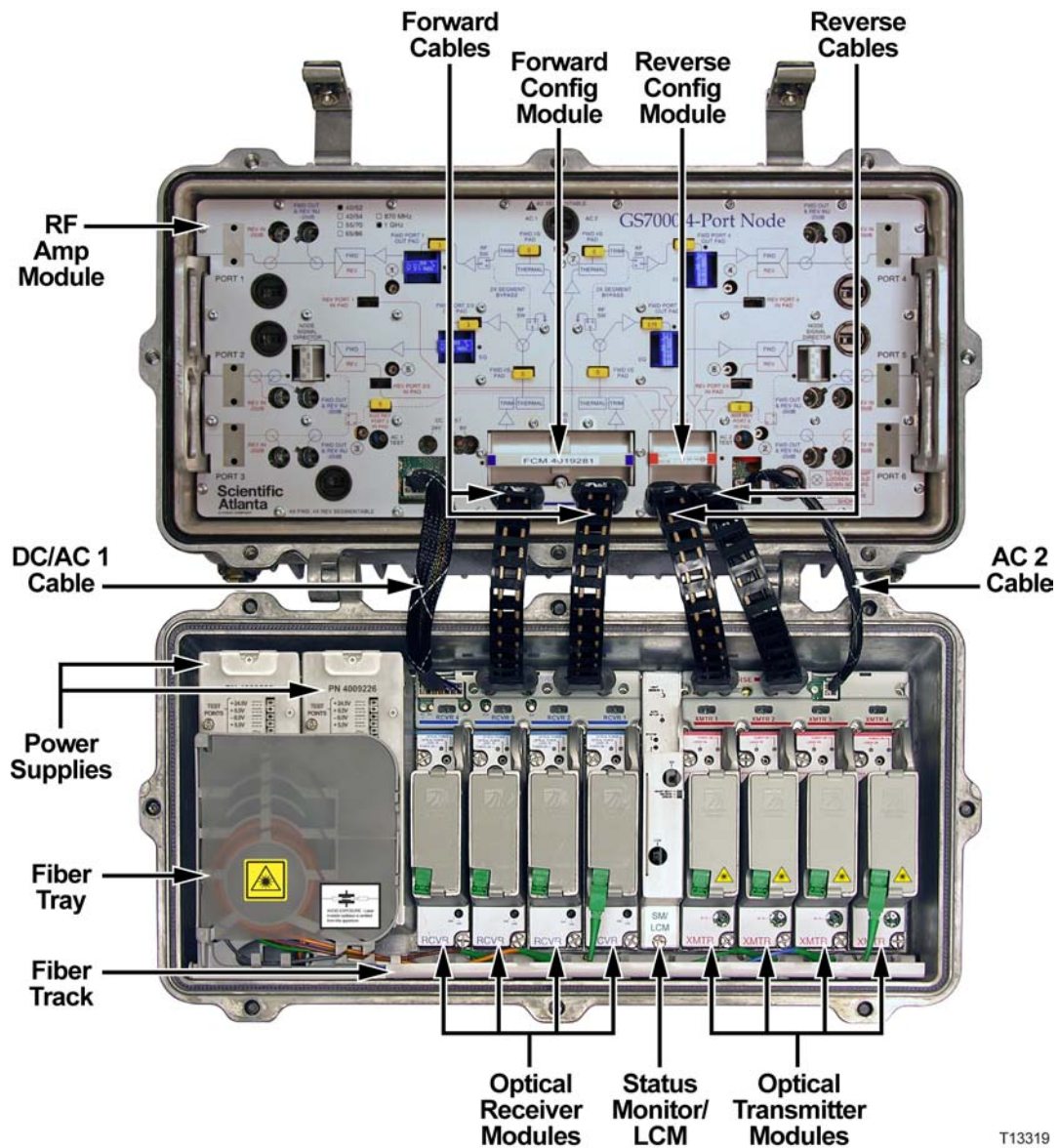
Functional Description

The Model GS7000 Node is used in broadband hybrid fiber/coax (HFC) networks. It is configured with the receivers, transmitters, configuration modules, and other modules to meet your unique network requirements. This platform allows independent segmentation and redundancy for both the forward and reverse paths in a reliable, cost-effective package.

The Model GS7000 Node receives forward optical inputs, converts the input to an electrical radio frequency (RF) signal, and outputs the RF signals at up to six ports. The forward bandwidth is from 52 MHz (or 54, or 70, or 86 MHz) to 1002 MHz. The lower edge of the passband is determined by the diplex filter and the reverse amplifier assembly. Diplex filter choices are 52 MHz, 54 MHz, 70 MHz, or 86 MHz.

The forward path of the Model GS7000 Node can be deployed with a broadcast 1310/1550 nm optical receiver with common services distributed to either four output ports (all high level) or six output ports (two high level and four lower level). The forward path can also be segmented by using one optical receiver that feeds all output ports, two independent optical receivers that each feed half of the node's output ports (left/right segmentation) or four independent optical receivers that feed four independent forward paths. Forward optical path redundancy is supported via the use of optional local control module. The type of forward segmentation and/or redundancy is determined by the type of RF amplifier assembly and Forward Configuration Module installed in the node.

The Model GS7000 Node's reverse path is equally flexible. Reverse traffic can be segmented or combined and routed to up to four FP or DFB reverse optical transmitters, or to two advanced Baseband Digital Reverse optical transmitters as part of our bdr™ system. Redundant (back-up) transmitters may be utilized. In addition, an auxiliary input path is provided for reverse signal injection (5 - 210 MHz). Reverse segmentation and/or redundancy is determined by the type of Reverse Configuration Module installed in the node.

The Model GS7000 Node accepts Optical Transmitter Modules based on the existing 694x/GainMaker optical transmitters. Reverse optical transmitters can be installed to transmit data, video, or both. Reverse bandwidth is determined by the diplex filter and the reverse amplifier assembly. Diplex filter choices are 40 MHz, 42 MHz, 55 MHz, or 65 MHz.

A new Low Power Receiver has been developed for the Model GS7000 Node, and is compatible with existing 694X and GainMaker Nodes. The Model GS7000 Node utilizes new transmitter and receiver module covers that have been designed to allow fiber pigtails storage within them, providing improved fiber management within the node.

Up to four optical receivers and up to four analog or two digital transmitters can be installed in the Model GS7000 Node.

45 - 90 V AC input power is converted to +24.5, +8.5, -6.0, and +5.5 V DC by an internal power supply to power the Model GS7000 Node.

Status Monitor/Local Control Module Description

Overview

A local control module and a status monitor are available for the Model GS7000 Node. A status monitor consists of a local control module with a transponder core module installed in the housing. The same housing is used for both units.

The units perform the following functions:

■ Local Control Module - controls redundancy and forward segmentation

■ Status Monitor - adds status monitoring capability to the local control module

Local Control Module Description

The local control module locally monitors the following node voltages and signals:

■ Receiver optical input level (all receivers)

■ Transmitter optical output level (all transmitters)

■ AC power presence (for split AC powering cases, AC power from both sides of node housing is monitored)

■ DC voltages from both primary and redundant power supplies

The local control module communicates serially with the RF amplifier module to control the optional forward band redundancy switches on the forward configuration module. It is a low-cost module that plugs into the status monitor connectors on the optical interface board.

The local control module is equipped with a craft port to allow local control of the optional forward band redundancy switches, the reverse band 6 dB (wink) attenuators, and the reverse band on/off switches through a handheld controller. All parameters monitored by the local control module can be reviewed using the handheld controller.
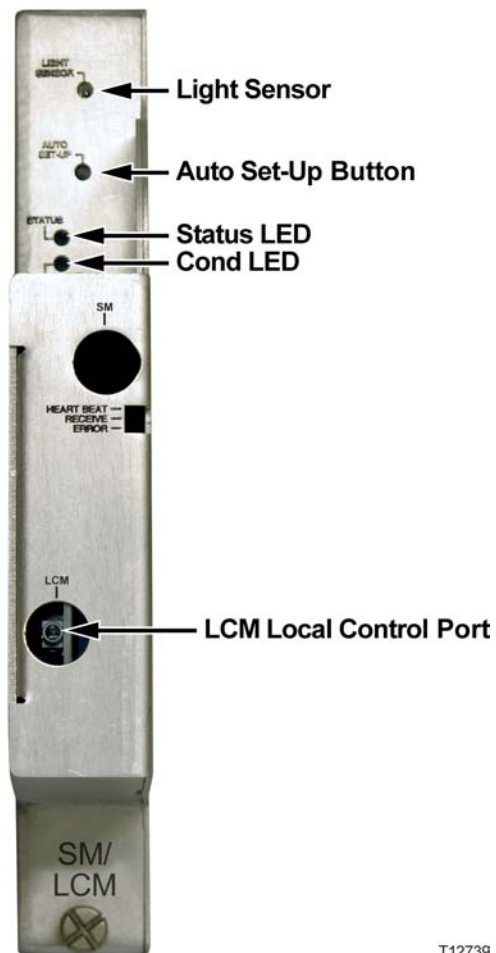
The local control module can be upgraded to a status monitor through the addition of a transponder core module. The transponder core module plugs directly onto the local control module's PWB. The mechanical housing for the status monitor and the local control module are the same.

Note: The Heart Beat, Receive, and Error indicator LEDs are only present if the transponder module is installed.

Status Monitor Description

The status monitor is HMS compliant and provides node monitoring and control capability at the cable plants headend. The following node voltages and signals are monitored and their status reported to the headend by the status monitor.

- Receiver optical input level (all receivers)
- Transmitter optical output level (all transmitters)

- AC power presence (for split AC powering cases, AC power from both sides of node housing is monitored)

- DC voltages from both primary and redundant power supplies

Commands are sent from the headend to the status monitor. The status monitor communicates serially with the RF amplifier module to control the optional forward band redundancy switches on the forward configuration module, the reverse band 6 dB (wink) attenuators on the reverse amplifier PWB, and the reverse band on/off switches on the reverse amplifier PWB.

Note: The transponder core module can be seen through the upper of two round cutouts in the cover.

Status Monitor/Local Control Module Diagram

This diagram shows how the status monitor functions.

(External Plug-Ins: Either (1) or (2))

Status Monitor Connector (J15)

- Receiver 2 Optical Output Power
- Receiver 4 Optical Output Power
- Transmitter 1 Optical Output Power
- Transmitter 2 Optical Output Power
- Transmitter 3 Optical Output Power
- Transmitter 4 Optical Output Power
- PS1_24V_Mon — Voltage Divider Div. by 5
- PS1_8V_Mon — Voltage Divider Div. by 2
- PS1_5V_Mon — Voltage Divider Div. by 2
- PS1_-6V_Mon — Voltage Shifter / Divider
- PS2_24V_Mon — Voltage Divider Div. by 5
- PS2_8V_Mon — Voltage Divider Div. by 2
- PS2_5V_Mon — Voltage Divider
- PS2_-6V_Mon — Voltage Shifter / Divider
- +5V, + 24V supply

Redundancy Control Connector (J16)

- Receiver 1 Optical Output Power
- Receiver 3 Optical Output Power
- AC1_Mon — Voltage Divider Peak Detector
- AC2_Mon — Voltage Divider Peak Detector
- Stat_Mon_RF_OUT From Core Module
- Stat_Mon_RF_IN From Receiver 1 or 2
- Stat_Mon_RF_In / Out
- Stat_Mon_RF_IN Switch
- Receiver 1 24V Switch — Default: 5V -> 24V On
- Receiver 3 24V Switch — Default: 5V -> 24V On
- Receiver 2 24V Switch — Default: 0V -> 24V Off
- Receiver 4 24V Switch — Default: 0V -> 24V Off
- 5V, 24V, GND
- Serial_Data
- Serial_Clock
- Serial_Latch

(1) Transponder Module — Transponder Serial Interface

Test2Way Craft Port Interface

(2) Craft Port — Craft Port Serial Interface

Type 91200 Terminal Craft Port Interface

Plug-In Module Connections

1- Gnd	1- Gnd (PRGRM)
2- Gnd	2- NSS / SSEL
3- RFin (Stat_Mon_RF_IN)	3- MOSI / SDATOUT
4- Craft Port TX/RX	4- MISO / SDATIN
5- Gnd	5- SCLK / SCLK
6- Gnd	6- AUXIO1
7- AC1	7- Gnd
8- AC2	8- Gnd
9- Tamper Switch	9- RFOut (Stat_Mon_RF_OUT)
10- Craft Port 24V supply	10- RFOut (Stat_Mon_RF_OUT)
11-5V supply	11- Gnd
12- Gnd	12- Gnd

Stat_Mon_RF_IN Tamper Switch Power & Gnd

Serial Interfaces & IOs

UART0

SPI Interface & IOs

Micro Controller

- Analog Inputs (monitored) ADC0, ADC1, Comparators
- Filters / Dividers
- JTAG Header
- I/Os
- Serial Interface USART0
- I2C
- Hardware Config. Switch
- Oscillator 11.0592MHz
- EEPROM 1Kbytes

T13246

2

Installation

This chapter describes the physical installation of the Seg2Way Status Monitor/Local Control Module into the housing lid of the Model GS7000 Node.

In This Chapter

Installing the SM/LCM

Overview

You must perform the following steps to install the SM/LCM in the Model GS7000 Node.

1   Open the node housing.

2   Install the SM/LCM into the housing lid.

3   Close the node housing.

The following sections describe each of these steps in detail.

Opening the Housing

Open the housing as follows.

1   Remove the bolts securing the lid to the base.

2   Carefully open the lid to allow access to the inside of the housing.

3   Inspect gaskets on the cover flange and on the test port plugs.

4   Replace any gaskets showing signs of wear (cracked, twisted, pinched, or dry) with new, silicon-lubricated gaskets.

Installing the Module

Complete the following steps to install the SM/LCM into the node lid.

1   Inspect the pins on the electrical connector on the rear panel of the SM/LCM module prior to inserting the module in the node.

> ⚠ **CAUTION:**
>
> **Make sure that all pins on the connector are straight and also level, i.e., they are all at the same height. If not, damage may result to the connector pins upon installation, installation may be impeded, or the module may not function properly.**

Note: If the pins are not straight and level, the module should be returned to the factory. Refer to *Chapter 5, Customer Support Information*, for information on obtaining support and returning products.

Connector Pins
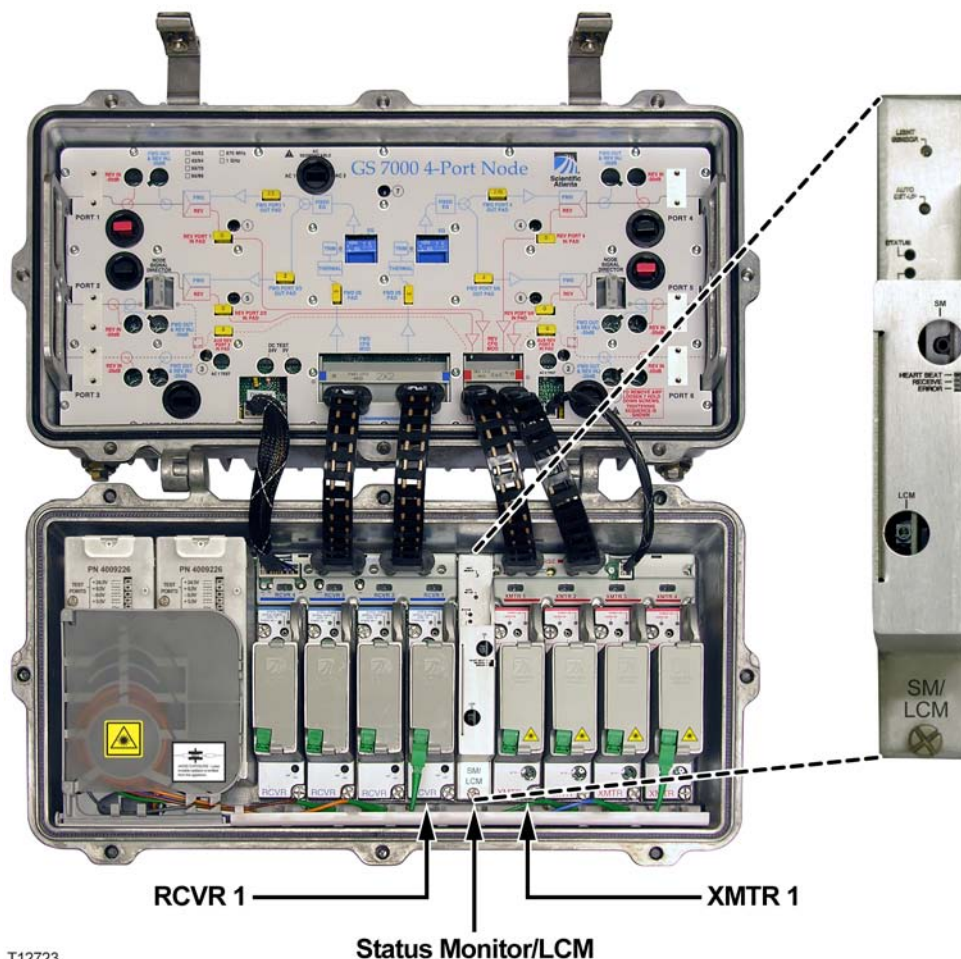
Guide Pin

T13581
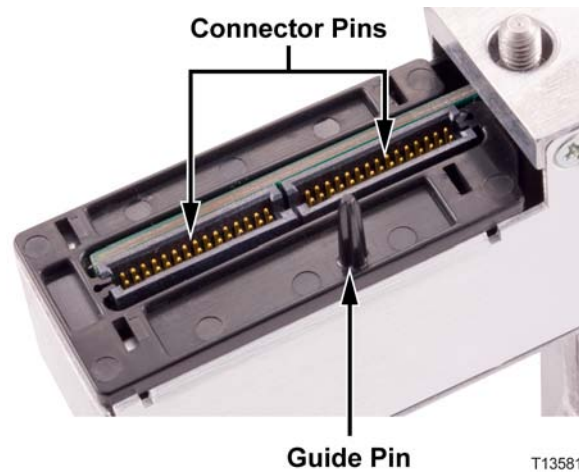
2 Carefully insert the SM/LCM into the node lid between the RCVR 1 and XMTR 1 positions as shown below.

⚠️ **CAUTION:**

Do not use too much force when seating the module in the node. If too much resistance is felt, remove the module and inspect the module electrical connector pins. Make sure that the pins are straight and level before re-attempting installation.

T12723

Important: To ensure proper connector alignment and fit, make sure that the connector guide pin on the back of the SM/LCM module inserts into the alignment hole on the optical interface board (OIB) as shown below.
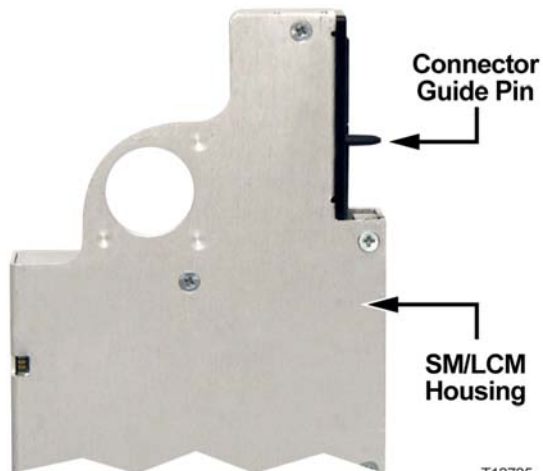
T12725

3 Tighten the module hold-down screws to secure the module in the lid. Torque the screws from 25 to 30 in-lbs (2.8 to 3.4 Nm).

Closing the Housing

Close the housing as follows.

1 Ensure any worn gaskets are replaced, and the gaskets are clean and in the correct position.
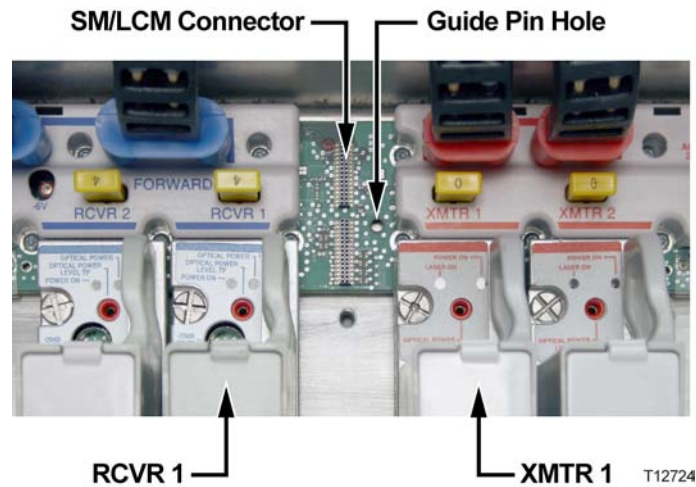
2 Carefully close the lid.

> ⚠ **CAUTION:**
>
> **Use caution when closing housing. Improper closing may result in the Model GS7000 Node not being sealed from the environment.**

3 For strand-mounted housings, pull the lid away from the base and remove the slack from the hinge before rotating the lid up toward the base.

4 Ensure no cables are pinched between lid and base.

5 Secure lid to base with bolts. Tighten from 5 to 12 ft-lbs (6.8 to 16.3 Nm) in the sequence shown in the following illustration. Repeat the sequence twice, ending with the final torque specification.
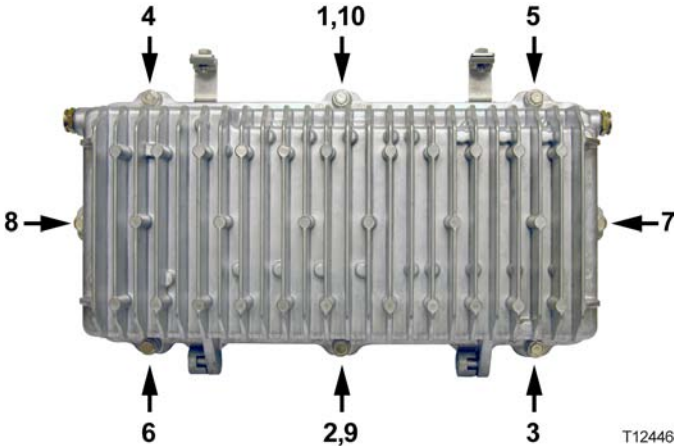
3

Configuration

This chapter describes configuration procedures for the Seg2Way Status Monitor/Local Control Module.

In This Chapter

Local Control Module Configuration Procedure

Introduction

The LCM needs to know the node's hardware configuration (number of receivers, transmitters, power supplies, and AC lines mounted or connected) so that it can control the node's behavior correctly. If an LCM was mounted in the node at manufacture, then it should be configured correctly as shipped. The configuration data is stored in an EEPROM residing on the LCM main board.

The LCM includes a craft port module that plugs into the LCM main board. The craft module contains a local control (craft) port that can be used to configure the LCM using a handheld programming terminal. This allows access to the LCM menu only, which provides direct access to the node's configuration.

LCM Configuration Parameters

The following table describes the available LCM configuration parameters when using a handheld programming terminal with terminal application "Node_GS7K.app", software number 538888 loaded.

Menu Item	Configuration Parameter	Description/Values
0	RX Status, RO RX1 Status, RO RX2 Status, RO RX3 Status, RO RX4 Status, RO RX1 Power Switch RX2 Power Switch RX3 Power Switch RX4 Power Switch RFInSwitch to TP	Description: Read-Only status indication. Indicates status of receivers 1 through 4, and each receiver's power switch status. Values: Active, Not Active

Menu Item	Configuration Parameter	Description/Values
1	RX & TX Config RX1 RX2 RX3 RX4 TX1 TX2 TX3 TX4	Description: Read/Write configurable parameter. Specifies whether receivers 1 through 4 and transmitters 1 through 4 are installed in the node. Values: Present, Absent
2	PS Config AC1 AC2 PS1 PS2	Description: Read/Write configuration parameter. Specifies whether AC input power 1 and/or 2, and power supplies 1 and 2 are installed in the node. Values: Present, Absent
3	RX Tresholds RX1 Min RX2 Min RX3 Min RX4 Min RX1 Max RX2 Max RX3 Max RX4 Max	Description: Read/Write configuration parameter. Specifies the switching levels for the two AB switches. Enter minimum and maximum power thresholds for receivers 1 through 4 switching levels. Values: #.# mW Defaults: 0.5 mW min., 2.0 mW max.
4	TX Thresholds TX1 Min TX2 Min TX3 Min TX4 Min TX1 Max TX2 Max TX3 Max TX4 Max	Description: Read/Write configuration parameter. Specifies the minimum and maximum power thresholds for transmitters 1 through 4 switching levels. Values: #.# mW Defaults: 0.5 mW min., 2.3 mW max.

Menu Item	Configuration Parameter	Description/Values

5	Node Setting
	    AB Switch 1
	    AB Switch 2
		Description: Read/Write configuration parameter. Specifies the AB switch settings.
		
		Values: Preferred A, Preferred B, Forced A, Forced B.
		Defaults: Preferred A

5	Node Setting
	    Reverse Port 1
	    Reverse Port 2
	    Reverse Port 4
	    Reverse Port 5
		Description: Read/Write configuration parameter. Specifies the reverse port settings.
		
		Values: On 0 dB, Off, On -6 dB
		Defaults: On 0dB

5	Node Setting Laser Type	Description: Read/Write configuration parameter. Specifies the installed transmitter type. Values: Analog Laser, bdr uncooled, bdr ITU Default: Analog Laser

5	Node Setting
	    Forward Seg.
	    Reverse Seg.
		Description: Read/Write configuration parameter. Specifies the forward and reverse segmentation.
		
		Values: Combined, Dual, Quad
		Defaults: Forward Seg.=Dual, Reverse Seg.=Combined

Menu Item	Configuration Parameter	Description/Values
6	RX & TX Power RX1 Power RX2 Power RX3 Power RX4 Power TX1 Power TX2 Power TX3 Power TX4 Power	Description: Read-Only status indication. Indicates the operating power level of receivers 1 through 4 and transmitters 1 through 4. Values: #.# mW
7	Power Supplies PS1 24V PS1 8V PS1 5V PS1 -6V PS2 24V PS2 8V PS2 5V PS2 -6V RCM Temp	Description: Read-Only status indication. Indicates the output voltage levels of power supplies 1 and 2. RCM Temp indicates the operating temperature of the local control module. Values: #.# V (for voltage levels), °F (for module temperature)
8	Product Info, RO RCM Up Time Time In Service HandHeld SW Ver HandHeld SW No. RCM SW Ver RCM SW No. RCM Model No. Alarm Details	Description: Read-Only status indication. Indicates various product properties such as up time, time in service, and software version numbers. Values: Hours (up time), Days (time in service), nnnnnn (various alpha-numeric values for version/number)

Menu Item	Configuration Parameter	Description/Values

9	Copy Parameters
	
	    From Product
	
	        Setting 1
	        Setting 2
	        Setting 3
	        Setting 4
	        Setting 4
	        Setting 6
	        Setting 7
	        Setting 8
	        Setting 9
		Description: Read/Write configuration parameter. Store up to nine node configuration settings for copying to a LCM in another node.
		
		Values: Used, Empty

9	Copy Parameters
	
	    To Product
	
	        Setting 1
	        Setting 2
	        Setting 3
	        Setting 4
	        Setting 4
	        Setting 6
	        Setting 7
	        Setting 8
	        Setting 9
		Description: Read/Write configuration parameter. Copy up to nine node configuration settings to a LCM in another node.
		
		Values: Abort, Restore

9	Copy Parameters Restore Default	Description: Allows the restoration of the default settings, which is for a fully populated node with two AC lines, two power supplies, four receivers, and four transmitters installed. Values: Abort, Restore

Configuring the LCM

The LCM can be configured using two different methods, as follows:

- Using the Auto-Setup button

- Using a handheld programming terminal

The following sections describe these procedures in detail.

Configuring the LCM Using the Auto-Setup Button

Complete the following steps to configure the LCM using the Auto-Setup button.

1 Connect power to the node.

2 Connect optical fibers to all installed receivers.

3 Press and release the Auto-Setup button on the LCM.

Note: Use a small diameter screwdriver, or other small round tool that fits the hole in the housing, to press the Auto-Setup button. Do not press hard. The button only depresses about 1/64 inch (0.4 mm). You can feel the button depress, but likely not hear it in a noisy environment.

Results: When pressed, the Auto-Setup button performs the following actions:

- Checks for installed modules

- Sets the switching levels for the two AB switches

- Resets all reverse band 6 dB (wink) switches to "low"

The Auto-Setup process typically takes less than one second (~50 ms).

Note: During the module check, the LCM micro-controller samples the inputs from the optical transmitters (up to 4), optical receivers (up to 4), power supplies (up to 2), and AC lines (up to 2), to determine which of these items are installed in the node.

Important: In order for a module to be detected and counted as "installed", it must be functioning properly at the time the Auto-Setup button is pressed. This includes proper optical levels being fed to the receivers.

Configuring the LCM Using the Model 91200 Handheld Programming Terminal

Complete the following steps to configure the LCM using the handheld terminal.

1 Connect the Model 91200 Handheld Programming Terminal to the local control port on the LCM as shown in the following illustration.

Type 91200 Handheld
Programming Terminal

T12726

Local Control
Module
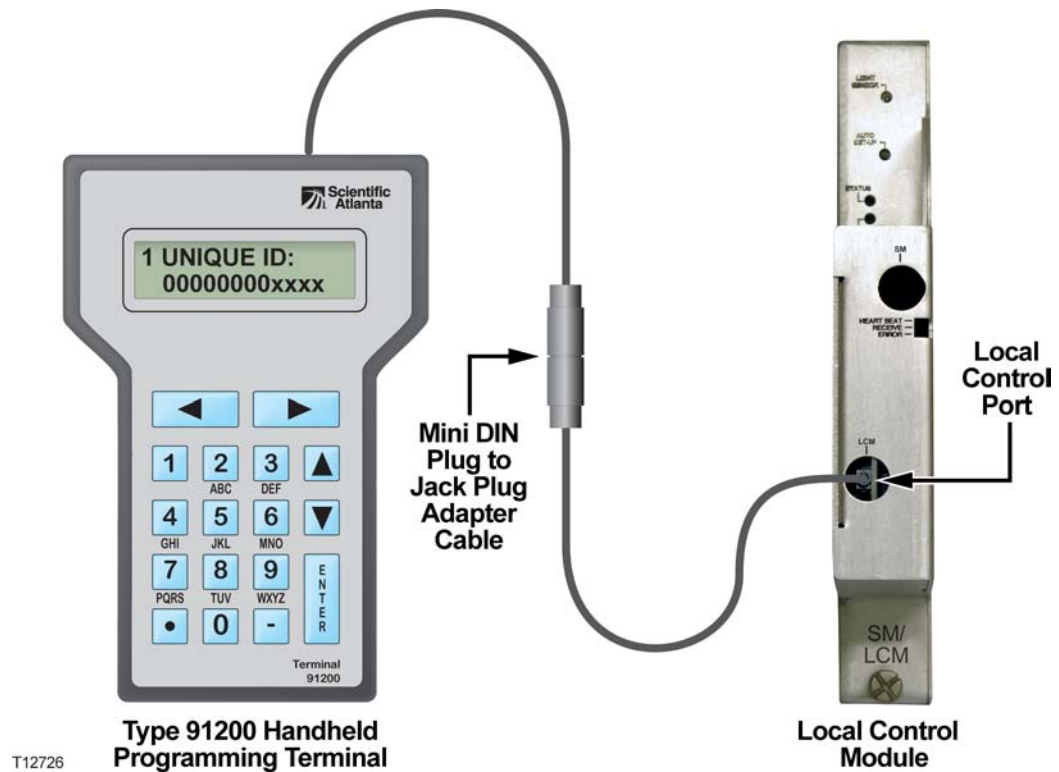
Result: The handheld terminal attempts to identify the device type of the node. If recognized, terminal application "Node_GS7K.app", software number 538888, is loaded into the handheld terminal's memory and the LCM/node configuration menu items are available. If the handheld terminal's screen does not illuminate, make sure that its plug is fully inserted into the local control port on the module.

Note: If the handheld terminal cannot identify the device type, or cannot find its associated terminal application, the LCM/node configuration menu items will not load. Refer to the handheld programming terminal's download kit user documentation.

2   Select menu item **1 - RX & TX Config** and enter its sub-menu.

    a   Set receivers RX1 through RX4 and transmitters TX1 through TX4 as **Present** or **Absent** in the node.

3   Select menu item **2 - PS Config** and enter its sub-menu.

    a   Set AC inputs AC1and AC2, plus power supply modules PS1 and PS2 as **Present** or **Absent** in the node.

4   Select menu item **3 - RX Thresholds** and enter its sub-menu.

    a   Set the minimum and maximum power thresholds for receivers RX1 through RX4.

    Note: This sets the switching levels for the two AB switches. The defaults are 0.5 mW minimum and 2.0 mW maximum.

5   Select menu item **4 - TX Thresholds** and enter its sub-menu.

      a Set the minimum and maximum power thresholds for transmitters TX1 through TX4.

          Note: The defaults are 0.5 mW minimum and 2.3 mW maximum.

6 Select menu item **5 - Node Settings** and enter its sub-menu.

      a Set the appropriate settings for your installation. The default settings are as follows:

          AB Switch 1, AB Switch 2: Preferred A

          Reverse Port 1, 2, 4, and 5: On, 0 dB

          Laser Type: Analog Laser

          Forward Seg: Dual

          Reverse Seg: Combined

          Note: See *LCM Configuration Parameters* (on page 18) for other setting options.

Note: Other LCM menu items are not directly related to configuration of the node, but are primarily read-only status indications. Other menu items of interest are:

■ Menu item **9 - Restore Defaults**, that allows the restoration of the default settings which is for a fully populated node with two AC lines, two power supplies, four receivers, and four transmitters installed.

■ Menu item **9 - Copy Parameters**, that allows you to store up to nine node configuration parameter settings and copy (restore) them to another LCM located in different node.

Status Monitor Configuration Procedure

Introduction

The SM needs to know the node's hardware configuration (number of receivers, transmitters, power supplies, and AC lines mounted or connected) so that it can monitor and control the node's behavior correctly. This configuration data is stored in an EEPROM residing on the SM main board.

The SM includes an HMS compliant transponder module that plugs into the LCM main board and has been programmed to emulate a legacy CheetahNet™ CMX transponder. The transponder is designed to work without manual configuration and is provisioned and managed by the CheetahNet system.

The required setup steps are:

1   Install the SM/LCM in the node.

    Note: Refer to *Installing the SM/LCM* (on page 12).

2   Configure the LCM using the Auto-Setup button.

    Note: Refer to *Configuring the LCM Using the Auto-Setup Button* (on page 23) for instructions.

3   Configure the SM using the CheetahNet system.

    Note: Refer to the instructions in the next section.

Configuring the SM in CheetahNet

The Configuration Wizard is the primary tool used to add devices to the CheetahNet system (formerly know as NetMentor). For additional information please refer to the CheetahNet Administration Guide (Tollgrade part number 6510-30-0357) that was provided with the CheetahNet software. You can also access the document from the Help menu within CheetahNet.

Before adding the GS7000 Node Seg2Way SM/LCM device into CheetahNet it is important to have the following information:

- Its RF address

- The serial number and physical location where the transponder is being installed

Note: The person adding the device into CheetahNet must also be aware of the naming conventions used in the software to identify a device as well as the associated HEC's (headend controllers), RF Modems, RPSs (reverse path switches) and RPS port number on which the device will be communicating.
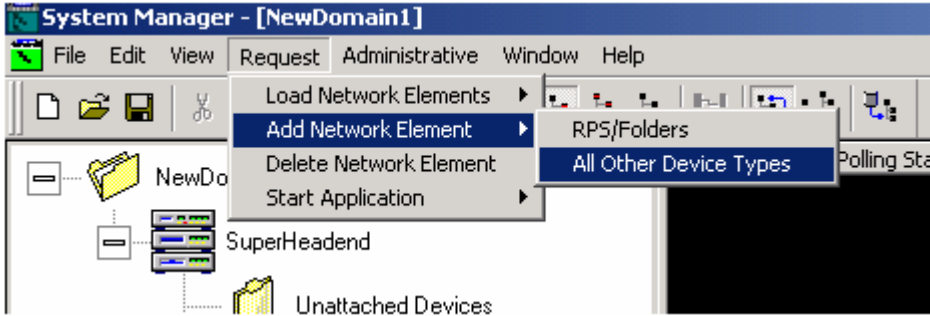
Starting the Configuration Wizard

The Configuration Wizard is accessed from the CheetahNet System Manager. It can be started in three different modes; Add Device, Add Similar Device, or Edit Device. You can use any one of the modes to start the application since you can modify filter settings and perform other desired tasks afterwards.

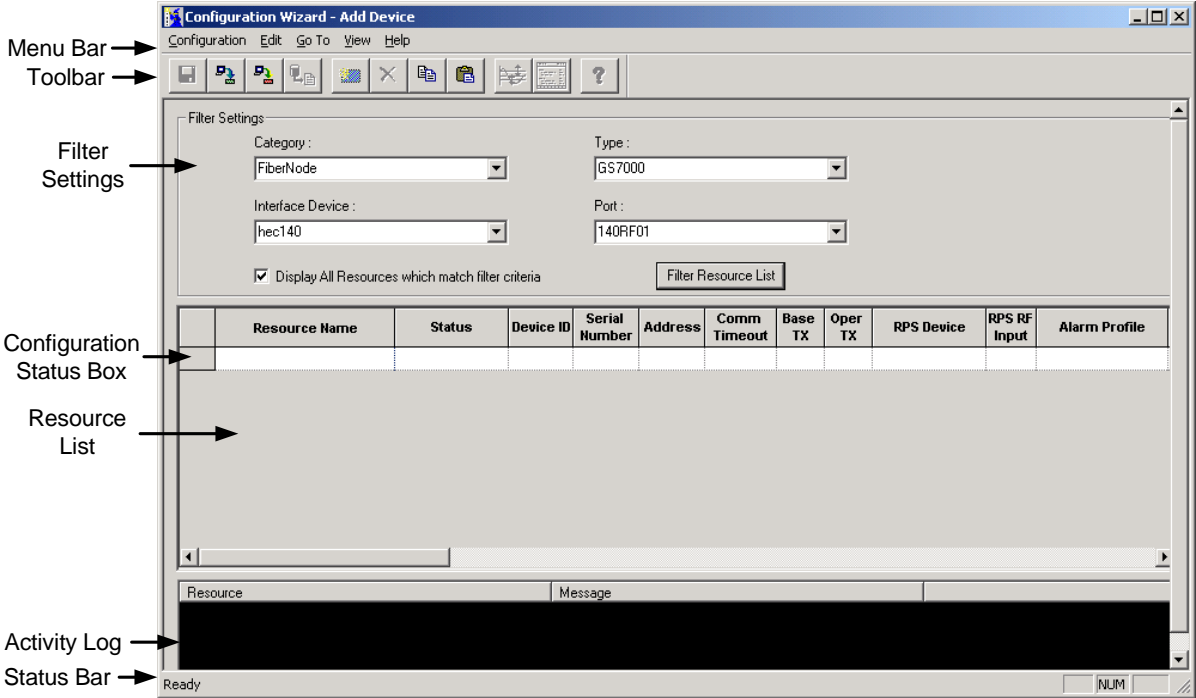Perform the following steps to start the Configuration Wizard in Add Device mode.

1 Start the System Manager.

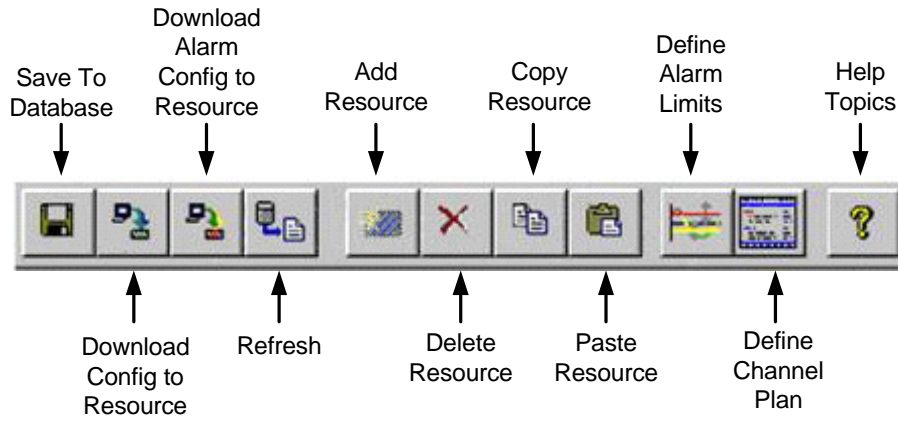**Result:** The System Manager main screen displays.

2 On the System Manager menu bar, select **Request - Add Network Element - All Other Device Types**.

Result: The Configuration Wizard main screen displays.

Note: The title bar indicates which start up mode was used, in this case Add Device mode.

3   Use the Configuration Wizard toolbar buttons to perform most operations.

Important: If you are unfamiliar with the Configuration Manager please refer to Chapter 2 - Working with the Configuration Wizard in the CheetahNet Administration Guide (Tollgrade part number 6510-30-0357) that was provided with the CheetahNet software. You can also access the document from the Help menu within CheetahNet.

Adding the GS7000 Device Using the Configuration Wizard

Perform the following steps to add the GS7000 device.

1   Start the Configuration Wizard.

2   Under **Filter Settings** in the **Category** field, click the down arrow and select **FiberNode** from the drop-down list.

3   Under **Filter Settings** in the **Type** field, click the down arrow and select **GS7000**.

   Note: If the GS7000 device type is not listed then contact the Tollgrade Technical Assistance department at 888-486-3510 and request the CheetahNet device driver for the GS7000 Seg2Way device type ID# 8704.

4   Under **Filter Settings** in the **Interface Device** field, click the down arrow and select the associated HEC that will be used to communicate with the GS7000 Seg2Way SM/LCM.

5   Under **Filter Settings** in the **Port** field, click the down arrow and select the associated RF modem port that will be used to communicate with the GS7000 Seg2Way SM/LCM.

6   Under **Filter Settings**, click the **Filter Resource List** button.

7   On the Configuration Wizard toolbar, click the **Add Resource** button.

8   In the Resource List fields, enter the GS7000 Seg2Way SM/LCM device's **Resource Name**, **Address**, **RPS Device**, and **RPS RF Input**.

9   On the toolbar, click the **Save to Database** button.

10   On the toolbar, click the **Download Config to Resource** button.

   Note: This step could take about a minute or two depending on the total number of devices that are currently deployed and being monitored.

   Result: When completed a detailed description is displayed in the **Activity Log** window.

11   Close the Configuration Wizard and return to the CheetahNet System Manager.

12   On the System Manager menu bar, select **Request - Load Network Elements - All Newly Added Devices**.

   Result: The new device should now display in the System Manager tree view under the associated HEC RF modem.

Verifying Status Monitor Configuration Locally

In the event that communications with the SM/LCM in CheetahNet is not successful it is recommended that the specific communication parameters be verified via a local connection to the device. The following equipment is required:

■   The Test2Way™ for Scientific Atlanta GS7000 Seg2Way SM/LCM application

■   A Scientific Atlanta local interface cable (part number 1004044)

■   A Windows-based laptop computer with a DB-9 serial port connector

Note: If the device has already been added to the CheetahNet system you should place the device in maintenance mode (polling off) before connecting to it locally.

Connect as shown in the following illustration and start the Test2Way for Scientific Atlanta GS7000 Seg2Way SM/LCM application.

Adapter Cable

Transponder Module

Windows-Based Laptop Computer

Status Monitor/ Local Control Module
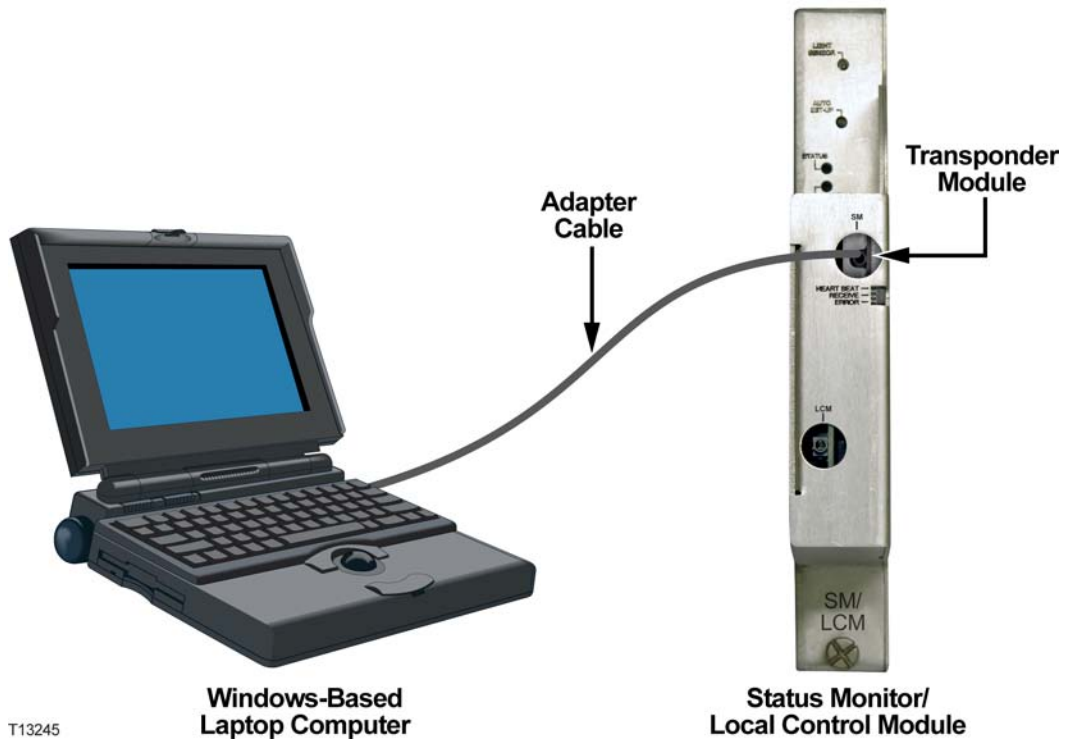
SM/ LCM

T13245

The following screen shows the specific information that can be gathered from the Test2Way for Scientific Atlanta GS7000 Seg2Way SM/LCM application. In order to verify specific attributes click on the associated **Get** button to display the reading in the text box field.
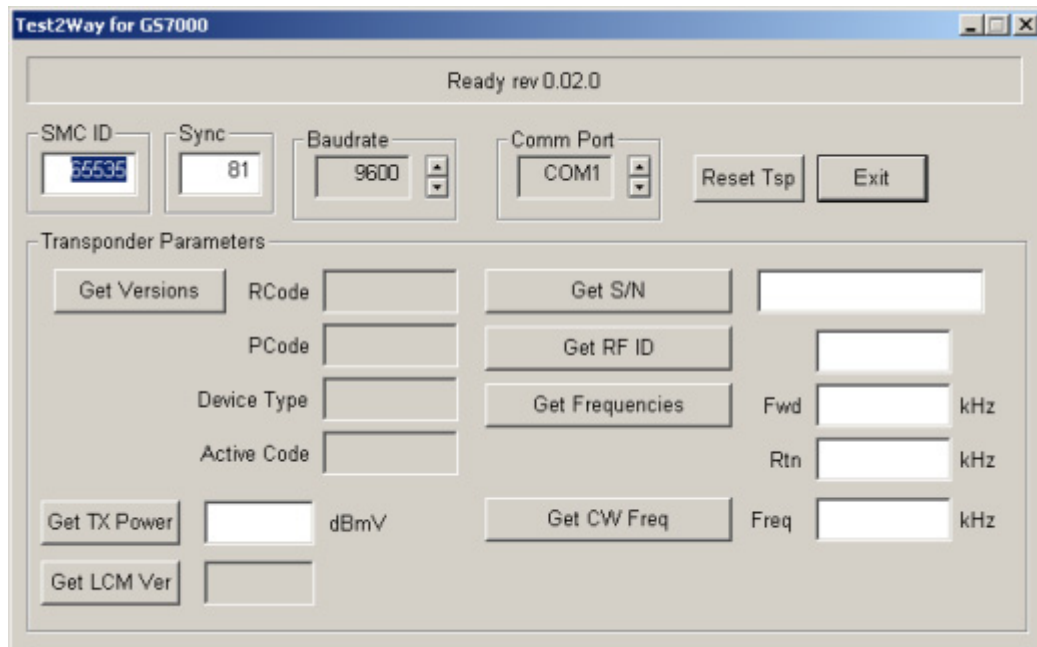
Important: This application should only be used to gather information from the SM/LCM. If a need arises to make changes to any of the parameters then you must contact the Tollgrade Technical Assistance Center at 888-486-3510 and ask for assistance on how to make adjustments to any of the parameters supported in the application.

4

Troubleshooting

This chapter contains instructions for troubleshooting SM/LCM operation.

In This Chapter

SM/LCM Sensors and Indicators

The SM/LCM housing contains a sensor and two indicators which provide the same indications whether the module is a local control module or a full status monitor.

Note: Refer to *Status Monitor/Local Control Module Description* (on page 6) for an illustration of the housing and indicators.

The functions of the sensor and indicators are described in the following table.

LED	Indication
LIGHT SENSOR	This ambient light sensor sends a trap to the status monitoring and control software indicating that the node housing is open.
COND (Green LED)	**BLINK (slow)** - Blinks approximately once a second if the module receives the correct input power voltage.
STATUS (Red LED)	**OFF** - Normal operation. **BLINK (slow)** - Minor alarm. One or more of the measured parameters is over threshold limit. Blinks approximately once per second. **FLASH (fast)** - Redundancy is ON. One or both of the primary optical receivers has failed and the secondary receivers are now operating. Flashes approximately two/three times per second. **ON (solid)** - 1x/2x Fwd Seg: Redundancy has failed. One or both of the primary optical receivers has failed and the secondary receivers are also not operating. 3x and 4x Fwd Seg: A receiver has failed.

Local Control Module Troubleshooting

Introduction

The LCM indicates its status through the STATUS and COND LEDs on the front of the module housing. More detailed status information can be obtained using the handheld programming terminal.

The following sections provide troubleshooting procedures based on the STATUS and COND LED indications.

Green COND LED not Blinking

If the green COND LED is not blinking, complete the following steps to troubleshoot.

1   Make sure the LCM is mating correctly with the connectors on the optical interface board (OIB) in the node. See *Installing the SM/LCM* (on page 12) for instructions on proper installation.

2   If the COND LED is still not blinking, remove the LCM from the node and examine the pins of LCM connectors. If any are bent or broken, replace the LCM.

3   If the COND LED is still not blinking, input power is not being supplied to the LCM through the OIB. Check and replace the OIB if necessary. Refer to *Model GS7000 GainMaker Scaleable 4-Port Node Installation and Operation Guide*, part number 4013584 for more information.

Red STATUS LED Blinking Slowly

If STATUS LED is blinking slowly, there is at least one alarm condition. This indication could be caused by:

■   Improper configuration of the LCM

■   Real operating condition problems

The following sections explain how to troubleshoot each of these possibilities.

Improper Configuration of the LCM

An improperly configured LCM can be the cause of this indication. Improperly configured, for example, can mean that the LCM's configuration does not match the actual receivers/transmitters mounted in the node. This could happen if the LCM you are using was previously used in another node.

Complete the following steps to troubleshoot.

1   Verify the LCM configuration. Refer to *Configuring the LCM* (on page 22) for instructions on properly configuring the LCM.

2   If the LCM configuration is correct, then follow the procedures in the next section to check for an operating condition that could cause the alarm.

Real Operating Condition Problems

Complete the following steps to determine what operating condition alarms exist.

1   Connect the Model 91200 Handheld Programming Terminal to the local control port on the LCM. Refer to *Configuring the LCM Using the Model 91200 Handheld Programming Terminal* (on page 23) for instructions.

2   Use menu item **1 - RX & TX Config** to check which receivers and transmitters are set as Present or Absent in the node. The configuration settings must match what is physically installed and operating.

3   Use menu item **2 - PS Config** to check which AC lines and PS modules are set as Present or Absent in the node. The configuration settings must match what is physically installed.

4   Use menu item **3 - RX Thresholds** to check the RX threshold levels. Are they correct? If not, reset the values.

5   Use menu item **4 - TX Thresholds** to check the TX threshold levels. Are they correct? If not, reset the values.

6   Use menu item **6 - Rx & Tx Power** to check the operating power levels against set threshold levels for alarms from steps 4 and 5.

7   Use menu item **7 - Power Supplies** to check the power supply measurements for out-of-range values.

Note: The thresholds for the power measurements are neither shown nor settable via the handheld terminal. These thresholds are hard-coded.

Red STATUS LED Flashing Fast

If STATUS LED is flashing fast, one or both of the secondary receivers is being turned on, i.e., redundancy is in use.

Complete the following steps to verify that the redundancy switching is correct.

1   Connect the Model 91200 Handheld Programming Terminal to the local control port on the LCM. Refer to *Configuring the LCM Using the Model 91200 Handheld Programming Terminal* (on page 23) for instructions.

2   Use menu item **5 - Node Setting**, sub-menus **5.1 - AB Switch 1** and **5.2 AB Switch 2**, to check the settings of the AB switches (Preferred A, Preferred B, Forced A, or Forced B). If not set correctly, reset as required.

3   Use menu item **6 - Rx & Tx Power** to check the optical power levels of the receivers against their set thresholds in menu item **3 - RX Thresholds**. This allows you to see which primary receivers have failed and had their corresponding secondary receivers turned on. Use menu item **0 - RX Status** to verify the status of the corresponding receivers.

Red STATUS LED On Solid

If the STATUS LED is on (solid RED), redundancy has failed. One or both of the secondary receivers could not be turned on and operated when their corresponding primary receiver failed.

To troubleshoot this condition, use the same procedure as in **Red COND LED Flashing Fast**, but look for the failure of both primary and secondary receivers.

5

Customer Support Information

Introduction

This chapter contains information on obtaining product support and returning products to Scientific Atlanta.

In This Chapter

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 Scientific Atlanta office.
you have customer service questions or need a return material authorization (RMA) number	call the nearest Customer Service center or Scientific Atlanta 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	SciCare™ Services Atlanta, Georgia United States	For *Technical Support*, call: ■ Toll-free: 1-800-722-2009 ■ Local: 678-277-1120 (Press **2** at the prompt) For *Customer Service* or to request an RMA number, call: ■ Toll-free: 1-800-722-2009 ■ Local: 678-277-1120 (Press **3** at the prompt) ■ Fax: 770-236-5477 ■ E-mail: customer.service@sciatl.com
Europe, Middle East, Africa	Belgium	For *Technical Support*, call: ■ Telephone: 32-56-445-197 or 32-56-445-155 ■ Fax: 32-56-445-053 For *Customer Service* or to request an RMA number, call: ■ Telephone: 32-56-445-133 or 32-56-445-118 ■ Fax: 32-56-445-051 ■ E-mail: elc.service@sciatl.com
Japan	Japan	■ Telephone: 81-3-5908-2153 or +81-3-5908-2154 ■ Fax: 81-3-5908-2155 ■ E-mail: yuri.oguchi@sciatl.com
Korea	Korea	■ Telephone: 82-2-3429-8800 ■ Fax: 82-2-3452-9748 ■ E-mail: kelly.song@sciatl.com
China (mainland)	China	■ Telephone: 86-21-6485-3205 ■ Fax: 86-21-6485-3205 ■ E-mail: xiangyang.shan@sciatl.com
All other Asia-Pacific countries & Australia	Hong Kong	■ Telephone: 852-2588-4746 ■ Fax: 852-2588-3139 ■ E-mail: support.apr@sciatl.com

Region	Centers	Telephone and Fax Numbers
Brazil	Brazil	For *Technical Support*, call: ■ Telephone: 55-11-3845-9154 ext 230 ■ Fax: 55-11-3845-2514 For *Customer Service* or to request an RMA number, call: ■ Telephone: 55-11-3845-9154, ext 109 ■ Fax: 55-11-3845-2514 ■ E-mail: luiz.fattinger@sciatl.com
Mexico, Central America, Caribbean	Mexico	For *Technical Support*, call: ■ Telephone: 52-3515152599 ■ Fax: 52-3515152599 For *Customer Service* or to request an RMA number, call: ■ Telephone: 52-55-50-81-8425 ■ Fax: 52-55-52-61-0893 ■ E-mail: karla.lugo@sciatl.com
All other Latin America countries	Argentina	For *Technical Support*, call: ■ Telephone: 54-23-20-403340 ext 109 ■ Fax: 54-23-20-403340 ext 103 For *Customer Service* or to request an RMA number, call: ■ Telephone: 770-236-5662 ■ Fax: 770-236-5888 ■ E-mail: veda.keillor@sciatl.com

Return Product for Repair

You must have a return material authorization (RMA) number to return a product. Contact the nearest customer service center and follow their instructions.

Returning a product to Scientific Atlanta for repair includes the following steps:

- *Obtaining an RMA Number and Shipping Address* (on page 42)
- *Completing the Scientific Atlanta Transmission Networks Repair Tag* (on page 43)
- *Packing and Shipping the Product* (on page 46)

Obtaining an RMA Number and Shipping Address

You must have an RMA number to return products.

RMA numbers are only valid for 60 days. RMA numbers older than 60 days must be revalidated by calling a customer service representative before the product is returned. You can return the product after the RMA number is revalidated. Failure to comply with the above may delay the processing of your RMA request.

Complete the following steps to obtain an RMA number and shipping address.

1   Contact a customer service representative to request a new RMA number or revalidate an existing one.

    Refer to *Support Telephone Numbers* (on page 40) to find a customer service telephone number for your area.

2   Provide the following information to the customer service representative:

    - Your company name, contact, telephone number, email address, and fax number
    - Product name, model number, part number, serial number (if applicable)
    - Quantity of products to return
    - A reason for returning the product and repair disposition authority
    - Any service contract details

3   A purchase order number or advance payment to cover estimated charges will be requested at the time a customer service representative issues an RMA number.

    Notes:

    - For credit card or cash in advance customers, a proforma invoice will be sent to you upon completion of product repair listing all charges incurred.
    - Customer service must receive a purchase order number within 15 days after you receive the proforma invoice.

- In-warranty products can accrue costs through damage, misuse, cosmetics, or if no problem is found. Products incurring costs will not be returned to you without a valid purchase order number.

4   Once an RMA number has been issued, a confirmation e-mail or fax will be sent to you detailing the RMA number, product and product quantities authorized for return, together with shipping address details and RMA terms and conditions.

   Note: Alternatively, you may obtain an RMA fax request form, complete and fax it to a customer service representative, or e-mail your completed request form to: customer.service@sciatl.com.

5   Go to *Completing the Scientific Atlanta Transmission Networks Repair Tag* (on page 43).

Completing the Scientific Atlanta Transmission Networks Repair Tag

Product returned for repair, both in-warranty and out-of-warranty, should have a repair tag attached to the product detailing the failure mode. A supply of tags can be obtained free of charge by calling a customer service representative.

The Scientific Atlanta Transmission Networks repair tag provides important failure information to the Scientific Atlanta repair department. This information will reduce the amount of time needed to repair the unit and return it to you. This information can also reduce the cost of out-of-warranty repairs.

It is best to have the Scientific Atlanta Transmission Networks repair tag completed by a person knowledgeable about the failure symptoms of the unit to be returned for repair. The tag should be securely attached to the failed unit with the elastic string, tape, or another method and returned to Scientific Atlanta.

Complete the following steps to fill out the Scientific Atlanta Transmission Networks repair tag.

1   Complete header information.

- ■ RMA Number: Enter the RMA number provided by the Scientific Atlanta customer service representative. All RMA numbers start with "3" and are followed by 7 additional digits. An RMA number is required to return products to Scientific Atlanta.

- ■ If you are the technician who is filling out this tag, you may not have the RMA number. Leave it blank for now. Someone else in your organization, who has the number, can fill it in later.

- ■ Date: Enter the date the unit was removed from service. If this date is unknown, enter the date you are completing the repair tag.

- Company and City: Enter the company name and city of the customer who owns the unit to be returned for repair.

- SA Part # and Serial #: Enter the part number and serial number of the unit you are returning for repair. The part number and serial number can usually be found on a bar code label on the outside of the unit. If this information can't be found leave this blank.

- Product: Enter the model description of the unit you are returning for repair. For example, Model 6940/44 Node, Multimedia Tap, RF Signal Manager, etc.

2   Complete time of failure information.

Please identify when this unit failed

1 ☐   Out of box - During installation
2 ☐   Out of box - In 1st month
3 ☐   Early life - In 1st year of operation
4 ☐   Useful life - After 1st year of operation

T11027

This information will help the repair technician understand the failure mode. If the time to failure is unknown, leave this information blank.

3   Complete the failure description and technician information:

Please describe failure condition: _____

Technician: _____
Phone number (optional): _____
Reorder SA Part # 4004401

T11028

- Failure Description: Include as much information as possible. For example:
  – Which feature is not working or which specification is not being met? For example, does the problem affect audio, video, status monitoring and control, forward path, reverse path, cosmetics, all functions, etc.
  – If it is a multi-port product, which port is not working or if all ports are not working?
  – If the unit has degraded performance or is completely failed.

-   – If the failure happens only at specific environmental conditions (i.e., at hot temperature).
-   – If the failure is intermittent or constant.
-   – How you were powering the unit when it failed? (DC vs. AC, voltage levels, etc.)

Important: Descriptions like "bad unit," "failed," or "no HBO" are not specific enough to be helpful.

-   ■ Technician and Phone Number: Enter the name and phone number of the technician completing the failure description information. A Scientific Atlanta representative may want to call this person to better understand the problem.

4 Attach the repair tag to the unit you are returning for repair. Use the elastic string provided, tape, or another method to securely attach the tag.

5 Go to *Packing and Shipping the Product* (on page 46).

Packing and Shipping the Product

Complete the following steps to pack the product and ship it to Scientific Atlanta.

1 Are the product's original container and packing material available?

-   ■ If yes, pack the product in the original container using the original packing material.
-   ■ If no, pack the product in a sturdy corrugated box, that is suitable to the method of shipment, and cushion it with packing material.

Important: You are responsible for delivering the returned product to Scientific Atlanta safely and undamaged. Shipments damaged due to improper packaging may be refused and returned to you at your expense.

Note: PLEASE DO NOT RETURN ANY POWER CORDS, ACCESSORY CABLES, OR OTHER ACCESSORY PRODUCTS. Instructions for ordering replacement power cords, accessory cables, or other accessories can be provided by a customer service representative.

2 Write the following information on the outside of the shipping container:

-   ■ RMA number
-   ■ Your name
-   ■ Your complete address
-   ■ Your telephone number
-   ■ "Attention: Factory Service"

Important: The RMA number should be clearly marked on all returned product, boxes, packages, and accompanying paperwork. RMAs received by the factory service receiving department that are not clearly marked may experience delays in the processing of RMA requests. All returned product should be marked to the attention of Factory Service.

3 Ship the product to the address provided by the customer service representative in the confirmation e-mail or fax.

Note: Scientific Atlanta does not accept freight collect. Be sure to prepay and insure all shipments. For both in-warranty and out-of-warranty repairs, you are responsible for paying your outbound freight expense, any applicable import and/or export duties and taxes. Scientific Atlanta will pay the return freight expense for in-warranty repairs.

International Shipments: International shipments should be consigned to Scientific Atlanta with the notified party on the Airway Bill stated as "Expeditors International for Customs Clearance".

4 On receipt of product returned under an RMA number, a receipt notification e-mail or fax will be sent to you by Repair Receiving confirming receipt of product and quantities received. Please check the receipt notification to assure the product and quantity of product received by Scientific Atlanta matches what you shipped.

Glossary

A

ampere. A unit of measure for electrical current.

ac, AC

alternating current. An electric current that reverses its direction at regularly recurring intervals.

AFC

automatic frequency control. An arrangement whereby the tuning of a circuit is automatically maintained within specified limits with respect to a reference frequency.

AGC

automatic gain control. A process or means by which gain is automatically adjusted in a specified manner as a function of input level or other specified parameters.

attenuation

The difference between transmitted and received signal strength due to loss through equipment, lines, or other transmission medium. Usually expressed in decibels.

attenuator

A passive device designed to reduce signal strength without distorting the waveform. Usually specified in dB.

baseband

The original band of frequencies occupied by the signal before it modulates the carrier frequency to form the transmitted signal. Characteristic of any network technology that uses a single carrier frequency and requires all stations attached to the network to participate in every transmission.

baud (Bd)

A measure of signaling rate based on the number of signaling events per unit of time.

BW

bandwidth. A measure of the information-carrying capacity of a communications channel, for example the range of usable frequencies that can be carried by a CATV system. The bandwidth corresponds to the difference between the lowest and highest frequency that can be carried by the channel.

C/N or CNR

carrier-to-noise ratio. The ratio, in decibels, of the carrier to that of the noise in a receiver's IF bandwidth after specified band limiting and before any nonlinear process such as amplitude limiting and detection takes place.

dB

decibel. One tenth of a bel, the number of decibels denoting the ratio of two amounts of power being ten times the common logarithm of this ratio.

dc, DC

direct current. An electric current flowing in one direction only and substantially constant in value.

distribution system

The part of a CATV system consisting of the transmission medium (coaxial cables, fiber optic cables, etc.) used to carry signals from the headend system to subscriber terminals.

duplexer

A device which permits the connection of both a receiver and a transmitter to a common antenna.

EMC

electromagnetic compatibility. A measure of equipment tolerance to external electromagnetic fields.

EQ

equalizer.

equalization

The process of compensating for an undesired result. For example, equalizing tilt in a distribution system.

ESD

electrostatic discharge. Discharge of stored static electricity that can damage electronic

equipment and impair electrical circuitry, resulting in complete or intermittent failures.

FM

frequency modulation. A transmission technique in which the frequency of the carrier varies in accordance with the modulating signal.

frequency

The number of similar shapes in a communications or electrical path in a unit of time. For example, the number of sine waves moving past a fixed point in a second.

frequency agile

The ability to change from one frequency to another without changing components.

frequency response

The effect that changing the frequency has on the magnitude of a signal.

frequency stability

A measure of the departure from nominal frequency value of a signal, with respect to time, temperature, or other influence.

ft-lb

foot-pound. A measure of torque defined by the application of one pound of force on a lever at a point on the lever that is one foot from the pivot point.

gain

A measure of the increase in signal level, relative to a reference, in an amplifier. Usually expressed in decibels.

Hertz

A unit of frequency equal to one cycle per second.

HFC

hybrid fiber/coaxial. A network that uses a combination of fiber optics and coaxial cable to transport signals from one place to another. A broadband network using standard cable television transmission components, such as optical transmitters and receivers, coaxial cable, amplifiers, and power supplies. The broadband output stream is transmitted as an optical signal, over the high-speed, fiber optic transmission lines to local service areas where it is split, converted to electrical RF signals, and distributed to set-tops over coaxial cable.

Glossary

HMS

hybrid management sublayer. A set of ANSI/SCTE standards specifying an element management system for hybrid fiber/coaxial networks. The standards establish key protocols for the communication of status monitoring information between elements in the network.

IF

intermediate frequency. The common frequency which is mixed with the frequency of a local oscillator to produce the outgoing radio frequency (RF) signal.

in-lb

inch-pound. A measure of torque defined by the application of one pound of force on a lever at a point on the lever that is one inch from the pivot point.

LCM

local control module.

LED

light-emitting diode. An electronic device that lights up when electricity passes through it.

Nm

Newton meter. A measure of torque defined by the application of one Newton of force on a lever at a point on the lever that is one meter from the pivot point. (1 Nm = 0.737561 ft-lb)

OIB

optical interface board.

PROM

programmable read-only memory. A memory chip on which data can be written only once. Once data has been written onto a PROM, it cannot be written to again.

PS

power supply.

PWB

printed wiring board.

QAM

quadrature amplitude modulation. A phase modulation technique for representing digital information and transmitting that data with minimal bandwidth. Both phase and amplitude of carrier waves are altered to represent the binary code. By manipulating two factors, more discrete digital states are possible and therefore larger binary schemes can be represented.

RCVR

receiver.

reverse path

Signal flow direction toward the headend.

RF

radio frequency. The frequency in the portion of the electromagnetic spectrum that is above the audio frequencies and below the infrared frequencies, used in radio transmission systems.

RFI

radio frequency interference.

RMA

return material authorization. A form used to return products.

RPS

reverse path switch.

RX

receive or receiver.

S/N or SNR

signal-to-noise ratio. The ratio, in decibels, of the maximum peak-to-peak voltage of the video signal, including synchronizing pulse, to the root-mean-square voltage of the noise. Provides a measure and indication of signal quality.

SM

status monitor.

SM/LCM

status monitor/local control module.

SMC

status monitoring and control. The process by which the operation, configuration, and performance of individual elements in a network or system are monitored and controlled from a central location.

torque

A force that produces rotation or torsion. Usually expressed in lb-ft (pound-feet) or N-m (Newton-meters). The application of one pound of force on a lever at a point on the lever that is one foot from the pivot point would produce 1 lb-ft of torque.

TX

transmit or transmitter.

uV

microvolt. One millionth of a volt.

V

volt.

W

watt. A measure of electrical power required to do work at the rate of one joule per second. In a purely resistive load, 1 Watt = 1 Volt x 1 Amp.

XMTR

transmitter.

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