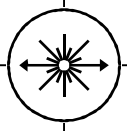
70285

LaserLink® LLNTR Fiber Optic Transmitter 1550nm, 5-210 MHz

INSTALLATION AND OPERATION MANUAL



ANTEC Network Technologies

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LaserLink® LLNTR Fiber Optic Transmitter 1550nm, 5-210 MHz

INSTALLATION AND OPERATION MANUAL

When ordering parts from ANTEC Network Technologies, be sure to include the equipment model number, equipment serial number and a description of the part.

In all correspondence with ANTEC Network Technologies regarding this publication, please refer to:

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Table of Contents

Continued on next page

Table of Contents - continued

Chapter 1
General Information

Overview

Introduction

This manual describes installation and operation of the Laser Link® Narrowcast Return Transmitter (LLNTR).

Manual Contents

This manual contains three chapters.

- Chapter 1 - General Information
- Chapter 2 - Installation
- Chapter 3 - Setup and Operation

How to Use this Manual

This manual is divided into the chapters listed above. Major topics in each chapter are listed at the beginning of the chapter. Use these lists to find the desired information.

In this Chapter

This chapter contains these major topics.

How to Contact ANTEC Network Technologies

Overview

ANTEC Network Technologies is ready to assist you as necessary.

How to Contact ANTEC Network Technologies

Here's how to contact us.

In the USA . . .	Outside the USA . . .
By phone, call 1-800-FIBERME and follow the voice prompts. By mail, write to: ANTEC Network Technologies Attention: Technical Service 11450 Technology Circle Duluth, GA 30097	Contact your ANTEC Network Technologies sales office for assistance. Sales offices are listed on the back cover of this manual.

We Welcome Your Comments

Overview

We welcome your comments on this manual. User comments are an important source of ideas to improve our manuals.

How to Comment

You can contact us by mail or e-mail.

By Mail . . .	By E-mail:
Write to: ANTEC Network Technologies Attention: Technical Publications 11450 Technology Circle Duluth, GA 30097	Send a message to: **tech.pubs@antec.com**

Safety

Overview

Safety of personnel is the primary concern during all procedures.

This section describes typical safety considerations. All of them may not apply to you or your installation/operation environment.

Additional Requirements

Your organization may have additional safety requirements. These recommendations in no way supersede any safety requirements of your organization.

Admonishments

Dangers, warnings, cautions and notes appear in the text immediately before the procedure step or other text to which they apply. Observe all these admonishments. The table below describes each category of admonishment.

Admonishment Category	Description
DANGER	DANGER refers to a situation hazardous to personnel if the information in the DANGER is not observed. Possible consequences are severe injury or death.
WARNING	WARNING refers to a situation in which customer service may be interrupted if the WARNING is not observed.
CAUTION	CAUTION refers to a situation in which equipment may be damaged if the CAUTION is not observed.
NOTE	NOTE highlights critical information about a procedure or description. A NOTE does not describe hazards to personnel, equipment or service.

Continued on next page

Safety, Continued

Admonishment Symbols

A graphic symbol and title denote each type of admonishment. The table below lists typical admonishments, their graphic symbol and meaning. All of these admonishments may not be used in this manual.

Admonishment	Graphic Symbol	Meaning
DANGER		Electrical hazard.
DANGER		Laser light hazard.
DANGER		Lifting object hazard.
DANGER		Mechanical hazard.
DANGER		Chemical Hazard
WARNING		Possible interruption of customer service.
CAUTION		Possible damage to equipment.
NOTE	none	Highlights critical information. No personnel or equipment hazards.

Continued on next page

Safety, Continued

Emergency Plan

Have an emergency plan. Know the procedures for obtaining first-aid and firefighting assistance. Plan your work and maintain good housekeeping. Your safety and the quality of the product depend on it.

Resuscitation

Personnel working with or near hazardous voltages or chemicals should be familiar with modern methods of resuscitation.

Electrical Safety Summary

These are general electrical safety precautions that are not related to any specific procedure. These are recommended precautions that personnel should understand and apply.

Electrical Danger

DANGER

Avoid shorting circuits when using metal tools. Some circuits have high current capability. When shorted, these circuits will flash and may cause burns or eye injury.

Remove all jewelry and exposed metal objects from body and clothing before performing maintenance, adjustments or troubleshooting. Before working inside the equipment, remove all power unless power is required to perform the procedure.

Failure to observe these dangers may result in death or severe injury.

Continued on next page

Safety, Continued

Electrical Danger - continued

DANGER

Replacement of fuses or other parts must be with identical types and ratings. Substitution of non-identical parts may cause safety and fire hazards.

Servicing this equipment may require working with protective covers removed and ac power connected. Use extreme caution during these procedures.

Failure to observe these dangers may result in death or severe injury.

Mechanical Safety Summary

These are general mechanical safety precautions that are not related to any specific procedure. These are recommended precautions that personnel should understand and apply.

Mechanical Danger

DANGER

Overhead hazards, either because items may fall or because personnel may strike them unintentionally, are typical around industrial sites. Never stand underneath anything while it is hoisted. Always wear a hard hat, especially if someone is above you.

Failure to observe this danger may result in death or severe injury.

Continued on next page

Safety, Continued

Laser Safety Summary

These are general safety precautions associated with a class 1B laser. They are not related to any specific procedure. These are recommended precautions that personnel must understand and apply.

Radiation from semiconductor laser diodes feeding this detector may be sufficiently intensive to cause almost instantaneous damage to the eye. Consider each application hazardous until proven safe. Carefully consider power emitted, radiation angle of divergence or confinement of radiation within optical fibers or other physical constraints. Since the radiation is in the non visible (infra red) portion of the spectrum, take precautions to avoid the accidental viewing of the light source.

Laser Danger

DANGER

Laser hazard. This product contains a class 1B laser with no safety interlocks. Under no circumstances should connectors be viewed with equipment enabled. Direct viewing of connectors can cause eye damage.

Failure to adhere to this danger may result in serious injury to the eye(s) or even blindness.

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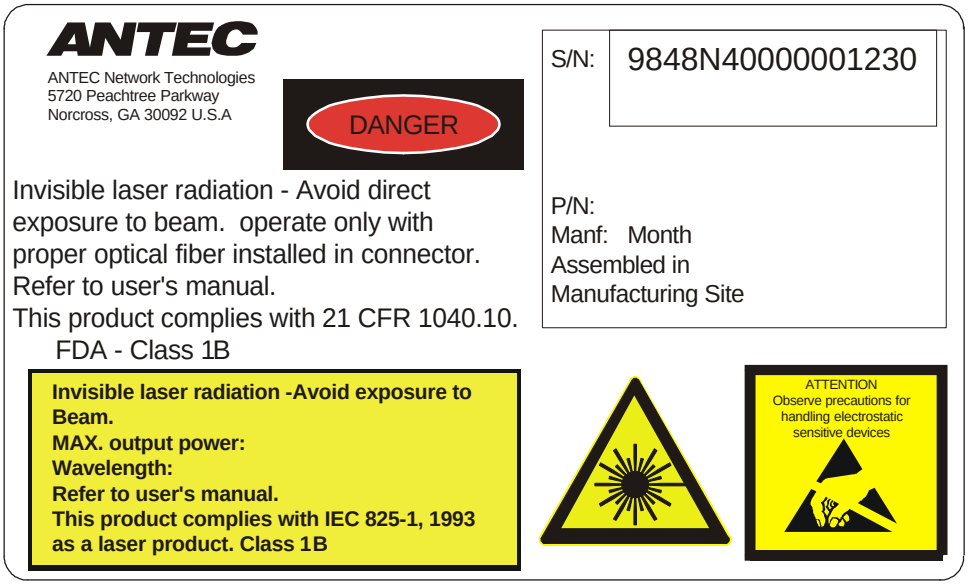
Safety, Continued

Labels

A safety label is affixed to this equipment in plain view. The safety label is shown below.



Equipment Description

Overview

This section contains a high-level physical and functional description of the LLNTR.

LLNTR features are listed below:

- Front Panel Accessible Test Points — Optical Output Power (1 V dc/10mW); RF Laser Drive Level (-30dB)
- Front Panel Accessible Controls — Power on/off key switch. Attenuation Adjust (-8 to +2 dB min.)
- Front Panel Accessible Indicators — Green/Red power LED; Green/Red optical power status LED; Green/Red laser temperature status LED; Green/Red laser bias status LED; Green/Red fan status LED
- Front panel mounted SC/APC connector

Physical Description

The LLNTR consists of a metal chassis and internal electrical and optical components. The chassis installs into a Laser Link II Mainframe.

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Equipment Description, Continued

Diagram

The diagram below illustrates the LLNTR

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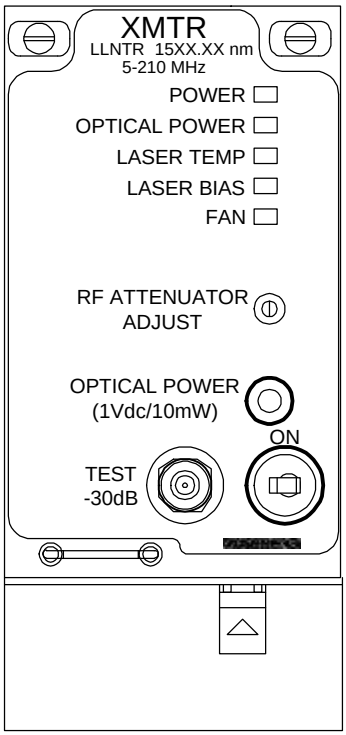
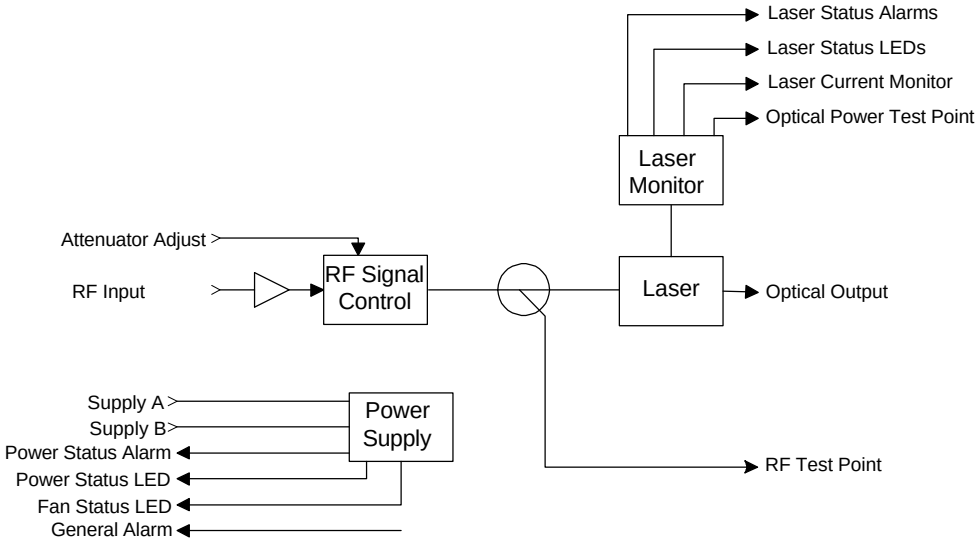


Functional Diagram

The diagram below shows how the LLNTR functions.



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Equipment Description, Continued

Functional Description

Refer to the LLNTR functional diagram. The RF input requires a nominal 32 dBmV/channel signal for 6 channel loading. This signal is amplified and then passed through a variable attenuator circuit. The variable attenuator has a range of –8 to +2 dB and is controlled by a front panel potentiometer.

The output of the attenuator is coupled to the laser board and to a calibrated -30 dB test point mounted on the front panel. The RF signal is applied to the laser board where it modulates the light source for transmission over the output fiber.

The laser board consists of a DFB laser diode package. A laser monitor circuit provides constant temperature and output power control of the diode package over the full range of ambient temperature. This monitor circuit also provides a calibrated 1V dc/10 mW optical power test point to the front panel, controls the front panel optical power, laser temperature and laser bias status LEDs. It also provides analog signals and alarms to the telemetry connector on the Laser Link II Mainframe.

The A/B power select circuit is an integral part of the LLNTR. In the event of a failure of the primary power supply, an optional redundant power supply wired to the Laser Link power distribution board can provide power to the LLNTR automatically. The POWER LED on the front panel displays power status. During normal operation, the LED is green. It is red when the +24V A supply (primary) has failed and power is supplied by the +24V B supply (backup). The LED is off when the LLNTR receives no power.

The LLNTR also provides power alarms and status indicators to the Laser Link user panel or the Element Management Interface Card (EMIC). The Laser Link EMIC collects the vital signs signals from the modules in the Laser Link II Mainframe and provides the communications interface between the mainframe and the Track Link™ Element Management System.

The Laser Link II Mainframe user panel receives information from the LLNTR through the mainframe general operational alarm (GOALN). The alarm LED on the mainframe turns red if any of the following occur: redundant power supply is selected; optical output power drops by 25%; laser temperature is out-of-range; laser bias is out-of-range; or fan failure.

Equipment Specifications

Overview

This section describes specifications of the LLNTR.

Optical Specifications

The table below lists optical specifications.

Characteristic	Specification
Output power	+9 ±1 dBm
Connector return loss	≥65 dB SC/APC
Wavelength	1560.61 ±0.1 nm 1558.98 ±0.1 nm 1557.36 ±0.1 nm 1555.75 ±0.1 nm 1554.13 ±0.1 nm 1552.52 ±0.1 nm 1550.92 ±0.1 nm 1549.32 ±0.1 nm

RF Specifications

The table below lists RF specifications.

Characteristic	Specification
Input and test point impedances	75 Ohms
Frequency range	5-210 MHz
Flatness	±0.75 dB
Input and test point return losses	≥14 dB
Input level	+32 dBmV per channel[1, 5]
Level adjustment	-8 to +2 dB
Test point level	-30 ±1 dB[6]
CNR	≥49 dB[1, 2]
CSO	≤ -48 dB[1, 2]

Continued on next page

Equipment Specifications, Continued

RF Specifications (continued)

Characteristic	Specification
CTB	≤ -59 dB[1, 2]
NPR dynamic range	15 dB for 35 MHz[2, 3, 7]
Crosstalk	≥ 40 dB[4]

Notes:

1. Six CW carriers. 7, 13, 19, 25, 31 and 37 MHz
2. Optical path 10 dB fiber, 6 dB passive. Receiver: LLDR
3. Estimated input dynamic range levels for 35 MHz noise load: -45 to –29 dBmV/Hz
4. 8 optical channels launched into 10 dB of fiber at 7 dBm
5. Performance estimates based on 10% ±1% OMI
6. Relative to laser drive level
7. At 40 dB NPR level

Power Specifications

The table below lists power specifications.

Characteristic	Specification
Input power	+24 V dc provided by Laser Link II Mainframe
Power consumption	20 W maximum
Current drain	850 mA maximum

Physical Specifications

The table below lists physical specifications.

Characteristic	Specification
Operating temperature	32 to 122 ºF (0 to 50 ºC)
Relative humidity	5 to 95%, non-condensing
Optical connector	SC/APC
Mounting	Requires Laser Link II Mainframe
Dimensions	Height: 5.21 in (13.2 cm) Width: 2.17 in (5.5 cm) Depth 13.5 in (34.3 cm)
Weight	2.19 lb (1 kg)

List of Abbreviations

Overview

This table lists non-standard abbreviations in this manual.

Abbreviations

Abbreviation	Definition
CDM	companded delta modulation
C/N	carrier-to-noise
CNR	Carrier to noise ratio
CSO	composite second order
CTB	composite triple beat
dB	decibel
dBm	decibel referenced to 1 milliwatt
dBmV	decibel-millivolt
DC	directional coupler
DFB	distributed feedback
DSO	discrete second order
EMIC	Element management interface card
EQ	equalizer
FDM	frequency division multiplex
GOALN	Global alarm
LLDR	Laser Link Reverse Data Receiver
LLNTR	Laser Link Narrowcast Return Transmitter
NPR	Noise power ratio
nsec	nanosecond
NTSC	National Television Standards Committee
RDL	non-cooled, Fabry-Perot data laser
RDU	non-cooled/isolated distributed feedback laser
RVD	cooled/isolated distributed feedback laser
RVL	cooled Fabry-Perot video laser
RR	return for repair
RRU	reverse receiver unit

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END OF CHAPTER

Chapter 2
Installation

Overview

Introduction This chapter describes installation of the Laser Link Narrowcast Return Transmitter (LLNTR).

In this Chapter This chapter contains these sections.

Topic	See Section
Preparing for Installation	A
Installing the LLNTR	B
Care and Cleaning of Optical Connectors	C

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Section A
Preparing for Installation

Overview

Introduction This section describes preparing to install the LLNTR.

In this Section This section contains the following topics.

Unpacking

Overview

ANTEC Network Technologies thoroughly inspects and carefully packs all equipment before shipment. At the time of shipment, the carrier assumes responsibility for its safe delivery; therefore, do not return damaged units to ANTEC Network Technologies.

Procedure

Unpack the LLNTR according to the procedure below.

Step	Action
1	Inspect shipping carton for visible damage.
2	Open the shipping carton. (Do not destroy shipping cartons until installation is complete.)
3	Remove all packing material.
4	Inspect unit for visible damage.
5	Using packing list, check for missing items (see "How To Inventory Equipment Received").

Inspection

What to do about Visible Loss or Damage

Report visible loss or damage as follows.

NOTE

Failure to adequately describe external evidence of loss or damage may result in the carrier refusing to honor a damage claim.

Step	Action
1	Obtain a claim form from the carrier.
2	Make a note of any loss or evidence of external damage on the freight bill or receipt.
3	Have freight bill or receipt signed by the carrier's agent

What to do about Concealed Damage

Concealed damage is not apparent until after unpacking. The contents may be damaged in transit due to rough handling even though the carton may not show external damage. The carrier is responsible for hidden damage caused in transit. If you follow these instructions carefully, ANTEC Network Technologies guarantees its full support of your claims to protect you against loss from concealed damage.

Step	Action
1	If you discover damage after unpacking, make a written request for inspection by the carrier's agent within 15 days of delivery date.
2	File any claims with the carrier, not ANTEC Network Technologies.

How to Inventory Equipment

Follow this procedure to inventory equipment.

Step	Action
1	Check off each item received against the list on the packing slip included with the shipment.
2	Verify this list matches the purchase order.
3	If any items are missing, please notify ANTEC Network Technologies immediately by calling 1-800-FIBERME (in the US) or calling your local sales office (outside of the US)..
4	Return a copy of the packing slip with the missing item(s) circled.

How to Return Equipment

Overview

ANTEC Network Technologies makes every effort to ensure parts and equipment arrive in working condition. Occasionally, it may be necessary to return parts or equipment that are not in working condition.

Procedure

Follow this procedure to return equipment.

<table>
<tr><th>Step</th><th>Action</th></tr>
<tr><td>1</td><td>Contact ANTEC Network Technologies . . .
<table>
<tr><th>In the US</th><th>Outside the US</th></tr>
<tr><td>By phone, call 1-800-FIBERME and follow the voice prompts.</td><td>Contact your sales office for assistance. Sales offices are listed on the back cover of this manual.</td></tr>
</table></td></tr>
<tr><td>2</td><td>Tag or otherwise identify the defective equipment. Be sure to write the RR number on the tag.</td></tr>
<tr><td>3</td><td>If possible, please reference the sales order, purchase order, and date the equipment was received.</td></tr>
<tr><td>4</td><td>  CAUTION
Do not use Styrofoam chips (peanuts). Use of Styrofoam chips (peanuts) will void the warranty.

Pack the equipment in the original container and protective packing material, if possible. If the original packing material is not available, use a sturdy corrugated box and appropriate protective packing material.</td></tr>
</table>

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How to Return Equipment, Continued

Procedure (continued)

Step	Action
5	Be sure to include this information: Your Name Company Name Street Address City, State, Country and Zip/Postal Code Telephone Number RR Number Problem Description
6	NOTE Ship equipment prepaid. ANTEC Network Technologies will not accept freight collect. Ship equipment to ANTEC Network Technologies as directed by Customer Service.

Recommended Tools and Equipment

Tools and Equipment

These recommended tools and equipment are required for installation.

Quantity	Description
1	1/4-inch flat-blade screwdriver
1	Optical connector cleaning supplies

Section B
Installing the LLNTR

Installation

Introduction

This section describes installing the LLNTR.

The LLNTR is shipped assembled with the exception of the 15-pin male-to-female shielded cable assembly and keys for the ON/OFF switch.

Install the LLNTR in any slot, one through seven, of the mainframe. After installation, refer to the procedures in Chapter 3, Setup and Operation, to activate the LLNTR.

Procedure

Follow this procedure to install the LLNTR.

Step	Action
1	**CAUTION** **Static sensitive devices. Always wear a properly grounded wrist strap when working on this equipment. The shelf has a grounding jack that may be used to plug the wrist strap into. Failure to observe this caution may result in equipment damage or premature equipment failure.** Open the front cover of the mainframe by turning the front panel latch handles counterclockwise.

Continued on next page

Installation, Continued

Procedure (continued)

Step	Action
2	**NOTE** **When installing in a mainframe bay that is equipped with 14 rails, remove the rail in the "B" position to accommodate the LLNTR.** Carefully insert the LLNTR into an empty slot of the Laser Link II Mainframe. Align the flange on the top and bottom of the LLNTR with the top and bottom slide rail on the mainframe.
3	Locate the optical connector mounted on the front panel. Clean the connector as described in Care and Cleaning of Fiber Optic Connectors.
4	Secure the LLNTR in the shelf with the two captive screws located on the top of the LLNTR front face plate. The screws are provided with the LLNTR.
5	Connect the 15-pin D-type shielded cable assembly: • one end to the connector labeled POWER on the rear of the LLNTR. • other end to the connector on the power distribution board of the mainframe, J1- J7.
6	Secure both cable connectors with screws.
7	Verify shelf power is on and turn the key switch of the LLNTR to the ON position.
8	Verify that the POWER and LASER STATUS LEDs are green before proceeding. Note that while the LLNTR is stabilizing during initial startup, the LASER STATUS LED will be red
9	Turn the key switch to the OFF position.
10	Clean outgoing fiber connector as described in Care and Cleaning of Fiber Optic Connectors.
11	Connect the LLNTR to the outgoing fiber connector.
12	Continue to Chapter 3 to activate the LLNTR.

Section C
Care and Cleaning of Optical Connectors

Overview

Introduction

Fiber optic connectors are cleaned at assembly, but require recleaning when the equipment is installed. Both the connector attached to the bulkhead adapter in the equipment and the jumper connector that will be attached to the bulkhead adapter must be cleaned. This section describes recommended cleaning instructions for both halves of the connection.

Guidelines

Proper care and cleaning of optical connectors is critical to equipment operation. Follow these guidelines when working with optical connectors.

DANGER

Laser light hazard. Never look into the end of an optical fiber or connector. Use an indirect image-converting device such as the "Find-R-Scope." Failure to observe this danger can result in eye damage or blindness.

- The working surfaces of optical connectors are highly-polished and designed for precision alignment. Keep them microscopically-clean and free of scratches.
- Optical power readings and signal quality can seriously degrade if optical connectors or bulkheads are mishandled or allowed to become dirty.
- Optical bulkheads on transmitters and receivers and the connector faces of optical cables are shipped with protective caps. Do not remove caps until ready to make connections.
- Do not touch unprotected optical connector faces. Do not allow dirt to touch the connector or the bulkheads. Small scratches, minute traces of dirt or skin oils can degrade signal quality.

Continued on next page

Overview, Continued

Consumable Materials

These consumable materials are required for the cleaning procedure.

- Lint Free Wipes (tissues)
- Ethyl or Isopropyl Alcohol, >91% purity (Do not use a lesser grade. Do not use common rubbing alcohol.)
- Filtered Canned Air
- Lint Free Swabs

Cleaning

Overview

This section describes cleaning two types of optical connectors:

- Connectors installed in a bulkhead adapter
- Connectors not installed in a bulkhead adapter

Cleaning of Connectors in a Bulkhead Adapter

Follow this procedure to clean optical connectors installed in an equipment bulkhead adapter.

Step	Action
1	Remove protective cap from bulkhead connector.
2	Blow dust particles from the interior surface of the bulkhead adapter using filtered canned air as follows: **CAUTION** **Be sure to hold air can in upright position so that liquid from the can cannot enter the air tube. Do not shake the can. Do not blow air directly on the fiber. Failure to observe this caution may damage the connector or cause contaminates to be placed on the surface being cleaned.**

Step	Action
1	Hold air can upright. Position the can extension tube approximately 6 in (15.3 cm) from the surface to be cleaned.
2	Gently blow into the adapter.

Continued on next page

Cleaning, Continued

Cleaning of Connectors in a Bulkhead Adapter (continued)

Step	Action
3	Swab the bulkhead adapter using a lint-free swab as follows: **CAUTION** **Do not use alcohol less than 91% pure. Do not use common rubbing alcohol. Failure to observe this caution will deposit contaminates on the fiber surface.**

Step	Action
1	Moisten a lint-free swab with >91% pure ethyl or isopropyl alcohol.
2	Insert the moistened swab into the bulkhead adapter until it touches the interior connector face.
3	Apply light pressure and rotate the swab approximately eight to ten turns.
4	Remove the swab.
5	Insert a dry lint-free swab and gently turn several times.

Continued on next page

Cleaning, Continued

Cleaning of Connectors in a Bulkhead Adapter(continued)

Step	Action
4	Blow dust particles from the interior surface of the bulkhead adapter using filtered canned air as follows: **CAUTION** **Be sure to hold air can in upright position so that liquid from the can cannot enter the air tube. Do not shake the can. Do not blow air directly on the fiber. Failure to observe this caution may damage the connector or cause contaminates to be placed on the surface being cleaned.** **Step** / **Action** 1 — Hold air can upright. Position the can extension tube approximately 6 in (15.3 cm) from the surface to be cleaned. 2 — Gently blow air into the adapter.
5	Insert a recently cleaned connector into the bulkhead adapter.

Continued on next page

Cleaning, Continued

Cleaning of Connectors Not in a Bulkhead Adapter

Follow this procedure to clean optical connectors not installed in an equipment bulkhead adapter.

Step	Action
1	NOTE Do not reinstall protective cap after cleaning procedure. Protective caps are designed to protect the connector ferrule from damage, not to keep the connector clean. Remove protective cap from bulkhead connector.
2	**CAUTION** **Avoid contamination of lint-free wipes. Handle wipes by the edges. Discard each wipe immediately after use. Failure to observe this caution may result in contaminates on the surface being cleaned.** Place a dry lint-free wipe on a solid surface.
3	Place another dry lint-free wipe on top of the first wipe.
4	**CAUTION** **Do not use alcohol less than 91% pure. Do not use common rubbing alcohol. Failure to observe this caution will deposit contaminates on the fiber surface.** Moisten the top wipe with >91% pure ethyl or isopropyl alcohol.

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Cleaning, Continued

Cleaning of Connectors Not in a Bulkhead Adapter (continued)

Step	Action
5	Gently wipe the connector ferrule and endface. For APC connectors only, wipe with one continuous motion in the direction of the angle.
6	Discard the wipes.
7	Place a dry lint-free wipe on a solid surface and gently slide the connector endface across the wipe. For APC connectors only, wipe with one continuous motion in the direction of the angle.
8	Blow dust particles from connector using filtered canned air as follows: **CAUTION** **Be sure to hold air can in upright position so that liquid from the can cannot enter the air tube. Do not shake the can. Do not blow air directly on the fiber. Failure to observe this caution may damage the connector or cause contaminates to be placed on the surface being cleaned.**
9	Promptly insert connector into cleaned bulkhead adapter.

Step	Action
1	Hold air can upright. Position the can extension tube approximately 6 in (15.3 cm) from the surface to be cleaned.
2	Gently blow air across the connector end or surface to be cleaned.

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END OF CHAPTER

Chapter 3
Setup and Operation

Overview

Introduction

This chapter describes how to set up and operate Laser Link Narrowcast Return Transmitter (LLNTR). These procedures assume the LLNTR is installed according to the procedures in Chapter 2 of this manual.

In this Chapter

This chapter contains the following sections.

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Section A
Activating the LLNTR

Activation

Introduction

This section describes activating the LLNTR. Activation consists of connecting the RF input signal to the LLNTR. When the input signal is connected, the LLNTR automatically produces an optical output.

RF Signal Input Check

Check the RF input signal with a spectrum analyzer prior to connecting the cable to the RF IN jack of the LLNTR. In the case of a 6 NTSC channel load, the laser drive level is optimized during manufacture to achieve the specified link performance of the LLNTR with an RF input level of 32 dBmV/channel.

After verifying the 32 dBmV/channel RF level, connect the 75-Ohm cable to the RF input port on the rear of the LLNTR.

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Section B
Controls and Indicators

Overview

Introduction

This section describes the controls and indicators of the Laser Link Narrowcast Return Transmitter (LLNTR).

In this Section

This section contains the following topics.

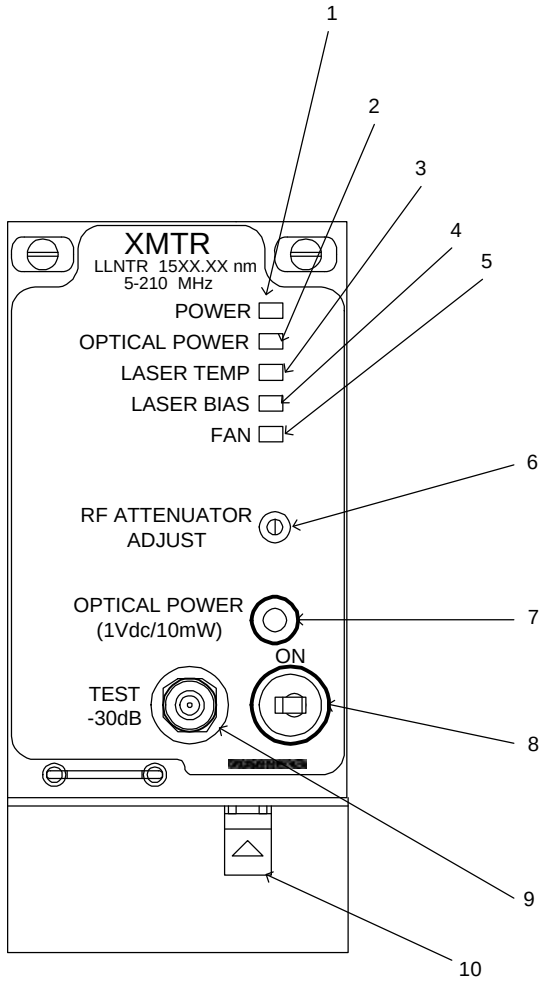
Front Panel Controls and Indicators

Overview

The front panel of the Laser Link Narrowcast Return Transmitter (LLNTR). provides access to the optical and RF test points, RF attenuator and LED diagnostic indicators and the optical output connector.

Diagram

This diagram shows the front panel of the LLNTR.



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Front Panel Controls and Indicators, Continued

Description

The table below describes the front panel controls and indicators.

Reference	Control/Indicator	Description
1	POWER LED	Displays status of power to the LLNTR: • Green indicates normal operation of the +24 V dc primary power supply • Red indicates the LLNTR is powered by the +24 V dc backup supply • Off (not lit) indicates no power to the LLNTR.
2	OPTICAL POWER LED	• Green indicates normal operation • Red indicates optical power has dropped by >25% of initial value.
3	LASER TEMP LED	• Green indicates normal operation • Red indicates laser temperature is out of range
4	LASER BIAS LED	• Green indicates normal operation • Red indicates laser bias current is out of range
5	FAN LED	• Green indicates normal operation • Red indicates fan failure
6	RF ATTEN ADJUST	Provides –8 to +2 dB level adjustment to the laser RF drive level
7	OPTICAL POWER 1 V dc/10 mW	Optical power test point. Provides a scaled dc voltage of the LLNTR's optical output power. 1 V dc represents 10 mW of optical power at 1550 nm
8	OFF/ON Key Switch	Key switch turns power on and off to activate and deactivate the LLNTR
9	TEST -30 dB	A -30 dB sample of the laser RF drive level
10	SC Adapter	Optical output SC/APC connector

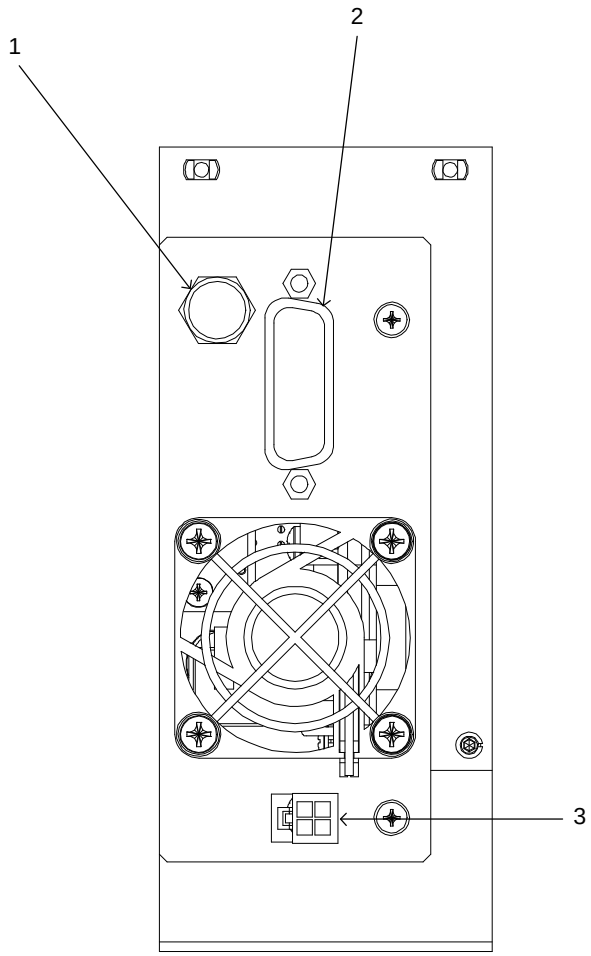
Rear Panel Connectors

Overview

The rear panel of the LLNTR provides access to the RF input connector and the power interface.

Diagram

This diagram shows the rear panel of the LLNTR.



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Rear Panel Connectors, Continued

Description The table below describes the rear panel controls and indicators.

Reference	Connector	Description
1	RF IN	RF input F-type connector
2	POWER	15-pin D-type connector. Provides power and alarm connector to the Laser Link II Mainframe power distribution board. • Pin 1 - GND • Pin 2 - NC • Pin 3 - NC • Pin 4 - GOALN (general alarm) • Pin 5 - Redundant power alarm • Pin 6 - +24 V dc supply A • Pin 7 - +24 V dc supply B • Pin 8 - GND • Pin 9 - NC • Pin 10 - NC • Pin 11 - Optical output power calibrated 1 V/10 mW • Pin 12 - Laser bias current calibrated 1 V/50 mA • Pin 13 - LIM current limit alarm • Pin 14 - +24 V dc supply A • Pin 15 - GND
3	FAN	4-pin connector. Allows fan removal.

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Section C
Status Monitoring

Overview

Introduction

This section describes status monitoring for the LLNTR.

In addition to the front-panel LEDs, LLNTR vital parameters are also privided to the mainframe EMIC or user panel and to the mainframe telemetry port. Depending on the configuration purchased, the mainframe is shipped to the customer with either the EMIC or the user panel installed. Should the user desire to upgrade to the EMIC in the future, an upgrade kit is available. Refer to the Laser Link II Mainframe manual.

In this Section

This section contains the following topics.

User Panel

Description

The Laser Link user panel receives information from the LLNTR through the mainframe's general operation alarm, GOALN. The ALARM LED on the panel illuminates red to signal an alarm condition for any of the modules housed in the mainframe (transmitters, receivers, and amplifiers).

Conditions of the LLNTR which would trip this alarm include: operation by redundant power supply, laser temperature out of range, laser bias out of range, optical power output out of range (drop by 25%), and/or a fan failure.

EMIC

Description

The optional Element Management Interface Card (EMIC)

- collects the vital signs signals of the modules in a Laser Link II Mainframe
- provides the communications interface between the mainframe and the Track Link system (if used)

Parameters monitored by this system include: power supply status, +5 V dc status, optical output power, laser bias current, and laser temperature (via GOALN signal). The actual optical output power and laser bias values are provided to the user through a graphical interface.

Third Party

Description

For use with third-party network management systems, such as AM Communications and Superior Electronics products, the LLNTR may be monitored via the telemetry port on the Laser Link II Mainframe. The 25-pin connector interface is located on the power distribution board and provides non-proprietary network management signals (see mainframe user manual). The telemetry alarm parameters, vital sign designation, and DB-15 connector pin numbers are provided in the table below.

Alarm Vital Sign (VS #/Pin #)	Description	Logic
#1 / 5	Redundant power alarm	+5 V = alarm 0 V = normal
#2 / 11	Optical output power	Analog 1 V/10 mW
#3 / 12	Laser bias current	Analog 1 V/50 mA
#4 / 4	GOALN general alarm, ±5 V dc fault, RPAN, laser temp out of range, laser bias out of range, optical power out of range, or fan alarm	+24 V = normal 0 V = alarm

Section D
Troubleshooting

Troubleshooting

Overview

The LLNTR is designed for continual reliable service in a communications network. There is no recommended maintenance required to be performed on the LLNTR. Routine network preventative maintenance such as monitoring performance can be achieved from the front panel diagnostics or through element management systems such as Track Link or third party providers.

Chart

Use this chart as an aid in the trouble analysis of the LLNTR. If you require assistance, call ANTEC Technical Services at 1-800-FIBER ME. Technical Service is available between 8 am and 6 pm est. Twenty-four hour emergency service is available on a callback basis within 30 minutes.

Indicator	Trouble Condition	Recommended Action
Power LED red or extinguished	Power failure	Check the +24 V A and B LED status on the user panel. • If red, replace the appropriate power supply and contact Technical Services for an RR#. • If extinguished, check the 15-pin cable from the LLNTR to the mainframe power distribution board for +24 V. Replace as needed. • If the cable is normal and +24 V is present, replace the LLNTR and contact Technical Services for an RR#.
OPTICAL POWER LED red	Optical output power is out of range	Replace the LLNTR and contact Technical Services for an RR#

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Troubleshooting, Continued

Chart (continued)

Indicator	Trouble Condition	Recommended Action
LASER TEMP LED red	Laser temperature is out of range	If the operating environment is within normal range, replace the LLNTR and contact Technical Services for an RR#
LASER BIAS LED red	Laser bias current is out of range	Replace the LLNTR and contact Technical Services for an RR#
FAN LED red	Fan failure	The LLNTR will continue to operate properly up to 50 ºC. Replace or repair as necessary. Disconnect fan by removing fan screw and power adapter. Contact Technical Services for an RR# or replacement fan.

END OF CHAPTER

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