TABLE OF CONTENTS

REVISION HISTORY

REVISION	DESCRIPTION	DATE
1.0	First Release	Jul 03
2.0	Second Release	Jun 04
3.0	Third Release – Added LTA specs	Nov 04
4.0	Fourth Release – Updated Specs	Dec 04
5.0	Code change – AGC default RF threshold –20 to –70 dBm	Mar 05
6.0	Update jumper names on card edge diagram	April 05
7.0	Added OIP3 & Noise Figure specs	Jun 05
8.0	Updated safety and added assembly and labeling section	Jul 05
9.0	Added LTA squelch info and LTA-WB specs	Aug 05
10.0	Removed LR squelch feature, added note about SET/FACTORY jumper	Jul 06
10.1	Updated block diagrams & specs. Added in rear plates. Updated *Vista*LINK® description and cleaned up format.	Nov 08

CAUTION

⚠ !

If LED7 is on or flashing, there will be DC voltage for LNB power at the L-BAND IN connector. This can damage some test equipment.

You can turn off the LNB power by switching DIP switch 4 to the Off position.

WARNING

⚠ !

Do not hook up the 7707LT/LTA and 7707LR DWDM cards directly with a short fiber optic cable. The 7707LT/LTA DWDM card produces +7dBm of power, which will damage the receiver if connected directly.

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1. OVERVIEW

The 7707LT/LTA/LTA-WB and 7707LR/LR-WB L-band Transmitter/Receiver modules are used for conveying L-Band satellite signals over fiber optic cable. The 7707LR-WB & 7707LTA-WB offer extended bandwidth from 250 to 2250MHz vs. 950 to 2250MHz for the 7707LR & 7707LTA. All versions accept one L-Band RF coaxial input and provide a fiber optic output signal. An L-Band BNC RF output is also available for monitoring or further signal distribution. The 7707LR/LR-WB accepts a fiber optic input from the 7707LT/LTA/LTA-WB and provides two L-Band RF output signals via BNCs. Monitoring and control of card status and parameters is provided locally via card edge and remotely via *Vista*LINK® capability.

The 7707LT/LTA/LTA-WB and 7707LR/LR-WB modules each occupy one card slot and can be housed in either a 1RU frame, which will hold up to three modules, or a 3RU frame which will hold up to 15 modules.

Features:
- Broadband operation - 950 to 2250MHz
- Protocol transparent - handles all video, audio and data modulation formats
- Fully hot swappable from front of frame
- Available in SC/PC, SC/APC, ST/PC and FC/PC connector options
- Supports multi-mode and single-mode fiber optic cable
- Comprehensive signal and card status monitoring via four-digit card-edge display, or remotely through SNMP and *Vista*LINK® capability

7707LT/LTA Features
- Automatic and manual gain control on RF input
- Additional L-Band BNC output
- Three user selectable output RF gain settings
- Injects LNB power (+13 or +17 VDC selectable with built-in current limiting) into RF input cable

7707LR Features
- Supports manual and automatic gain control
- Two L-Band RF outputs for extra signal distribution or monitoring functions
- Three user selectable output RF gain settings
- RF output independent of optical loss (within AGC range)

7707LR-WB & 7707LTA-WB Features
- Band operation 250 to 2250MHz
- Wide AGC hold range (50dB) using 7707LTA/LTA-WB + 7707LR/LR-WB
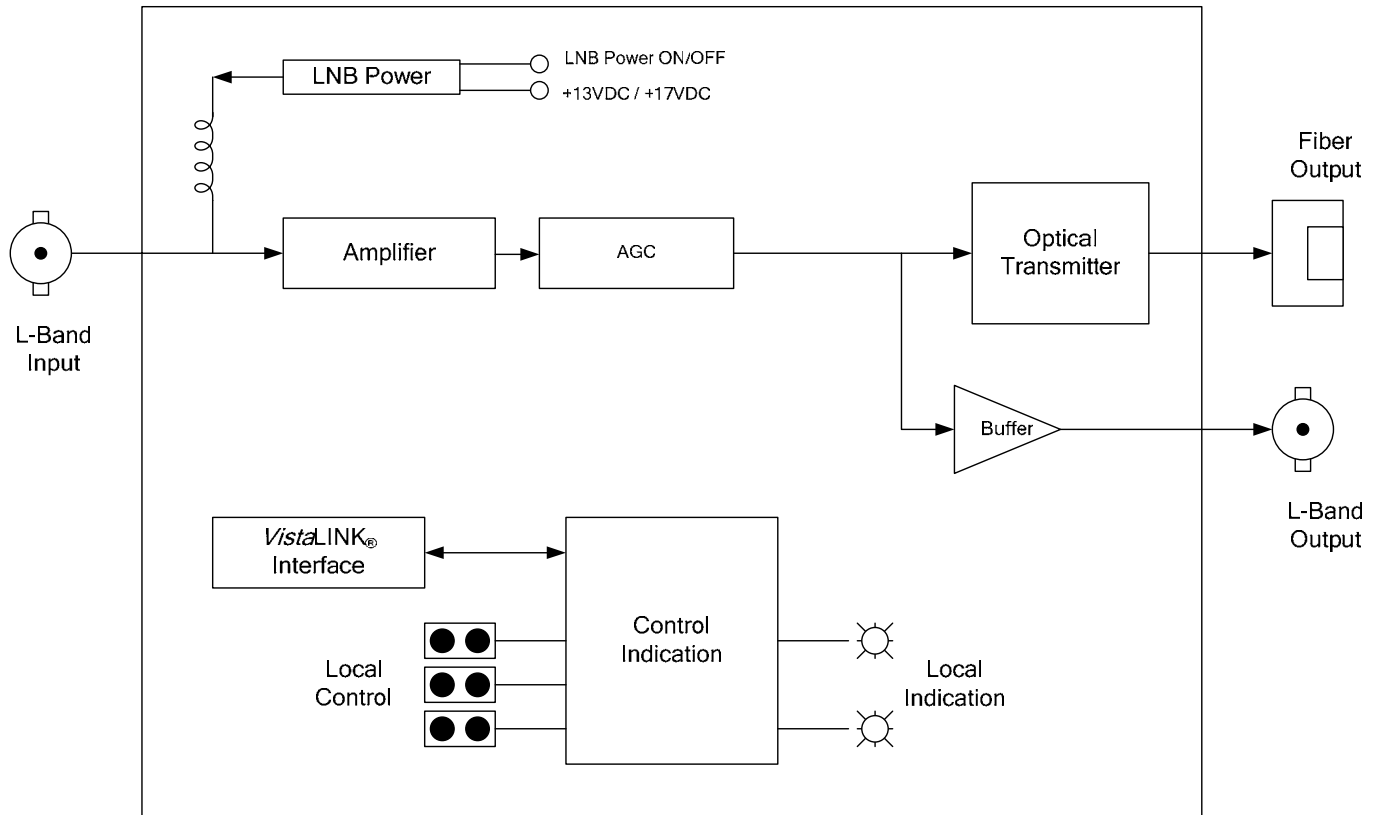
Figure 1-1: 7707LT/LTA Block Diagram
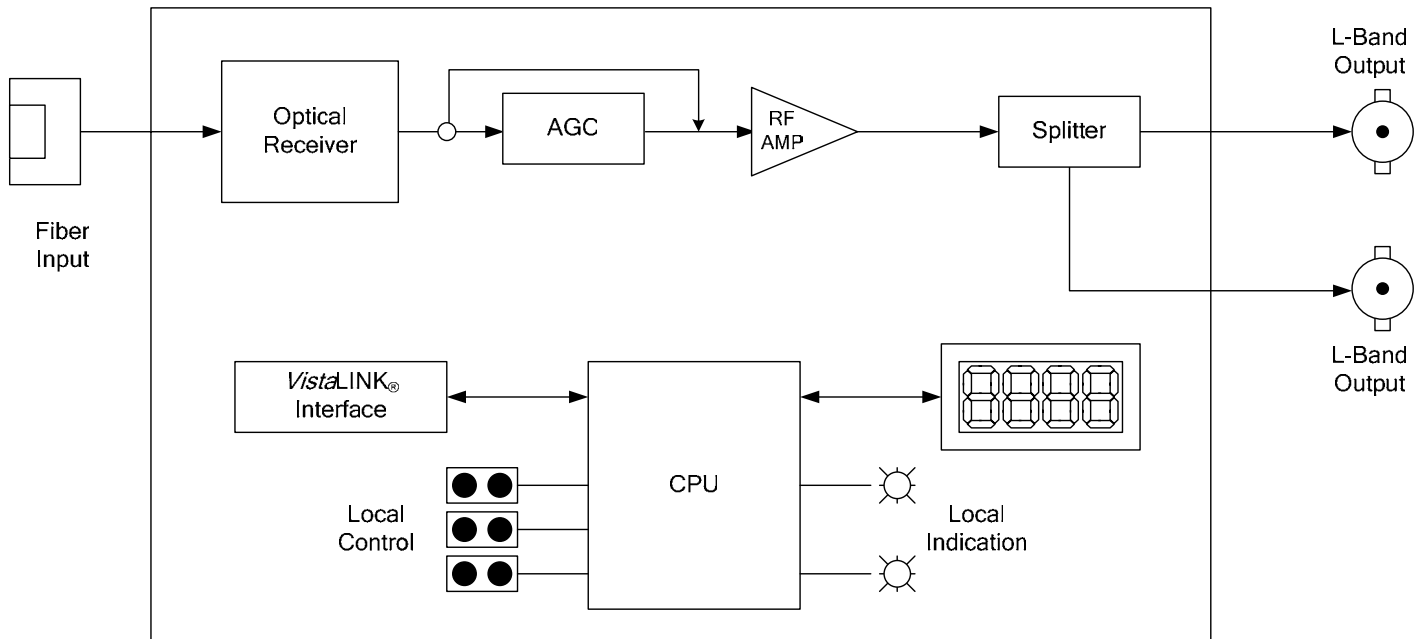
Figure 1-2: 7707LR Block Diagram

2. INSTALLATION

Each of the modules in the 7707L series comes standard with a companion +3RU rear plate. The rear plate must be specified during the time of order. SC/PC, SC/APC, ST/PC or FC/PC optical connectors are available for these modules and must be specified during the time of order. For information on mounting the rear plate and inserting the module into the frame, see the 7700FR manual for detailed instructions.
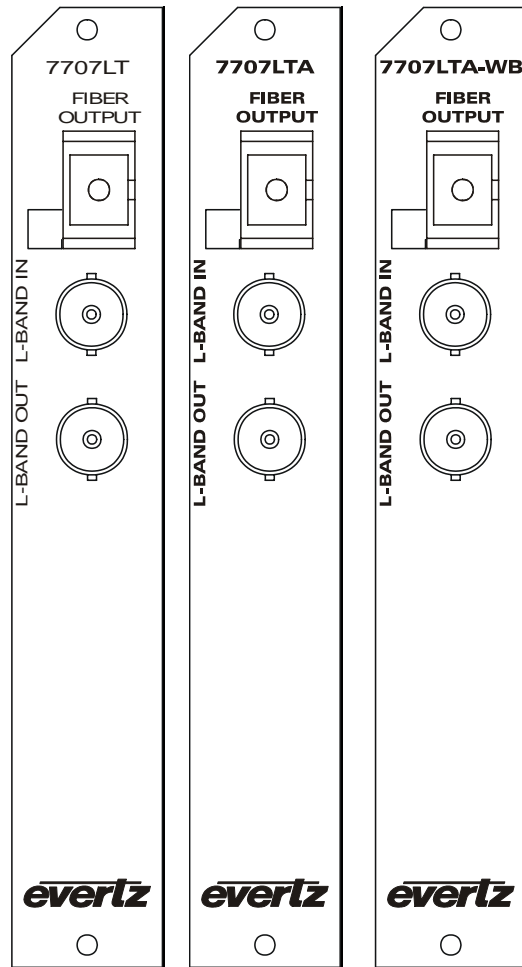
Figure 2-1: 7707LT/LTA/LTA-WB Rear Panel
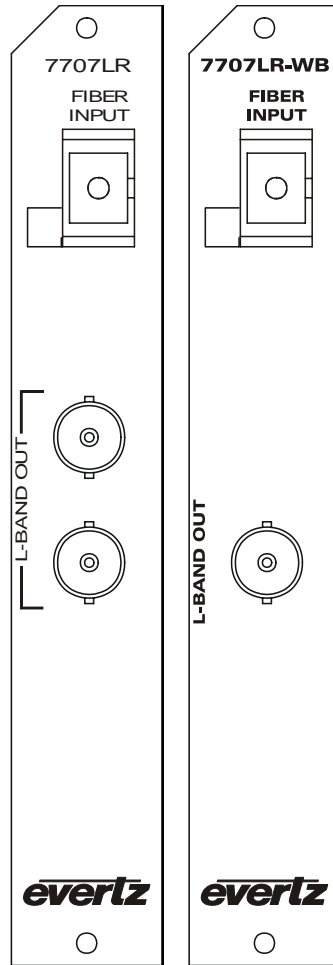
Figure 2-2: 7707 LR Rear Panels

2.1. 7707LT/LTA CONNECTIONS

L-BAND IN: Input BNC connector for L-band satellite signals. This connector can also carry LNB power back to the satellite receiver (see section 5.1.1).

> ⚠ **!** **If LED7 is on or flashing, there will be DC voltage for LNB power at the L-BAND IN connector. This can damage some test equipment.**
>
> **You can turn off the LNB power by setting DIP switch 3 to the off position.**

L-BAND (MONITORING) OUT: Monitoring output BNC is an L-Band RF output for monitoring of L-band satellite signals.

FIBER OUTPUT: SC/PC, SC/APC, ST/PC or FC/PC female connector with the optical output from the 7707LT/LTA as shown in section 3.1.3. This connector should be connected to the FIBER IN connector of a 7707LR module at the destination end with a suitable fiber optic cable. The 7707LT/LTA transmits on the wavelength marked on the rear panel.

> Be sure to terminate unused connectors with appropriate loading (50 or 75 Ohm).

2.2. 7707LR CONNECTIONS

FIBER INPUT: SC/PC, SC/APC, ST/PC or FC/PC female connector with the optical input to the 7707LR as shown in section 3.2.2. This connector should be connected to the FIBER OUT connector of a 7707LT/LTA module at the origination end with a suitable fiber optic cable.

L-BAND OUT: Two output BNC connectors for received L-band satellite signals. The top connector (closest to the fiber input) is the monitoring output and the bottom connector is the L band signal for further distribution in your system.

> Be sure to terminate unused connectors with appropriate loading (50 or 75 Ohm).

2.3. CARE AND HANDLING OF OPTICAL FIBER

2.3.1. Safety

⚠	**CLASS 1 LASER PRODUCT**

Background colour: yellow
Triangular band: black
Symbol: black

⚠	INVISIBLE LASER RADIATION DO NOT VIEW DIRECTLY WITH OPTICAL INSTRUMENTS CLASS 1M LASER PRODUCT

Background colour: yellow
Triangular band: black
Symbol: black

2.3.2. Assembly

Assembly or repair of the laser sub-module is done only at Evertz facility and performed only by Evertz technical personnel.

2.3.3. Labeling

Certification and Identification labels are combined into one label. As there is inadequate space on the product to place the label, it is reproduced here in the manuals.

- There is no date of manufacture on this label as it can be traced by bar code label placed on the PCB of each Evertz plug-in product
- Class 1 Laser Products: Model number is one of 7707LTA13, 7707LTA13L, 7707LTA15 or 7707LTAxx (xx = 27, 29, 31, 33, 35, 37, 43, 45, 47, 49, 51, 53, 55, 57, 59, 61)
- Class 1M Laser Products: Model number is one of 7707LTADxxx (Dxxx represents ITU Grid Channel: D200, D210, D220, D230, D240, D250, D260, D270, D280, D290, D300, D310, D320, D330, D340, D350, D360, D370, D380, D390, D400, D410, D420, D430, D440, D450, D460, D470, D480, D490, D500, D510, D520, D530, D540, D550, D570, D580, D590, D600)

Figure 2-3: Reproduction of 7707LTA Certification and Identification Label for Models that are Class 1 Laser Products

Figure 2-4: Reproduction of 7707LTA Certification and Identification Label for Models that are Class 1M Laser Products

2.3.4. Handling and Connecting Fibers

> **Never touch the end face of an optical fiber. Always keep dust caps on optical fiber connectors when not connected and always remember to properly clean the optical end facet of a connector before making a connection.**

The transmission characteristics of the fiber are dependent on the shape of the optical core and therefore care must be taken to prevent fiber damage due to heavy objects or abrupt fiber bending. Evertz recommends that you maintain a minimum bending radius of 5 cm to avoid fiber-bending loss that will decrease the maximum attainable distance of the fiber cable. The Evertz fiber optic modules come with cable lockout devices, to prevent the user from damaging the fiber by installing a module into a slot in the frame that does not have a suitable I/O module.

3. TECHNICAL SPECIFICATIONS

3.1. 7707LT/LTA SPECIFICATIONS

3.1.1. RF Input

Connector:	1 BNC per IEC 61169-8 Annex A (F-type optional)
I/O Impedance:	75 Ω (50 Ω optional)
Return Loss:	> 10dB
Input Frequency Range (LT):	950MHz – 2150MHz
Input Frequency Range (LTA):	950MHz – 2250MHz
Input Frequency Range (LTA-WB):	250MHz – 2250MHz

Input Power Range:
LT:	-20 to –50dBm
LTA, LTA-WB:	-20 to –65dBm

AGC Hold Range:
LT:	-20 to –40dBm
LTA, LTA-WB:	-20 to –50dBm

3.1.2. RF Output

Connector:	1 BNC per IEC 61169-8 Annex A (F-type optional)
I/O Impedance:	75 Ω (50 Ω optional)
Return Loss:	> 10dB
Output Frequency Range (LT):	950MHz – 2150MHz
Output Frequency Range (LTA):	950MHz – 2250MHz
Output Frequency Range (LTA-WB):	250MHz – 2250MHz
Flatness (LT):	-3dB @ 950MHz – 1000MHz
	±1.5dB @ 1000MHz – 2150MHz
	±0.25dB @ any 36MHz BW
Flatness (LTA):	±1.5dB @ 950MHz – 2250MHz
	±0.25dB @ any 36MHz BW
Flatness (LTA-WB):	±2.0dB @ 250MHz – 2250MHz
	±0.25dB @ any 36MHz BW

Output Signal Range
7707LT AGC Mode:	-25dBm ± 2dB (with input from -40 to -20dBm)
7707LTA/7707LTA-WB AGC Mode:	-20dBm ± 2dB (with input from -50 to -20dBm)
Manual Mode:	(Input Signal) –(5dB) + (Manual Gain Setting) ±1dB

Manual Gain Settings
7707LT:	0,10,15 dB
7707LTA/7707LTA-WB:	10,20,30 dB
OIP3:	+10dBm (-40dBm input level)

Intermodulation Products
7707LT:	-55dBc (AGC mode, Input :–20dBm)
7707LTA/7707LTA-WB:	-55dBc (AGC mode, Input: –20dBm)
Noise Figure:	16dB/32dB (minimum / maximum optical loss)

Carrier To Noise
7707LT: > 37dB @ any 36MHz BW
7707LTA/7707LTA-WB: > 37dB @ any 36MHz BW

3.1.3. Optical Output

Number of outputs: 1
Connector: Female SC/PC, SC/APC, ST/PC, FC/PC
Operating Wavelength:
    Standard: 1310nm, 1550nm (nominal)
    CWDM: 1270nm to 1610nm
    DWDM: C-Band Wavelengths (ITU G.694.1 Compliant)
Optical Power:
    1310nm FP (LT): -5 dBm ± 1dBm
    1310nm FP (LTA/LTA-WB): 0 dBm ± 1dBm
    1310nm, 1550nm &
    CWDM DFB: +2dBm ±1dBm
    DWDM DFB: +7dBm ± 1dBm
Fiber Size: 9 μm core / 125 μm overall

3.1.4. Electrical

Voltage: +12VDC
Power: 9 Watts (Non DWDM), 10 Watts (DWDM)
EMI/RFI: Complies with FCC regulations for class A devices
    Complies with EU EMC directive

3.1.5. Physical

7700 or 7701 frame mounting:
    Number of slots: 1

3.1.6. Compliance

Electrical Safety: CSA Listed to UL 60065-03, IEC 60065
    Complies with CE Low voltage
    Directive
Laser Safety: Class 1 laser product
    Class 1M laser product (DWDM versions only)
    Complies with 24 CFR 1040.10 and 1040.11, IEC 60825-1
EMI/RFI: Complies with FCC Part 15, Class A
    EU EMC directive

3.2. 7707LR SPECIFICATIONS

3.2.1. RF Output

Connector:	2 BNC per IEC 60169 (Amendment 2), F type optional
I/O Impedance:	75 Ω (50 Ω optional)
Return Loss:	>10dB
Output:	
AGC Mode:	-20dBm (within AGC range)
Manual Mode:	-20 to –65dBm (depends on the RF level and optical loss)

Intermodulation Products with Paired 7707LR:
    7707LT13: -40dBc (LT:AGC mode, I/P –20dBm ; LR:AGC mode –5dBm optical)

OIP3: +10dBm (-40dBm input level)

Intermodulation Products with Paired 7707LR:
    7707LT15: -50dBc (LT:AGC mode, I/P –20dBm ; LR:AGC mode 0dBm optical)
    7707LTA, 7707LTA-WB: -55dBc (LTA:AGC mode, I/P –20dBm ; LR:AGC mode 0dBm optical)

Noise Figure: 16dB/32dB (minimum / maximum optical loss)

Flatness: ± 1.5dB @ 950MHz-2250MHz (7707LR paired with 7707LTA)
    ± 2dB @ 250MHz-2250MHz (7707LR paired with 7707LTA-WB)
    ± 0.25dB @ any 36MHz BW

Carrier to Noise:
    Standard: 37dB @ 36MHz BW / 25km* (10dB optical Loss)(0dBm optical Tx)
    -H Version: 37dB @ 36MHz BW / 40km* (16dB optical Loss)(0dBm optical Tx)
    *1310nm fiber attenuation 0.4dB/km

3.2.2. Optical Input

Number of inputs:	1
Connector:	Female SC/PC, SC/APC, ST/PC, FC/PC, FC/APC
Operating Wavelength:	1270nm - 1610nm
Maximum Input Power:	
Standard:	+3dBm
-H Version:	-7dBm
Optical Sensitivity:	
Standard:	-14dBm @ 35dB S/N @ 36MHz BW
-H Version:	-23dBm @ 40dB S/N @ 36MHz BW

3.2.3. Electrical

Voltage:	+12VDC
Power:	5 Watts
EMI/RFI:	Complies with FCC regulations for class A devices
	Complies with EU EMC directive

3.2.4. Physical

7700 or 7701 frame mounting:
    Number of slots: 1

4. STATUS INDICATORS AND DISPLAYS

4.1. 7707LT/LTA STATUS INDICATORS

The 7707LT/LTA module has nine LED status indicators on the front card edge to show operational status of the card at a glance.

Two large LEDs on the front of the board indicate the general health of the module.

LOCAL FAULT: This red LED indicates poor module health and will be illuminated if a board power fault exists (i.e.: a blown fuse) or if the laser is nearing the end of the life cycle. The LOCAL FAULT indication can also be reported to the frame through the FRAME STATUS jumper.

MODULE OK: This green LED indicates good module health. It will be on when the board power is good.

There are seven small LEDs that indicate the status of the incoming RF signal, laser status, LNB power, and AGC/manual operation.

RF HIGH: This red LED (LED1) will be on when the incoming RF signal is higher than the permitted Input signal range.

RF OK: This green LED (LED2) will be on when the incoming RF signal is within the permitted Input signal range.

RF LOW: This yellow LED (LED3) will be on when the incoming RF signal is lower than the permitted Input signal range.

LASER FAIL: This red LED (LED4) will be on when the laser is at the end of its life. This is a sign that the laser should be replaced immediately.

LASER OK: This green LED (LED5) will be on when the output laser is operating with its normal output power.

LNB POWER: The LED (LED6) will be on yellow when there is LNB power (+13 or +17 volts DC) being output on the RF input BNC (DIP switch 3 is on). Refer to section 5.1.1 for a description of how to set the LNB power.

The LED (LED6) will be yellow and flashing on and off if LNB power is enabled and there is a short on the RF cable connected to the RF input BNC. Remove the short circuit from the cable and then reset the cable short via the card edge menu. The LED should stay on if the short was removed.

AGC/ MANUAL: This green LED (LED7) is on when the card is operating in AGC mode. If the card is set to AGC mode by setting DIP switch 4 to the Off position, the card will be in AGC mode if the RF input level is within AGC range and this is indicated by LED7. If the RF level drops out of AGC range, the card will be operating in manual 30dB gain mode and LED7 will turn off.

To enable AGC mode, set DIP switch 4 to the Off position.

To disable AGC and set to manual mode, set DIP switch 4 to the On position (towards PCB).

⚠ **!**

If the LNB POWER LED (LED6) is on or flashing, there will be DC voltage for LNB power at the L-BAND IN connector. This can damage some test equipment.

You can turn off the LNB power by setting DIP switch 3 to the Off position.

If the LNB POWER LED (LED6) is flashing when the board is first plugged in, reset the cable short option via card edge menu to reset the LNB power circuitry.

If the flashing continues, then the RF cable has a short.

4.2. 7707LR STATUS INDICATORS

The 7707LR modules have nine LED status indicators on the front card edge to show operational status of the card at a glance.

Two large LEDs on the front of the board indicate the general health of the module

LOCAL FAULT: This red LED indicates poor module health and will be on during the absence of a valid optical input signal, or if a local input power fault exists (i.e.: a blown fuse). The LOCAL FAULT indication can also be reported to the frame through the FRAME STATUS jumper.

MODULE OK: This green LED indicates good module health. It will be on when a valid optical input signal is present, and the board power is good.

There are 7 small LEDs that indicate the status of the output RF signal, and optical input signal.

RF HIGH: This red LED (LED1) will be on when the output RF signal is higher than the rated output signal range.

RF OK: This green LED (LED2) will be on when the output RF signal is within the rated output signal range.

RF LOW: This yellow LED (LED3) will be on when the output RF signal is lower than the rated output signal range.

OPTICAL INPUT HIGH: This red LED (LED4) will be on when the input optical power is to high.

OPTICAL INPUT OK: This green LED (LED 5) will be on when the input optical power is within the rated input range.

OPTICAL INPUT LOW: This yellow LED (LED6) will be on when the optical power is than the rated input range.

AGC/MANUAL: This green Led (LED 7) is on when AGC Mode is enabled and off when Manual mode is enabled.

To enable AGC mode, set DIP switch 4 to the Off position.

To disable AGC and set to manual mode, set DIP switch 4 to the On position (towards PCB).

5. DIP SWITCH CONTROLS

5.1. 7707LT/LTA DIP SWITCH CONTROLS

The 7707LT/LTA modules are equipped with a four-position DIP switch at the front card edge. All positions are assigned sequentially such that switch 1 is located at the top of the DIP switch (farthest from the card ejector). Table 5-1 gives an overview of the front DIP switch functions and section 5.1.1 describes the front DIP switch function in more detail. The On (closed) position is down, or closest to the printed circuit board. The Off (open) position is up, or farthest from the printed circuit board.

DIP Switch	Function
1	Reserved for future use
2	LNB Voltage
3	LNB Power Enable
4	Manual Gain

Table 5-1: Front DIP Switch Functions

5.1.1. 7707LT/LTA Configuring the LNB Power

The 7707LT/LTA has the ability to inject 13 or 17 volts DC into the cable connected to the RF input BNC to power the antenna LNB device. DIP switches 2 and 3 at the front of the card control the LNB Power injector circuitry. The LNB POWER LED (LED6) indicates whether there is LNB power being delivered to the receiver on the RF Input. See section 4.1.

DIP 2	DIP 3	DESCRIPTION
---	Off (default)	LNB power Off
Off	On	+ 13 VDC LNB power On
On	On	+ 17 VDC LNB power On

Table 5-2: 7707LT LNB Power Switch Settings

> ⚠ !
>
> If the LNB POWER LED (LED6) is on or flashing, there will be DC voltage for LNB power at the L-BAND IN connector. This can damage some test equipment.
>
> You can turn off the LNB power by setting DIP switch 3 to the Off position.

5.1.2. 7707LT/LTA Configuring AGC or Manual mode

The 7707LT input RF stage has an automatic gain control (AGC) that adjusts to varying input RF levels. To set the unit in AGC (Automatic Gain Control) mode, set DIP 4 to the Off (open) position. To set the unit in Manual mode, set DIP 4 to the On (closed) position. Once the card has been set to Manual mode, the user can adjust the gain values manually via the card edge menu system. See section 0.

The DIP switch controls the gain mode only when the jumper J38 is in Master mode. If this jumper is in slave mode, the gain is controlled via SNMP only.

5.2.   7707LR DIP SWITCH CONTROLS

The 7707LR modules are equipped with a four-position DIP switch at the front card edge. All positions are assigned sequentially such that switch 1 is located at the top of the DIP switch (farthest from the card ejector). The On (closed) position is down, or closest to the printed circuit board. The Off (open) position is up, or farthest from the printed circuit board.

The DIP switch controls the gain mode only when the jumper J38 is in Master mode. If this jumper is in slave mode, the gain is controlled via SNMP only.

DIP Switch	Function
1	
2	
3	Low Power Transmitter
4	Manual Gain

Table 5-3: Front DIP Switch Functions

5.2.1.   Configuring the LNB Power

The 7707LT/LTA has the ability to inject 13 or 17 volts DC into the cable connected to the RF input BNC to power the antenna LNB device. DIP switches 2 and 3 at the front of the card control the LNB Power injector circuitry. The LNB POWER LED (LED6) indicates whether there is LNB power being delivered to the receiver on the RF Input. See section 4.1.

DIP 2	DIP 3	DESCRIPTION
---	Off (default)	LNB power Off
Off	On	+ 13 VDC LNB power On
On	On	+ 17 VDC LNB power On

Table 5-4: 7707LT/LTA LNB Power Switch Settings

5.2.2.   7707LR Configuring AGC or Manual Mode

The DIP switches control the gain of the RF output section of the 7707LR and can be used to adjust for losses in varying lengths of fiber optic cable in the system.

The 7707LR output RF stage has an automatic gain control (AGC) that adjusts to varying input optical levels. To set the unit in AGC (Automatic Gain Control) mode, set DIP 4 to the Off (open) position. To set the unit in Manual mode, set DIP 4 to the On (closed) position. Once the card has been set to Manual mode, the user can adjust the gain values manually via the card edge menu system.

⚠ ! In order to conduct a frequency response sweep, the 7707L cards must be set and configured to Manual Mode and not AGC mode

⚠ ! Output RF power measurements are made with 1 m of fiber optic cable between the transmitting module and the receiving module.

6. JUMPERS POSITIONS

6.1. 7707LT/LTA JUMPERS
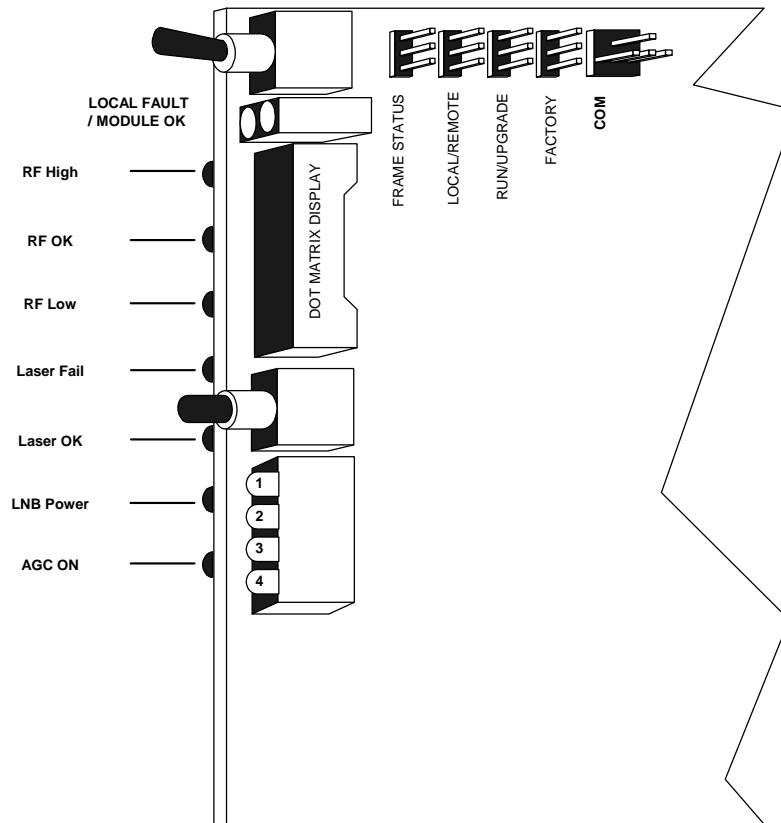
Figure 6-1: Location of 7707LT/LTA Jumpers and LEDs

6.2. 7707LR JUMPERS
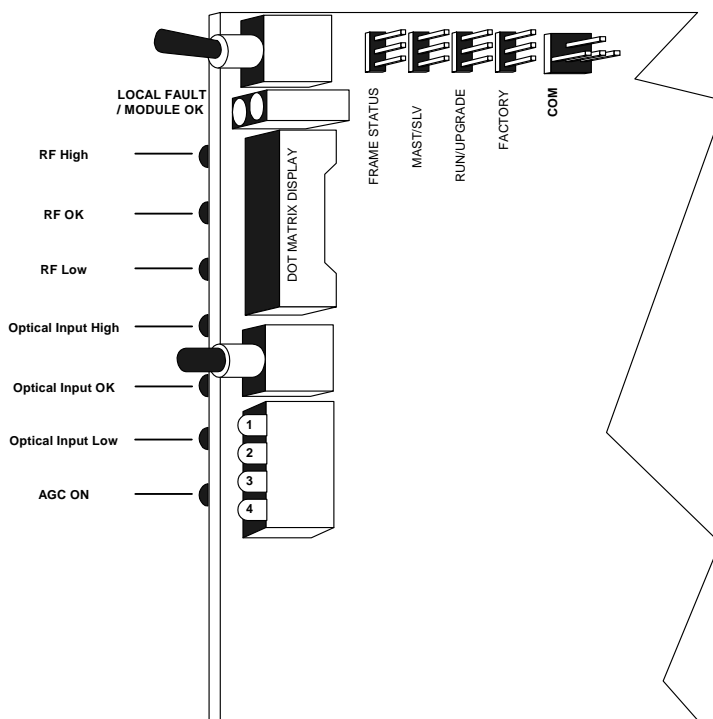
Figure 6-2: Location of 7707LR Jumpers and LEDs

**6.3. SELECTING WHETHER LOCAL FAULTS WILL BE MONITORED
BY THE GLOBAL FRAME STATUS**

The FRAME STATUS jumper J3 determines whether local faults (as shown by the Local Fault indicator) will be connected to the 7700FR frame's global status bus.

FRAME STATUS: To monitor faults on this module with the frame status indicators (on the Power Supply FRAME STATUS LEDs and on the Frame's Fault Tally output) install this jumper in the On position (default).

When this jumper is installed in the Off position local faults on this module will not be monitored.

6.4. SET/FACTORY JUMPER

When shipped from the Evertz facility, the SET/FACTORY jumper will be in the SET (upward) position. This jumper *should not* be changed from the SET position for any reason. Changing this jumper out of the SET position can cause the module to function incorrectly.

6.5. SELECTING WHETHER MODULE WILL BE CONTROLLED FROM THE LOCAL CONTROLS OR THROUGH THE *VISTA*LINK® INTERFACE

The MASTER jumper J38 selects whether the module will be controlled from the local user controls or through the *Vista*LINK® interface.

MASTER: When this jumper is installed in the MASTER position, the card functions are controlled through the local controls.

SLAVE: When this jumper is installed in the SLAVE position, the card functions are controlled through the *Vista*LINK® interface.

6.6. CONFIGURING THE MODULE FOR FIRMWARE UPGRADES

UPGRADE: The UPGRADE jumper J43 is used when firmware upgrades are being done to the module. For normal operation it should be installed in the *RUN* position. See the *Upgrading Firmware* section of this manual for more information.

To upgrade the firmware in the module unit:

1. Pull the module out of the frame.

2. Move the UPGRADE jumper into the *UPGD* position.

3. Install the Upgrade cable provided (located in the vinyl pouch in the front of this manual) onto the SERIAL header at the card edge.

4. Re-install the module into the frame.

5. Run the upgrade as described in the *Upgrading Firmware* section of this manual.

6. When the upgrade is completed, remove the module from the frame, move the UPGRADE jumper into the *RUN* position, remove the upgrade cable and re-install the module.

The module is now ready for normal operation.

7. DOT-MATRIX DISPLAY

Additional signal and status monitoring and control of the card's parameters are provided via the four-digit alphanumeric display located on the card edge. The card edge toggle switch is used to select whether you are displaying status from the card (monitoring mode) or setting control parameters for the card (control mode). To select one of the display modes, press the pushbutton one or more times to exit the current display mode and return to the mode select menu item (the display will show **MON** or **SET**). Press the toggle switch to select monitor mode (**MON**) or control mode (**SET**). Once you have selected the desired mode press the pushbutton to enter that mode.

When you are in monitor mode, the toggle switch determines what data is being displayed on the alphanumeric display. Each time the toggle switch is pressed up/down, the display advances to the next/previous display. A message indicating what display mode is active is shown for one second. After one second without the toggle switch being pressed, the selected display data is shown. The card edge pushbutton is used to select sub-items where applicable.

7.1. CARD EDGE MENU SYSTEM

> ✎ When changes are made in the menu system, the user must exit the menu system and wait 30 seconds before the new menu settings are stored in flash.

7.1.1. Navigating the Menu System

When you are in control mode, the toggle switch and pushbutton are used to navigate through a menu system to set various parameters for the module. To enter the menu system, press the pushbutton one or more times to exit the current display mode and return to the mode select menu item. The display will show MON or SET. Press the toggle switch to select control mode (SET) and then press the pushbutton to enter the control mode main setup menu. You can use the toggle switch to move up and down the list of available sub menus. Once the desired submenu name is displayed, press the pushbutton to select the next menu level.

Once you are in the sub menu, there will be a list of parameters to adjust. To adjust any parameter, use the toggle switch to move up or down to the desired parameter and press the pushbutton. Using the toggle switch, adjust the parameter to its desired value. If the parameter is a numerical value, the number will increase if you lift the toggle switch and decrease if you push down on the toggle switch. If the parameter contains a list of choices, you can cycle through the list by pressing the toggle switch in either direction.

When you have stopped at the desired value, press the pushbutton. This will update the parameter to the selected value and return to the mode select menu item (the display shows **SET**). To change another parameter, press the pushbutton to enter the main menu system again and continue selecting and adjusting other parameters.

Each time the toggle switch is pressed up/down, the display advances to the next/previous display. A message indicating what display mode is active is shown for one second. After one second without the toggle switch being pressed, the selected display data is shown. The card edge pushbutton is used to select sub-items where applicable.

7.2.   7707LT/LTA TOP LEVEL MENU STRUCTURE

The following is a brief description of the top level of the menu tree that appears when you enter the Control menu. Selecting one of these items will take you down into the next menu level.

7.2.1. User Menu / Set

RFTH: Allows the user to configure the Upper and Lower Input Threshold.
CABL: Cable short Reset.
GAIN: Allows the user to set the Gain levels of the 7707LT in manual mode.
SQL*:   Allows the user to enable the Optical Squelch function.
SQTH*:   Allows the user to set the RF input threshold for optical squelch.
DISP: Allows the user to set the orientation of the front panel display.
FDEF: Allows the user to resets the module to its factory default values.

7.2.2. User Menu / Mon

RFTH: Allows the user to monitor the upper and lower Input Threshold.
PWR: Allows the user to monitor the RF Input power.
SQL*:   Allows the user to enable the Optical Squelch function.
SQTH*:   Allows the user to set the RF input threshold for optical squelch.
LNBV: Allows the user to monitor the upper and lower LNB output voltage.
LNBE: Allows the user to check the status of the LNB.
GAIN: Allows the user to monitor the Gain.
S/W: Allows the user to check the software version.

* Available with firmware revision 1.2 build 31 and CPLD code revision 1.2 (CPLD is not field upgradeable) on non-DWDM laser products.

7.3.   7707LT/LTA USER MENU-SET

7.3.1. 7707LT/LTA Setting the RF Threshold

RFTH
UPPR
LWR

AGC (Automatic Gain Control) Mode Operation			
Manual Mode Operation –7707LT/LTA			
7707LT Gain Setting	*Default L-Band Warning Thresholds*	*7707LTA Gain Setting*	*Default L-Band Warning Thresholds*
AGC	-15dBm to –35dBm	AGC	-20dBm to –70dBm
0dB	-10dBm to -45dBm	10dB	-20dBm to -55dBm
+10dB	-20dBm to -55dBm	+20dB	-30dBm to -65dBm
+15dB	-30dBm to -60dBm	+30dB	-40 dBm to -70dBm

The RF threshold setting enables the user to set both the upper and lower threshold.

7.3.2. 7707LT/LTA Cable Short Reset

CABL
RSET

The CABL function allows the user to reset LNB power if a short has occurred and been repaired in the LNB cable.

7.3.3. 7707LTA Optical Squelch Enable

SQL
ON
OFF

The SQL function allows the user to enable the optical squelch function of the 7707LTA. When enabled, the optical laser output will be squelched when the RF input level drops below the level defined by SQTH.

Default setting is OFF.

7.3.4. 7707LTA Optical Squelch Threshold Level

SQTH
ON
OFF

The SQL function allows the user to enable the optical squelch function of the 7707LTA. When enabled, the optical laser output will be squelched when the RF input level drops below the level defined by SQTH.

7707LTA Gain Setting	SQTH Range
AGC	-20dBm to –70dBm
10dB	-20dBm to -55dBm
+20dB	-30dBm to -65dBm
+30dB	-40 dBm to -70dBm

7.3.5. 7707LT/LTA Adjusting the Gain

GAIN
7707LT
AUTO (AGC only)
0 dB (manual only)
10 dB (manual only)
15 dB (manual only)
7707LTA
AUTO (AGC only)
10 dB (manual only)
20 dB (manual only)
30 dB (manual only)

The gain control allows the user to control the gain of the 7707LT/LTA card. The unit can be set to either AGC mode or manual mode.

To manually set the Gain control, first set the 7707LT/LTA to manual mode (refer to section 5.1.2 for further details). When the unit is in manual mode, the 7707LT gain values can be adjusted to 0dB, 10dB, or 15dB and the 7707LTA gain values can be set for 10dB, 20dB, or 30dB.

7.3.6. 7707LT/LTA Changing the Display Orientation

DISP
VERT
HOR

The *DISP* control allows the user to select a horizontal or vertical orientation for the displays to accommodate mounting the module in the 3RU or 1RU frames.

7.3.7. 7707LT/LTA Restoring Factory Defaults

FDEF
YES
NO

To restore the factory defaults, enter the FDEF control and choose *YES* to restore all factory settings to the 7707L. All configurations previously made to the card will be lost.

7.4. 7707LT/LTA USER MENU – MON

The Mon (monitoring) menu allows the user to check the status and values of the settings for the 7707L card. To make changes to the settings, please refer to the User Set menu outlined in section 7.3.

7.4.1. 7707LT/LTA RF-In Threshold

RFTH
UPPR
LWR

AGC (Automatic Gain Control) Mode Operation			
Manual Mode Operation –7707LT/LTA			
7707LT Gain Setting	*Default L-Band Warning Thresholds*	*7707LTA Gain Setting*	*Default L-Band Warning Thresholds*
AGC	-15dBm to –35dBm	AGC	-20dBm to –70dBm
0dB	-10dBm to -45dBm	10dB	-20dBm to -55dBm
+10dB	-20dBm to -55dBm	+20dB	-30dBm to -65dBm
+15dB	-30dBm to -60dBm	+30dB	-40 dBm to -70dBm

The RF threshold setting enables the user to monitor both the upper and lower threshold.

7.4.2. 7707LT/LTA RF In Power

PWR

The PWR control allows the user to monitor the power levels of the RF-IN.

7.4.3. 7707LT/LTA LNB Output Voltage

LNBV
HIGH
LOW

The LNBV control allows the user to monitor the output voltage of the LNB. Both high and low outputs can be monitored.

7.4.4. 7707LT/LTA LNB Enable

LNBE
ON
OFF

The LNBE control allows the user to check if the LNB is enabled or disabled. If the LNB is enabled, *ON* will be displayed on the card edge. If the LNB is disabled, *OFF* will be displayed on the card edge.

7.4.5. 7707LT/LTA Gain

GAIN
7707LT
AUTO (AGC only)
0 dB (manual only)
10 dB (manual only)
15 dB (manual only)
7707LTA
AUTO (AGC only)
10 dB (manual only)
20 dB (manual only)
30 dB (manual only)

The gain control allows the user to monitor the gain of the 7707LT card.

To make changes to the gain, please refer to section 5.1.2.

7.4.6. 7707LT/LTA Software Version

S/W

The *S/W* function allows the user to check the version of software in the card.

7.5. 7707LR TOP LEVEL MENU STRUCTURE

The following is a brief description of the top level of the menu tree that appears when you enter the Control menu. Selecting one of these items will take you down into the next menu level.

7.5.1. 7707LR User Menu / Set

RFTH: Allows the user to adjust the upper and lower RF-Out Threshold.
OPTH: Allows the user to adjust the upper and lower optical threshold.
GAIN: Allows the user to adjust gain values on the 7707LR card.
TXPW: Allows the user to adjust the laser power expected from the 7707LT.
DISP: Allows the user to adjust the card edge display.
FDEF: Allows the user to restore factory default settings.

7.5.2. 7707LR User Menu / Mon

RFTH: Allows the user to check the RF-Out Threshold.
PWR: Allows the user to check the RF-Out power.
OPTH: Allows the user to monitor the Optical Threshold.
OPWR: Allows the user to monitor the optical Power.
GAIN: Allows the user to check the gain levels.
TXPW: Allows the user to check the laser power expected from the 7707LT.
S/W: Allows the user to check the software version.

7.6.   7707LR USER MENU-SET

7.6.1. 7707LR Setting the RF Output Threshold

RFTH
UPPR
LWR

AGC (Automatic Gain Control) Mode Operation			
Manual Mode Operation –7707LR			
TXPW –5 7707LR	*TXPW +3 7707LR*	*TXPW –7 7707LR-H*	*Default 7707LR Warning Thresholds*
AGC	AGC	AGC	-10dBm to –21dBm
0dB	0dB	0dB	-10dBm to –35dBm
+6dB	+12dB	+6dB	-10dBm to –35dBm
+12dB	+24dB	+12dB	-10dBm to –25dBm

The RFTH control allows the user to adjust both Upper and Lower Threshold of the RF- Output

7.6.2. Optical Threshold

OPTH
UPPR
LWR

The OPTH control allows the user to adjust both the upper and lower optical threshold. The upper optical threshold can be adjusted between the ranges of +004 to –033. The lower optical threshold can be adjusted between the ranges of +004 to –033.

7.6.3. Adjusting the Gain

```
GAIN
    7707LR / 7707LR-H

    Auto (AGC only)
    0 dB (manual only)
    6 dB (manual only)
    12 dB (manual only)

    7707LR

    Auto (AGC only)
    0 dB (manual only)
    12 dB (manual only)
    24 dB (manual only)
```

The gain control allows the user to control the gain of the 7707LR card. The unit can be set to either AGC mode or manual mode.

To manually set the Gain control, first set the 7707LR to manual mode (refer to section 5.2.2 for further details). When the unit is in manual mode, the gain values depend on the type of receiver ordered. The 7707LR configured for a +3dBm transmitter for can be adjusted to 0dB, 12dB or 24dB. The 7707LR that has been configured for a –5dBm transmitter and the 7707LR-H can be adjusted to 0dB, 6dB or 12dB.

7.6.4. 7707LR Transmitter Power Calibration Mode

```
TXPW
    7707LR

    -5
    +3

    7707LR-H

    -7
```

The TXPW control allows the user to set the 7707LR to the paired transmitter power.

When connecting to a 7707LT13 that is in AGC mode, set the 7707LR's TXPW value to –5dBm. This will ensure a –20dBm RF output power when the 7707LR is set to 0dB gain mode and has –5dBm optical input power.

When connecting to a 7707LTA13, 7707LT15, 7707LTxx or 7707LTDyyy that is in AGC mode, set the 7707LR's TXPW value to +3. This will ensure a –20dBm RF output power when the 7707LR is set to 0dB gain mode and has 0dBm optical input power.

The 7707LR-H has a fixed TXPW of –7 and provides a –20dBm RF output for –7dBm optical input power (attenuated optical signal) and a 0dB gain setting on the 7707LR-H.

7.6.5. 7707LR Changing the display orientation

```
DISP
    VERT
    HOR
```

The *DISP* control allows the user to select a horizontal or vertical orientation for the displays to accommodate mounting the module in the 3RU or 1RU frames.

7.6.6. 7707LR Restoring Factory Defaults

```
FDEF
    YES
    NO
```

To restore the factory defaults, enter the FDEF control and choose *YES* to restore all factory settings to the 7707L. All configurations previously made to the card will be lost.

7.7.   7707LR USER MENU – MON

The Mon (monitoring) menu allows the user to check the status and values of the settings for the 7707L card. To make changes to the settings, please refer to the User Set menu outlined in section 7.6.

7.7.1. 7707LR RF-Out Threshold

RFTH

The RFTH function allows the user to monitor the threshold of the RF-Output.

7.7.2. 7707LR RF Out Power

PWR

The PWR function allows the user to monitor the power of the RF Output.

7.7.3. 7707LR Optical Threshold

OPTH

The OPTH function allows the user to monitor the optical threshold of the 7707LR.

7.7.4. 7707LR Optical Power

OPWR

The OPWR function allows the user to monitor the optical power of the 7707LR.

7.7.5. 7707LR Gain

GAIN
7707LR/-H
Auto (AGC only)
0 dB (manual only)
6 dB (manual only)
12 dB (manual only)
7707LR
Auto (AGC only)
0 dB (manual only)
12 dB (manual only)
24 dB (manual only)

The GAIN control allows the user to monitor the gain setting of the 7707LR.

To make changes to the Gain of the 7707LR, please refer to section 0. The 7707LR configured for a +3dBm transmitter for can be adjusted to 0dB, 12dB or 24dB. The 7707LR that has been configured for a −5dBm transmitter can be adjusted to 0dB, 6dB or 12dB.

The 7707LR-H can be adjusted to 0dB, 6dB or 12dB and assumes a maximum input optical power of −7dBm.

7.7.6. 7707LR Transmitter Power Calibration Mode

TXPW
-5
+3

The TXPW control allows the user to view the laser power expected from the 7707LT at its optical output.

7.7.7. 7707LR Software Version

S/W

The S/W function allows the user to check the software version currently in the 7707LR.

7.8.   CARD EDGE CONTROLS

The 7707LT/LTA & 7707LR are equipped with a three-position, return-to-center toggle switch is used to select the various card-edge displays and menu items and is also used in conjunction with a momentary pushbutton to select some sub-items of the menu system.

7.9.   CONFIGURING GAIN LEVELS OF THE 7707LT/LTA AND 7707LR IN MANUAL MODE

The following method has been outlined to configure gain levels of the L-Band cards. Configuring the gain levels of the 7707LT/LTA, 7707LR and 7707LR-H cards is done via the card-edge menu system.   The 7707LT/LTA and 7707LR must first be placed in Manual mode. Both cards are configured for AGC (automatic gain control) mode from the factory. To configure the units for manual mode, please refer to section 5.1.2 for the 7707LT/LTA and section 5.2.2 for the 7707LR.

The L band cards provide the user with the ability to adjust the gain of both the transmitter and receiver. Follow the logic diagram below to avoid distortion issues.

```
                         ┌─────────────────┐
                         │ Determine Which │
7707LR-H or 7707LR       │  Receiver You   │        7707LR Coupled with
Coupled with -5dBm       │      Have       │        +3dBm Transmitter
Transmitter              └─────────────────┘
```

Left branch (7707LR-H or 7707LR Coupled with -5dBm Transmitter):

- Set Manual Gain on Tx and Rx to 0dBm (10dB for LTA). Is The Gain Sufficient? — **YES** → End Procedure
  - **NO** ↓
- Increase Gain on Rx to 6dB. Is Gain Sufficient? — **YES** → End Procedure
  - **NO** ↓
- Increase Gain on Tx to 10dB (20dB for LTA). Inspect Signal Spectrum for Distortion or 'Spectrum Skirts'
  - ↓
- Is Distortion Present? — **YES** → Decrease Gain of Tx to 0dB (10dB for LTA)
  - **NO** ↓
- Is Signal Strength Sufficient? — **YES** → End Procedure
  - **NO** ↓
- Increase Gain on Rx to 12dB
  - ↓
- Is Signal Strength Sufficient? — **YES** → End Procedure
  - **NO** ↓
- Increase Gain on Tx to 15dB (30dB for LTA). Inspect Signal Spectrum for Distortion or 'Spectrum Skirts'
  - ↓
- Is Distortion Present? — **YES** → Decrease Gain of Tx to 10dB (20dB for LTA)
  - **NO** ↓
- Is Signal Strength Sufficient? — **YES** → End Procedure
  - **NO** ↓
- Leave Gain on Rx to 12dB

Right branch (7707LR Coupled with +3dBm Transmitter):

- Set Manual Gain on Tx and Rx to 0dBm (10dB for LTA). Is The Gain Sufficient? — **YES** → End Procedure
  - **NO** ↓
- Increase Gain on Rx to 12dB. Is Gain Sufficient? — **YES** → End Procedure
  - **NO** ↓
- Increase Gain on Tx to 10dB (20dB for LTA). Inspect Signal Spectrum for Distortion or 'Spectrum Skirts'
  - ↓
- Is Distortion Present? — **YES** → Decrease Gain of Tx to 0dB (10dB for LTA)
  - **NO** ↓
- Is Signal Strength Sufficient? — **YES** → End Procedure
  - **NO** ↓
- Increase Gain on Rx to 24dB
  - ↓
- Is Signal Strength Sufficient? — **YES** → End Procedure
  - **NO** ↓
- Increase Gain on Tx to 15dB (30dB for LTA). Inspect Signal Spectrum for Distortion or 'Spectrum Skirts'
  - ↓
- Is Distortion Present? — **YES** → Decrease Gain of Tx to 10dB (20dB for LTA)
  - **NO** ↓
- Is Signal Strength Sufficient? — **YES** → End Procedure
  - **NO** ↓
- Leave Gain on Rx to 24dB

8.   *VISTA*LINK® REMOTE MONITORING/CONTROL

8.1.   WHAT IS *VISTA*LINK®?

*Vista*LINK® is Evertz's remote monitoring and configuration platform which operates over an Ethernet network using Simple Network Management Protocol (SNMP). SNMP is a standard computer network protocol that enables different devices sharing the same network to communicate with each other. *Vista*LINK® provides centralized alarm management, which monitors, reports, and logs all incoming alarm events and dispatches alerts to all the VLPro Clients connected to the server. Card configuration through *Vista*LINK® PRO can be performed on an individual or multi-card basis using simple copy and paste routines, which reduces the time to configure each module separately. Finally, *Vista*LINK® enables the user to configure devices in the network from a central station and receive feedback that the configuration has been carried out.

There are 3 components of SNMP:

1. An SNMP manager, also known as a Network Management System (NMS), is a computer running special software that communicates with the devices in the network. Evertz VL-Fiber demo Manager graphical user interface (GUI), third party or custom manager software may be used to monitor and control Evertz *Vista*LINK® enabled fiber optic products.

2. Managed devices, (such as 7707EO and 7707OE cards), each with a unique address (OID), communicate with the NMS through an SNMP Agent. Evertz *Vista*LINK® enabled 7700 series modules reside in the 3RU 7700FR-C MultiFrame and communicate with the manager via the 7700FC *Vista*LINK® frame controller module, which serves as the Agent.

3. A virtual database, known as the Management information Base (MIB), lists all the variables being monitored which both the Manager and Agent understand. Please contact Evertz for further information about obtaining a copy of the MIB for interfacing to a third party Manager/NMS.

For more information on connecting and configuring the *Vista*LINK® network, see the 7700FC Frame Controller chapter.

8.2.   *7707LT/LTA VISTA*LINK® MONITORED PARAMETERS

7707LT/LTA Parameter	Description
Local/Remote Jumper	Determines whether card will be controllable through *Vista*LINK® or the card edge.
Input Power	Input RF power presented to 7707LT/LTA.
Laser Current	The amount of current the laser transmitter is using.
LNB State	Whether the LNB power is being powered by 7707LT/LTA.
LNB Voltage	The voltage level the 7707LT/LTA is providing the LNB with

Table 8-1: 7707LT *Vista*LINK® Monitored Parameters

8.3. *7707LT/LTA VISTA*LINK® CONTROLLED PARAMETERS

7707LR Parameter	Description
Lower RF Threshold	Enables the user to set the Lower RF Threshold.
Upper RF Threshold	Enables the user to set the Upper RF Threshold.
Gain Mode	Allows the user to set the Gain of the module.
Squelch*	Allows the User to set the Optical Squelch ON or OFF.
Squelch Threshold*	Allows the User to set the Threshold level for Optical Squelch.

Table 8-2: 7707LT/LTA *Vista*LINK® Controlled Parameters

* Available with firmware revision 1.2 build 31 and CPLD code revision 1.2 (CPLD is not field upgradeable) on non-DWDM laser products.

8.4. *7707LR VISTA*LINK® MONITORED PARAMETERS

7707LR Parameter	Description
Optical Power Low	Indicates the optical power is lower than the rated input range.
Optical Power High	Indicates the Optical input power is higher than the rated input range.
RF Output Power Low	Indicates the output RF signal is lower than the set lower RF output threshold trip level.
RF Output Power High	Indicates the output RF signal is higher than the set upper RF output threshold trip level.

Table 8-3: 7707LR *Vista*LINK® Monitored Parameters

8.5. *7707LR VISTA*LINK® CONTROLLED PARAMETERS

7707LR Parameter	Description
Lower Optical Threshold	Enables the user to set the Lower optical Threshold.
Upper Optical Threshold	Enables the user to set the Upper optical Threshold.
Lower RF Threshold	Enables the user to set the Lower RF Threshold.
Upper RF Threshold	Enables the user to set the Upper RF Threshold.
RF Cable Shorted Reset	Allows the user to reset this alarm once the problem has been corrected.
Manual AGC Mode	Enables the user to set this feature.
RF Output Power Setting	Enables the user to set this feature.
Gain Mode	Allows the user to set the Gain of the module.

Table 8-4: 7707LR *Vista*LINK® Controlled Parameters

8.6. 7707LT/LTA *VISTA*LINK® TRAPS

7707LT/LTA Trap	Description of True Condition
Laser Failed	Laser has stopped working.
Laser Degrade	Laser is nearing end of life cycle.
Radio Frequency: Input Power Low	Input RF signal power is below threshold setting.
Radio Frequency: Input Power High	Input RF signal power is above threshold setting.
Cable Shorted	LNB power has short circuited.
Optical Output Squelched*	The optical output has been squelched (laser is off).

Table 8-5: 7707LT/LTA *Vista*LINK® Traps

* Available with firmware revision 1.2 build 31 and CPLD code revision 1.2 (CPLD is not field upgradeable) on non-DWDM laser products.

8.7. *7707LR VISTA*LINK® TRAPS

7707LR Trap	Parameter
Optical Power Low	Input optical signal power is below threshold setting.
Optical Power High	Input optical signal power is above threshold setting.
Radio Frequency: Input Power Low	Input RF signal power is below threshold setting.
Radio Frequency: Input Power High	Input RF signal power is above threshold setting.

Table 8-6: 7707LR *Vista*LINK® Traps

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