2405/2407LTA

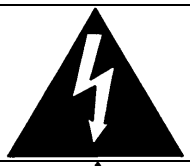
Standalone L-Band Fiber Optic Transmitter

Instruction Manual

EVERTZ MICROSYSTEMS LTD.
5288 John Lucas Drive,
Burlington, Ontario,
Canada L7L 5Z9
Phone: 905-335-3700
Sales: sales@evertz.com Fax: 905-335-3573
Tech Support: service@evertz.com Fax: 905-335-0909
Web Page: http://www.evertz.com

Version 1.1 May 2007

IMPORTANT SAFETY INSTRUCTIONS

	The lightning flash with arrowhead symbol within an equilateral triangle is intended to alert the user to the presence of uninsulated “Dangerous voltage” within the product’s enclosure that may be of sufficient magnitude to constitute a risk of electric shock to persons.
	The exclamation point within an equilateral triangle is intended to alert the user to the presence of important operating and maintenance (Servicing) instructions in the literature ac-companying the product.

- Read this information
- Keep these instructions.
- Heed all warnings.
- Follow all instructions.
- Do not use this apparatus near water
- Clean only with dry cloth.
- Do not block any ventilation openings. Install in accordance with the manufacturer’s instructions.
- Do not install near any heat sources such as radiators, heat registers, or other apparatus (including amplifiers) that produce heat.
- Do not defeat the safety purpose of the polarized or grounding type plug. A polarized plug has two blades, one blade being wider than the other. A grounding type plug has two blades and a third grounding prong. The wide blade or the third prong is provided for your safety. If the provided plug does not fit into your outlet, consult an electrician for replacement of the obsolete outlet.
- Protect the power cord from being walked on or pinched particularly at plugs, convenience receptacles and the point where they exit from the apparatus.
- Only use attachments/accessories specified by the manufacturer
- Unplug this apparatus during lightning storms or when unused for long periods of time.
- Refer all servicing to qualified service personnel. Servicing is required when the apparatus has been damaged in any way (ie. liquid has been spilled or objects have fallen into the apparatus, the apparatus has been exposed to rain or moisture, does not operate normally, or has been dropped).

WARNING
TO REDUCE THE RISK OF FIRE OR ELECTRIC SHOCK, DO NOT EXPOSE THIS APPARATUS TO RAIN OR MOISTURE.

WARNING
DO NOT EXPOSE THIS EQUIPMENT TO DRIPPING OR SPLASHING AND ENSURE THAT NO OBJECTS FILLED WITH LIQUIDS ARE PLACED ON THE EQUIPMENT.

WARNING
TO COMPLETELY DISCONNECT THIS EQUIPMENT FROM THE AC MAINS, DISCONNECT THE PLUG FROM THE DUAL POWER SUPPLIES AC RECEPTACLE.

WARNING
THE MAINS PLUG OF THE POWER SUPPLY CORD SHALL REMAIN READILY OPERABLE.

INFORMATION TO USERS IN EUROPE

NOTE

This equipment with the CE marking complies with both the EMC Directive (89/336/EEC) and the Low Voltage Directive (73/23/EEC) issued by the Commission of the European Community.

Compliance with these directives implies conformity to the following European standards:

- EN60065 Product Safety
- EN55103-1 Electromagnetic Interference Class A (Emission)
- EN55103-2 Electromagnetic Susceptibility (Immunity)

This equipment has been tested and found to comply with the limits for a Class A digital device, pursuant to the European Union EMC directive. These limits are designed to provide reasonable protection against harmful interference when the 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 the user will be required to correct the interference at his own expense.

INFORMATION TO USERS IN THE U.S.A.

NOTE

FCC CLASS A DIGITAL DEVICE OR PERIPHERAL

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 the 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 the user will be required to correct the interference at his own expense.

WARNING

Changes or Modifications not expressly approved by Evertz Microsystems Ltd. could void the user's authority to operate the equipment.

Use of unshielded plugs or cables may cause radiation interference. Properly shielded interface cables with the shield connected to the chassis ground of the device must be used

TABLE OF CONTENTS

Figures

Tables

REVISION HISTORY

REVISION	DESCRIPTION	DATE
1.0	First Release	April 07
1.1	Fixed Formatting and Typos	May 07

CAUTION

If the LNB POWER LED is on or flashing, there will be DC voltage for LNB power at the RF IN connector. This can damage some test equipment.

You can turn off the LNB power by switching LNB MODE switch to the OFF position.

1. OVERVIEW

The 2405/2407LTA is a fiber optic transmitter used for transporting L-Band satellite signals over fiber optic cable. The 2405/2407LTA accepts one L-Band RF input on an F-Type connector and provides a fiber optic output. An L-Band RF output is also provided for monitoring of the input RF signal. This port provides a copy of the input signal prior to any manual or AGC gain control. The DC power input is via an F-Type connector. The 2407LTA sends monitoring and configuration status information down the fiber for viewing locally at a 7708LR receiver and remotely via SNMP/VistaLINK®. See 7708LR manual for details on the parameters monitored. The 2405LTA does not send this monitoring information down the fiber.

Features:

- Extended L-Band frequency range - 950 to 2150MHz
- Protocol transparent - handles all video, audio and data modulation formats
- 2407LTA signal and configuration status are relayed for monitoring at 7708LR products. With the 7708LR this information can be monitored remotely through SNMP and VistaLINK®. See the 7708LR manual for details
- Automatic and manual gain control
- L-Band monitor coaxial output
- Can inject LNB power (as provided by connected DC power supply) into the RF input cable for LNB powering
- Can inject 22 kHz (selectable on/off) into the RF input cable for LNB local oscillator control
- -WP version provides IP65 dust and water protection for mounting outdoors without a supplemental enclosure

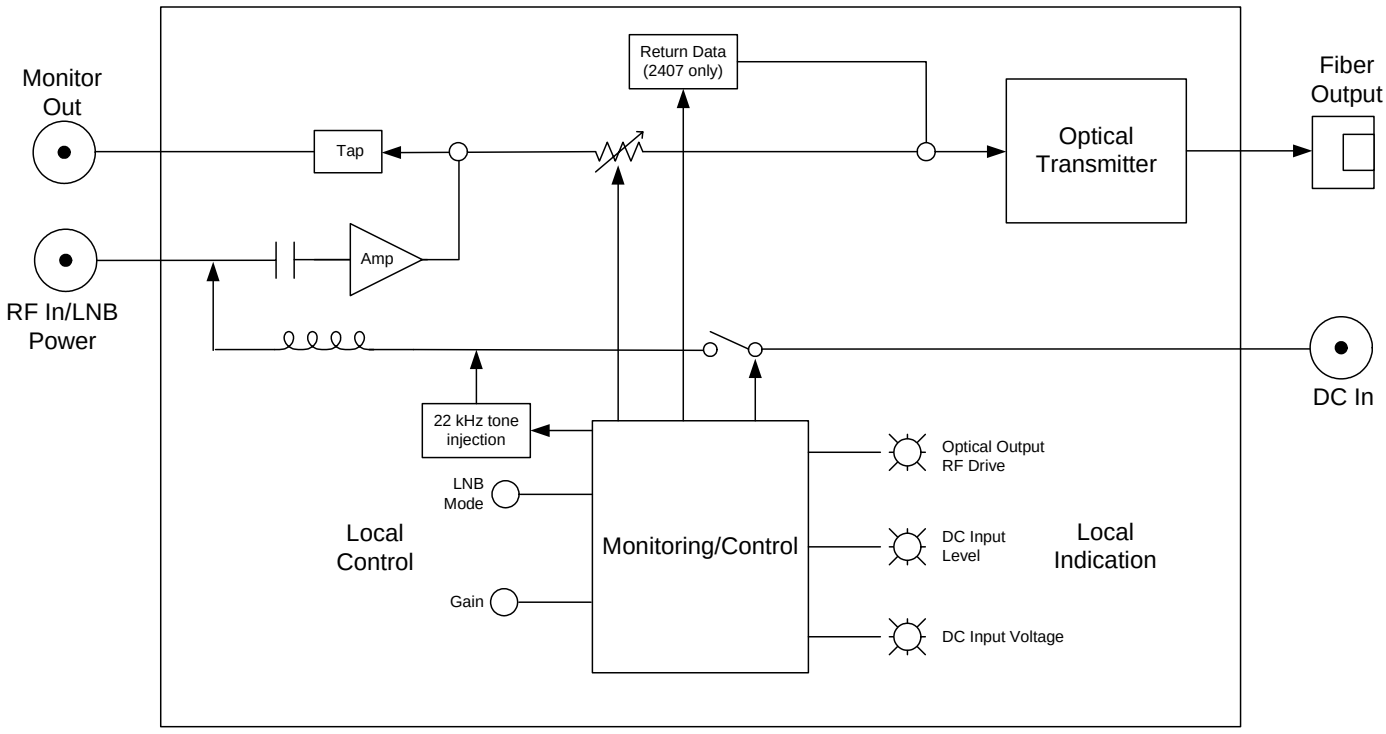


Figure 1-1: 2405/2407LTA Block Diagram

2. INSTALLATION

The 2405/2407LTA comes in a die-cast enclosure with integral mounting flanges. It is recommended that the enclosure be mounted on a flat surface with the connectors facing down. For units with the -WP option that are exposed to the elements, while not required to prevent water ingress into the unit, good outdoor installation practice suggests protecting connectors with a wrap of Scotch 130C rubber tape followed by Scotch Super 88 vinyl tape, or equivalent.

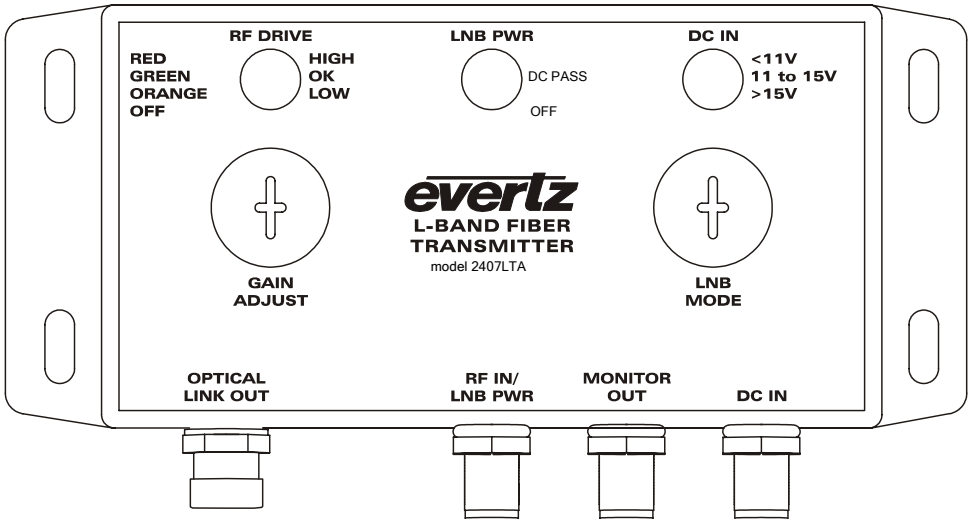


Figure 2-1: 2407LTA Module

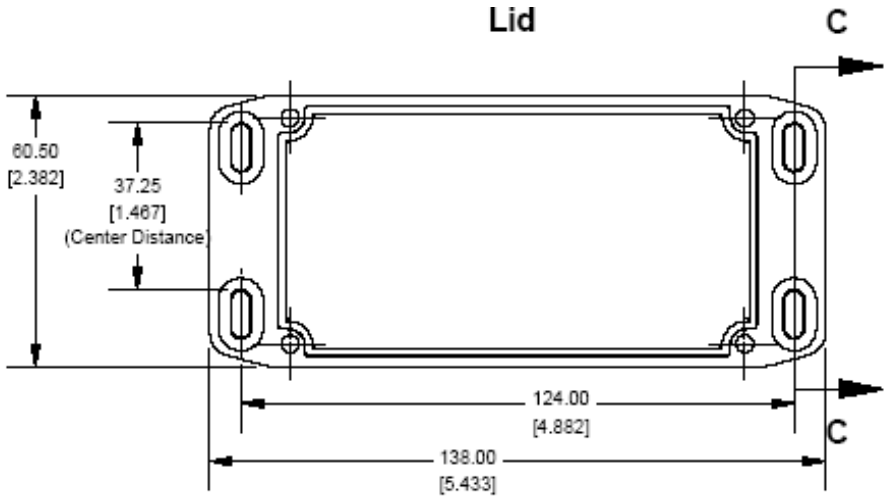


Figure 2-2: 2405/2407LTA Mounting Hole Centers and Dimensions – mm [in]

2.1. 2405/2407LTA CONNECTIONS

RF IN Input F-Type connector for L-band satellite signals. This connector can also provide LNB power and 22kHz tone back to the satellite dish.

If LNB POWER LED is on or flashing, there will be DC voltage for LNB power at the RF IN connector. This can damage some test equipment.

You can turn off the LNB power by switching LNB MODE switch to the OFF position.

MONITOR OUT Output F-Type connector provides a buffered copy of the incoming RF signal for monitoring purposes (signal peaking, etc.)

When unused, it is recommended that this connector be terminated with a 75 Ohm load.

DC IN Input F-Type connector for DC power supply. Input power supply range is from 11-23 VDC.

Do not exceed 23VDC at the DC input connector or damage to the unit will result.

FIBER OUTPUT FC/APC female connector with the optical output from the 2405/2407LTA. This connector should be connected to the FIBER IN connector of an appropriate Evertz companion receiver model at the destination end with a suitable fiber optic cable. The 2405/2407LTA transmits on the 1310 wavelength unless otherwise indicated by wavelength label.

2.2. CARE AND HANDLING OF OPTICAL FIBER

2.2.1. Safety

CLASS 1 LASER PRODUCT

Background colour: yellow
Triangular band: black
Symbol: black

2.2.2. Assembly

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

2.2.3. Labelling

Certification and Identification labels are combined into one label.

- Date of manufacture on this label can be traced by serial number.
- Class 1 Laser Products: Model number is one of 2405/2407LTA13, 2405/2407LTA15 or 2405/2407LTAxx (xx = 27, 29, 31, 33, 35, 37, 43, 45, 47, 49, 51, 53, 55, 57, 59, 61)

Reproduction of 2405/2407LTA Certification and Identification Label for models that are Class 1 Laser Products

2.2.4. 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.

3. 2405/2407LTA SPECIFICATIONS

3.1. RF INPUT

Connector:	F-type
I/O Impedance:	75 Ω
Return Loss:	>15dB
Input Frequency Range:	950MHz – 2150MHz
Input Power Range:	-20 to –60dBm
AGC Hold Range:	-20 to –45dBm
LNB Voltage:	Pass-through from DC input, -0.3VDC
Maximum LNB Current:	400mA, current limited

3.2. MONITOR OUTPUT

Connector:	F type
I/O Impedance:	75 Ω
Return Loss:	>13dB
Output Frequency Range :	950MHz – 2150MHz
Flatness :	±1.5dB @ 250MHz – 2250MHz
	±0.5dB @ any 36MHz BW
Output Level:	± 3dB with respect to input

3.3. OPTICAL OUTPUT

Number of outputs:	1
Connector:	Female FC/APC
Operating Wavelength:	
Standard:	1310nm
1550nm:	1550nm
CWDM:	1270-1610nm
Optical Power:	
1310nm FP:	0 dBm ± 1 dBm
1550 DFB:	2 dBm ± 1 dBm
CWDM:	2 dBm ± 1 dBm
Fiber Size:	9 μm core / 125 μm overall

3.4. ELECTRICAL

Voltage:	+11VDC to 23VDC
Power:	3 Watts with no LNB load
EMI/RFI:	Complies with FCC regulations for class A devices
	Complies with EU EMC directive.

3.5. PHYSICAL

Dimensions (with flanges):	5.4"L x 2.4"W x 1.2"H
	(138mm L x 61mm W x 31mm H)

3.6. ENVIRONMENTAL

Dust and Water Protection: IP65 **(-WP version only)**
Temperature: -40 to +60 deg. C.

3.7. SYSTEM PERFORMANCE (WHEN COMBINED WITH A 7708LR)

Frequency Range: 950MHz - 2150MHz
Flatness: ±1.5dB @ 950MHz - 2250MHz
±0.25dB @ any 36MHz BW
Output Signal Level: (Input signal) + (TX gain) + (RX gain) - (2xOptical Loss)
Inter-modulation Products: -55dBc @ (RF input -20dBm, TX/RX gain to 0dB)

4. STATUS INDICATORS

The 2405/2407LTA module has three LED status indicators on the front of the box to show operational status of the module at a glance.

4.1. RF DRIVE INDICATOR

HIGH: The RF DRIVE LED will be RED when the incoming RF signal plus the module gain is overdriving the laser. Over driving the laser will be manifested as high IM products at the receiver.

OK: The RF DRIVE LED will be GREEN when the incoming RF signal plus the module gain is within the normal drive levels for the laser.

LOW: In manual gain mode, the RF DRIVE LED will be ORANGE when the incoming RF signal plus the module gain is under driving the laser. Signal to noise ratio will suffer. In AGC mode, this LED will be ORANGE when the incoming signal drops below the AGC hold range.

The following table provides a guide for the RF power levels that trip the LED indicators in each gain mode. Please note the tolerance for the levels.

Nominal Input Level (dBm)	Setting	Gain (dB)	LOW Trip (dBm) +/- 3dBm	HIGH Trip (dBm) +/- 3dBm
-20 to –45dBm	0	AGC	-45	-15
-20	1	+2	-25	-15
-22	2	+4	-27	-17
-24	3	+6	-29	-19
-26	4	+8	-31	-21
-28	5	+10	-33	-23
-30	6	+12	-35	-25
-32	7	+14	-37	-27
-34	8	+16	-39	-29
-36	9	+18	-41	-31
-38	A	+20	-43	-33
-40	B	+22	-45	-35
-42	C	+24	-47	-37
-44	D	+26	-49	-39
-46	E	+28	-51	-41
-48	F	+30	-53	-43

Table 4-1: LED trip points for RF DRIVE LED for each gain setting

4.2. LNB POWER INDICATOR

DC PASS: The LNB PWR LED will be GREEN when the LNB power mode is set to DC PASS. In this mode, DC input from the connected power supply is fed to the LNB. The voltage seen by the LNB will be approximately equal to the voltage supplied by the connected DC power supply minus 0.3VDC minus cable drop.

When the LNB PWR LED is **blinking** green or orange, there will be a 22khz tone present in addition to LNB power.

If the LNB PWR LED is on or flashing, there will be DC voltage for LNB power at the RF IN connector. This can damage some test equipment.

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

4.3. DC INPUT INDICATOR

<11V The DC IN LED will be RED when the supply voltage at the DC input is less than 11 Volts.

11V to 15V The DC IN LED will be GREEN when the supply voltage at the DC input is between 11 and 15 Volts.

>15V to 23V The DC IN LED will be ORANGE if the supply voltage at the DC input is greater than 15 Volts.

5. USER CONTROLS

User controls are located behind the two removable hole plugs on the front of the unit. These plugs are threaded and may be removed and installed with a Philips head screwdriver. When installing, ensure that the plugs are snug so as to prevent water ingress, but do not over tighten and distort the rubber washer.

5.1. GAIN

Gain adjustment is via a 16 position rotary switch located behind the GAIN ADJUST hole plug. The switch itself is marked 0-9 and A-F, and may be rotated using a small Philips screwdriver. Each step on the rotary switch represents a 2 dB gain change, with position 0 being AGC mode. AGC will maintain the output of the 2405/2407LTA at a constant level even if the input signal level changes, but remains within the hold range of –20 to –45 dBm.

Switch Position	Function
0	AGC
1	Manual Gain 2 dB
2	Manual Gain 4 dB
4-F	Manual Gain 6 dB to 30 dB in 2dB steps

Table 5-1: Gain Adjustment Switch

If conducting frequency response sweeps, both the 2405/2407LTA and the companion receiver should NOT be an AGC mode and should be set to a manual gain value.

5.2. LNB MODE

The 2405/2407LTA has the ability to inject 22khz tone as well the DC voltage supplied by the connected power supply into the cable connected to the RF input. This allows both powering and control of the connected LNB. Adjustment is via a 16 position rotary switch located behind the LNB MODE hole plug. The switch itself is marked 0-9 and A-F, and may be rotated using a small Philips screwdriver.

Switch Position	LNB Power	22 kHz
0	OFF	OFF
1	DC PASS	OFF
2	DC PASS	ON
3 –F	OFF	OFF

Table 5-2: LNB Mode Switch

If the LNB PWR LED is on or flashing, there will be DC voltage for LNB power at the RF IN connector. This can damage some test equipment.

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

6. +PS OPTION

When equipped with the +PS option, the 2405/2407LTA will come with an 18VDC, 44W power supply and F-Type cable adapter. This allows the power supply to be connected to the 2405/2407LTA using an appropriate length of coaxial cable with F-Type connectors on either end. The supply is capable of providing power to the 2405/2407LTA and up to 400mA to the connected LNB.

This power supply is not suitable for exposure to the elements and must be installed indoors or in an enclosure.