7706LT Series
Extended L-Band Fiber Transmitter
USER MANUAL

EVERTZ MICROSYSTEMS LTD.

5292 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: 905-335-7571
Web Page: www.evertz.com

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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 accompanying the product.

- Read these instructions
- 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, stoves, 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 with one wider than 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, such as power-supply cord or plug is damaged, 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.
-

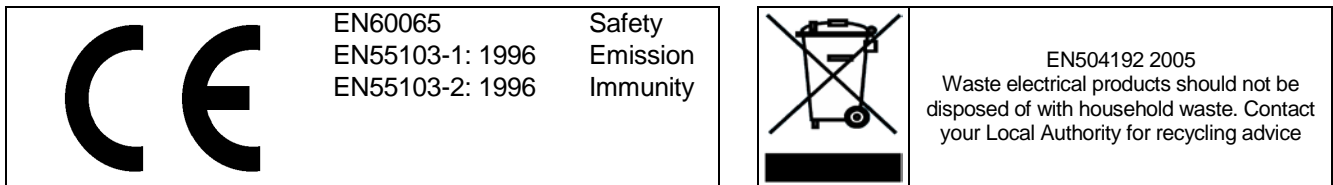| |
|---|
| **WARNING**
TO REDUCE THE RISK OF FIRE OR ELECTRIC – SHOCK, DO NOT EXPOSE THIS APPARATUS TO RAIN OR MOISTURE |
| **WARNING**
DO NOT EXPOSE THIS EQUIPMENT TO DRIPPING OR SPLASHING AND ENSURE THAT NO OBJECTS FILLED WITH LIQUIDS ARE PLACED ON THE EQUIPMENT |
| **WARNING**
TO COMPLETELY DISCONNECT THIS EQUIPMENT FROM THE AC MAINS, DISCONNECT THE POWER SUPPLY CORD PLUG FROM THE AC RECEPTACLE |
| **WARNING**
THE MAINS PLUG OF THE POWER SUPPLY CORD SHALL REMAIN READILY OPERABLE |

INFORMATION TO USERS IN EUROPE

NOTE

CISPR 22 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 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.

CE	EN60065	Safety
	EN55103-1: 1996	Emission
	EN55103-2: 1996	Immunity

| | EN504192 2005 Waste electrical products should not be disposed of with household waste. Contact your Local Authority for recycling advice |

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.

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FIGURES

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REVISION HISTORY

REVISION	DESCRIPTION	DATE
1.0	First Release	Mar 2013
1.1	Updates throughout	Sep 2016

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1. OVERVIEW

The 7706LT is a fiber optic transmitter for RF signals in the extended L-Band or wider frequency range. It accepts a single RF input on coaxial cable and provides a single output for optical transmission. An RF monitor provides a convenient means of obtaining peak satellite signal strength, or additional signal distribution.

Gain may be adjusted manually or managed automatically via AGC. 13/17V DC adjustable LNB power with 22kHz tone is also provided.

Features:
- Extended frequency response for L-Band signals
- Protocol independent design - transports all modulation formats
- LNB power with selectable 13/17V DC
- LNB current limit & short circuit protection
- 22kHz tone on/off for LNB local oscillator control
- RF monitor output for signal peaking and signal distribution
- Manual gain and AGC modes for tuning optimal CNR performance
- Fiber link provides electrical isolation between antenna and facility, mitigating ground loop and lightning issues

The 7706LT occupies one card slot and can be housed in a 1RU frame that will hold up to three modules, a 350FR that will hold up to seven modules or a standalone enclosure which holds one module.
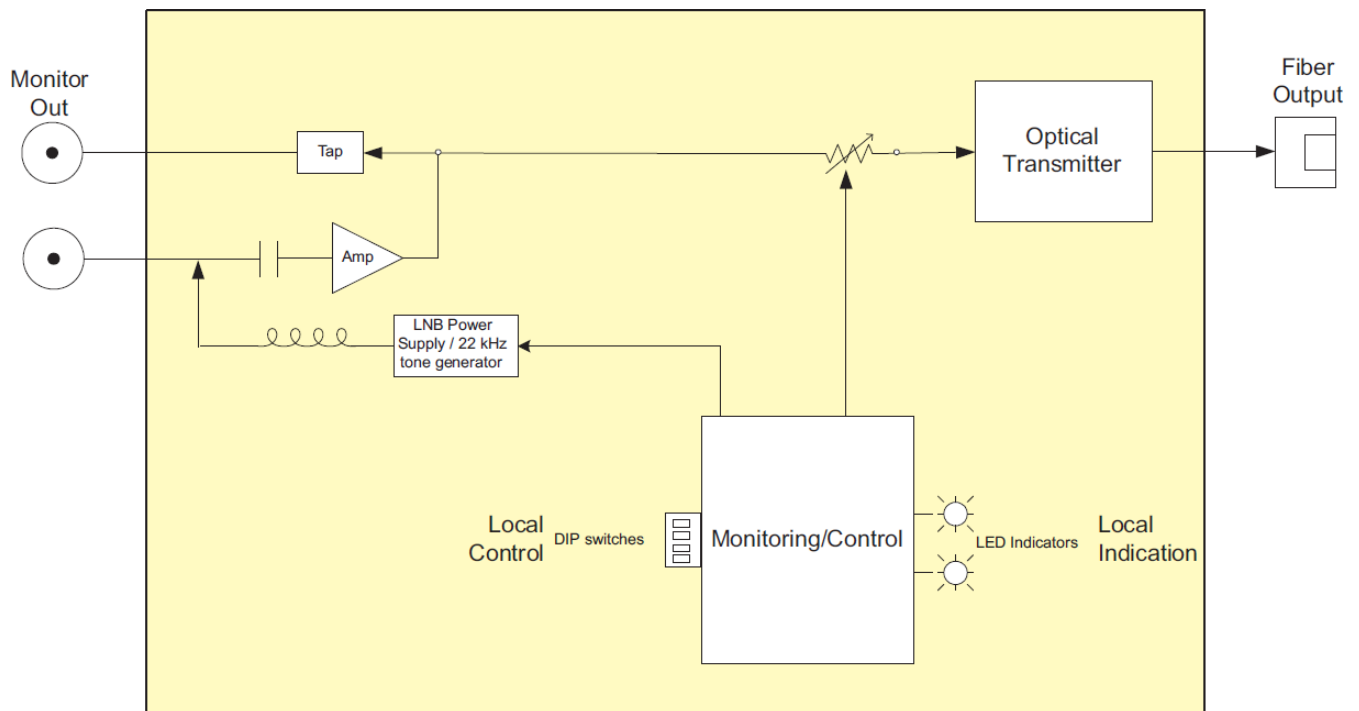
Figure 1-1: 7706LT Block Diagram

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2. INSTALLATION

The 7706LT comes with a companion rear plate appropriate for a 1RU, 3RU or standalone enclosure as specified at the time of order. SC/UPC, SC/APC, ST/UPC, FC/UPC, FC/APC or ST/UPC optical connectors are available and the type specified at the time of order will be installed. For information on mounting the rear plate and inserting the module into the frame, see the 7700FR manual for detailed instructions.
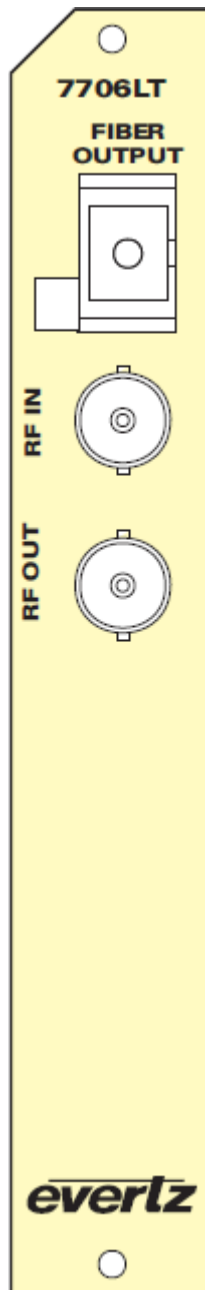
Figure 2-1: 7706LT Module

2.1.   7706LT CONNECTIONS

FIBER OUTPUT: SC/UPC, SC/APC, FC/UPC, FC/APC or ST/UPC female connector with the optical output from the 7706LT. 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 7706LT may transmit 1310nm, CWDM or DWDM wavelengths as indicated by the part number on the card ejector. The standard connector type is UPC. This connector type is compatible with standard PC connectors, but for optimal return loss performance, Evertz recommends the use of UPC fiber terminations throughout the system. The optional APC connectors provide further enhanced return loss performance, and when specified, should be used throughout the system.

RF IN: Input connector for RF signals. This connector can also provide LNB power and 22 kHz tone back to the LNB.

RF OUT: Output connector provides a buffered copy of the incoming RF signal for monitoring purposes (signal peaking, etc.) or coaxial distribution. Although not essential, if this connector is to remain unused, it is recommended that it be terminated with an appropriate 75 Ohm or 50 Ohm load.

> **The RF input is protected to the same degree as other professional RF devices, and will withstand a degree of ESD from handling, etc. Regardless, proper precautions should be taken during handling, such as the use of static bags and wrist straps. The input is not protected against lightning or other coupling of large energy spikes. If the installation is such that the RF input may be susceptible to spikes (e.g. direct connection to the antenna/LNB) then appropriate supplemental surge protection should be installed (e.g. Polyphaser).**

2.2.   CARE AND HANDLING OF OPTICAL FIBER

2.2.1. Safety

2.2.1.1. 7706LT 1310nm FP and CWDM Versions

CLASS 1 LASER PRODUCT

Background colour: yellow
Triangular band: black
Symbol: black

2.2.1.2. 7706LT DWDM Versions

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

Background colour: yellow
Triangular band: black
Symbol: black

2.2.2. Assembly

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

2.2.3. Labelling

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 7706LT or 7706LTxx (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 7706LTDxxx (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)
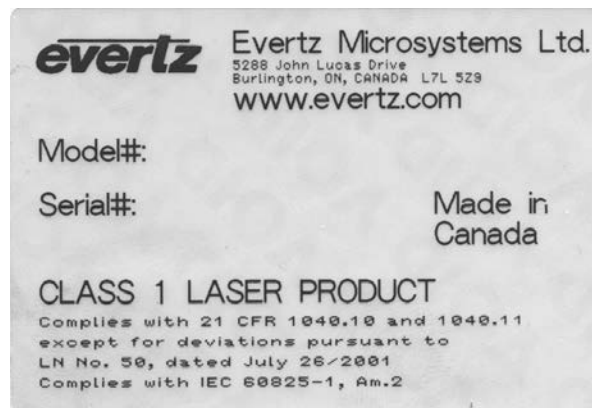
Figure 2-2 Reproduction of 7706LT Certification and Identification Label for Models that are Class 1 Laser Products

Figure 2-3 Reproduction of 7706LT Certification and Identification Label for Models that are Class 1M 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 the user maintain a minimum bending radius of 5 cm to avoid fiber-bending loss that will decrease the maximum attainable distance of the fiber cable. Evertz fiber optic modules are equipped with lockout devices that prevent the user from damaging the fiber connector by installing a module into a slot in the frame that does not have a suitable rear plate installed.

3.   SPECIFICATIONS

3.1.   RF INPUT

Number of Inputs: 1
Connector: BNC per IEC 61169-8 Annex A (F-Type and SMA Optional)
Input Impedance: 75Ω (50Ω Optional)
Return Loss: > 15dB (>10dB for 50Ω)
Frequency Range: 850MHz-2250MHz
Input Power Range: -10dBm to -60dBm
AGC Gain Range: -10 to +30dB
Input IP3:   +10dBm
LNB Power
   Voltage: 13V DC, 17V DC, off (selectable)
   Current: 400mA
   Protection: Short Circuit, current limited
   LO Control: 22kHz on/off (selectable)

3.2.   RF MONITOR OUTPUT

Number of Outputs: 1
Connector: BNC per IEC 61169-8 Annex A (F-Type and SMA Optional)
Output Impedance: 75Ω (50Ω Optional)
Return Loss: > 15dB (>10dB for 50Ω)
Frequency Range: 850MHz to 2250MHz
Output Level: within -2.0dB of input signal

3.3.   OPTICAL OUTPUT

Number of Outputs: 1
Connector: Female FC/UPC, ST/UPC, FC/UPC, SC/APC, FC/APC
Operating Wavelength
   Standard: 1310nm DFB
Output Power: +2dBm

3.4.   RF SYSTEM PERFORMANCE 7706LT+7706LRA PAIR

Frequency Range: 850MHz-2250MHz
Flatness: ±1.5dB

3.5.   ELECTRICAL

Voltage: +12V DC
Power: 6W max excluding LNB Power

3.6.   PHYSICAL (NUMBER OF SLOTS)

350FR: 1
7700FR-C: 1
7800FR: 1

3.7. COMPLIANCE

Laser Safety: Class 1 laser product

Complies with 24 CFR 1040.10 and 1040.11   IEC 60825-1

EMI/RFI: Complies with FCC Part 15, Class A

EU EMC directive

4. STATUS INDICATORS

The 7706LT has eight LED status indicators on the front card edge to show operational status of the card at a glance. See Figure 5-1 for LED locations.

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

LOCAL FAULT: This red LED will be on during the absence of a valid RF input signal (too low, too high or out of AGC range), an LNB short/overload, or if a local internal power fault exists (i.e.: a blown fuse). Whether or not this LOCAL FAULT indication is reported to the frame may be selected by the FRAME STATUS jumper (see section 5.1).

MODULE OK: This green LED will be on when the RF input signal is within range, LNB power conditions are normal and the board power is good.

There are six small LEDs that indicate the status of the input RF signal, LNB, and AGC mode signals.

RF HIGH: This red LED will be on when the input RF signal is higher than the RF high threshold setting.

RF OK: This green LED will be on when the input RF signal is within threshold settings.

RF LOW: This yellow LED will be on when the input RF signal is lower than the RF low threshold setting.

GAIN MODE: This LED is on when AGC mode is enabled and off when Manual mode is enabled. It will be green when power levels are within the AGC hold range and a constant RF output level is being maintained. It will be red if power levels are either above or below the power levels required for the AGC circuit to be able to maintain a constant level.

LNB MODE: This LED is on when LNB power is ON. It will green when LNB is active and OK (no short). It will be red when an LNB short or overload is detected (fault present).

SQUELCH MODE: This LED is on when squelch is enabled. It will be green when squelch is enabled but not active. It will be red when squelch mode is enabled and the output signal is squelched.

LED #	Colour	Function
LOCAL / FAULT	RED	LED 1 is red or LED 2 is off or LED 3 is yellow or LED 4 is red or LED 5 is red.
	GREEN	LED 1 is off and LED 2 is green and LED 3 is off and LED 4 is green or off and LED 5 is green or off.
1	RED	RF Input Power is greater then or equal to the upper threshold setting.
	OFF	RF Input Power is less then the upper threshold setting.
2	GREEN	RF Input Power is less the upper threshold setting and greater then the lower threshold setting.
	OFF	RF Input Power is less then the lower threshold setting or greater then the upper threshold setting.
3	YELLOW	RF Input Power less then or equal to the lower threshold setting.
	OFF	RF Input Power greater then the lower threshold setting.
4	RED	AGC is on but unable to maintain output power setting.
	GREEN	AGC is on and can maintain output power setting.
	OFF	AGC is off (manual mode)
5	RED	LNB Short/Overload
	GREEN	LNB power on and OK
	OFF	LNB power OFF
6	RED	Squelch active
	GREEN	Squelch on but not active
	OFF	Squelch off

Table 4-1: LED Status Indicators

5. JUMPER POSITIONS

5.1. 7706LT JUMPERS AND LEDS
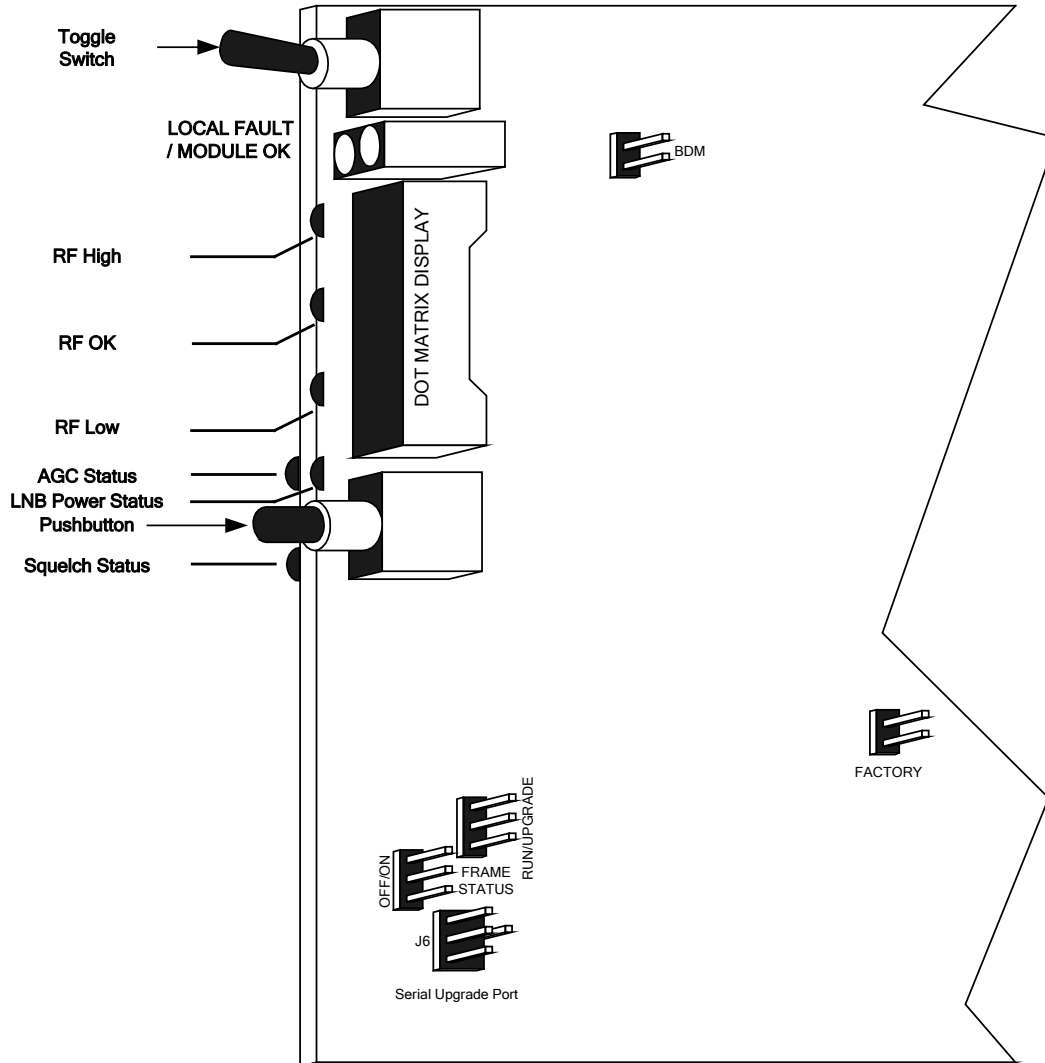
Figure 5-1: Location of 7706LT Jumpers and LEDs

5.2. 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.

5.3. CONFIGURING THE MODULE FOR FIRMWARE UPGRADES

UPGRADE: The UPGRADE jumper J5 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.

5.4. FACTORY AND BDM JUMPERS

When shipped from the Evertz facility, the FACTORY and BDM jumpers will not be installed. These jumpers **should not** be installed for any reason. If jumpers are on these positions they should be removed.

6. DOT-MATRIX DISPLAY

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 (see Figure 5-1) is used to navigate through the display menus and the push button is used to select options. Table 6-1 provides a quick reference to the display menu structure.

CTRL menu items have user-adjustable configuration values associated with them. STAT menu items display operating conditions or configuration values, but do not allow adjustment.

If a specific menu selection has a configuration value associated with it, then this may be changed using the toggle switch. Pressing the pushbutton will apply the displayed value and return you to the previous menu level.

The most recent user selection will be maintained in non-volatile memory in the event of power loss to the module.

Top Level	Level 1	Level 2	Level 3	Level 4
	BACK			
		BACK		
		RFTH	LWR	0 to -60 dBm Default -60 dBm
			UPPR	0 to -60 dBm Default 0 dBm
		MODE	AGC	
			MAN (default)	
		SQL	ON	
			OFF (default)	
		SQTH	0 to -60dBm Default: -60dBm	
		GAIN (visible in manual mode only)	0 to 31.5dB Default: 0dB	
DEFD selection	**CTRL**	**OUTL** (visible in AGC mode only)	0 to -50dBm Default: -20dBm	
		PSWD+	0 to 9999 (Default 7154)	
		This area visible only if correct password entered.	PSWL+	0000 - 9999
			LASR+	ON
				OFF
		LNBV	18V	
			13V	
			OFF (Default)	
		22KT	ON	
			OFF (Default, also can only be off if LNBV is off)	
		LNTH	LWR	0 to 500mA Default = 0
			UPPR	0 to 500mA Default = 500

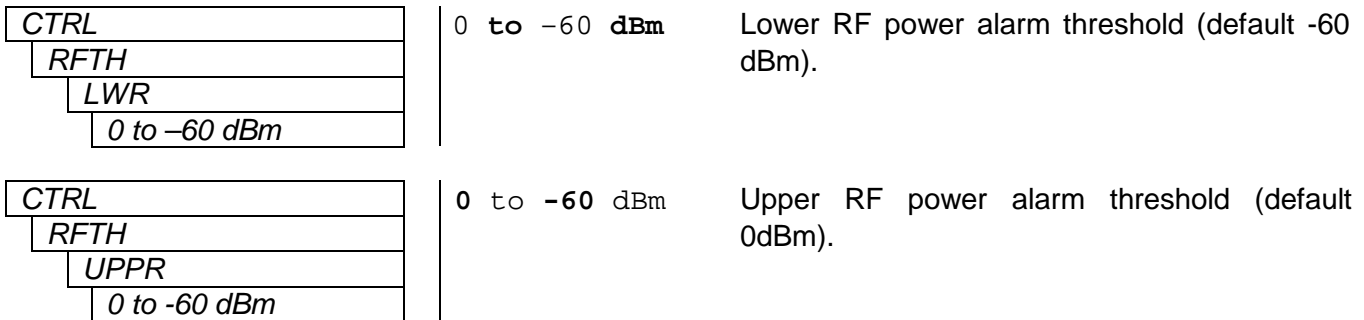|				
CTRL (continued)		**DEFD**	Fault status (Default)	
			PWR	
			MODE	
			SQL	
			GAIN	
			OUTL	
			LNBV (-LNB only)	
			22KT (-LNB only)	
			LNBC (-LNB only)	
		DISP	HORZ	
			VERT (default)	
	STAT	**BACK**		
		PWR	0 to -60dBm	
		RFTH	LWR	0 to -60 dBm
			UPPR	0 to -60 dBm
		MODE	AGC	
			MAN	
		GAIN (visible in manual mode only)	-10 to 30dB	
		SQL	ON	
			OFF	
		LASR	OK	
			OFF	
			FALT	
		LNBV	18V	
			13V	
			OFF	
		22KT	ON	
			OFF	
		LNBC	0 to 500mA	
		LNTH	LWR	0 to 500mA
			UPPR	0 to 500mA
		VER	Firmware version	

Table 6-1: Card Edge Menu Structure

6.1. 7706LT CONTROLLED PARAMETERS

To change the 7706LT parameters, select the CTRL menu item in menu level 1. The toggle switch may then be used to select the parameter to change as described below.

6.1.1. Adjusting the RF Input Power Alarm

The 7706LT measures and can display the input RF power over a range of 0dBm to –60dBm in increments of 1dBm. Alarms may be set for high and low input RF power that will appear locally on the card edge LEDs (see Section 4). To set the alarm threshold points, select the CTRL menu item in the first menu level and then use the toggle switch to display the RFTH option and press the pushbutton to select it.

CTRL
   RFTH
     LWR
       0 to –60 dBm
	`0 to –60 dBm` Lower RF power alarm threshold (default -60 dBm).

CTRL
   RFTH
     UPPR
       0 to -60 dBm
	`0 to -60 dBm` Upper RF power alarm threshold (default 0dBm).

> ✎ **The 7706LT will not allow threshold settings where the lower threshold is greater than the upper threshold.**

6.1.2. Selecting the Input Gain Mode

The 7706LT has two gain modes available:

Manual gain mode allows the user to select a fixed gain level for the RF signal.

AGC (automatic gain control) will maintain a constant output level even if the input RF level changes, as long as this input level does not go outside of the AGC hold range (the 7706LT has from 0 to +31.5 dB of gain available to automatically apply to the incoming signal to maintain the target level). The AGC target level is user adjustable (see Section 6.1.6).

To select the gain mode, select the CTRL menu item in the first menu level, then use the toggle switch to display the MODE option and press the pushbutton to select it.

CTRL
   MODE
     AGC
     MAN
	`AGC` AGC mode (default).
	 `MAN` Manual mode.
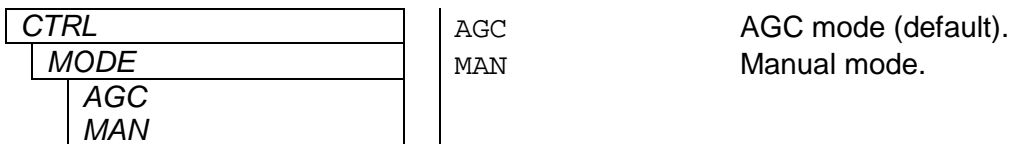
6.1.3. Enabling/Disabling Squelch Mode

Squelch mode will turn off the laser output if the RF input drops below the squelch threshold setting (see section 6.1.4). This feature is useful for triggering downstream automatic main/standby protection switches, and for other such applications. To enable or disable squelch mode, select the CTRL menu item in the first menu level, then use the toggle switch to display the SQL option and press the pushbutton to select it.

CTRL
SQL
ON
OFF

ON   Enable squelch mode.
OFF   Disable squelch mode (default).

6.1.4. Adjusting the Squelch Mode Threshold

The RF Squelch threshold may be set from this menu via the SQTH selection. The squelch level is based on the RF input power to the transmitter.

To select the RF Squelch threshold, select the CTRL menu item in the first menu level, then use the toggle switch to display SQTH option and press the pushbutton to select it.

CTRL
SQTH
0 to -60 dBm

0 to -60 dBm   RF Squelch threshold range (default -60 dBm).

6.1.5. Adjusting the RF Gain

The 7706LT can apply gain to adjust the level of the input signal in 0.5 dB increments. This allows weaker signals to be gained up for optimal laser depth of modulation and CNR performance. For optimal performance tuning, it is recommended that a spectrum analyzer be connected at the receive side of the link while the gain value is adjusted to provide the best CNR performance while not introducing distortion products which may appear as an increase in the noise floor while increasing gain level, or as "spectrum skirts". To set the gain, select the CTRL menu item in the first menu level, then use the toggle switch to display the GAIN option and press the pushbutton to select it.

CTRL
GAIN
0 to +31.5 dBm

0 to +31.5 dBm   Output signal gain level (default 0 dBm).

> **Note that this menu item is not applicable and therefore not visible when in AGC mode.**

6.1.6. Adjusting the AGC Target Level

The target output level to be maintained by the 7706LT when AGC mode is user adjustable. Adjustment of this parameter allows optimal laser depth of modulation and CNR performance to be achieved. A typical value is −20 to −10 dBm, but for optimal performance it is recommended that a spectrum analyzer be connected at the receive side of the link while this value is adjusted to provide the best CNR performance while not introducing distortion products which may appear as an increase in the noise floor while increasing the target level, or as "spectrum skirts". To set the AGC target level, select the CTRL menu item in the first menu level, then use the toggle switch to display the OUTL option and press the pushbutton to select it.

CTRL	
OUTL	
0 to -50 dBm	

0 to -50 dBm   AGC output signal target level (default –20 (dBm)

> ✎ **Note that this menu item is only applicable and visible when the card is set to operate in AGC mode.**

6.1.7. Setting the Passcode (DWDM versions only)

Due to the high-powered lasers used on the DWDM version of these cards, it is possible to turn the laser on and off and protect this function with a passcode. This provides added optical safety. Depress the pushbutton and select the PSWD option. Actuate the toggle switch to achieve the correct code number (Factory Default Passcode = 0000).

CTRL	
PSWD	
0-9999	
PSWL+	
LASR+	
0000-9999	
ON	
OFF	

PWSD   Store a new passcode (0-9999) required for BLOCK configuration. This menu is not available without entering the correct passcode.

LASR+   Enable / Disable Laser. Only visible for DWDM versions.

6.1.8. Setting the LNB Voltage Level

The voltage level for LNB power is user adjustable. To set the LNB output voltage level, select the CTRL menu item in the first menu level, then use the toggle switch to display the LNBV option and press the pushbutton to select it.

CTRL	
LNBV	
18V	
13V	
OFF	

18V   Sets the LNB output voltage to 18V.
13V   Sets the LNB output voltage to 13V.
OFF   Disables the LNB output voltage.

6.1.9. Configuring the 22KHz Tone

A 22 kHz tone may be combined with the LNB voltage for universal LNB local oscillator control. The 22KHz tone can be enabled or disabled via the `22KT` selection menu. To select the 22KHz tone, select the `CTRL` menu item in the first menu level, then use the toggle switch to display the `22KT` option and press the pushbutton to select it.

CTRL
22KT
ON
OFF

Indicates whether the 22KHz tone on LNB output is enabled or disabled.

`ON`	22KHz tone is enabled.
`OFF`	22KHz tone is disabled.

6.1.10. Setting the LNB Current Threshold Level

The 7706LT monitors the amount of current being drawn by the LNB. This function may be used to provide an early warning of impending LNB failure. To set the LNB current threshold, select the `CTRL` menu item in the first menu level, then use the toggle switch to display the `LNTH` option and press the pushbutton to select it.

CTRL
LNTH
LWR / UPPR
0 to 500A

`LWR`	Lower RF threshold level.
`UPPR`	Upper RF threshold level.
`0 to 500A`	RF threshold range.

6.1.11. Default Card-Edge Display

This allows configuration of which operating condition will be displayed as the top-level item on the dot-matrix display. The default is NORM, which displays "OK" or "LASER FAULT" in the event of a problem with the laser. To choose an alternate parameter, select the `CTRL` menu item in the first menu level, then use the toggle switch to display the `DEDF` option and press the pushbutton to select it.

CTRL
DEFD
NORM
PWR
MODE
SQL
GAIN
OUTL
LNBV
22KT
LNBC

`NORM`	Laser status
`PWR`	Measured RF Input power
`MODE`	Gain mode
`SQL`	Squelch setting
`GAIN`	Gain setting (manual mode only)
`OUTL`	AGC output level setting (AGC mode only)
`LNBV`	LNB voltage setting
`22KT`	22kHz tone setting
`LNBC`	Measured LNB current

6.1.12. Setting the Display Orientation

The *DISP* option allows the user to set a horizontal or vertical orientation for the card edge display. To set the display orientation, select the *CTRL* menu item in the first menu level, then use the toggle switch to display the *DISP* option and use the pushbutton to select it.

CTRL		HORZ	Horizontal display used when the module is housed in the one-rack unit 7701FR frame or the stand-alone enclosure.
DISP			
HORZ			
VERT		VERT	Vertical display used when the module is housed in the three-rack unit 7700FR frame.

6.1.13. Displaying the RF Threshold

To display the RF input power threshold, select the STAT menu item in the first menu level, then use the toggle switch to display the RFTH option and press the pushbutton to select it.

STAT			
RFTH		LWR	Indicates the lower RF threshold level.
LWR / UPPR		UPPR	Indicates the upper RF threshold level.
0 to -60dBm		0 to -60dBm	RF threshold range (in dBm units).

6.1.14. Displaying the Gain Mode

To display the gain mode, select the STAT menu item in the first menu level, then use the toggle switch to display the MODE option and press the pushbutton to select it.

STAT			
MODE			
AGC		AGC	Gain mode is AGC (automatic gain control).
MAN		MAN	Gain mode is manual.

6.1.15. Displaying the Gain Level

To display the gain level, select the STAT menu item in the first menu level, then use the toggle switch to display the GAIN option and press the pushbutton to select it. This status item is only available when the card is set to manual gain mode.

STAT		
GAIN		
0 to 31.5 dB	0 to +31.5 dB	Gain level (manual gain mode only)

6.1.16. Displaying the Squelch Status

To display the squelch mode setting, select the STAT menu item in the first menu level, then use the toggle switch to display the SQL option and press the pushbutton to select it.

STAT			
SQL			
ON		ON	Squelch mode enabled.
OFF		OFF	Squelch mode disabled.

6.1.17. Displaying the Laser Status

To display the laser status, select the STAT menu item in the first menu level, then use the toggle switch to display the LASR option and press the pushbutton to select it.

```
STAT
  LASR
      OK
      OFF
      FALT
```

OK	Laser is operating normally.
OFF	Laser is disabled.
FALT	Fault in laser operation.

6.1.18. Displaying the LNB Voltage Level

To display the LNB Voltage, select the STAT menu item in the first menu level, then use the toggle switch to display the LNBV option and press the pushbutton to select it.

```
STAT
  LNBV
      18V
      13V
      OFF
```

Indicates the LNB output voltage.

6.1.19. 22KHz Tone Status

To display the 22KHZ tone status, select the STAT menu item in the first menu level, then use the toggle switch to display the 22KT option and press the pushbutton to select it.

```
STAT
  22KT
      ON
      OFF
```

Indicates whether the 22KHz tone on LNB output is enabled or disabled.

ON	22KHz tone is enabled.
OFF	22KHz tone is disabled.

6.1.20. Displaying the LNB Current

To display the LNB Current, select the STAT menu item in the first menu level, then use the toggle switch to display the LNBC option and press the pushbutton to select it.

```
STAT
  LNBC
      0 to 500mA
```

Indicates the LNB current. Visible for -LNB versions only.

0 to 500mA   LNB current range.

6.1.21. Displaying the LNB Current Threshold Level

To display the LNB Current threshold, select the STAT menu item in the first menu level, then use the toggle switch to display the LNTH option and press the pushbutton to select it.

```
STAT
  LNTH
      LWR / UPPR
          0 to 500mA
```

LWR	Indicates the lower RF threshold level.
UPPR	Indicates the upper RF threshold level.
0 to 500mA	LNB current threshold range.

6.1.22. Displaying the Firmware Version

To display the firmware version, select the STAT menu item in the first menu level, then use the toggle switch to display the VER option and press the pushbutton to select it. The firmware version will scroll across the display.

For example: **VER 1.0 BUILD 006**