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## REVISION HISTORY

<u>REVISION</u>	<u>DESCRIPTION</u>	<u>DATE</u>
1.0	First Release	Jul 08
1.1	Added table format throughout section 4.2	May 09

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Although every attempt has been made to accurately describe the features, installation and operation of this product in this manual, no warranty is granted nor liability assumed in relation to any errors or omissions unless specifically undertaken in the Evertz sales contract or order confirmation. Information contained in this manual is periodically updated and changes will be incorporated into subsequent editions. If you encounter an error, please notify Evertz Customer Service department. Evertz reserves the right, without notice or liability, to make changes in equipment design or specifications.

## WARNING



Never look directly into an optical fiber. Non-reversible damage to the eye can occur in a matter of milliseconds.



Do not hook up the 770700-2L-3G DWDM cards directly to each other with a short fiber optic cable. The 770700-2L-3G DWDM cards produce +7dBm of power, which will damage the receiver if connected directly.



Do not hook up the 770700-2L-3G CWDM or DWDM cards and 770700-2L-3G-H with high sensitivity receiver directly to each other with a short fiber optic cable. The 770700-2L-3G DWDM and CWDM cards produce more than -7dBm of power, which will damage the receiver if connected directly.

## 1. OVERVIEW

The 7707OO-2L-3G is a *VistaLINK*<sup>®</sup> enabled, optical to optical wavelength converter for Video or Evertz proprietary signals. Monitoring and control of card status parameters is provided locally at the card edge and remotely via *VistaLINK*<sup>®</sup>. Reclocking and data rate indication is provided for supported rates from 270 Mb/s to 3.125 Gb/s, as per Table 1-1:

Standard	Data Rate
<b>Video</b>	
<b>SMPTE259M-L</b>	270 Mb/s
<b>SMPTE292M</b>	1.485 Gb/s
<b>DVB-ASI</b>	270 Mb/s
<b>SMPTE305M</b>	270 Mb/s
<b>SMPTE424M</b>	2.970 Gb/s
<b>Evertz Rates</b>	
<b>7707VT-8</b>	2.5 Gb/s
<b>7707VT-2-HD</b>	3.125 Gb/s
<b>7707VT-4-HS</b>	3.125 Gb/s

**Table 1-1: Re-clocked and Detected Signal Rates**

The 7707OO-2L-3G accepts two fiber inputs and provides two optical outputs respectively.

The 7707OO-2L-3G is available in different versions to meet a variety of applications. All versions accept 1310 nm to 1610 nm optical input signals on multi-mode or single-mode fiber. They produce a 1310nm optical output signal for interfacing with connected equipment. FP, CWDM and DWDM laser types are available for interface with the fiber link connection (See section 3 for a complete list of technical specifications).

### Features:

- Reclocking for Video and Evertz Proprietary signal rates as per Table 1-1
- Non-reclocking mode for support of additional signal rates
- Full-Duplex
- Wide range optical input (1270nm - 1610nm)
- 1310nm, 1550nm, CWDM and DWDM wavelengths available for fiber link connection
- DWDM wavelengths (ITU-T G.694.1 compliant) also available for fiber link connection
- Comprehensive signal and card status monitoring via four digit card edge display or remotely through SNMP and *VistaLINK*<sup>®</sup> capability
- Detection and display of optical input power and data rate
- Fully hot-swappable from front of frame

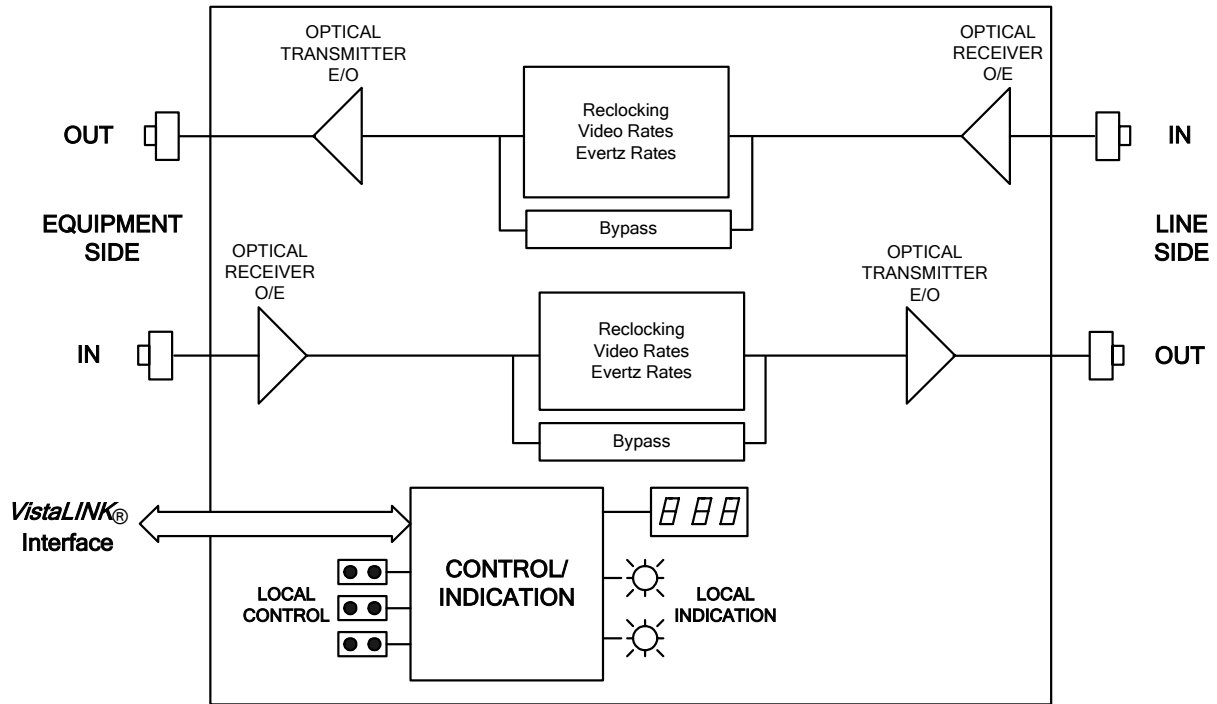
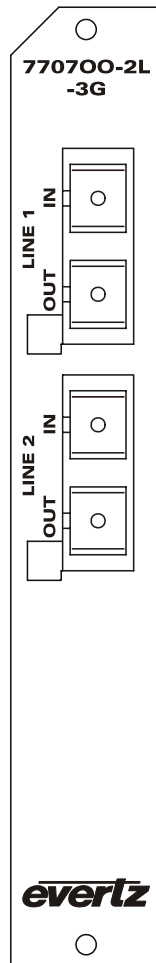


Figure 1-1: 770700-2L-3G Block Diagram

## 2. INSTALLATION

The 770700-2L-3G comes with a companion rear plate that has four SC/PC (shown), ST/PC, FC/PC, or SC/APC optical connectors. For information on mounting the rear plate and inserting the module into the frame see section 3 of the 7700FR chapter.



**Figure 2-1: 770700-2L-3G Rear Panel**

**OPTICAL INPUTS:** Inputs for optical signals. Available with SC/PC, ST/PC, FC/PC, SC/APC female connectors. Accepts video (as per SMPTE297) and Evertz proprietary optical signals and provides auto-rate selection and reclocking. A non-reclocking mode is also selectable for other bi-level data formats for 125 Mb/s up to 3.125 Gb/s. These wide range inputs accept optical wavelengths of 1270nm to 1610nm, accommodating standard, CWDM or DWDM transmission schemes.

**OPTICAL OUTPUT:** There are two SC/PC (shown), ST/PC, FC/PC or SC/APC female connectors for optical signal outputs. The "LINE 1 or 2 OUT" a 1310nm FP, 1550nm DFB, CWDM or DWDM laser as ordered.

## 2.1. CARE AND HANDLING OF OPTICAL FIBER

### 2.1.1. Safety



**CLASS 1 LASER PRODUCT**

### 2.1.2. Assembly

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

### 2.1.3. Labeling

Certification and Identification labels are combined into one label. As there is not enough room 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 Printed circuit board of each Evertz plug-in module
- The Model number is one of: 77070013-2L-3G, 77070015-2L-3G, 770700xx/yy-2L-3G, 770700xx/yy-2-OC-H (xx and yy = 27, 29, 31, 33, 35, 37, 43, 45, 47, 49, 51, 53, 55, 57, 59, 61) 770700Dxxx/Dyyy-2-OC, 770700Dxxx/Dyyy-2-OC-H (Dxxx and Dyyy 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)

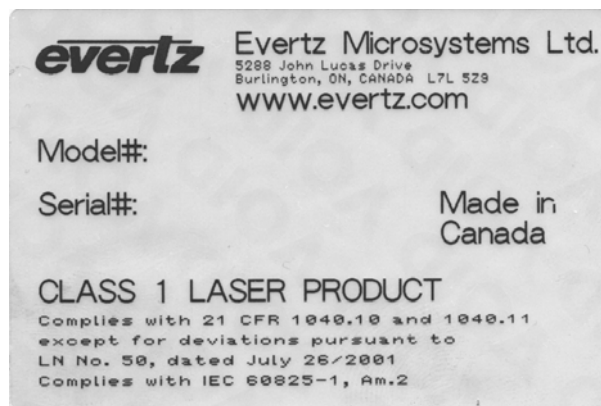


Figure 2-2: Reproduction of Laser Certification and Identification Label



#### 2.1.4. 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 face 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. For further information about care and handling of fiber optic cable see section 3 of the Fiber Optics System Design section of this manual binder.

### 3. SPECIFICATIONS

#### 3.1. OPTICAL INPUTS

Standards (reclocked):

Standard	Data Rate
<b>Video</b>	
<b>SMPTE259M-L</b>	270 Mb/s
<b>SMPTE292M</b>	1.485 Gb/s
<b>DVB-ASI</b>	270 Mb/s
<b>SMPTE305M</b>	270 Mb/s
<b>SMPTE424M</b>	2.970 Gb/s
<b>Evertz Rates</b>	
<b>7707VT-8</b>	2.5 Gb/s
<b>7707VT-2-HD</b>	3.125 Gb/s
<b>7707VT-4-HS</b>	3.125 Gb/s

Rates (non-reclocked): 125Mb/s-3.125 Gb/s  
Connector: Female SC/PC, ST/PC, FC/PC, SC/APC  
Wavelength: 1270nm -1610nm

Optical Sensitivity  
Standard & Equipment Side: -21dBm  
High Sensitivity (-H): -28dBm

Max. Input Power:  
Standard & Equipment Side: -1dBm  
High Sensitivity (-H): -7dBm

Fiber Size: 62  $\mu$ m core / 125  $\mu$ m overall

#### 3.2. OPTICAL OUTPUTS

Standards: Same as optical input  
Number of Outputs: 2  
Connector: SC/PC, ST/PC, FC/PC, SC/APC female housing  
Return Loss: < 14 dB  
Fiber Size: 9  $\mu$ m core / 125  $\mu$ m overall

**Equipment Side:****Wavelengths:****Standard:** 1310nm**Output Power:****1310nm FP:** -7dBm ± 1dBm**Line Side:****Wavelengths:****Standard:** 1310nm, 1550nm (nominal)**CWDM:** 1270nm to 1610nm (See ordering information)**DWDM:** C-Band/L-Band (ITU-T G.694.1 compliant)**Output Power:****1310nm FP:** -7dBm ± 1dBm**CWDM:** 0dBm ± 1dBm**DWDM:** +7dBm ± 1dBm**3.3. ELECTRICAL****Voltage:**

+12VDC

**Power:**

6 Watts (9 Watts DWDM)

**EMI/RFI:**

Complies with FCC regulations for class A devices

Complies with EU EMC directive

**3.4. PHYSICAL****7700 or 7701 frame mounting:****Number of slots:** 1

## 4. STATUS INDICATORS AND DISPLAYS

The 770700-2L-3G has 4 LED Status indicators and a 4 digit alphanumeric display on the front card edge to show operational status of the card at a glance. The card edge shaft encoder is used to select various displays on the alphanumeric display. Figure 4-1 shows the location of the card edge status indicators, dot matrix display, pushbutton and jumpers.

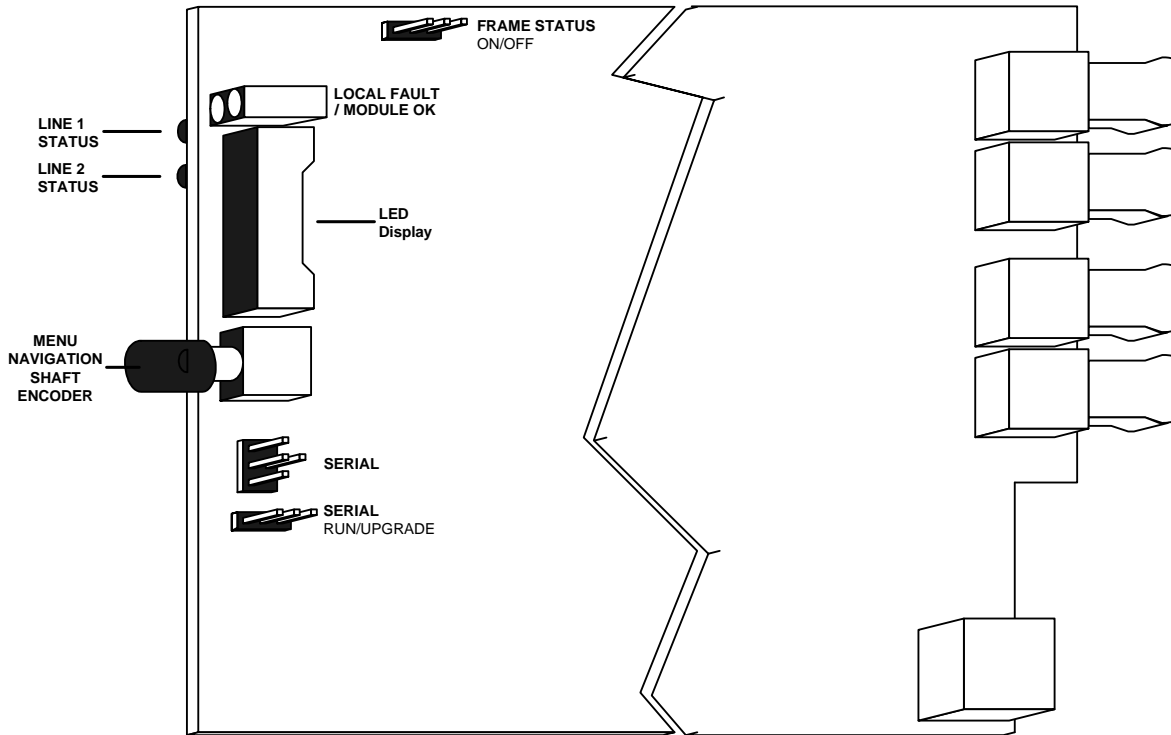


Figure 4-1: 770700-2L-3G Status Indicator and Jumper Locations

#### 4.1. STATUS INDICATOR LEDES

- LOCAL FAULT:** This Red LED indicates poor module health and will be on if:
- There is absence of a valid LINE 1 or LINE 2 input signal
  - A local power fault exists (i.e. a blown fuse)
  - LINE 1 or LINE 2 laser fault
  - Optical input power is reported as “OVER” on LINE 1 or LINE 2 inputs

The LOCAL FAULT indication can also be reported to the frame through the FRAME STATUS jumper.

- LINE STATUS:**
- |                |                                                                                          |
|----------------|------------------------------------------------------------------------------------------|
| <b>Red:</b>    | LINE laser fault                                                                         |
| <b>Green:</b>  | Locked on to a valid, recognized signal format on LINE input                             |
| <b>Yellow:</b> | LINE input is in non-reclock (bypass) mode                                               |
| <b>Off:</b>    | Signal is unrecognized, does not match data rate setting or is not present at LINE input |

#### 4.2. DOT-MATRIX DISPLAY

Additional signal and status monitoring is provided via the four-digit dot-matrix display located at the card-edge. The shaft encoder is used to navigate through the display menu. Figure 4-2 provides a quick reference to the display menu structure.

Pressing the shaft encoder advances the display to the next menu level. The encoder may then be used to move up or down through selections of that menu level. Select **BACK** to return to the top menu level.

**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 shaft encoder. Pressing the encoder 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.

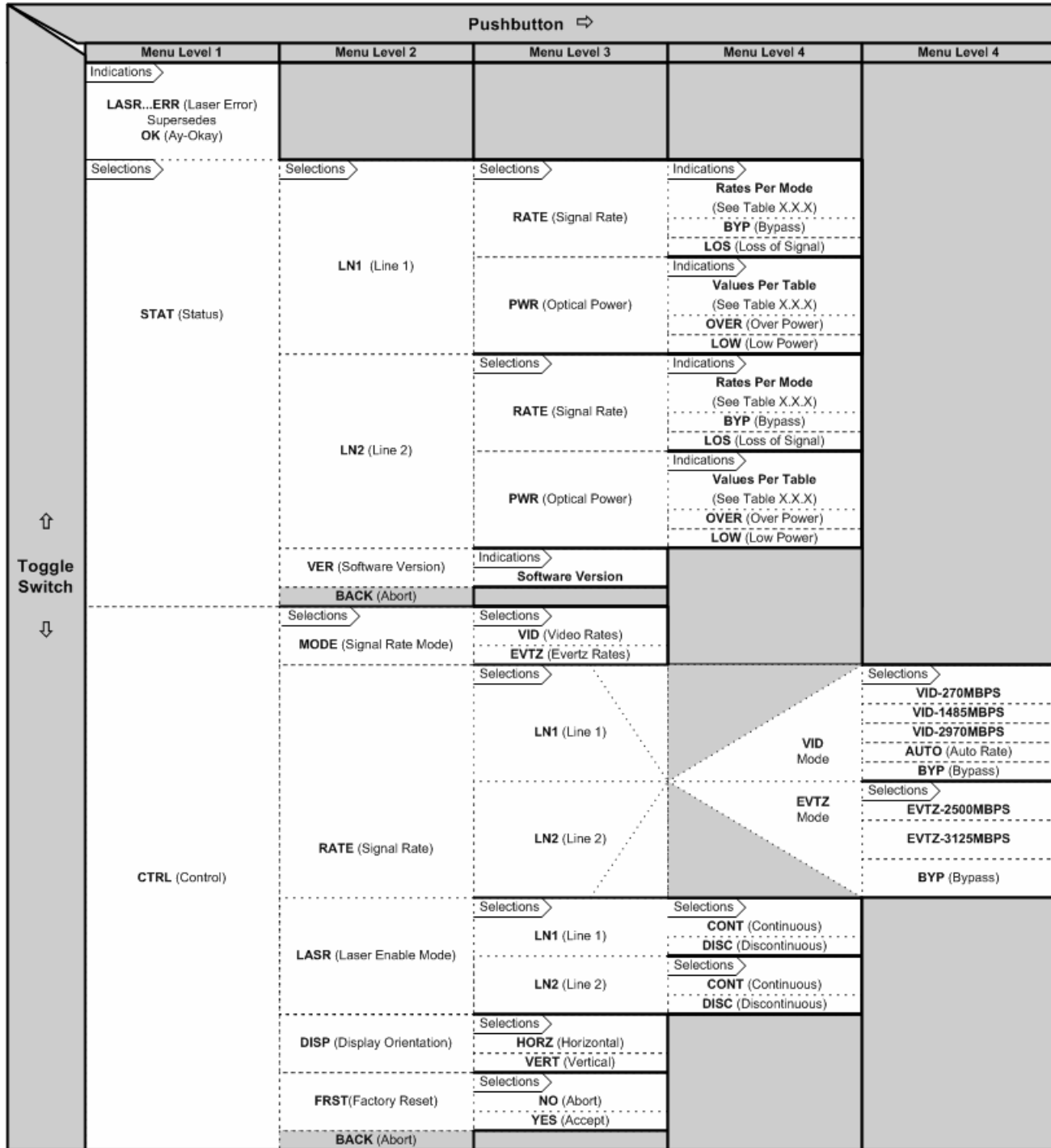


Figure 4-2: Card-Edge Menu Structure

#### 4.2.1. Displaying the Data Standard Detected at the LINE Input

To display the data standard detected at the LINE input, select the **STAT** menu item in menu level 1, then use the toggle switch to display the **LN1** (Line 1) or **LN2** (Line 2) option and press the pushbutton to select it. Use the toggle switch to then display the **RATE** option and press the pushbutton to select it. For the sake of brevity, only **LN1** will be discussed in the manual.

STAT	VID-270MBPS	SD-SDI, DVB-ASI, 270 Mb/s
LN1	VID-1485MBPS	HD-SDI, 1.485 Gb/s
RATE	VID-2970MBPS	SMPTE424M, 2.970Gb/s
Rates Per Mode	EVTZ-2500MBPS	Evertz Fiber Rate (7707VT-8), 2.5Gb/s
BYP	EVTZ-3125MBPS	Evertz Fiber Rate (7707VT-4-HS/7707VT-2-HD), 3.125 Gb/s
LOS	BYP	LINE input is set to bypass (non-reclock) mode
	LOS	No signal present

#### 4.2.2. Displaying the Optical Power at the LINE Input

The 770700-2L-3G module can measure and display the input optical power over a range of -1dBm to -40dBm at increments of 1dBm for the standard version and -7dBm to -40dBm in 1dBm increments for the -H version. To display the optical power detected at the LINE input, select the **STAT** menu item in menu level 1, then use the toggle switch to display the **LINE** option and press the pushbutton to select it. Use the toggle switch to then display the **PWR** option and press the pushbutton to select it. For the sake of brevity, only **LN1** will be discussed in the manual.

STAT	OVER	Indicates optical input power exceeding -1dBm for standard version and -7dBm for “-H” version
LN1	-1 to -40	Optical input power within this range (Standard Version).
PWR	-7 to -32	Optical input power within this range (-H Version).
OVER	LOW	Input optical power low (< -40 dBm on standard version, < -32 dBm on -H version)
-1 to -40		
-7 to -32		
LOW		

#### 4.2.3. Displaying the Data Standard Detected at the EQUIPMENT Input

To display the data standard detected at the EQUIPMENT input, select the **STAT** menu item in menu level 1, then use the toggle switch to display the **EQUIP** option and press the pushbutton to select it. Use the toggle switch to then display the **RATE** option and press the pushbutton to select it.

STAT	VID-270MBPS	SD-SDI, DVB-ASI, 270 Mb/s
EQUP	VID-1485MBPS	HD-SDI, 1.485 Gb/s
RATE	VID-2970MBPS	SMPTE424M, 2.970Gb/s
Rates Per Mode	EVTZ-2500MBPS	Evertz Fiber Rate (7707VT-8), 2.5Gb/s
BYP	EVTZ-3125MBPS	Evertz Fiber Rate (7707VT-4-HS/7707VT-2-HD), 3.125 Gb/s
LOS	BYP	EQUIPMENT input is set to bypass (non-reclock) mode
	LOS	No signal present

#### 4.2.4. Displaying the Optical Power at the EQUIPMENT Input

The 770700-2L-3G module can measure and display the input optical power over a range of -1dBm to -40dBm at increments of 1dBm. To display the optical power detected at the EQUIPMENT input, select the **STAT** menu item in menu level 1, then use the toggle switch to display the **EQUP** option and press the pushbutton to select it. Use the toggle switch to then display the **PWR** option and press the pushbutton to select it.

STAT	OVER	Indicates optical input power exceeding -1dBm
EQUP	-1 to -40	Optical input power within this range
PWR	LOW	Input optical power low (< -40 dBm)
OVER		
-1 to -40		
LOW		

#### 4.2.5. Displaying the Firmware Version

To display the version of the 770700-2L-3G's embedded firmware, select the **STAT** menu item in menu level 1, then use the toggle switch to display the **VER** option and press the pushbutton to select it. The display will show the following:

**VER x.x BUILD xxx**      Software version. Character string scrolls across four digit display

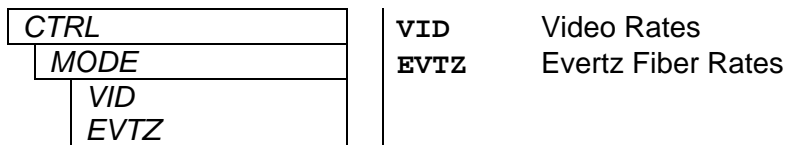


#### 4.2.6. Selecting the Data Standard Mode

The data rates reclocked by the 770700-2L-3G are grouped into Video and Evertz categories as follows:

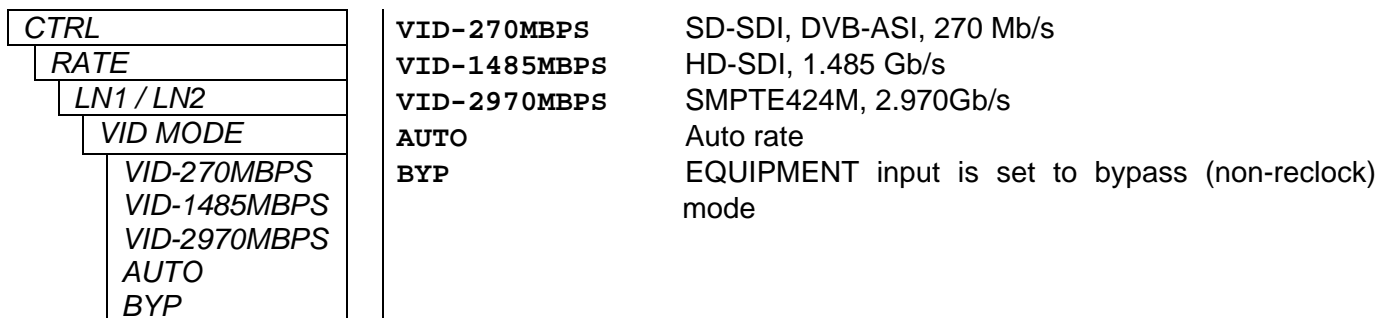
Standard	Data Rate
<b>Video</b>	
<b>SMPTE259M-L</b>	270 Mb/s
<b>SMPTE292M</b>	1.485 Gb/s
<b>DVB-ASI</b>	270 Mb/s
<b>SMPTE305M</b>	270 Mb/s
<b>SMPTE424M</b>	2.970 Gb/s
<b>Evertz Rates</b>	
<b>7707VT-8</b>	2.5 Gb/s
<b>7707VT-2-HD</b>	3.125 Gb/s
<b>7707VT-4-HS</b>	3.125 Gb/s

The 770700-2L-3G should be set for either Video or Evertz mode as appropriate for the incoming signals. To set the data mode, select the **CTRL** menu item in menu level 1, then use the toggle switch to display the **MODE** option and press the pushbutton to select it.



#### 4.2.7. Setting the Data Standard

For proper operation, the 770700-2L-3G must be configured to support the incoming signal type (Video or Evertz). In both modes, a reclocker bypass option is available for signal types/rates that are not listed. To select a particular data rate, select the **CTRL** menu item in menu level 1, and then use the toggle switch to display the **RATE** option and press the pushbutton to select it.



CTRL	<b>EVTZ-2500MBPS</b>	Evertz Fiber Rate (7707VT-8), 2.5Gb/s
RATE	<b>EVTZ-3125MBPS</b>	Evertz Fiber Rate (7707VT-4-HS/7707VT-2-HD), 3.125 Gb/s
LN1 / LN2	<b>BYP</b>	EQUIPMENT input is set to bypass (non-reclock) mode
EVTZ MODE		
EVTZ-2500MBPS		
EVTZ-3125MBPS		
BYP		

#### 4.2.8. Selecting the Output Laser Enable Mode

In some applications, it is beneficial to disable the laser output with no input signal present. Alternatively, it may be preferable to maintain an optical output signal, even with no input. The 770700-2L-3G supports both modes of operation.

To configure the laser enable mode, select the **CTRL** menu item in the first menu level. Use the toggle switch to select the **LASR** menu item and press the pushbutton. Then use the toggle switch to select either the **LINE** side laser or the equipment (**EQUP**) side laser and press the pushbutton. The toggle switch can then be used to change the mode of operation. Press the pushbutton to apply the displayed selection and return to the first menu level. For the sake of brevity, only **LN1** will be discussed in the manual.

CTRL	<b>CONT</b>	Continuous operation. Laser is always enabled, even without an active input signal.
LASR	<b>DISC</b>	Discontinuous operation. Laser is disabled when no active input signal is detected.
LN1		
CONT		
DISC		

#### 4.2.9. Setting the Orientation of the Text on the Card Edge Display

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 show the **DISP** menu selection and use the pushbutton to select it. Use the toggle switch to change between **HORZ** and **VERT**. Press the push button to make your selection.

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

#### 4.2.10. Resetting Factory Defaults

The 770700-2L-3G may have all settings returned to factory defaults using a single menu control item. To reset to factory defaults, select the **CTRL** menu item in the first menu level. Use the toggle switch to select the **FRST** menu item and press the pushbutton. The following selections are available:

<b>NO</b>	Abort and do not perform factory reset
<b>YES</b>	Return all configuration values to factory defaults

## 5. JUMPERS AND LOCAL CONTROLS

Several jumpers, located at the front of the module are used to preset various operating modes. Figure 4-1 shows the locations of the jumpers.

### 5.1. SELECTING WHETHER LOCAL FAULTS WILL BE MONITORED BY THE GLOBAL FRAME STATUS

The FRAME STATUS jumper 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 LED's 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.

### 5.2. CONFIGURING THE MODULE FOR FIRMWARE UPGRADES

**UPGRADE:** The UPGRADE jumper 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 pull it out of the frame. Move the UPGRADE jumper into the *UPGRADE* position. Install the Upgrade cable provided (located in the vinyl pouch in the front of this manual) onto the SERIAL header at the card edge. Re-install the module into the frame. Run the upgrade as described in the *Upgrading Firmware* section of this manual. Once the upgrade is complete, 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.

## 6. VISTALINK<sup>®</sup> REMOTE MONITORING/CONTROL

### 6.1. WHAT IS VISTALINK<sup>®</sup>?

VistaLINK<sup>®</sup> 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. VistaLINK<sup>®</sup> 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 VistaLINK<sup>®</sup> 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, VistaLINK<sup>®</sup> 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 VistaLINK<sup>®</sup> enabled fiber optic products.
2. Managed devices (such as 770700-2L-3G cards), each with a unique address (OID), communicate with the NMS through an SNMP Agent. Evertz VistaLINK<sup>®</sup> enabled 7700 series modules reside in the 3RU 7700FR-C MultiFrame and communicate with the manager via the 7700FC VistaLINK<sup>®</sup> 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 and 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 VistaLINK<sup>®</sup> network, see the 7700FC Frame Controller chapter.

### 6.2. VISTALINK<sup>®</sup> MONITORED PARAMETERS

The following parameters can be remotely monitored through the VistaLINK<sup>®</sup> interface.

Parameter	Description
Optical Power	A range of values describing optical power at both the LINE and EQUIPMENT fiber inputs.
Signal Rate	The data standard/rate detected at both LINE and EQUIPMENT inputs.

**Table 6-1: VistaLINK<sup>®</sup> Monitored Parameters**

### 6.3. VISTALINK® CONTROLLED PARAMETERS

The following parameters can be remotely controlled through the VistaLINK® interface.

Parameter	Description
<b>Signal Rate Mode</b>	Select Video or Evertz rates.
<b>Signal Rate</b>	Select the data rate/standard from available video and Evertz types, automatic and bypass modes.
<b>Laser Mode</b>	Select continuous or discontinuous laser mode for LINE and EQUIPMENT side lasers (separate settings for each).
<b>Optical Threshold</b>	Optical power threshold for low optical power alarm trap – separate settings for LINE and EQUIPMENT receivers.

**Table 6-2: VistaLINK® Controlled Parameters**

### 6.4. VISTALINK® TRAPS

The following traps can be VistaLINK® enabled and monitored.

Parameter	Description
<b>Laser Fault</b>	Indicates deficient operation of the optical output line and/or equipment laser.
<b>Input Signal Presence</b>	Indicates missing signals at LINE and/or EQUIPMENT inputs.
<b>Optical Power</b>	Indicates LINE and/or EQUIPMENT optical input power below threshold setting.

**Table 6-3: VistaLINK® Traps**