TABLE OF CONTENTS

Figures

Tables

REVISION HISTORY

REVISION	DESCRIPTION	DATE
0.1	Preliminary Version	May 05
1.0	First release -updated drawings, and menu items	Jun 05
1.1	Updated safety section and added assembly and labeling sections	July 05
1.2	Updated specifications, VistaLINK® tables	Aug 05
1.2.1	Formatting, typos fixed	Jan 06
1.3	Updated menu items and VistaLINK® description	Jan 07
1.4	Updated menu structure layout	Oct 08

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 7707VT-8 DWDM and 7707VR-8 cards directly with a short fiber optic cable. The 7707VT-8 DWDM card produces +7dBm of power, which will damage the receiver if connected directly.

Do not hook up the 7707VT-8 cards that output more than -7dBm of power (see 7707VT-8 specifications for output power of various laser types) and 7707VR-8-H high sensitivity receiver cards directly with a short fiber optic cable. The 7707VT-8 cards that produce more than -7dBm of power will damage the receiver if connected directly.

1. OVERVIEW

The 7707VT-8 is a *Vista*LINK® enabled, fiber transmitter for SDI, DVB-ASI or SDTi video signals. This double card combines up to eight SDI, DVB-ASI or SDTi signals using Time Domain Multiplex (TDM) technology and transmits them over a single fiber. The companion 7707VR-8 Octal SDI Receiver demultiplexes the signals and converts them back to separate SDI video feeds.

The 7707VT-8 and companion 7707VR-8 will transparently pass incoming SDI video feeds with embedded AES audio or any other data in the horizontal or vertical ancillary data space. Monitoring and control of card status and parameters is provided locally at the card edge or remotely via *Vista*LINK®.

The fiber output is available in an assortment of optical wavelengths, accommodating standard, CWDM or DWDM transmission schemes.

| 7707VT13-8 | 1310 nm FP | -7dBm output, suitable for distances up to 50 Km |
| 7707VT15-8 | 1550 nm DFB | 0dBm output, suitable for distances up to 75 Km |

There are several versions with built in isolators specifically suited to coarse wave division multiplexing (CWDM) applications. These versions all have 0dBm output and are suitable for distances up to 75 Km.

7707VT27-8	1270 nm DFB
7707VT29-8	1290 nm DFB
7707VT31-8	1310 nm DFB
7707VT33-8	1330 nm DFB
7707VT35-8	1350 nm DFB
7707VT37-8	1370 nm DFB
7707VT43-8	1430 nm DFB
7707VT45-8	1450 nm DFB
7707VT47-8	1470 nm DFB
7707VT49-8	1490 nm DFB
7707VT51-8	1510 nm DFB
7707VT53-8	1530 nm DFB
7707VT55-8	1550 nm DFB
7707VT57-8	1570 nm DFB
7707VT59-8	1590 nm DFB
7707VT61-8	1610 nm DFB

There are several versions with built in isolators specifically suited to dense wave division multiplexing (DWDM) applications. The DWDM versions are suitable for distances >120 km @ 270 Mb/s (for DWDM applications contact factory).

| 7707VTDyyy-8 | DWDM DFB laser output, yyy – ITU channel number |

The 7707VT-8 occupies two card slots in the 3 RU frame, which will hold up to 7 modules or one card slot in the 1RU frame, which will hold up to three modules. One 7707VT-8 module can also be installed in the S7701 stand-alone enclosure.

Features:

- Multiplexor for eight synchronous or asynchronous 270Mb/s SDI, DVB-ASI or SDTi video signals.
- Signal transport uninterrupted by loss of any SDI, DVB-ASI or SDTi input feed.
- Transparently passes embedded AES or any other data in the horizontal or vertical ancillary data space.
- Comprehensive signal and card status monitoring via four character card-edge display.
- *Vista*LINK® – enabled offering remote monitoring, control and configuration capabilities via SNMP. *Vista*LINK® is available when modules are used with the 3RU 7700FR-C frame, a 7700FC *VistaLINK*® Frame Controller module in slot 1 of the frame using the 9000NCP Network Control Panel or Evertz *VistaLINK*® PRO or other third party SNMP manager software.
- Automatic coaxial equalization up to 250m at 270Mb/s (Belden 8281).
- Fully hot swappable from front of frame with no fiber/coax disconnect/reconnect required.
- Supports single-mode and multi-mode fiber optic cable.
- Optical output wavelengths of 1310nm, 1550nm and up to 16 CWDM wavelengths.
- DWDM wavelengths also available.
- SC/PC, ST/PC, FC/PC fiber connectors available.
- Input selection feature allows user to route 1 of the 8 incoming video signals to the SDI output
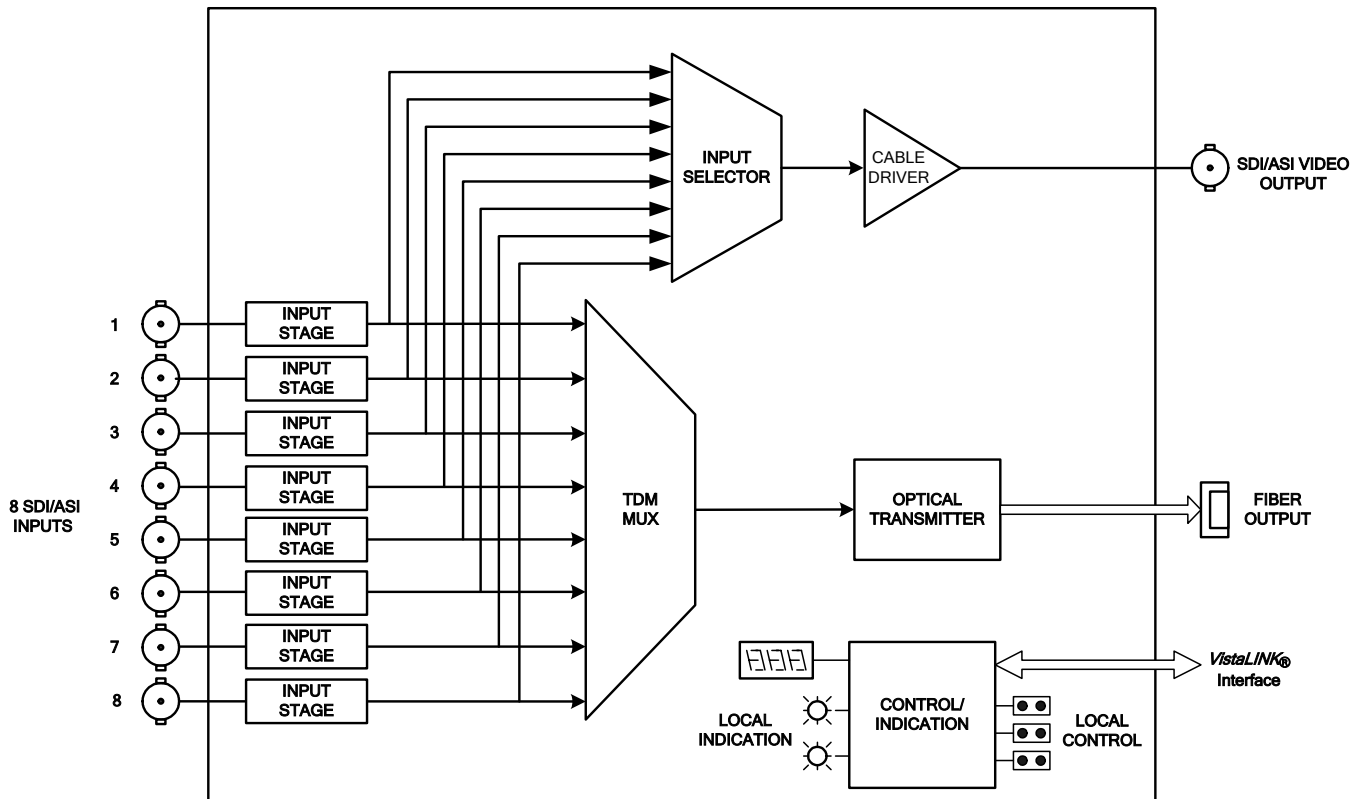
Figure 1-1: 7707VT-8 Block Diagram

2.   INSTALLATION

The 7707VT-8 comes with a companion rear plate that has nine BNC connectors and one SC/PC (see Figure 2-1), ST/PC or FC/PC optical connector. For information on mounting the rear plate and inserting the module into the frame see section 3 of the 7700FR chapter.
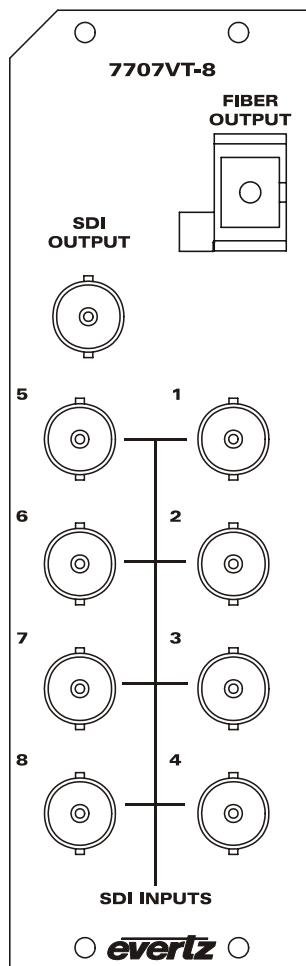
Figure 2-1: 7707VT-8 Rear Panel

SDI INPUT: Eight independent BNC input connectors for 10-bit serial digital video signals compatible with the SMPTE 259M-C, DVB-ASI or SMPTE 305M standards. These inputs provide adaptive compensation for up to 250m of industry standard Belden 8281 cable, at 270Mb/s.

SDI OUTPUT: User selectable video loopback output. Any of the inputs can source this output for reclocked loop back functionality. Selection controlled via card edge menu or *Vista*LINK®.

FIBER OUTPUT: Output SC/PC, SC/PC with cover (shown), ST/PC or FC/PC female connector. This optical output contains the eight input SDI video signals. Any ancillary data (e.g. embedded audio, closed captioning, etc) present in the input SDI video stream prior to multiplexing is transparently passed through to the fiber output.

> ✍ **Do not hook up the 7707VT-8 DWDM and 7707VR-8 cards directly with a short fiber optic cable. The 7707VT-8 DWDM card produces +7dBm of power that will damage the receiver if connected directly.**

> ✍ **Do not hook up the 7707VT-8 cards that output more than -7dBm of power (see the 7707VT-8 specifications for output power of various laser types) and 7707VR-8-H high sensitivity receiver cards directly with a short fiber optic cable. The 7707VT-8 cards that produce more than -7dBm of power will damage the receiver if connected directly.**

2.1. CARE AND HANDLING OF OPTICAL FIBER

2.1.1. Safety

⚠ !

CLASS 1 LASER PRODUCT

Background colour: yellow
Triangular band: black
Symbol: black

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 manual.
- There is no date of manufacture on this label as it can be traced by the bar code label placed on the Printed circuit board of each Evertz plug-in module
- The Model number is one of: 7707VT13-8, 7707VT15-8,
  7707VTxx-8, (xx = 27, 29, 31, 33, 35, 37, 43, 45, 47, 49, 51, 53, 55, 57, 59, 61)
  7707VTDyyy-8 (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 the 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.   SERIAL VIDEO INPUT

Standards:	SMPTE 259M-C, SMPTE 305M, DVB-ASI
Number of Inputs:	8 independent SDI, SDTi or DVB-ASI 270Mb/s signals
Connector:	8 BNC input per IEC 61169-8 Annex A
Equalization:	Automatic 250m (min) @ 270 Mb/s with Belden 8281 or equivalent cable
Return Loss:	> 15 dB up to 270 Mb/s

3.2.   SERIAL VIDEO OUTPUTS

Standards:	SMPTE 259M-C, SMPTE 305M, DVB-ASI
Number of Outputs:	1 Independent SDI, SDTi or DVB-ASI 270Mb/s signals
Connectors:	1 BNC per IEC 61169-8 Annex A
Signal Level:	800mV(nominal)
DC Offset:	0V $\pm$ 0.5V
Rise and Fall Time:	900ps(nominal)
Overshoot:	< 10% of amplitude
Return Loss:	> 15dB to 270Mb/s
Wide Band Jitter:	< 0.2UI

3.3.   OPTICAL OUTPUT

Number of Outputs:	1
Connector:	Female SC/PC, ST/PC or FC/PC
Return Loss:	> 14 dB
Rise and Fall Time:	200 ps nominal
Wide Band Jitter:	< 0.2UI
Fiber Size:	9 μm core / 125 μm overall
Wavelengths:	
Standard:	1310nm, 1550nm (nominal)
CWDM:	1270nm to 1610nm (See ordering information)
DWDM:	ITU channel 20 to 60, 100GHz spacing (ITU-T G.694.1 compliant)
Output Power:	
1310nm FP:	-7dBm $\pm$ 1dBm
1550nm & CWDM:	0 dBm $\pm$ 1dBm
DWDM:	+7dBm $\pm$ 1dBm

3.4.   ELECTRICAL

Voltage:	+12VDC
Power:	12 Watts (Non DWDM)
	15 Watts (DWDM)

3.5. COMPLIANCE

Electrical Safety: CSA Listed to CSA C22.2 No. 60065-03, UL 60065-03
IEC 60065-(2001-12) 7th Edition
Complies with CE Low voltage directive 93/68/EEC
Laser Safety: Complies with 24 CFR 1040.10 and 1040.11 except for deviations
pursuant to LN No. 50, dated July 26, 2001
Complies with IEC 60825-1, Am. 2
EMI/RFI: Complies with FCC regulations for class A devices.
Complies with EU EMC directive 89/336/EEC.

3.6. PHYSICAL

7700 or 7701 frame mounting:
  Number of slots: 2

4. STATUS INDICATORS AND DISPLAYS

The 7707VT-8 has 10 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 pushbutton and toggle switch are used to select various displays on the alphanumeric display. Figure 4-1 shows the locations of the indicators, pushbutton and toggle switch.
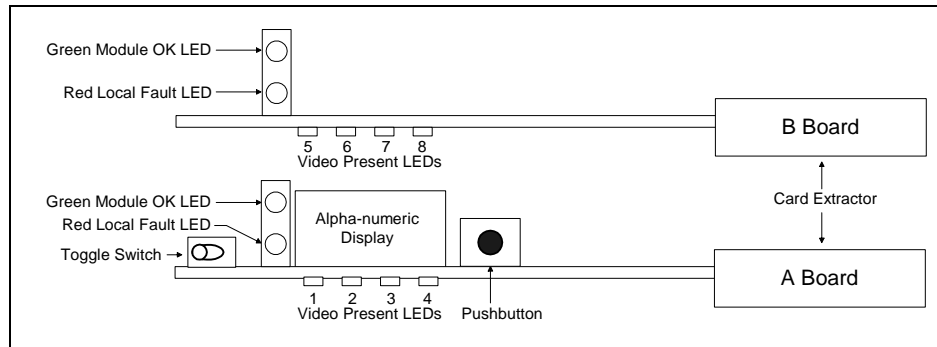
Figure 4-1: Location of Status Indicators and Controls

4.1. STATUS INDICATOR LEDS

LOCAL FAULT: On the 7707VT-8A main board, this Red LED will be ON if a laser fault exists, if the laser is set to Discontinuous mode with no valid inputs present, or if a local input power fault exists (i.e.: a blown fuse).

On the 7707VT-8B sub-board this Red LED will be ON if a local input power fault exists (i.e.: a blown fuse).

The LOCAL FAULT indications 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 input signal is present, and the laser and board power are good.

On the 7707VT-8, there are eight small LEDs on the front of the boards that indicate the status of video inputs.

VIDEO 1 STATUS LED:
    GREEN   Valid signal input. No errors.
    RED   Valid signal input. Errors detected.
    OFF   No valid input detected.
    YELLOW   Input is blocked from being transported through fiber by the user

VIDEO 2-8 STATUS LEDs function similar to VIDEO 1 STATUS LED

4.2. DOT-MATRIX DISPLAY

Additional signal and status monitoring is provided via the 4-digit dot-matrix display located at the card-edge. The card-edge pushbutton and toggle switch are used to navigate through the display menu. Figure 4-2 provides a quick reference to the display menu structure. The details of the each of the displays are described in the sections 4.2.1 to 4.2.7.

Toggle Switch	Top Level	⇨ Push Button ⇨		
⬆ **Toggle Switch** ⬇	**OK** Laser is ON	CH1 ⋮	VSD	N270 P270 2398 ASI UNKN LSV
			EQ	0 - 100 %
		CH8	VSD	N270 P270 2398 ASI UNKN LSV
			EQ	0 - 100 %
		VOUT	OFF,VID1...VID8	
		LASR	DISC/CONT	
		PSWD	0 - 9999	
			PWSL	0 - 9999
			VCH1 ⋮	DIS / EN
			VCH8	DIS / EN
		DISP	HORZ / VERT	
		VER	Software ID	

Figure 4-2: Display Menu Structure

4.2.1. Displaying the Video Standard

The 7707VT-8 detects the Video standards of the signal present at its input. To display the Video Standard, press the pushbutton, select the appropriate input and navigate the pushbutton to the VSD option. For the sake of brevity, only the menu item for Channel 1 (CH 1) will be described in this manual.

CH1
VSD
N270
P270
2398
ASI
None

The following video standard options are available:

N270 SMPTE 259M-C, 270 Mb/s 4:2:2 Component 525 line, 4:3 or SMPTE 305M

P270 SMPTE 259M-C, 270 Mb/s 4:2:2 Component 625 line, 4:3 or SMPTE 305M

2398 270Mb/s 4:2:2 Component 525 line; 4:3 at 23.98Hz

ASI Indicates DVB-ASI Signal at Input

NONE Loss of Valid Input Signal

4.2.2. Displaying The Equalization Strength

To exhibit the Equalization strength, depress the pushbutton, select the appropriate input and pushbutton to the EQ option.

CH1
EQ
0% to 100%

The following options are available:

0% to 100% Indicates applied equalization. 0% indicating short cable length.

4.2.3. Selecting a Source for the Controllable Output

To actuate the user configurable output, select the VOUT menu. The Output can be configured to any of the inputs or turned off.

VOUT
OFF
VID1 to VID 8

The following options are available:

OFF Video Output becomes driven LOW
VID1 The signal on video input 1 is driven to the output.

The functionality is similar for menu selections VID2 through VID8.

4.2.4. Setting the Behavior of Laser When There is no Applied Video

On the 7707VT-8, the LASR menu item enables the user to set the behavior of the laser transmitter when there is no video signal applied to the coaxial video inputs. To set the laser behavior, toggle the switch one or more times until the LASR message is shown on the display, and press the push button to enter the LASR sub-menu. Use the toggle switch to chose between CONT and DISC, and press the push button to select the mode of operation.

VOUT
CONT
DISC

The following options are available:

CONT Laser will transmit continuously regardless of whether there are valid input video signals present on coaxial inputs of the 7707VT-8.

DISC The laser will turn off when there is no recognizable video on any of the coaxial inputs.

4.2.5. Signal BLOCK Configuration

Depress the pushbutton and select the PSWD option. Actuate the toggle switch to achieve the correct code number (Factory Default = 7154).

```
PSWD
  PWSL
  VCH1
```

The following options are available:

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

VCH1   Enable / Disable. When Disabled the data input signal 1 is not placed on the fiber link data stream. This menu item is not modifiable without entering the correct passcode, though its current state is viewable.

The functionality is similar for menu selections **VCH2** through **VCH8**.

4.2.6. Setting the Orientation of the Text on the Card Edge Display

On the 7707VT-8 the **DISP** display enables the user to set a horizontal or vertical orientation for the card edge display messages. After one second the display will show a message indicating the current orientation of the display. When this message is showing press the pushbutton to change the orientation of the display.

```
DISP
  HOR
  VERT
```

The following options are available:

HOR   Horizontal display is used when the module is housed in the 1 rack unit 7701FR frame or the stand-alone enclosure.

VERT   Vertical display is used when the module is housed in the 3-rack unit 7700FR frame.

4.2.7. Displaying the Firmware Version

The **VER** display shows the firmware version and build number of the 7707VT-8 firmware. The following message will scroll across the display:

```
VER
  VER xx BLD xxx
```

The following is an example of the firmware version build number:

For example: VER 1.00 BLD 67

5. JUMPERS

Several jumpers, located at the front of the module, are used to preset various operating modes. Figure 5-1 and Figure 5-2 show the locations of the jumpers on the bottom and top board respectively.
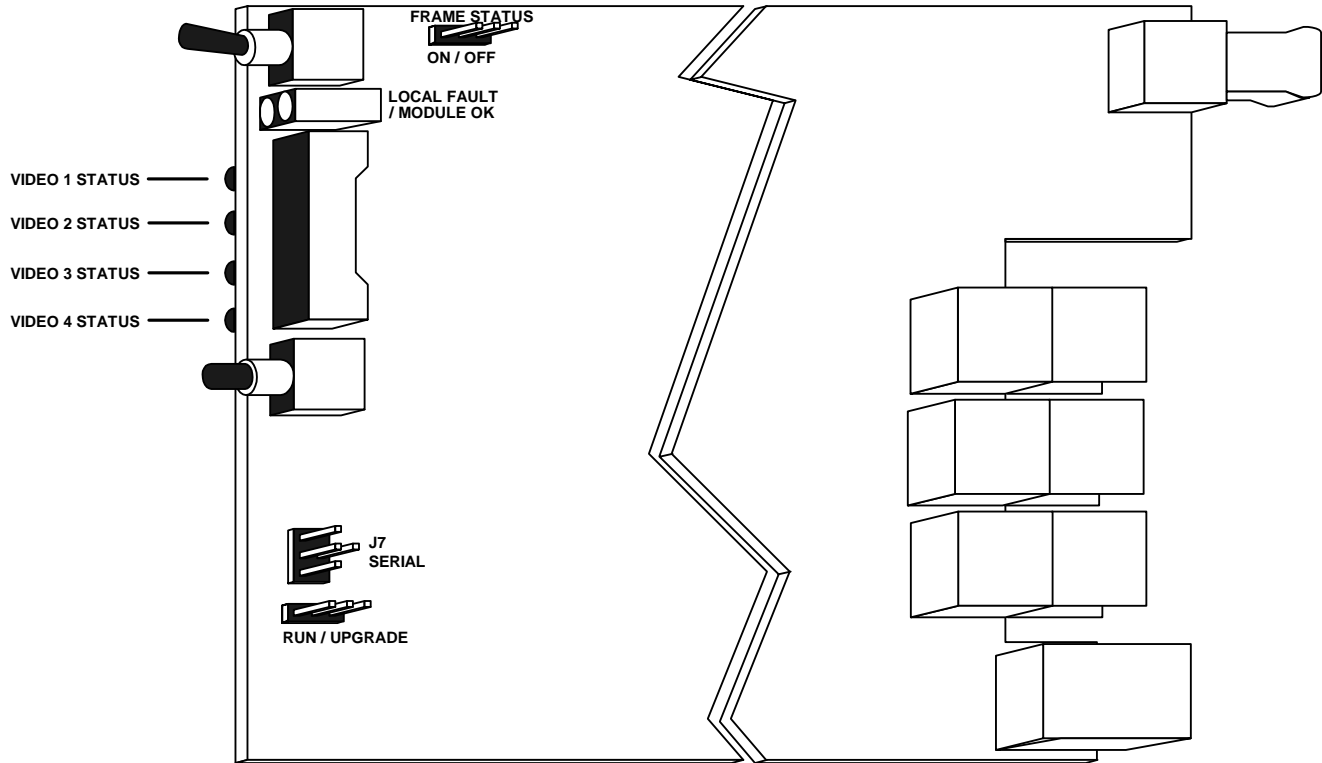

Figure 5-1: Location of Status Indicators and Jumpers – Bottom board (A)
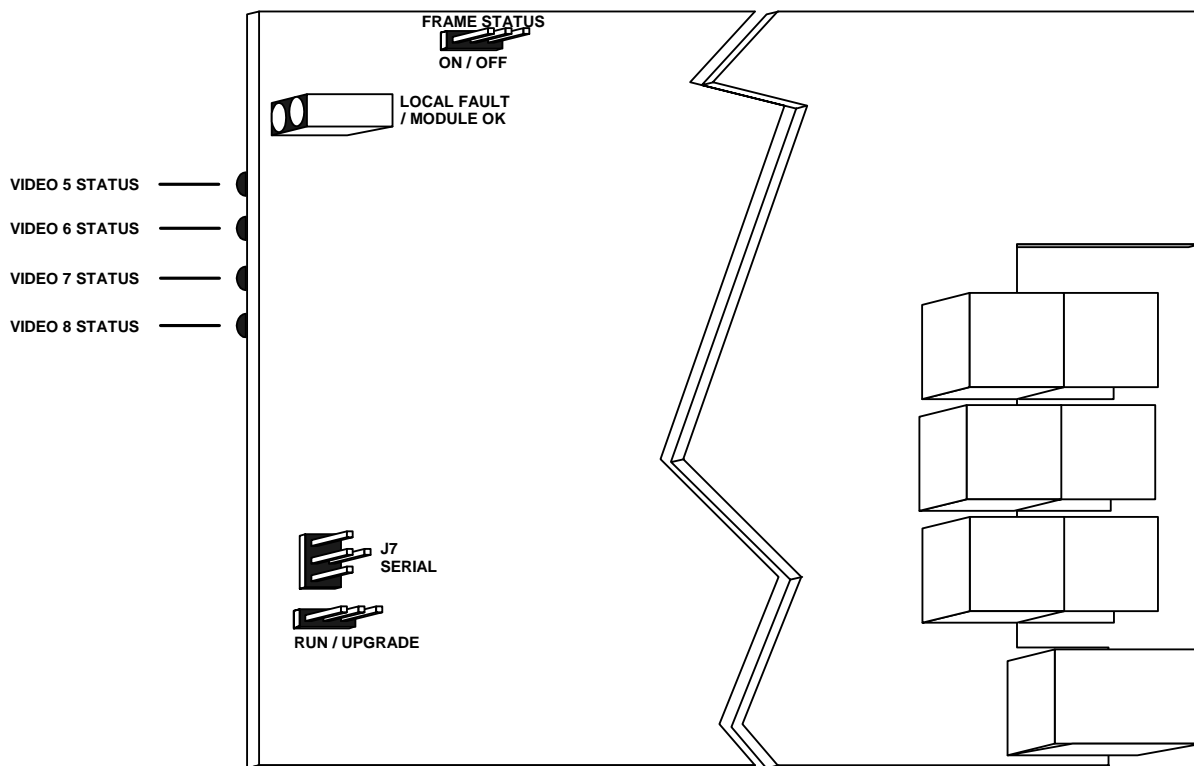
Figure 5-2: Location of Status Indicators and Jumpers – Top board (B)

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. Each of the cards of the module pair has a frame status jumper. Be sure to change both jumpers to the same state.

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

Each of the cards of the module pair needs to be upgraded with its specific firmware (A & B). Follow the same procedure for both the top and bottom modules. The module can be configured for firmware upgrades using the UPGRADE jumpers or with the serial port 'upgrade' command as described below.

For the A board (bottom) of the module pair use the file with a name similar to:
7707VT8A.BIN

For the B board (top) of the module pair:
7707VT8B.BIN

5.2.1. Using the Upgrade Jumper

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

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 in the front of this manual binder. 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.

5.2.2. Upgrade Serial Port Command

Install the Upgrade cable provided (located in the vinyl pouch in the front of this manual) onto the SERIAL header at the card edge of the card to be upgraded. Connect this cable to your computer and run a terminal program as described in the *Upgrading Firmware* section in the front of this manual binder. Type in "upgrade" without the quotes and hit Enter. Follow the prompts that are presented on your terminal screen and proceed to download the new firmware specified for this card.

6.   VistaLINK® REMOTE MONITORING/CONTROL

6.1.   WHAT IS VistaLINK®?

VistaLINK® 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® 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® 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® 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® enabled fiber optic products.

2. Managed devices (such as 7707VT-8 and 7707VR-8 cards), each with a unique address (OID), communicate with the NMS through an SNMP Agent. Evertz VistaLINK® enabled 7700 series modules reside in the 3RU 7700FR-C MultiFrame and communicate with the manager via the 7700FC VistaLINK® 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 VistaLINK® network, see the 7700FC Frame Controller chapter.

6.2.   VistaLINK® MONITORED PARAMETERS

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

Parameter	Description
Video 1 to 8: Input Video Standard	Indicates the presence of a valid video input signal.
Video 1 to 8: Cable Length	Indicates equalization applied to input video as a percent. Shorter cable length should have low percent equalization.

Table 6-1: VistaLINK® Monitored Parameters

6.3. VistaLINK® CONTROLLED PARAMETERS

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

Parameter	Description
EDH Insert 1 to 8	Enables recalculated EDH packets to be inserted into video stream, with updated error flags.
Monitoring Video	Select the input to source the video monitor output port or turn monitor output OFF.
Video Enable 1 to 8	Allows the User to enable/disable specific video paths. Disabled input data will not be placed on the fiber link.
Change Password	Setup the Password used to access the Video Blocking features.
Cable Length Threshold	Set the equalization strength that trips an alarm if the signal degrades.
Laser	Allows the user to control the laser behavior when no video is present on coaxial inputs. In *Discontinuous* mode the laser will be shut off with no valid input signals. In *Continuous* mode the laser will continuously transmit and maintain the link to the VR-8.

Table 6-2: VistaLINK® Controlled Parameters

6.4. VistaLINK® TRAPS

The following traps can be VistaLINK® enabled and monitored.

Trap	Description
Video Loss 1 to 8	Triggers when there is a loss of a valid video signal.
Video Error 1 to 8	Triggers when a video error has occurred.
EDH Packet Missing 1 to 8	Triggers upon loss of EDH Error Detection packets in video input.
EDH Error 1 to 8	Triggers when an EDH error has occurred.
Cable Length Fault 1 to 8	Triggers when equalization is higher than set Cable Length Threshold.
Laser Fault	Triggers when there is a laser fault.

Table 6-3: VistaLINK® Traps