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REVISION HISTORY

REVISION	DESCRIPTION	DATE
1.0	Original Version	Sept 04
2.0	Updated	Dec 04
2.1	Updated safety section and added assembly and labeling sections Updated tables and added Traps table	Aug 05
2.2	Added table format throughout section 4. General clean up.	Feb 09

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-2-HD DWDM cards and any 7707VR-2-HD series cards directly with a short fiber optic cable. The 7707VT-2-HD DWDM card produces +7dBm of power which will damage the receiver if connected directly.

Do not hook up the 7707VT-2-HD cards that output more than -7dBm of power (see 7707VT-2-HD specifications for output power of various laser types) and 7707VR-2-HD-H high sensitivity receiver cards directly with a short fiber optic cable. The 7707VT-2-HD cards that produce more than -7dBm of power will damage the receiver if connected directly.

1. OVERVIEW

The 7707VT-2-HD is a VistaLINK® enabled, fiber transmitter for two SMPTE 292M (1.485Gb/s) signals. This single card combines two HD-SDI signals using Time Domain Multiplex (TDM) technology and transmits them over a single fiber. The companion 7707VR-2-HD Dual HD-SDI Receiver demultiplexes the signals and converts them back to separate HD-SDI video feeds

The 7707VT-2-HD and companion 7707VR-2-HD will transparently pass incoming HD-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 VistaLINK®.

The 7707VT-2-HD is available in different versions to meet a variety of applications.

7707VT13-2-HD	1310 nm FP	Suitable for distances up to 6 Km @ 1.5 Gb/s
7707VT15-2-HD	1550 nm DFB	Suitable for distances up to 50 Km @ 1.5 Gb/s

There are several versions with built in isolators specifically suited to coarse wave division multiplexing (CWDM) applications. The CWDM versions are suitable for distances up to 50 Km @ 1.5 Gb/s

7707VT27-2-HD	1270 nm DFB
7707VT29-2-HD	1290 nm DFB
7707VT31-2-HD	1310 nm DFB
7707VT33-2-HD	1330 nm DFB
7707VT35-2-HD	1350 nm DFB
7707VT37-2-HD	1370 nm DFB
7707VT43-2-HD	1430 nm DFB
7707VT45-2-HD	1450 nm DFB
7707VT47-2-HD	1470 nm DFB
7707VT49-2-HD	1490 nm DFB
7707VT51-2-HD	1510 nm DFB
7707VT53-2-HD	1530 nm DFB
7707VT55-2-HD	1550 nm DFB
7707VT57-2-HD	1570 nm DFB
7707VT59-2-HD	1590 nm DFB
7707VT61-2-HD	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 more than 50 Km @ 1.5 Gb/s (for DWDM applications contact factory).

7707VTDyyy-2-HD	DWDM DFB laser output, xxx – ITU channel number

Features:

- Single card multiplexor for two synchronous or asynchronous SMPTE 292M (1.485Gb/s) video signals
- Signal transport uninterrupted by loss of any HD-SDI 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-digit card-edge display
- VistaLINK® –enabled for remote monitoring and control when installed in a 7700FR-C frame with 7700FC VistaLINK® Frame Controller
- Automatic coaxial equalization up to 100m at 1.485Gb/s (Belden 1694A)
- 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

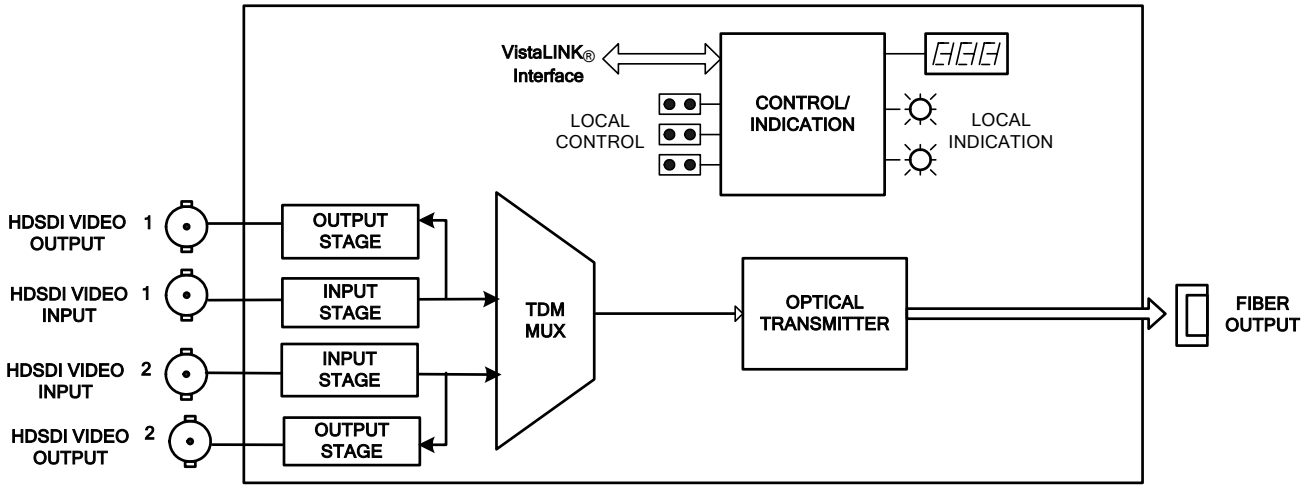

Figure 1-1: 7707VT-2-HD Block Diagram

2. INSTALLATION

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

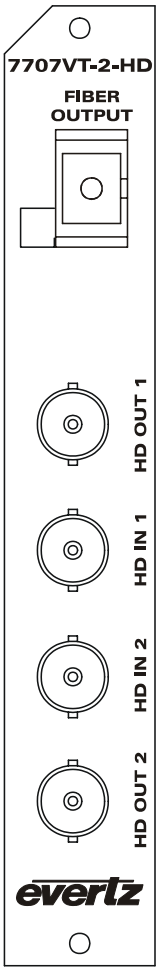

Figure 2-1: 7707VT-2-HD Rear Panel

HD INPUT: Two independent BNC input connectors for HD-SDI video signals compatible with SMPTE 292M standards. These inputs provide adaptive compensation for up to 100m of industry standard Belden 1694A cable, at 1.485Gb/s.

HD OUTPUT: There are two independent BNC connectors with under each HD-SDI video input. These act as loop through outputs compatible with SMPTE 292M standards. Reclocking is provided.

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

This optical output is available in 1310nm, 1550nm, up to sixteen CWDM wavelengths (ITU-T G.694.2 compliant) and up to 40 DWDM wavelengths (ITU-T G.694.1 compliant). The output wavelength is marked on the rear panel of each module. When connected directly to a companion module, the output is compatible with multi-mode fiber optic cable. If not connected directly (i.e. connected through CWDM, DWDM, WDM, or splitter/combiner) the output is compatible only with single-mode fiber optic cable.

Do not hook up the 7707VT-2-HD DWDM cards and any 7707VR-2-HD series cards directly with a short fiber optic cable. The 7707VT-2-HD DWDM card produces +7dBm of power which will damage the receiver if connected directly.

Do not hook up the 7707VT-2-HD cards that output more than -7dBm of power (see 7707VT-2-HD specifications for output power of various laser types) and 7707VR-2-HD-H high sensitivity receiver cards directly with a short fiber optic cable. The 7707VT-2-HD 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 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: 7707VT13-2-HD, 7707VT15-2-HD
  7707VTxx-2-HD, (xx = 27, 29, 31, 33, 35, 37, 43, 45, 47, 49, 51, 53, 55, 57, 59, 61)
  7707VTDyyy-2-HD (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. SERIAL VIDEO INPUT

Standards: SMPTE 292M
Number of Inputs: 2 independent SMPTE 292M 1.485Gb/s signals
Connector: 2 BNC input per IEC 61169-8 Annex A
Equalization: Automatic 100m @ 1.485Gb/s with Belden 1694A or equivalent cable
Return Loss: > 15 dB up to 1.485Gb/s

3.2. SERIAL VIDEO OUTPUTS

Number of Outputs: 2 Per Card
Connector: BNC per IEC 61169-8 Annex A
Signal Level: 800mV ±80mV
DC Offset: 0V ±0.5V
Rise and Fall Time: <270ps
Overshoot: <10% of amplitude
Return Loss: >12dB to 1.5Ghz
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: < 0.20UI
Fiber Size: 9 μm core / 125 μm overall
Wavelengths:
- **Standard:** 1310nm, 1550nm (nominal)
- **CWDM:** 1270nm to 1610nm (ITU-T G.694.2 compliant)
- **DWDM:** ITU channel 20 to 60, 100GHz spacing, (ITU-T G.694.1 compliant)

Output Power:
- **1310nm FP (Standard)** -7dBm ± 1dBm
- **1550nm & CWDM DFB** 0dBm ± 1dBm
- **DWDM DFB** +7dBm ± 1dB

3.4. ELECTRICAL

Voltage: +12VDC
Power: 10 Watts (Non DWDM)
13 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: 1

4. STATUS INDICATORS AND DISPLAYS

The 7707VT-2-HD 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 pushbutton is used to select various displays on the alphanumeric display. Figure 4-1 shows the locations of the indicators and pushbutton.

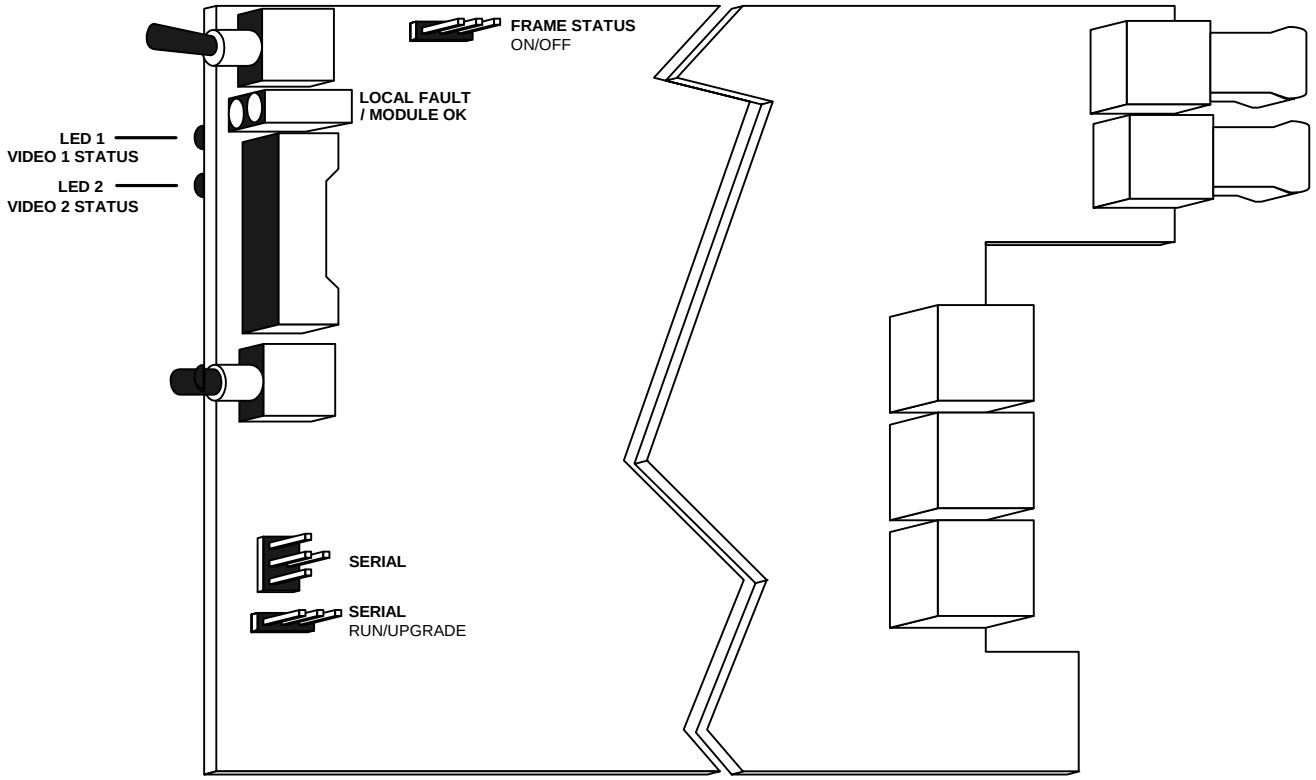

Figure 4-1: Location of Status Indicators and Jumpers

4.1. STATUS INDICATOR LEDS

LOCAL FAULT: This Red LED indicates poor module health and will be ON if a laser fault exists, the laser is set to OFF or a local input power fault exists (i.e.: a blown fuse). The LOCAL FAULT indication can also be reported to the frame through the FRAME STATUS jumper.

MODULE OK: This Green LED indicates good module health. It will be On when a valid input signal is present, and the laser and board power are good.

On the 7707VT-2-HD there are two small multi-color LEDs on the back of the board that indicate the status of video signals.

VIDEO 1 STATUS: Green indicates the presence of a valid signal on channel 1.
Yellow indicates the presence of CRC errors in the incoming channel 1 stream.
Red indicates a loss of video on channel 1.

VIDEO 2 STATUS: Green indicates the presence of a valid signal on channel 2.
Yellow indicates the presence of CRC errors in the incoming channel 2 stream.
Red indicates a loss of video on channel 2.

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.

	Pushbutton ?		
	Top Level Menu	**Menu Level 1**	**Menu Level 2**
? Toggle Switch ?	OK (If Laser is Ok) LASER...ERR (If Laser Error) (Local LED goes RED when there is Laser Error. Local LED is also RED if Laser is set to Discontinuos mode and there is no Video input to the 7707VT-2-HD)	**VSD1** (Video Standard)	**Video 1 Standard** (see list in 4.2.3 section)
		VSD2 (Video Standard)	**Video 2 Standard** (see list in 4.2.3 section)
		EQ1 (Cable length)	**0 to 100 meters** (10 meter steps)
		EQ2 (Cable length)	**0 to 100 meters** (10 meter steps)
		LASR (LASER control)	**CONT or DISC** (Default : CONT)
		FRST (Factory Reset)	**YES or NO**
		DISP (Display Orientation)	**VERT or HOR**
		VER (Software Version)	Version number and build shifted right to left

Figure 4-2: Card Edge Menu Structure

4.2.1. Top Level Menu

The following display messages indicate what is being displayed:

OK: 7707VT-2-HD laser is properly functioning and ON.
LASR...ERR: Laser Error Warning. Flashing indication alternates between **LASR** and **ERR**.

4.2.2. Menu Level One

The following display messages indicate what is being displayed:

VSD1:	Video Standard in Use On Channel 1.
VSD2:	Video Standard in Use On Channel 2.
EQ1:	Input Equalization Strength On Channel 1.
EQ2:	Input Equalization Strength On Channel 2.
LASR:	Sets behavior of laser when no input video signal is applied.
FRST:	Factory Reset (Default).
DISP:	Sets the orientation of the text displayed on the card edge.
VER:	Displays the present Firmware version.

4.2.3. Displaying the Video Standard

The 7707VT-2-HD detects the Video standards of the signal present at its input. For the sake of brevity, only *VSD1* will be discussed in the manual.

VSD1
NONE
UNKNOWN
1035I/60
1035I/59.94
1080I/50-1
1080I/50-2
1080I/60
1080I/59.94
1080P/30
1080P/29.97
1080P/25
1080P/24
1080P/23.98
1080P/24-SF
1080P/23.98-S
1080P/25-SFEM
720P/30
720P/29.97
720P/50
720P/25
720P/24
720P/23.98
1080P/24-EM
1080P/23.98-EM
1080P/24-SF-EM
1080P/23.98-SF-EM
1080P/24-EM
1080P/23.98-EM
1080P/24-SF-EM
1080P/23.98-SF-EM
720P/30-EM
720P/29.97-EM
720P/50-EM
720P/25-EM
720P/24-EM
720P/23.98-EM
720P/60-EM
720P/59.94-EM

To display the Video Standard, press the pushbutton one or more times until the VSD1 or VSD2 message is shown on the display. After one second the detected video standard will be shown.

4.2.4. Displaying the Equalization Strength

To display the Equalization strength, toggle the switch one or more times until the EQ1 or EQ2 message is shown on the display. Press the push button to display the equalization strength, the applied equalization strength will be shown in intervals of 10 meters. For the sake of brevity, only *EQ1* will be discussed in the manual.

EQ1
0 to 100
LOSS

0 to 100	Indicates applied equalization in meters.
LOSS	Indicates that no valid input signal is present.

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

On the 7707VT-2-HD the **LASR** display allows you 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 press the push button to enter the LASR submenu. Use the toggle switch to chose between CONT and DISC, and then press the push button to select the mode of operation.

LASR
CONT
DISC

CONT Laser will transmit continuously regardless of whether there are valid input video signals present on coaxial inputs of the 7707VT-2-HD.

DISC The laser will turn off when there is no recognizable video on either of the 7707VT-2-HD coaxial inputs.

4.2.6. Performing a Factory Reset

The 7707VT-2-HD allows performing a factory reset of card parameters. Enter **FRST** menu item, toggle to **YES** and hit the push button. This restores the default parameters of the card. The default optical threshold is –40dBm.

FRST
YES
NO

Enter FRST menu item, toggle to YES and hit the push button. This restores the default parameters of the card. The default optical threshold is –40dBm.

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

On the 7707VT-2-HD, the **DISP** display allows you to set a horizontal or vertical orientation for the card edge display messages. Toggle the switch until DISP appears on the card edge, enter the DISP submenu by pressing the push button. Use the toggle switch to change between HOR and VERT. Press the push button to make your selection.

DISP
VERT
HOR

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

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

4.2.8. Displaying the Firmware Version

The **VER** display shows the firmware version and build number of the 7707VT-2-HD firmware. The message will scroll across the display.

For example: **VER 1.0 BLD 067**

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 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 completed, remove the module from the frame, move the UPGRADE jumper into the *RUN* position, remove the upgrade cable and re-install the module. The module is now ready for normal operation.

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-2-HD and 7707VR-2-HD 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, 2 Cable Length (EQ)	Indicates equalization in per cent.
Video 1, 2 Standard	A range of values describing the detected video standard.
Video 1, 2 Not Present	Indicates the absence of a valid video input signal. (the state of the VIDEO PRESENT LED)
Video 1, 2 Error	Indicates a weak signal carrier at the coaxial input.
Video 1, 2 Cable Error	Indicates the state of CARRIER FAULT LED.
Laser Fail	Preemptive indication of laser problems.

Table 6–1: VistaLINK® Monitored Parameters

6.3. VISTALINK® CONTROLLED PARAMETERS

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

Parameter	Description
Laser Control	Allows user to control the laset behavior when no video is present on coxial inputs.
Video 1, 2 Cable Length Threshold	Allows user to set the threshold for cable length equalization.

Table 6–2: VistaLINK® Controlled Parameters

6.4. VISTALINK® TRAPS

The following traps can be remotely reported through the VistaLINK® interface.

Trap	Description
Video 1, 2 Not Present	Indicates the absence of a valid video input signal. (the state of VIDEO PRESENT LED)
Video 1, 2 Error	Indicates a video error.
Video 1, 2 Cable Error	Indicates a weak signal carrier at the coaxial input. (the state of CARRIER FAULT LED)
Laser Fail	Preemptive indication of Laser problems.

Table 6–3: VistaLINK® Traps

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