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REVISION HISTORY

<u>REVISION</u>	<u>DESCRIPTION</u>	<u>DATE</u>
1.0	Original Version	Feb 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 7708VT-4 DWDM and 7708VR-4 cards directly with a short fiber optic cable. The 7708VT-4 DWDM card produces +7dBm of power which will damage the receiver if connected directly.



Do not hook up the 7708VT-4 cards that output more than -7dBm of power (see 7708VT-4 specifications for output power of various laser types) and 7708VR-4-H high sensitivity receiver cards directly with a short fiber optic cable. The 7708VT-4 cards that produce more than -7dBm of power will damage the receiver if connected directly.

1. OVERVIEW

The 7708VT-4 is a *VistaLINK*® enabled SMPTE 292M fiber or coax transmitter for SDI, DVB-ASI or SDTi video signals. This single card combines up to four SDI, DVB-ASI or SDTi signals using Time Domain Multiplex (TDM) technology to transmit a single SMPTE 292M signal over fiber or coax cable. The companion 7708VR-4 Quad SDI Receiver demultiplexes the signals and converts them back to separate SDI video feeds.

The 7708VT-4 and companion 7708VR-4 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 the card status and parameters is provided locally at the card edge or remotely via *VistaLINK*®.

The fiber output is available in an assortment of optical wavelengths, accommodating standard, or CWDM transmission schemes. (See the technical specifications in section 3 for complete information).

7708VT13-4	1310 nm FP -7dBm output, suitable for distances up to 50 Km
7708VT15-4	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.

7708VT27-4	1270 nm DFB
7708VT29-4	1290 nm DFB
7708VT31-4	1310 nm DFB
7708VT33-4	1330 nm DFB
7708VT35-4	1350 nm DFB
7708VT37-4	1370 nm DFB
7708VT43-4	1430 nm DFB
7708VT45-4	1450 nm DFB
7708VT47-4	1470 nm DFB
7708VT49-4	1490 nm DFB
7708VT51-4	1510 nm DFB
7708VT53-4	1530 nm DFB
7708VT55-4	1550 nm DFB
7708VT57-4	1570 nm DFB
7708VT59-4	1590 nm DFB
7708VT61-4	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 >50 Km (for DWDM applications contact factory).

7708VTDyyy-4 DWDM DFB laser output, yyy – ITU channel number

The 7708VT-4 occupies one card slot and can be housed in either a 1RU frame, which will hold up to three modules, or a 3 RU frame, which will hold up to 15 modules.

Features:

- Single card TDM multiplexer for four synchronous or asynchronous 270Mb/s SDI, SDTi or DVB-ASI video signals
- Output compatible with SMPTE 292 reclocking devices
- Signal transport over fiber uninterrupted by loss of any SDI, SDTi or DVB-ASI 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 or remotely through SNMP and VistaLINK[®]
- Occupies one card slot and can be housed in either a 1RU frame which will hold up to 3 modules, a 3RU frame which will hold up to 15 modules, 3RU portable frame that holds up to 7 modules or a standalone frame which will hold 1 module
- VistaLINK[®] capability is available when modules are used with the 3RU 7700FR-C or 350FR portable frame and a 7700FC VistaLINK[®] Frame Controller module in slot 1 of the frame
- Fully hot-swappable from front of frame with no fiber disconnect/reconnect required
- Supports single-mode and multi-mode fiber optic cable
- Optical output wavelengths of 1310nm, 1550nm, and up to sixteen CWDM wavelengths (ITU-T G.694.2 compliant)
- DWDM wavelengths (ITU-T G.694.1 compliant) also available
- SC/PC, ST/PC, FC/PC connector options

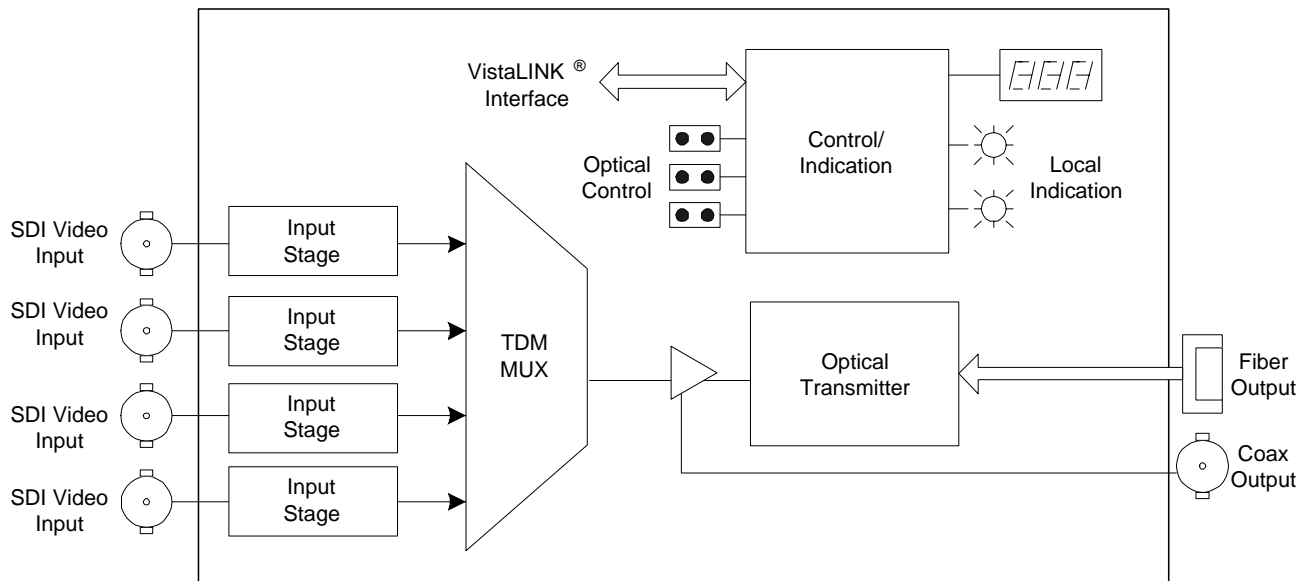


Figure 1-1: 7708VT-4 Block Diagram

2. INSTALLATION

The 7708VT-4 comes with a companion rear plate that has five 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 section 3 of the 7700FR chapter.

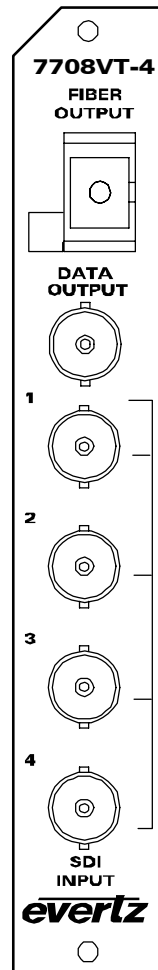


Figure 2-1: 7708VT-4 Rear Panel

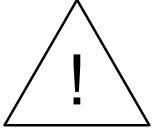
SDI INPUT: Four independent BNC input connectors for 10-bit serial digital video signals compatible with the SMPTE 259M, DVB-ASI or SMPTE 305M standards. These inputs provide adaptive compensation for up to 250m of industry standard Belden 8281 cable, at 270Mb/s.

OPTICAL OUTPUT: Output SC/PC, SC/PC with cover (shown), ST/PC or FC/PC female connector. This optical output contains the four 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 output.

DATA OUTPUT: Output BNC female connector. This coax SMPTE 292M output contains the four 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 output.

2.1. CARE AND HANDLING OF OPTICAL FIBER

2.1.1. Safety



Background colour: yellow
Triangular band: black
Symbol: black

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: 7708VT13-4, 7708VT15-4, 7708VTxx-4, (xx = 27, 29, 31, 33, 35, 37, 43, 45, 47, 49, 51, 53, 55, 57, 59, 61) 7708VTDyyy-4 (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)

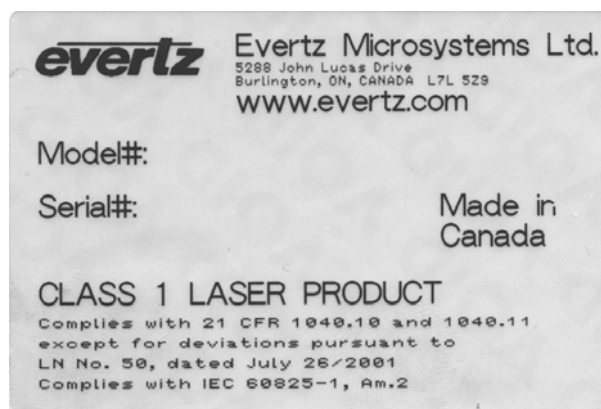


Figure 2-2: Reproduction of Laser Certification and Identification Label

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

Standard: SMPTE 259M-C, SMPTE 305M, DVB-ASI
Number of Inputs: 4 independent SDI or DVB-ASI, 270Mb/s signals
Connector: 4 BNC per IEC 61169-8 Annex A
Return Loss: > 15dB up to 270Mb/s

3.2. OPTICAL OUTPUT

Number of Outputs: 1
Output Standard: SMPTE 292M (not compatible with 7707VR-4)
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 μ m core / 125 μ m overall
Wavelengths:
 Standard: 1310nm
 CWDM: 1270nm to 1610nm (See ordering information)
 DWDM: ITU channel 20 to 60 wavelengths (ITU-T G.694.1 compliant)
Output Power:
 1310nm FP: -7dBm \pm 1dBm
 CWDM: 0 dBm \pm 1dBm
 DWDM: +7dBm \pm 1dBm

3.3. DATA OUTPUT

Number of Outputs: 1
Output Standard: SMPTE 292M
Connector: BNC per IEC 61169-8 Annex A
Impedance: 75 Ω nominal
Signal Level: 800mV nominal
DC Offset: 0V \pm 0.5V
Rise/Fall Time: <270ps nominal
Overshoot: <10% of amplitude
Return Loss: >12dB up to 1.5GHz
Wideband Jitter: <0.2UI (reclocked)

3.4. ELECTRICAL

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

3.5. COMPLIANCE

Electrical Safety:	CSA Listed to UL 60065-03, IEC 60065 Complies with CE Low voltage Directive
Laser Safety:	Class 1 laser product Complies with 24 CFR 1040.10 and 1040.11 Complies with IEC 60825-1
EMI/RFI:	Complies with FCC Part 15, Class A, EU EMC directive

3.6. PHYSICAL

350FR, 7700FR-C, 7800FR, 7701FR, or S7701FR frame mounting:
Number of slots: 1

4. STATUS INDICATORS AND DISPLAYS

The 7708VT-4 has 6 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.

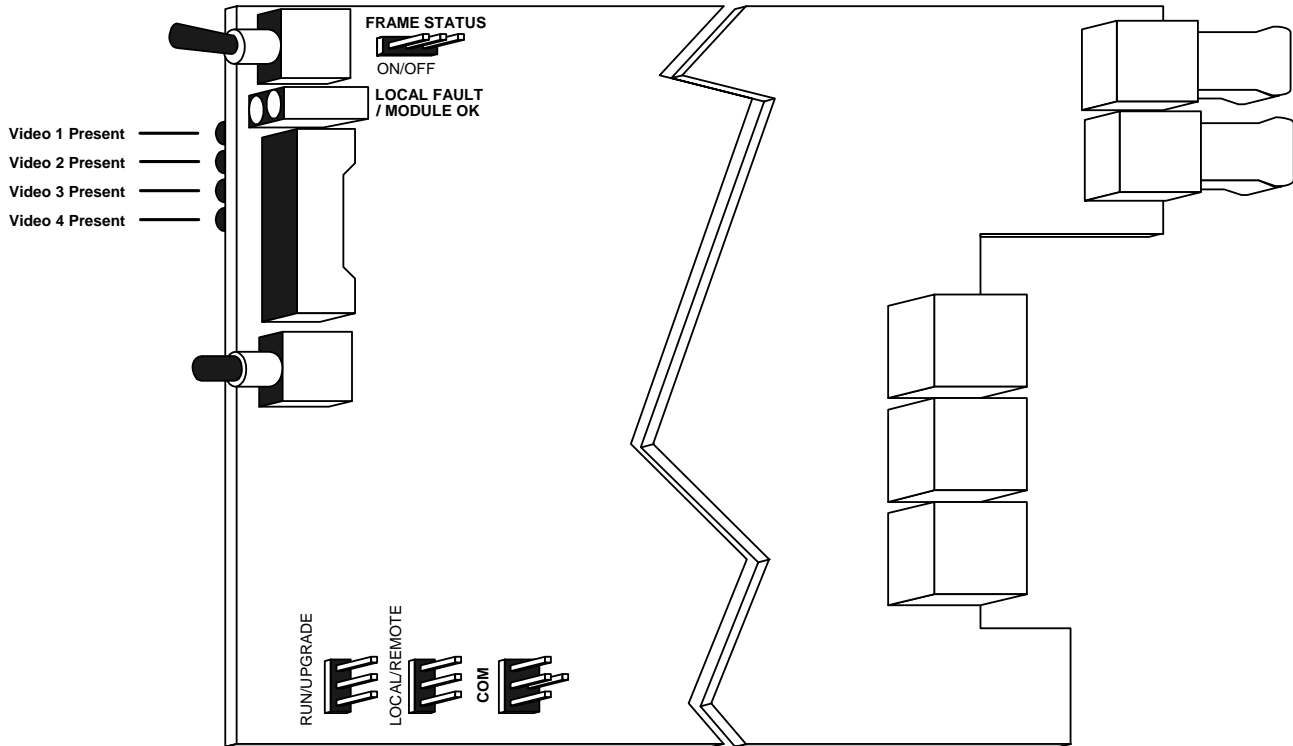


Figure 4-1: Location of Status Indicators and Jumpers

4.1. STATUS INDICATOR LEDS

LOCAL FAULT: This Red LED indicates poor module health and will be On during the absence of a valid input signal, if a laser fault exists, or if 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 powers are good.

On the 7708VT-4, there are four small LEDs on the back of the board that indicate the presence of video signals.

VIDEO 1 PRESENT: This Green LED indicates the presence of a valid signal on the Video 1 input.

VIDEO 2 PRESENT: This Green LED indicates the presence of a valid signal on the Video 2 input.

VIDEO 3 PRESENT: This Green LED indicates the presence of a valid signal on the Video 3 input.

VIDEO 4 PRESENT: This Green LED indicates the presence of a valid signal on the Video 4 input.

4.2. DOT-MATRIX DISPLAY

Additional signal and card status monitoring is provided via the 4-digit dot-matrix display located on the card edge. The card-edge pushbutton is used to select which data is being displayed in the alphanumeric display. Each time the pushbutton is pressed, the display advances to the next available display. A message indicating what display mode is active is shown for one second. After one second without the pushbutton being pressed, the selected display data is shown.

The following display messages indicate what is being displayed.

CH 1	Video Standard in Use On Channel 1.
CH 2	Video Standard in Use On Channel 2.
CH 3	Video Standard in Use On Channel 3.
CH 4	Video Standard in Use On Channel 4.
PSWD	Sets/configures password for enabling/disabling video channels.
LASR	Sets Laser to Continuous or Discontinuous mode.
DISP	Sets the orientation of the text displayed on the card edge.
VER	Displays the present Firmware version.

4.2.1. Displaying the Video Standard

The 7708VT-4 detects the Video standards of the signal present at its input.

CH1-CH4
VSD
N270
P270
ASI
NONE
UNKN

To display the Video Standard, press the pushbutton and actuate the toggle switch until CH 1, CH 2, CH 3 or CH 4 message is shown on the display. Enter specific channel menu by pressing pushbutton when specific channel is shown. Then toggle to VSD and press the pushbutton again. After one second the detected video standard will be shown. The following list describes possible displays and their meaning.

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.
ASI	Indicates DVB-ASI Signal at Input.
NONE	Indicates that no valid output signal is present.
UNKN	270Mb/s unrecognized format.

4.2.2. Signal BLOCK Configuration

PSWD PWSL VCH1	<p>Press the pushbutton and select the PSWD option. Actuate the toggle switch to achieve the correct code number (Factory Default = 7154).</p> <p>PWSL Store a new passcode (0-9999) required for BLOCK configuration. This menu is not available without entering the correct passcode.</p> <p>VCH1 EN / DIS. When Disabled the data received on the fiber link intended for output 1 is not output. This menu item is not modifiable without entering the correct passcode, though its current state is viewable.</p>
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4.2.3. Setting the Behavior of Laser When There is No Applied Video

On the 7708VT-4 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.

LASR CONT DISC	<p>CONT The laser will transmit continuously regardless of whether there are valid input video signals present on the coaxial inputs of the 7708VT-4.</p> <p>DISC The laser will turn off when there is no recognizable video on any of the coaxial inputs. EN / DIS. When Disabled the data received on the fiber link intended for output 1 is not output. This menu item is not modifiable without entering the correct passcode, though its current state is viewable.</p>
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4.2.4. Setting the Orientation of the Text on the Card Edge Display

On the 7708VT-4 the **DISP** display allows you 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 HORZ VERT	<p>HORZ Horizontal display used when the module is housed in the 1 rack unit 7701FR frame or the stand-alone enclosure.</p> <p>VERT Vertical display used when the module is housed in the 3-rack unit 7700FR frame.</p>
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4.2.5. Displaying the Firmware Version

The **VER** display shows the firmware version and build number of the 7708VT-4 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 7708VT-4 and 7708VR-4 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, 3, 4 Standard	A range of values describing the detected video standard

Table 6-1: VistaLINK[®] Monitored Parameters

6.3. VISTALINK® CONTROLLED PARAMETERS

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

Parameter	Description
Change Password	Allows user to change password that is needed in order to enable/disable video channels
Video 1, 2, 3, 4 Channel Enable	Enables or disables a video channel

Table 6-2: *VistaLINK*® Controlled Parameters

6.4. VISTALINK® TRAPS

The following traps can be remotely monitored through *VistaLINK*® interface.

Trap	Description
Video 1, 2, 3, 4 Not Present	Triggers when there is a loss of video signal
Video 1, 2, 3, 4 EDH Errors Present	Triggers when there is a EDH error present in video signal
Laser Not Ok	Triggers on laser fault condition

Table 6-3: *VistaLINK*® Traps

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