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REVISION HISTORY

REVISION	DESCRIPTION	DATE
1.0	First Release	Apr 08
1.1	Updated menu structure format	Oct 08
1.2	Correction to Features section	Oct 09

WARNING

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

1. OVERVIEW

The 7707VT-8-HS is a *Vista*LINK® enabled fiber transmitter for seven HD-SDI signals, eight SDI/DVB-ASI signals, or combinations thereof. The various input signals are combined using Time Domain Multiplexing (TDM), and transmitted over a single fiber. A companion 7707VR-8-HS fiber receiver demultiplexes the signals and converts them back to separate SDI/DVB-ASI and/or HD-SDI feeds.

The 7707VT-8-HS and companion 7707VR-8-HS will transparently pass incoming HD-SDI or SDI/SDTi video with embedded AES audio or 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®.

Features:

- Single card TDM multiplexer for 7 HD-SDI or 8 SDI-SDI/DVB-ASI signals
- Signal transport over fiber uninterrupted by loss of any HD-SDI, 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®
- Monitoring output of any input
- Main module fully hot-swappable from front of frame
- VistaLINK® capability is available when modules are used with the 3RU 7700FR-C or 350FR frame and a 7700FC VistaLINK® Frame Controller module in slot 1 of the frame
- Automatic coaxial input equalization up to 100m at 1.485Gb/s and 250m at 270Mb/s (Belden 1694A)
- Supports single-mode fiber optic cable
- Optical output wavelengths of 1310nm and 1550nm
- Female LC Duplex Connector
- Occupies two card slots and can be housed in a 3RU frame which will hold up to 7 modules or a 3RU portable frame that holds up to 3 modules

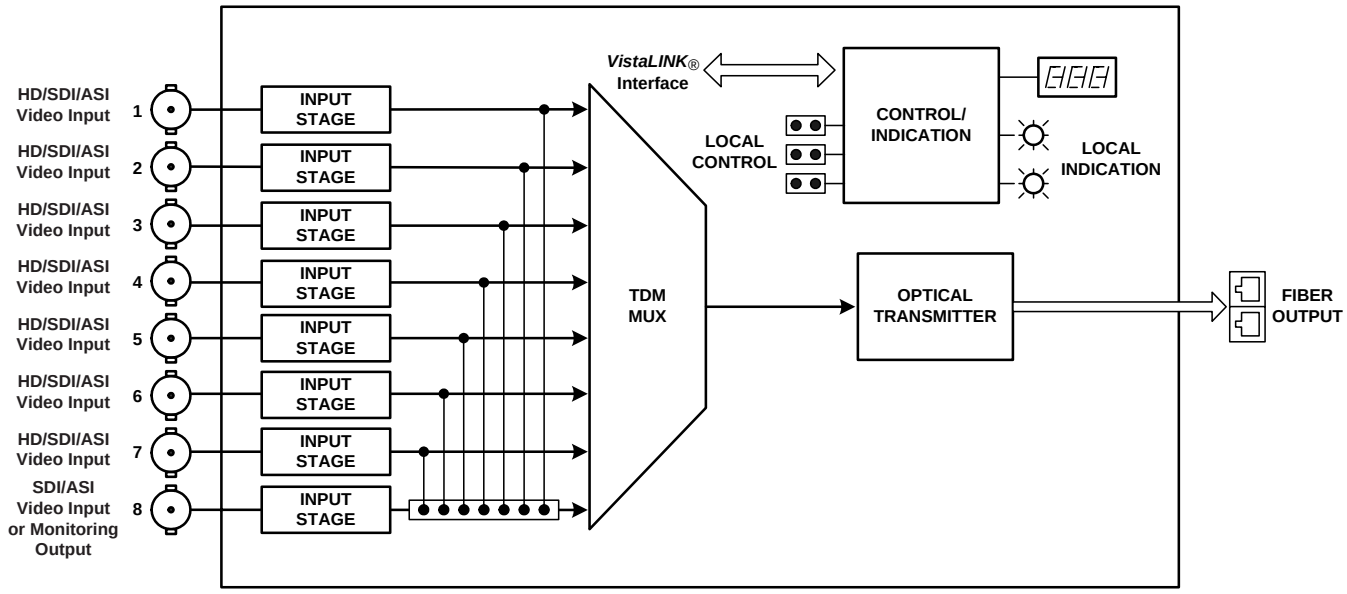


Figure 1-1: 7707VT-8-HS Block Diagram

2. INSTALLATION

The 7707VT-8-HS comes with a companion rear plate that has eight BNC connectors and one LC Duplex optical connector. For information on mounting the rear plate and inserting the module into the frame see section 3 of the 7700FR chapter.

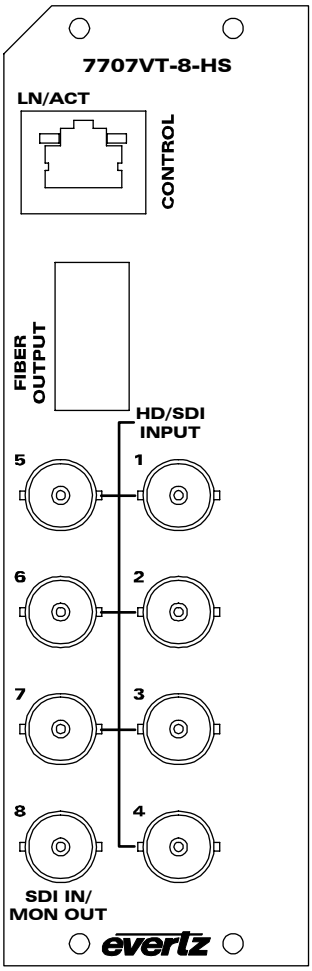


Figure 2-1: 7707VT-8-HS Rear Panel

HD/SDI INPUTS: Seven auto-sensing BNC inputs for HD-SDI, SDI/SDTi, or DVB-ASI, compatible with HD-SDI (SMPTE 292M), SD-SDI (SMPTE 259M-C), SDTi (SMPTE 305.2M) or EN500083-9 (DVB-ASI) standards. These inputs provide adaptive compensation for up to 100m of industry standard Belden 1694A cable at 1.485Gb/s, or 250m of 1694A cable at 270Mb/s.

SDI INPUT /MON OUT: One BNC input/output connection, configurable as an auto-sensing SDI/SDTi or DVB-ASI input, or as a loopback monitoring output. The loopback output may be configured to monitor any one of the seven HD/SDI inputs, selectable via card-edge or *Vista*LINK® controls.

FIBER OUTPUT: LC Duplex female connector, outputting the TDM multiplexed signal. Optical output can be specified for use with CWDM or DWDM.

NOTE: Only a single port of the XFP module is in use. This port corresponds to the location of the "Fiber Output" label.

CONTROL: RJ-45 Ethernet connection for SNMP monitoring and control. Module possesses local SNMP agent.

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 the bar code label placed on the printed circuit board of each Evertz plug-in module.

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. 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

Number of Inputs: 8 Inputs (1 configurable as input or output)
Standards: SMPTE 292M (Inputs 1-7 only), SMPTE 259-C, SMPTE 305.2M(SDTi), (DVB-ASI)
Connector: BNC per IEC 61169-8 Annex A
Equalization: Automatic to 100m at 1.485Gb/s (inputs 1-7 only) or 250m at 270Mb/s with Belden 1694A or equivalent cable
Return Loss: > 15 dB up to 1.5Gb/s

3.2. SERIAL VIDEO OUTPUT

Number of Outputs: 1 Output (configurable as input or output)
Standards: SMPTE 292M, SMPTE 259-C, SMPTE 305.2M(SDTi), EN500083-9 (DVB-ASI)
Connector: BNC per IEC 61169-8 Annex A
Signal Level: 800mV nominal
DC Offset: 0V ±0.5V
Rise and Fall Time: 900ps (nominal @ 270Mb/s), <270ps (@ 1.485Gb/s)
Overshoot: <10% of amplitude
Return Loss: >12dB to 1.5Gb/s
Alignment Jitter: < 0.2UI

3.3. OPTICAL OUTPUT

Number of Outputs: 1
Connector: Female LC Duplex
Return Loss: > 12 dB
Rise and Fall Time: 200 ps nominal
Fiber Size: 9 μm core / 125 μm overall
Wavelengths:
Standard: 1310nm (nominal), 1550nm
Output Power:
Standard: -3dBm ± 3dBm

	TRANSMITTER		**RECEIVER**	
	MIN	MAX	DISTANCE w/+S*	DISTANCE w/+H*
1310nm	-6dBm	-1dBm	10Km	---
1550nm	-1dBm	+2dBm	40Km	---

3.4. ELECTRICAL

Voltage: +12 VDC
Power: 20W

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

Number of slots: 2

4. STATUS INDICATORS AND DISPLAYS

The 7707VT-8-HS has 8 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/pushbutton is used to select various displays on the alphanumeric display. Figure 4-1 shows the locations of the indicators and shaft-encoder/pushbutton.

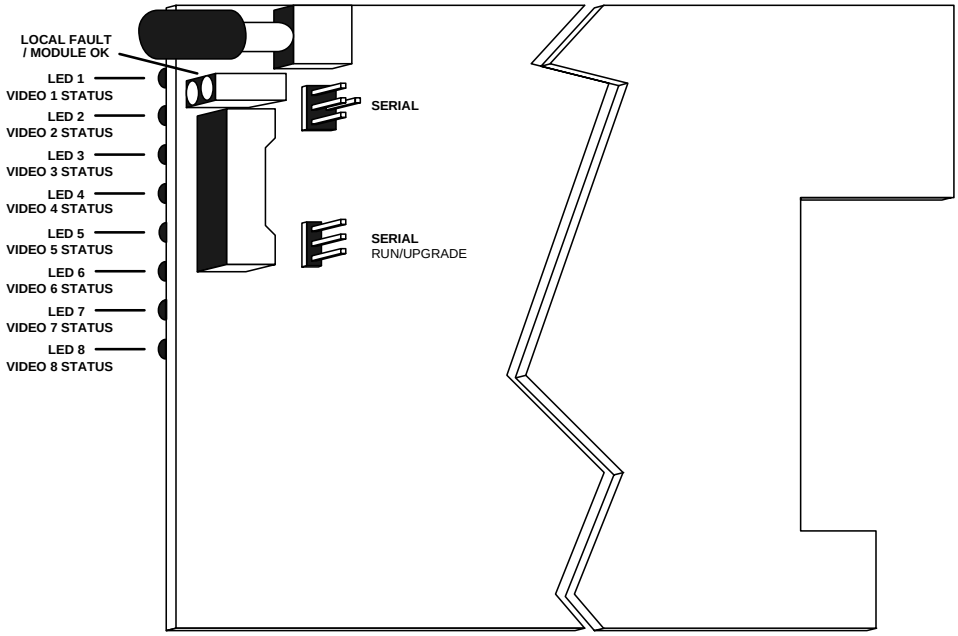


Figure 4-1: Location of Status Indicators, Jumpers and Controls

4.1. STATUS INDICATOR LEDS

Two large LEDs at the front card-edge display the status of the module as follows:

MODULE OK: This Green LED indicates good module health. It will be ON while there is no laser, XFP, card-slot or power faults.

LOCAL FAULT: This Red LED will illuminate when a fault condition is detected. Possible fault conditions include laser, XFP, card-slot or power faults. Whether or not this LOCAL FAULT indication is reported to the frame may be determined by the FRAME STATUS jumper (see section 5.1).

Eight multi-coloured LEDs indicate the status of the eight corresponding video signals:

VIDEO STATUS: **GREEN** indicates the presence of a valid input to the corresponding channel.

YELLOW indicates that the corresponding channel has been password-blocked (via CTRL/PSWD menu item), or that the input cannot be accommodated in the available link bandwidth (see STAT/LINK/USE menu item).

RED indicates the detection of video CRC or EDH errors.

OFF indicates a signal loss of signal condition.

4.2. DOT-MATRIX DISPLAY / CARD STATUS AND CONTROLS

Additional status monitoring and controls are provided via the 4-digit dot-matrix display located at the card-edge. The card-edge shaft-encoder/pushbutton (see Figure 4-1) is used to navigate through the display menus. To select an option, press the shaft-encoder/pushbutton. Figure 4-2 provides a quick reference to the display menu structure.

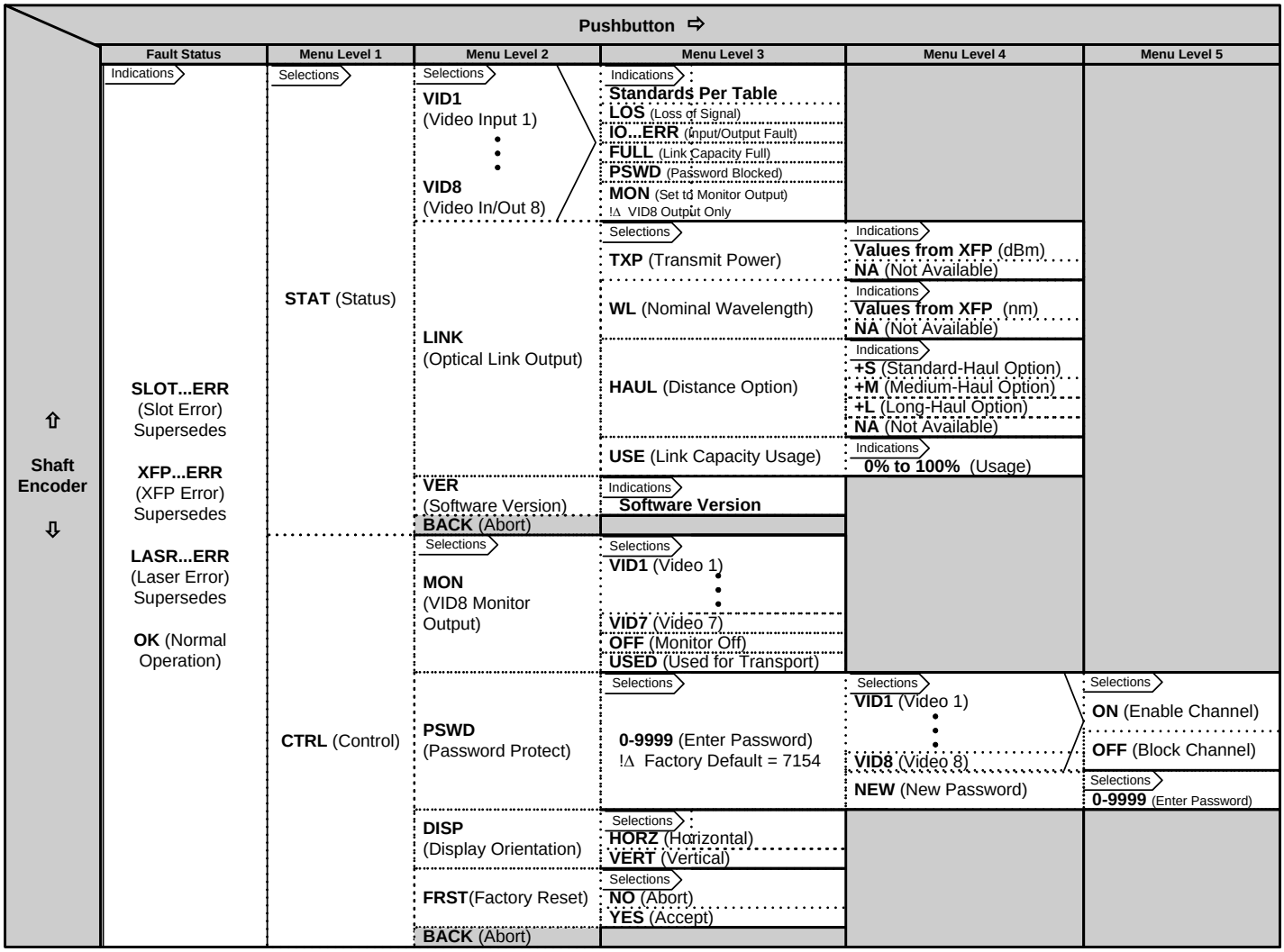


Figure 4-2: Card Edge Menu Structure

If a specific menu selection has a configuration value associated with it, then this may be changed using the shaft encoder. 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.

4.2.1. Display of Warning Status Indications

The top level, default display indicates overall card status and warnings:

OK Normal operation.

SLOT…ERR Slot Error Warning – A compatible rear-plate is not detected. Flashing indication alternates between **SLOT** and **ERR.**

XFP…ERR XFP Module Error Warning – A compatible XFP module is not detected. Flashing indication alternates between **XFP** and **ERR.**

LASR…ERR Laser Error Warning – A laser degrade condition is detected. Flashing indication alternates between **LASR** and **ERR**.

Pressing the shaft encoder from this default display will allow the user to select from **STAT** (status) and **CTRL** (control) menu items.

4.2.2. Displaying the Video Standard

The 7707VT-8-HS detects the video standard of the signals present at its inputs. To display the video standard, select the **STAT** menu item in menu level 1, then use the shaft encoder to display the desired video channel (from **VID1** to **VID8**) and press the shaft encoder to select it. For the sake of brevity, only the description for video input 1 will be provided. The settings for Video Inputs 2 to 7 (VID2 to VID7) and Video Input/Output 8 (VID8) are the same.

- *STAT*
  - *VID1*
    - *Standards*
    - *LOS*
    - *IO…ERR*
    - *FULL*
    - *PSWD*
    - *MON*

The following indications are available:

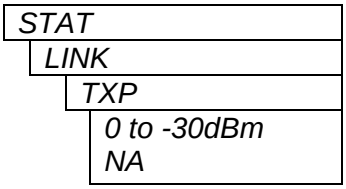
Standards For a list of available standards see the video standard list below.
LOS Loss of Signal.
IO…ERR Input/Output Fault Detected on selected input.
FULL Link Capacity Full – Combined maximum bandwidth has been reached.
PSWD Password Blocked.
MON Input channel set for monitoring output mode – VID8.

The video standard will be displayed from the list below:

1080I-60	**1080P-23.98**	**1080P-59.94**
1080I-59.94	**1080P-25**	**ASI**
1080I-50	**1080P-30**	**525I**
1035I-60	**1080P-29.97**	**525I-SDTI**
1035I-59.94	**720P-60**	**625I**
1080I-48	**720P-59.94**	**625I-SDTI**
1080I-47.96	**720P-50**	**UNKNOWN**
1080P-24	**1080P-60**	**LOS(signal loss)**

4.2.3. Displaying the Transmit Power

The 7707VT-8-HS can display the currently utilized transmit power from the XFP module in (dBm). To display the output power, select the **STAT** menu item in level 1, use the shaft encoder to display the desired selection (**TXP**) and press the shaft encoder to select and display it:

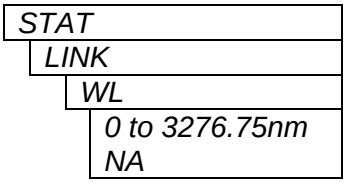


The following indications are available:

0 to -30dBm	Optical output power
NA	Unavailable (XF pluggable XFP module not detected)

4.2.4. Displaying the Nominal Wavelength

The 7707VT-8-HS can display the nominal wavelength from the XFP module in (nm). To display the nominal wavelength, select the **STAT** menu item in level 1, use the shaft encoder to display the desired selection (**WL**) and press the shaft encoder to select and display it:

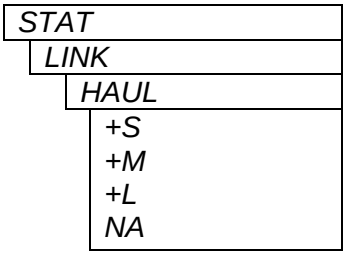


The following indications are available:

0 to 3276.75nm	Optical output wavelength
NA	Unavailable (pluggable XFP module not detected)

4.2.5. Displaying the Link Distance Option

The 7707VT-8-HS can display the XFP modules link distance option. To display the distance option, select the **STAT** menu item in level 1, use the shaft encoder to display the desired selection (**HAUL**) and press the shaft encoder to select and display it:



The following indications are available:

+S	Standard-Haul Option
+M	Medium-Haul Option
+L	Long-Haul Option
NA	Unavailable (pluggable XFP module not detected)

4.2.6. Displaying the Link Capacity Usage

The 7707VT-8-HS can display the amount of bandwidth the link is using. To display the link capacity usage, select the **STAT** menu item in level 1, use the shaft encoder to display the desired selection (**USE**) and press the shaft encoder to select and display it:

STAT
- *LINK*
  - *USE*
    - *0% to 100%*

The following indications are available:

0% to 100% Percentage value of currently used bandwidth

4.2.7. Displaying the Firmware Version

The **VER** option displays the card's current firmware version. To display the firmware version, select the **STAT** menu item in menu level 1 then turn the shaft encoder to display the **VER** option and press the shaft encoder to select it. The firmware version will scroll across the display.

STAT
- *VER*
  - *VER xx BLD xxx*

The following is an example of the firmware version.

For example: **VER 1.0 BLD 067**

4.2.8. Controlling Monitoring Video Output

The **MON** menu item allows the user to control which input video signal (**VID 1** through **VID7**) will be passed through to the Input channel 8 output on the 7707VT-8-HS. To select the output signal, select the **CTRL** menu item in menu level 1, use the toggle switch to display the **MON** option and press the pushbutton to select it.

CTRL
- *MON*
  - *VID1*
  - *VID2*
  - *VID3*
  - *VID4*
  - *VID5*
  - *VID6*
  - *VID7*
  - *USED*
  - *OFF*

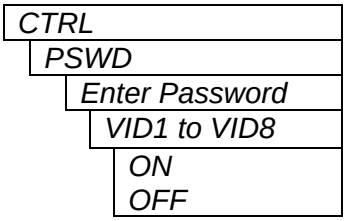
The possible selections are as follows:

VID1 Video input channel 1 signal will be available at the output
VID2 Video input channel 2 signal will be available at the output
VID3 Video input channel 3 signal will be available at the output
VID4 Video input channel 4 signal will be available at the output
VID5 Video input channel 5 signal will be available at the output
VID6 Video input channel 6 signal will be available at the output
VID7 Video input channel 7 signal will be available at the output
USED Video input exists at channel 8 and will be used for transport
OFF Video monitoring off

4.2.9. Password Protection for Channel Blocking

The **PSWD** menu item allows the user to set the channel blocking for each of the individual video inputs. This function is password protected. To enter the menu, use the shaft encoder to select **CTRL** in level 1 of the menu. Use the shaft encoder to display **PSWD** and push the shaft encoder to select it. By turning the shaft encoder, enter the correct password (Default **7154**).

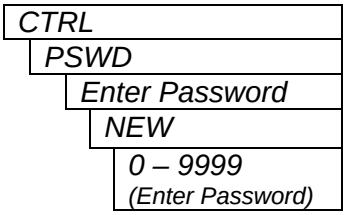
After the correct password is entered, turn the shaft encoder to select **VID1** through **VID8** and **NEW**. Pushing on the shaft encoder when each channel is shown, will open the selection of **ON** (Enable Channel) or **OFF** (Block Channel) for that particular channel.



The following indications are available:

ON Enables the selected video channel.
OFF Blocks the selected video channel.

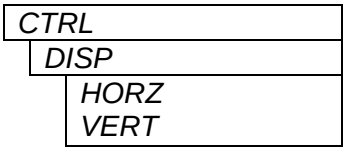
The user can set a new password by selecting the NEW option from the menu.



Selecting **NEW** rather than a channel will allow the user to define a password (**0-9999**).

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

The display option allows the user to set a horizontal or vertical orientation for the card edge display messages. To set the display orientation, select the **CTRL** menu item in menu level 1, use the shaft encoder to display the **DISP** menu selection and use the pushbutton to select it. Use the toggle switch to change between **HORZ** and **VERT** and press the shaft encoder to make your selection.



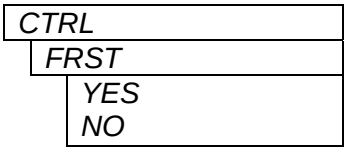
The possible selections are as follows:

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

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

4.2.11. Resetting Factory Defaults

The **FRST** menu option will return the 7707VT-8-HS to factory defaults. To return all settings to factory defaults, select the **CTRL** menu item in menu level 1, use the shaft encoder to display the **FRST** menu selection and use the pushbutton to select it. Use the shaft encoder to change between **YES** and **NO**, then press the encoder to make your selection.



The possible selections are as follows:

YES Accept: Return all card settings to factory default.

NO Abort: Retain current settings.

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 location 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 the 7707VT-8-HS 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 by the power supply LEDs or the frame's Fault Tally output but will only be indicated by the local fault indicator on the card itself.

5.2. CONFIGURING THE MODULE FOR FIRMWARE UPGRADES

UPGRADE: The UPGRADE jumper is used when firmware upgrades are being done to the card. For normal operation, this jumper should be installed in the RUN position. See the *Upgrading Firmware* section of this manual for more information.

To upgrade the 7707VT-8-HS's firmware, begin by pulling the module 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 (see Figure 4-1). 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. *VISTA*LINK® REMOTE MONITORING/CONTROL

6.1. WHAT IS *VISTA*LINK®?

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 *Vista*LINK® enabled fiber optic products.

2. Managed devices (such as 7707VT-8-HS and 7707VR-8-HS 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 *Vista*LINK® network, see the 7700FC Frame Controller chapter.

6.2. *VISTA*LINK® MONITORED PARAMETERS

The following parameters can be remotely monitored through the *Vista*LINK® interface.

Parameter	Description
Video Status	Indicates video status and video input standard
Link Transmit Power	Indicates link transmit power
Link Transmit Wavelength	Indicates link transmit wavelength
Link Distance Option	Indicates link distance option
Link Capacity Usage	Indicates link capacity usage

Table 6–1: *Vista*LINK® Monitored Parameters

6.3. *VISTA*LINK® CONTROLLED PARAMETERS

The following parameters can be remotely controlled through the *Vista*LINK® interface.

Parameter	Description
Controls VID8 Monitor Output	Controls VID8 Monitor Output
Channel Protection	Enable or Disable Channel Password Protection
Channel Protection Password	Sets the channel protection password

Table 6–2: *Vista*LINK® Controlled Parameters

6.4. *VISTA*LINK® TRAPS

The following traps can be remotely reported through the *Vista*LINK® interface.

Trap	Description
Slot Error Status	Triggers when there is a slot error
XFP Error Status	Triggers when there is an XFP error
Laser Error Status	Triggers when there is a laser error
Video [1 to 8] LOS Status	
Video [1 to 8] IO Status	
Video [1 to 8] Capacity Full Status	
Video [1 to 8] Bit-Error Status	

Table 6–3: *Vista*LINK® Traps