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## TABLE OF CONTENTS

1.	OVERVIEW .....	1
2.	INSTALLATION .....	2
2.1.	CARE AND HANDLING OF OPTICAL FIBER.....	3
3.	SPECIFICATIONS .....	4
3.1.	OPTICAL INPUT.....	4
3.2.	SERIAL VIDEO OUTPUTS.....	4
3.3.	SERIAL MONITORING OUTPUT .....	4
3.4.	ELECTRICAL .....	4
3.5.	PHYSICAL .....	4
4.	STATUS INDICATORS AND DISPLAYS .....	5
4.1.	STATUS INDICATOR LEADS .....	5
4.2.	DOT-MATRIX DISPLAY / CARD STATUS AND CONTROLS .....	6
4.2.1.	Display of Warning Status Indications.....	8
4.2.2.	Displaying the Video Standard.....	8
4.2.3.	Displaying the Received Power.....	9
4.2.4.	Displaying the Link Distance Option .....	9
4.2.5.	Displaying the BER (Bit-Error Rate) .....	9
4.2.6.	Displaying the 7707VT-8-HS Companion Transmitter Status .....	10
4.2.7.	Displaying the Firmware Version.....	10
4.2.8.	Setting Output Type on Loss of Input.....	10
4.2.9.	Controlling Monitoring Video Output .....	11
4.2.10.	Password Protection for Channel Blocking .....	11
4.2.11.	Setting the Orientation of the Text on the Card Edge Display.....	12
4.2.12.	Resetting Factory Defaults .....	12
5.	JUMPERS AND LOCAL CONTROLS .....	13
5.1.	SELECTING WHETHER LOCAL FAULTS WILL BE MONITORED BY THE GLOBAL FRAME STATUS .....	13
5.2.	CONFIGURING THE MODULE FOR FIRMWARE UPGRADES .....	13
6.	VISTALINK® REMOTE MONITORING/CONTROL.....	14
6.1.	WHAT IS VISTALINK®?.....	14
6.2.	VISTALINK® MONITORED PARAMETERS.....	14
6.3.	VISTALINK® CONTROLLED PARAMETERS.....	15
6.4.	VISTALINK® TRAPS.....	15

**Figures**

Figure 1-1: 7707VR-8-HS Block Diagram .....	1
Figure 2-1: 7707VR-8-HS Rear Panel .....	2
Figure 4-1: Location of Status Indicators and Jumpers .....	5
Figure 4-2: Card Edge Menu Structure .....	7

**Tables**

Table 6-1: <i>VistaLINK</i> ® Monitored Parameters .....	14
Table 6-2: <i>VistaLINK</i> ® Controlled Parameters .....	15
Table 6-3: <i>VistaLINK</i> ® Traps .....	15

## REVISION HISTORY

<u>REVISION</u>	<u>DESCRIPTION</u>	<u>DATE</u>
1.0	First Release	Apr 08
1.1	Added card edge controls information to section 4.2. Updated menu structure format throughout 4.2.1 to 4.2.12. Updated features & technical specs.	Oct 08
1.2	Correction to features section	Oct 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.**

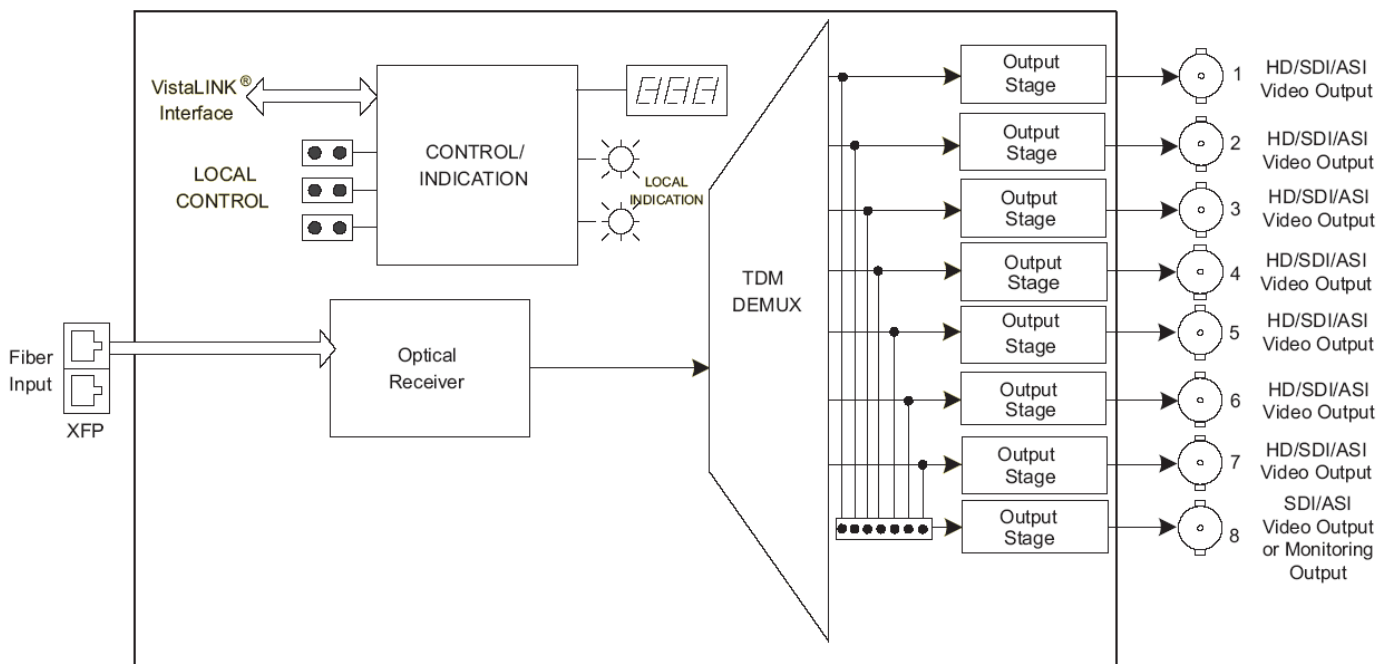
## 1. OVERVIEW

The 7707VR-8-HS is a *VistaLINK*® enabled fiber receiver for seven HD-SDI signals, eight SDI/DVB-ASI signals, or combinations thereof. This module operates with a companion 7707VT-8-HS, to reverse the Time Domain Multiplexing (TDM) process and restore the 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 *VistaLINK*®.

### Features:

- Single card TDM multiplexer for 7 HD-SDI or 8 SDI-SDI/DVB-ASI signals
- Independent signal outputs unaffected by loss of any other HD, SDI, SDTi or DVB-ASI input feed
- Transparently passes embedded AES or any other data in the horizontal or vertical ancillary data space
- Main module fully hot-swappable from front of frame
- Supports single-mode and fiber optic cable
- Monitoring output of any input
- Accepts any wavelength in the 1310nm to 1550nm range
- Female LC Duplex Connector
- Comprehensive signal and card status monitoring via four digit card edge display or remotely through SNMP and *VistaLINK*®
- *VistaLINK*® capability is available when modules are used with the 3RU 7700FR-C and 350FR frame and a 7700FC *VistaLINK*® Frame Controller module in slot 1 of the frame
- 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: 7707VR-8-HS Block Diagram**

## 2. INSTALLATION

The 7707VR-8-HS 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 section 3 of the 7700FR manual chapter.

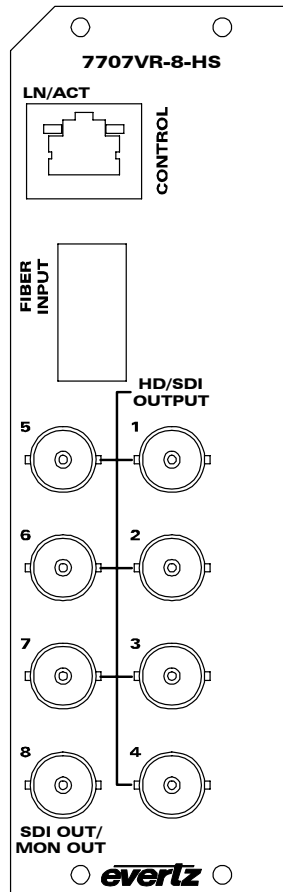


Figure 2-1: 7707VR-8-HS Rear Panel

- FIBER INPUT:** LC Duplex female connector. This wide range input accepts optical wavelengths of 1270nm to 1610nm, accommodating standard, CWDM or DWDM transmission schemes.
- CONTROL:** RJ-45 Ethernet connection for SNMP monitoring and control. Module possesses local SNMP agent
- HD/SDI OUTPUTS:** Seven BNC outputs 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.

**SDI OUT /MON OUT:** One BNC output, configurable as the channel 8 SDI Output or as a monitoring output for any one of the seven HD/SDI outputs, selectable via card-edge or *VistaLINK*<sup>®</sup> controls. Compatible with HD-SDI (SMPTE 292M), SD-SDI (SMPTE 259M-C), SDTi (SMPTE 305.2M) or EN500083-9 (DVB-ASI) standards.



**NOTE: Only a single port of the XFP module is in use. This port corresponds to the location of the “Fiber Input” label.**

## 2.1. CARE AND HANDLING OF OPTICAL FIBER



**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 chapter in the front of the binder.

### 3. SPECIFICATIONS

#### 3.1. OPTICAL INPUT

Number of Inputs:	1
Connector:	Female LC Duplex
Return Loss:	>12dB
Operating Wavelength:	1310nm to 1550nm
Maximum Input Power	
Standard (+S) Receiver:	-1dBm
High Sensitivity (+H) Receiver:	-7dBm
Optical Sensitivity	
Standard (+S) Receiver:	-14dBm
High Sensitivity (+H) Receiver:	-22dBm

#### 3.2. SERIAL VIDEO OUTPUTS

Number of Outputs:	8
Standards:	SMPTE 292M, SMPTE 259M-C, DVB-ASI
Connector:	BNC per IEC 61169-8 Annex A
Signal Level:	800mV (nominal)
DC Offset:	0V $\pm$ 0.5V
Rise and Fall Time	
1.485Gb/s:	<270ps
270Mb/s:	900ps nominal
Overshoot:	< 10% of amplitude
Return Loss:	> 12dB to 1.5 Gb/s
Alignment Jitter:	< 0.2 UI

#### 3.3. SERIAL MONITORING OUTPUT

Number of Outputs:	1 (dual purpose I/O from output 8)
Connector:	IEC 61169-8 Annex A

#### 3.4. ELECTRICAL

Voltage:	+12V DC
Power:	20 W
EMI/RFI:	Complies with FCC regulations for class A devices Complies with EU EMC directive

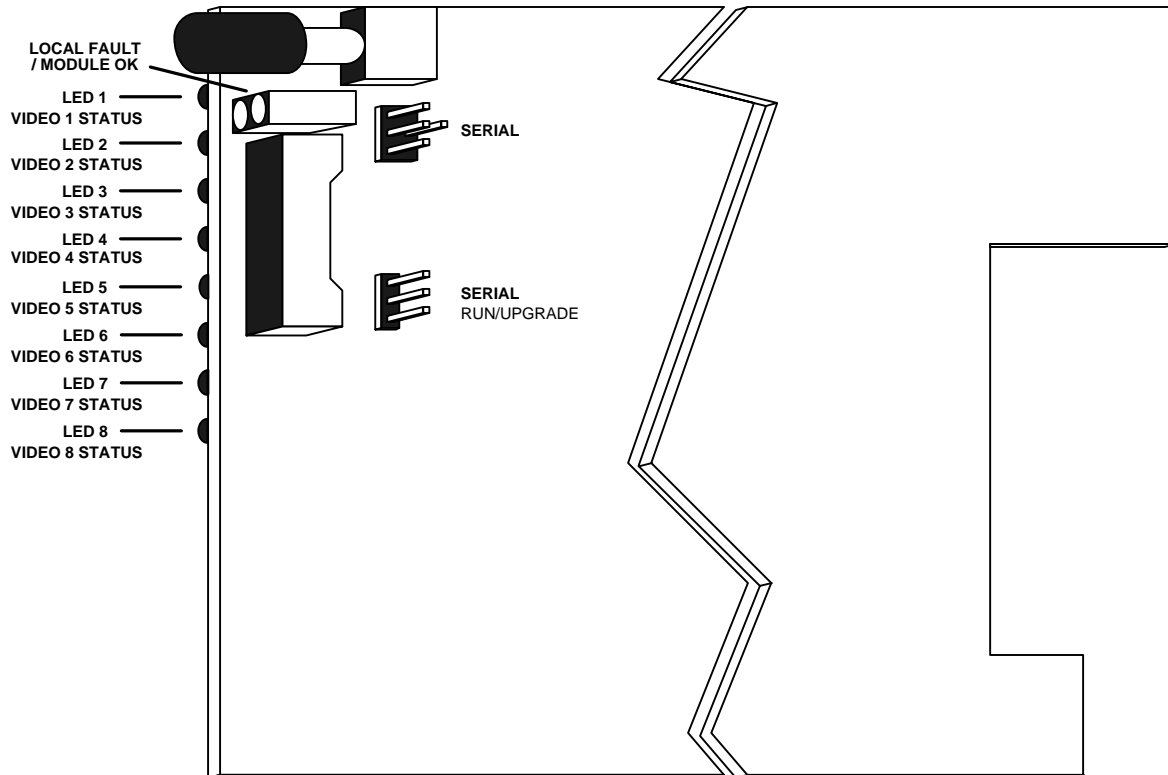
#### 3.5. PHYSICAL

<b>7700 or 7701 frame mounting</b>	
Number of slots:	2



## 4. STATUS INDICATORS AND DISPLAYS

The 7707VR-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 and Jumpers**

### 4.1. STATUS INDICATOR LEDES

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

- MODULE OK:** This Green LED indicates good module health. It will be ON while there is no Link, XFP, card-slot or power faults.
  
- LOCAL FAULT:** This Red LED will illuminate when a fault condition is detected. Possible fault conditions include Link, 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 Figure 4-1).

On the edge of the 7707VR-8-HS there are 8 small multi-coloured LEDs that indicate the status of video signals from the companion 7707VT-8-HS transmitter.

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

**VIDEO STATUS:**     **GREEN** indicates the presence of a valid signal on the corresponding channel.

**YELLOW** indicates that the corresponding channel has been password-blocked (via CTRL/PSWD men item).

**OFF** indicates a signal loss of signal condition.

## **4.2. DOT-MATRIX DISPLAY / CARD STATUS AND CONTROLS**

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

You can use the toggle switch to move up and down the list of available parameters to adjust. To adjust any parameter, use the toggle switch to move up or down to the desired parameter and press the pushbutton. Using the toggle switch, adjust the parameter to its desired value. If the parameter is a numerical value, the number will increase if you push up on the toggle switch and decrease if you push down on the toggle switch. If the parameter contains a list of choices, you can cycle through the list by pressing the toggle switch in either direction. The parameter values are changed as you cycle through the list.

When you have stopped at the desired value, depress the pushbutton. This will return to the parameter select menu item you are setting (the display shows the parameter name you were setting). To change another parameter, use the toggle switch to select other parameters. If neither the toggle switch nor pushbutton is operated for several seconds the card edge control will exit the menu system and return to an idle state.

On all menus, there is an extra selectable item: *BACK*. Selecting *BACK* will take you to the previous menu (the one that was used to get into the current menu). On the main menu, *BACK* will both take the user to the normal operating mode (indicated by the moving line on the card edge display).

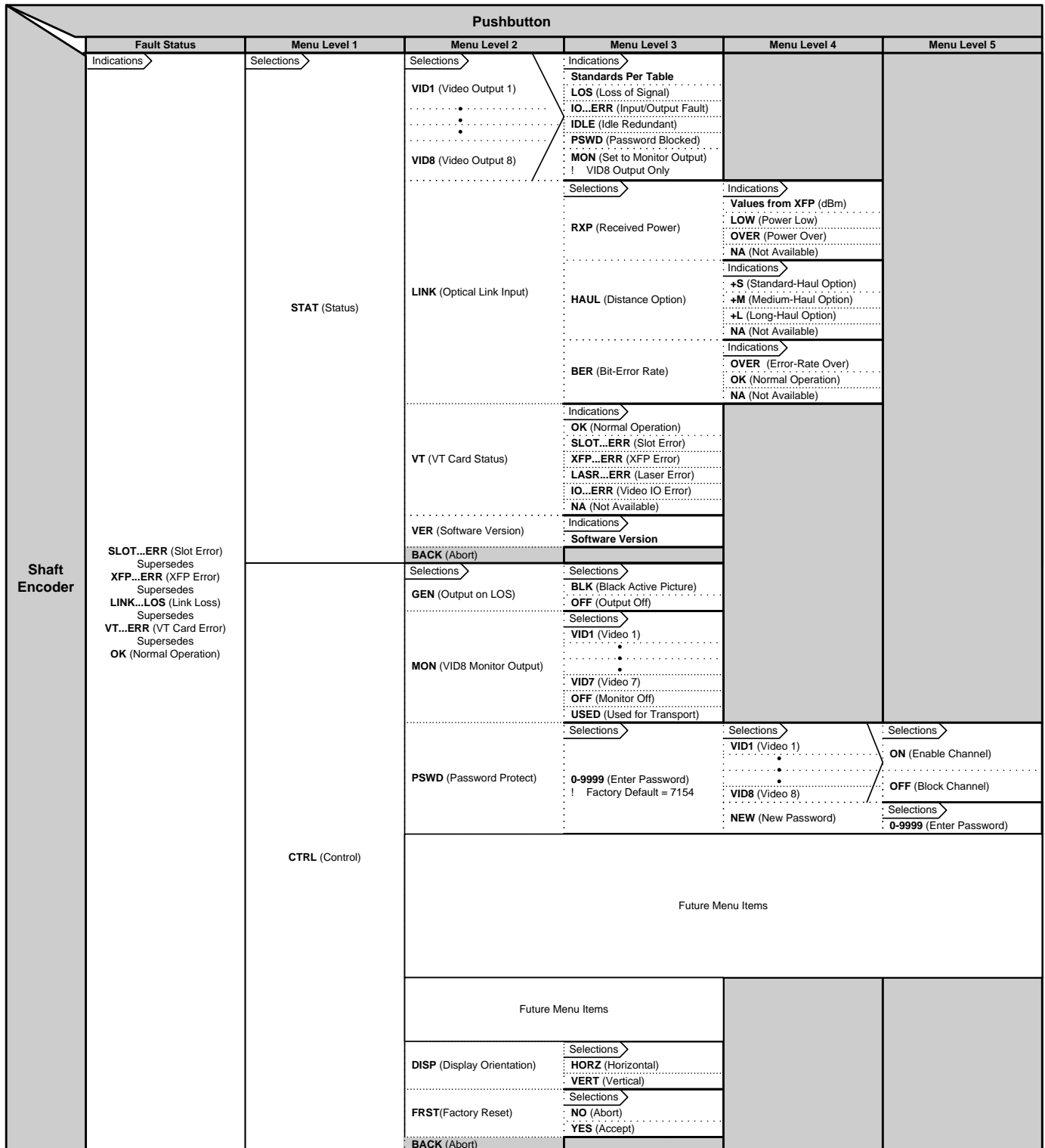


Figure 4-2: Card Edge Menu Structure



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:

<b>OK</b>	Normal operation.
<b>SLOT...ERR</b>	Slot Error Warning – A compatible rear-plate is not detected. Flashing indication alternates between <b>SLOT</b> and <b>ERR</b> .
<b>XFP...ERR</b>	XFP Module Error Warning – A compatible XFP module is not detected. Flashing indication alternates between <b>XFP</b> and <b>ERR</b> .
<b>LINK...LOS</b>	Link Error Warning – A valid link input is not detected. Flashing indication alternates between <b>LASR</b> and <b>LOS</b> .
<b>VT...ERR</b>	VT Error Warning – An error condition has been flagged at the companion 7707VT-8-HS module. Flashing indication alternates between <b>VT</b> and <b>ERR</b> .

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 7707VR-8-HS detects the video standard of the signals present at its outputs. 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. 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)

<b>STAT</b>
VID1 – VID8
LOS
IO...ERR
IDLE
PSWD
MON

<b>LOS</b>	Signal loss
<b>IO...ERR</b>	Output Fault Detected on selected output
<b>IDLE</b>	Idle Redundant (future use)
<b>PSWD</b>	Password Blocked
<b>MON</b>	Input channel set for monitoring output mode – VID8

### 4.2.3. Displaying the Received Power

The 7707VR-8-HS can display the received power from the XFP module in (dBm). To display the input power, select the **STAT** menu item in level 1, next select **LINK** in level 2, use the shaft encoder to display the desired selection (**RXP**) and press the shaft encoder to select it to display:

STAT	0 to -30dBm	Optical Input Power.
LINK		
RXP		
VALUES FROM XFP LOW OVER NA		
	LOW	Optical Input power is below normal operating conditions.
	OVER	Optical Input power exceeds recommended operating conditions.
	NA	Unavailable (pluggable XFP module not detected).

### 4.2.4. Displaying the Link Distance Option

The 7707VR-8-HS can display the XFP modules link distance option. To display the distance option, select the **STAT** menu item in level 1, next select **LINK** in level 2, use the shaft encoder to display the desired selection (**HAUL**) and press the shaft encoder to select it to display:

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

### 4.2.5. Displaying the BER (Bit-Error Rate)

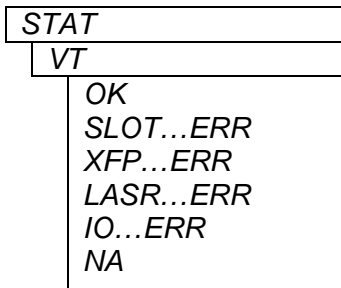
The 7707VR-8-HS can display the Bit-Error Rate (BER) status of the optical input. To display the BER status, select the **STAT** menu item in level 1, next select **LINK** in level 2, use the shaft encoder to display the desired selection (**BER**) and press the shaft encoder to select and display it.

STAT	OVER	Detected Bit-Error Rate exceeds 10 <sup>-12</sup>
LINK		
BER		
OVER OK NA		
	OK	Normal Operation
	NA	Unavailable

A Bit-Error Rate (BER) of  $10^{-12}$  will cause **OVER** to be indicated. Since the BER must be calculated over an extended period of time, to produce a timely indication this will return to **OK** unless a BER of  $10^{-11}$  is sustained. If the BER falls between these two thresholds, then **OVER** will be indicated intermittently at a minimum rate of once per 3 minutes.

#### 4.2.6. Displaying the 7707VT-8-HS Companion Transmitter Status

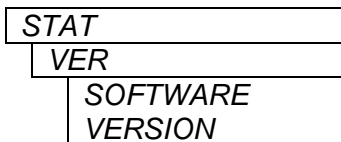
The 7707VR-8-HS can display the status of the 7707VT-8-HS transmitter. To display the transmitter status, select the **STAT** menu item in level 1, next select **VT** in level 2.



<b>OK</b>	Card is functioning properly.
<b>SLOT...ERR</b>	Slot Error Warning – indication alternates between <b>SLOT</b> and <b>ERR</b> .
<b>XFP...ERR</b>	XFP Module Error Warning – Flashing indication alternates between <b>XFP</b> and <b>ERR</b> .
<b>LASR...ERR</b>	Laser Error Warning – Flashing indication alternates between <b>LASR</b> and <b>ERR</b> .
<b>IO...ERR</b>	Video IO Error – indication alternates between <b>IO</b> and <b>ERR</b> .
<b>NA</b>	Unavailable.

#### 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 use the toggle switch to display the **VER** option and press the pushbutton to select it. The firmware version will scroll across the display.



For example: **VER 1.0 BLD 067**

#### 4.2.8. Setting Output Type on Loss of Input

The 7707VR-8-HS can provide a valid black or totally muted output signal upon loss of video to any one or more inputs on the companion 7707VT-8-HS. In the case where there is loss of optical input, all of the outputs will be either valid black or muted. In valid black mode, the signal standard presented will be the same as the last valid input seen on that particular channel. The **GEN** menu item allows selection of either valid black or muted output. To set this mode, select the **CTRL** menu item in menu level 1, use the shaft encoder to display the **GEN** option and press the shaft encoder to select it. Use the toggle switch to select either **BLK** (valid black) or **OFF** (mute). The **GEN** settings are as follows:

CTRL
GEN
BLK
OFF

**BLK** Valid black output on loss of input.  
**OFF** Output muted on loss of input.

#### 4.2.9. 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 Output channel 8 connector on the 7707VR-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 shaft encoder to select it. The possible selections are as follows:

CTRL
MON
VID1 – VID7
OFF
USED

**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.  
**OFF** Video monitoring off.  
**USED** Video input exists at channel 8 and will be used for transport.

#### 4.2.10. Password Protection for Channel Blocking

The **PSWD** menu item allows the user to set the channel blocking of 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).

CTRL
PSWD
0-9999
VID1 – VID8
ON
OFF

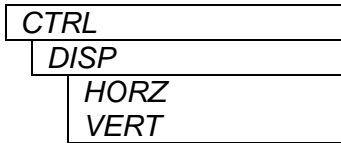
After the correct password is entered, turn the shaft encoder to select **VID1** through **VID8** and **NEW**. Pushing on the shaft encoder when each channel is shown will open the selection of **ON** (Enable Channel) or **OFF** (Block Channel) for that particular channel.

CTRL
PSWD
0-9999
NEW
0-9999

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

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

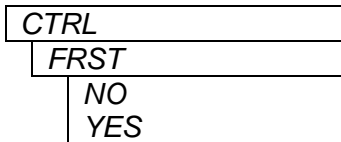
The **DISP** display option allows the user to set a horizontal or vertical orientation for the card edge display messages. To set the display orientation, select the **CTRL** menu item in menu level 1, use the toggle switch to display the **DISP** menu selection and use the pushbutton to select it.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



- |             |   |
|-------------|---|
| <b>HORZ</b> | Horizontal display used when the module is housed in the 1 rack unit 7701FR frame or the stand-alone enclosure. |
| <b>VERT</b> | Vertical display used when the module is housed in the 3-rack unit 7700FR frame.                                |

#### 4.2.12. Resetting Factory Defaults

The **FRST** menu option will return the 7707VR-8-HS to factory defaults. To return all settings to factory defaults, select the **CTRL** menu item in menu level 1, use the toggle switch to display the **FRST** menu selection and use the pushbutton to select it. Use the toggle switch to change between **YES** and **NO**. Press the push button to make your selection.



- |            |        |
|------------|--------|
| <b>NO</b>  | Abort  |
| <b>YES</b> | Accept |

The user can select the **BACK** menu item to return to menu level 1.



## 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 the 7707VR-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 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 7707VR-8-HS's firmware, begin by pulling 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 (see Figure 3). 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 7707VT-8-HS and 7707VR-8-HS 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
Video Status	Indicates video status and video input standard.
Link Receive Power	Indicates link received power.
Link Bit-Error Rate	Indicates link bit-error rate status.
Link Distance Option	Indicates link distance option.
7707VT-8-HS Card Status	Indicates transmitter companion card status.

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>Generated Video on LOS</b>	Controls Generated Video on loss.
<b>VID8 Monitor Output</b>	Controls VID8 Monitor Output.
<b>Channel Protection</b>	Controls Channel Protection.
<b>Channel Protection Password</b>	Set Channel Protection Password.
<b>Optical Power Alarm Threshold</b>	Controls Optical Power Alarm Threshold.

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

### 6.4. VISTALINK® TRAPS

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

Trap	Description
<b>Slot Error Status</b>	Triggers when there is a slot error.
<b>XFP Error Status</b>	Triggers when there is an XFP error.
<b>VT Error Status</b>	Triggers when there is a VT error.
<b>Laser Error Status</b>	Triggers when there is a laser error.
<b>Video [1 to 8] LOS Status</b>	
<b>Video [1 to 8] IO Status</b>	
<b>Link Bit-Error Rate Status</b>	
<b>Optical Power Below Threshold</b>	

**Table 6–3: *VistaLINK*® Traps**

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