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REVISION HISTORY

REVISION	DESCRIPTION	DATE
1.0	Original Version	Feb 06
1.1	Added “GEN” menu item	Feb 07
1.2	Added card edge controls information to section 4.2. Updated menu structure format throughout 4.2.1 to 4.2.9. Updated technical specs, block diagram & rear plate	Oct 08
1.3	Added delay specification to section 3.	Oct 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-4-HS DWDM cards and any 7707VR-4-HS series cards directly with a short fiber optic cable. The 7707VT-4-HS DWDM card produces +7dBm of power which will damage the receiver if connected directly.

Do not hook up the 7707VT-4-HS cards that output more than -7dBm of power (see 7707VT-4-HS specifications for output power of various laser types) and 7707VR-4-HS-H high sensitivity receiver cards directly with a short fiber optic cable. The 7707VT-4-HS cards that produce more than -7dBm of power will damage the receiver if connected directly.

1. OVERVIEW

The 7707VR-4-HS is a *Vista*LINK® –enabled fiber optic receiver for two HD-SDI signals; or one HD-SDI signal and three SDI/SDTi signals; or four SDI/SDTi signals. This single card module demultiplexes up to four input signals that have been Time Domain Multiplexed (TDM) by the companion 7707VT-4-HS Quad SDI/Dual HD-SDI Fiber Transmitter module.

The 7707VR-4-HS and companion 7707VT-4-HS will transparently pass embedded AES audio or any other data in the horizontal or vertical ancillary data space. Monitoring and control of card status and parameters is provided locally at the card edge or remotely via *Vista*LINK®.

Features:

- Single card TDM de-multiplexer for two HD-SDI signals, or one HD-SDI signal and three SDI/DVB-ASI signals, or four SDI/DVB-ASI signals
- Low jitter outputs
- Independent signal outputs unaffected by loss of any other HD, SDI or
- DVB-ASI input feed
- Transparently passes embedded AES or any other data in the horizontal or vertical ancillary data space
- Fully hot-swappable from front of frame
- Supports single-mode and multi-mode fiber optic cable
- Accepts any wavelength in the 1270nm to 1610nm range
- SC/PC, ST/PC, FC/PC connector options
- Comprehensive signal and card status monitoring via four digit card edge display or remotely through SNMP and *Vista*LINK®
- *Vista*LINK® capability is available when modules are used with the 3RU
- 7700FR-C or 350FR frame and a 7700FC *Vista*LINK® Frame Controller module in slot 1 of the frame
- 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

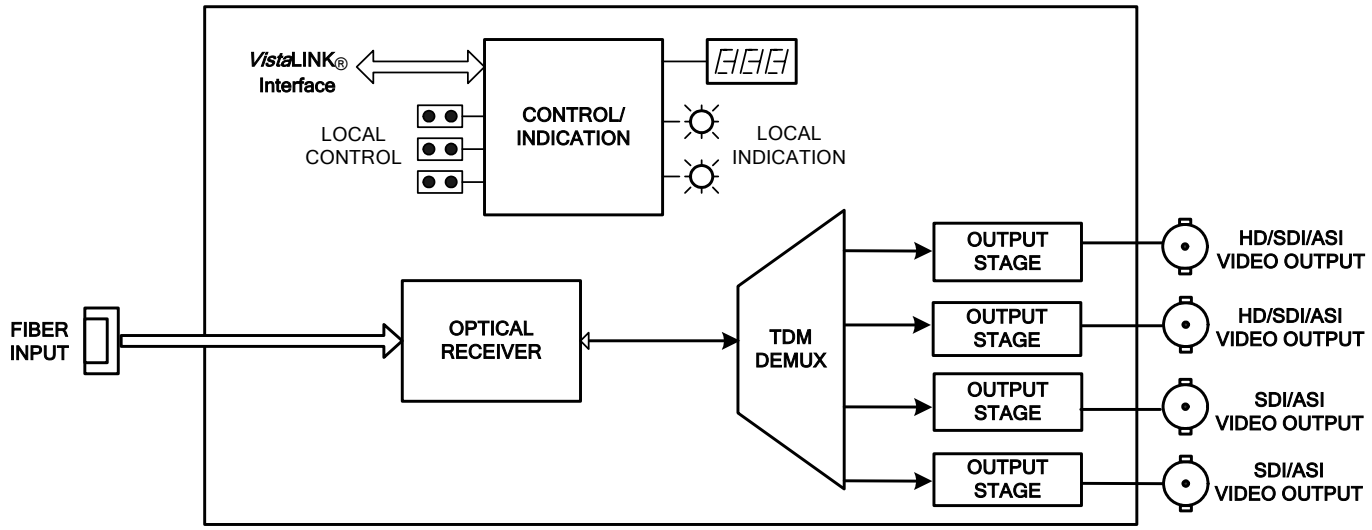

Figure 1-1: 7707VR-4-HS Block Diagram

2. INSTALLATION

The 7707VR-4-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 the 7700FR manual chapter, section 3.

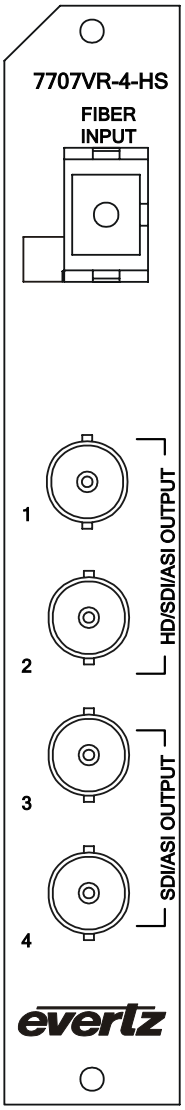

Figure 2-1: 7707VR-4-HS Rear Panel

OPTICAL INPUT: SC/PC, SC/PC with cover (shown), ST/PC or FC/PC female connector. This wide range input accepts optical wavelengths of 1270nm to 1610nm, accommodating standard, CWDM or DWDM transmission schemes.

Do not hook up the 7707VT-4-HS DWDM cards and any 7707VR-4-HS series cards directly with a short fiber optic cable. The 7707VT-4-HS DWDM card produces +7dBm of power which will damage the receiver if connected directly.

Do not hook up the 7707VT-4-HS cards that output more than -7dBm of power (see 7707VT-4-HS specifications for output power of various laser types) and 7707VR-4-HS-H high sensitivity receiver cards directly with a short fiber optic cable. The 7707VT-4-HS cards that produce more than -7dBm of power will damage the receiver if connected directly.

HD/SDI OUTPUTS: Two BNC connectors, one for each of the two independent, reclocked HD-SDI or SDI/SDTi video signals compatible with HD-SDI (SMPTE 292M), SD-SDI (SMPTE 259M-C) or SDTi (SMPTE 305.2M) standards.

SDI OUTPUTS: Two independent BNC connectors, one for each of the two independent, reclocked SDI/SDTi video signals compatible with SD-SDI (SMPTE 259M-C) or SDTi (SMPTE 305.2M) standards.

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. 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 chapter in the front of the binder.

3. SPECIFICATIONS

3.1. OPTICAL INPUT

Number of Inputs: 1
Connector: Female SC/PC, ST/PC or FC/PC
Return Loss: >25dB
Operating Wavelength: 1270nm to 1610nm
Maximum Input Power
Standard Version: -1dBm
-H Version: -8dBm
Optical Sensitivity
Standard Version: -20dBm
-H Version: -28dBm

3.2. SERIAL VIDEO OUTPUTS

Number of Outputs: 2 HD/SDI/DVB-ASI and 2 SDI/DVB-ASI video signals
Standard:
Outputs 1&2: SMPTE 292M, SMPTE 259M-C, DVB-ASI
Outputs 3&4: SMPTE 259M-C, DVB-ASI
Connector: 1 BNC per IEC 61169-8 Annex A
Signal Level: 800mV nominal
DC Offset: 0V ± 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
Wideband Jitter: < 0.2 UI

3.3. SYSTEM PERFORMANCE

Delay of Transmitter/Receiver Pair: <1.6ms

Delay is through a 1 meter length fiber cable between the transmitter/receiver modules.

3.4. ELECTRICAL

Voltage:	+12V DC
Power:	10 W
EMI/RFI:	Complies with FCC regulations for class A devices Complies with EU EMC directive

3.5. PHYSICAL

7700 or 7701 frame mounting
Number of slots: 1

4. STATUS INDICATORS AND DISPLAYS

The 7707VR-4-HS has 7 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 modes on the alphanumeric display. Figure 4-1 shows the locations of the indicators and pushbutton.

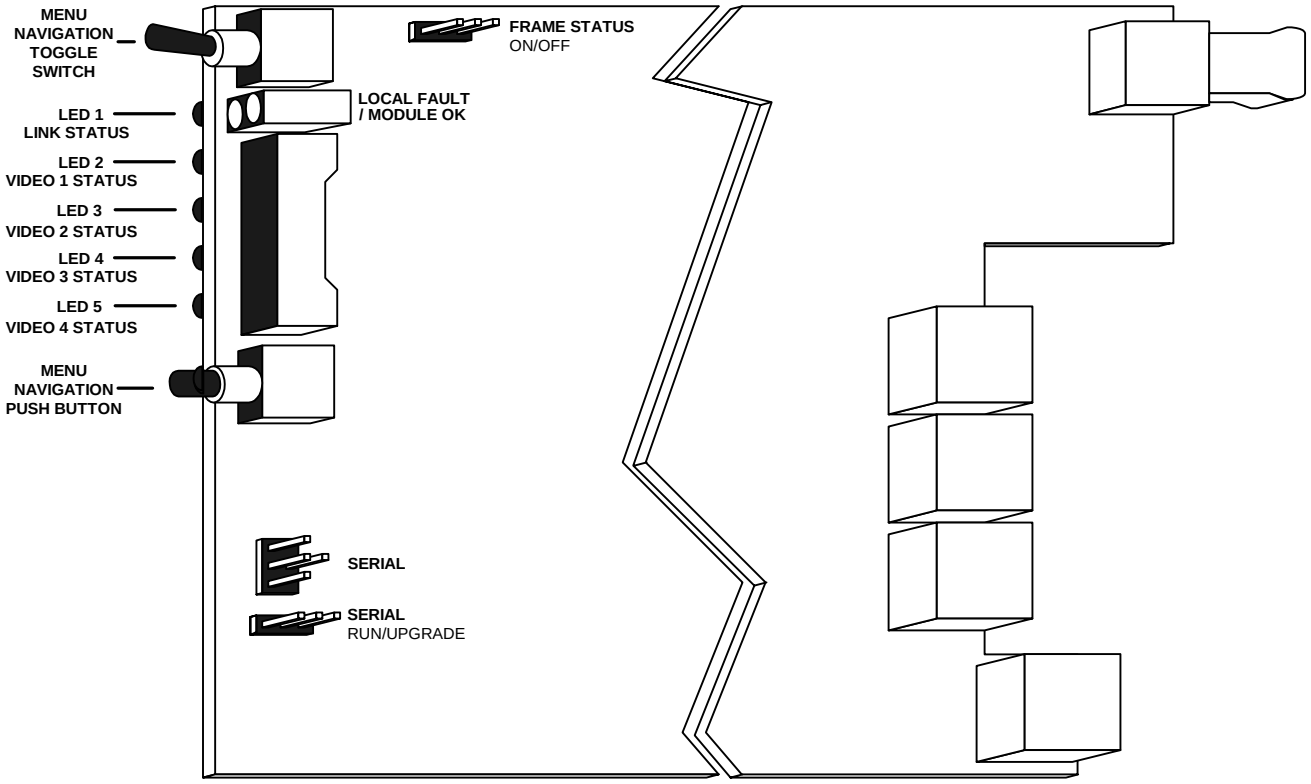

Figure 4-1: Location of Status Indicators and Jumpers

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, low optical power, or if a local internal power fault exists (i.e.: a blown fuse). Whether or not this LOCAL FAULT indication is reported to the frame may be selected by the FRAME STATUS jumper (see section 5.1).

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

On the edge of the 7707VR-4-HS there are five small multi-colour LEDs that indicate the status of video signals and condition of the optical link with the companion 7707VT-4-HS transmitter.

LINK STATUS: **Green** indicates the presence of a valid optical signal on the fiber input.
Red indicates the detection of bit errors in the optical input signal (when bit error detection is enabled – see section 4.2.6).
LED Off indicates signal loss on the fiber input.

VIDEO 1 STATUS: **Green** indicates the presence of a valid signal on channel 1.
LED Off indicates signal loss on channel 1.

VIDEO 2 STATUS: **Green** indicates the presence of a valid signal on channel 2.
LED Off indicates signal loss on channel 2.

VIDEO 3 STATUS: **Green** indicates the presence of a valid signal on channel 3.
LED Off indicates signal loss on channel 3.

VIDEO 4 STATUS: **Green** indicates the presence of a valid signal on channel 4.
LED Off indicates signal loss on channel 4.

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 pushbutton and toggle-switch are 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).

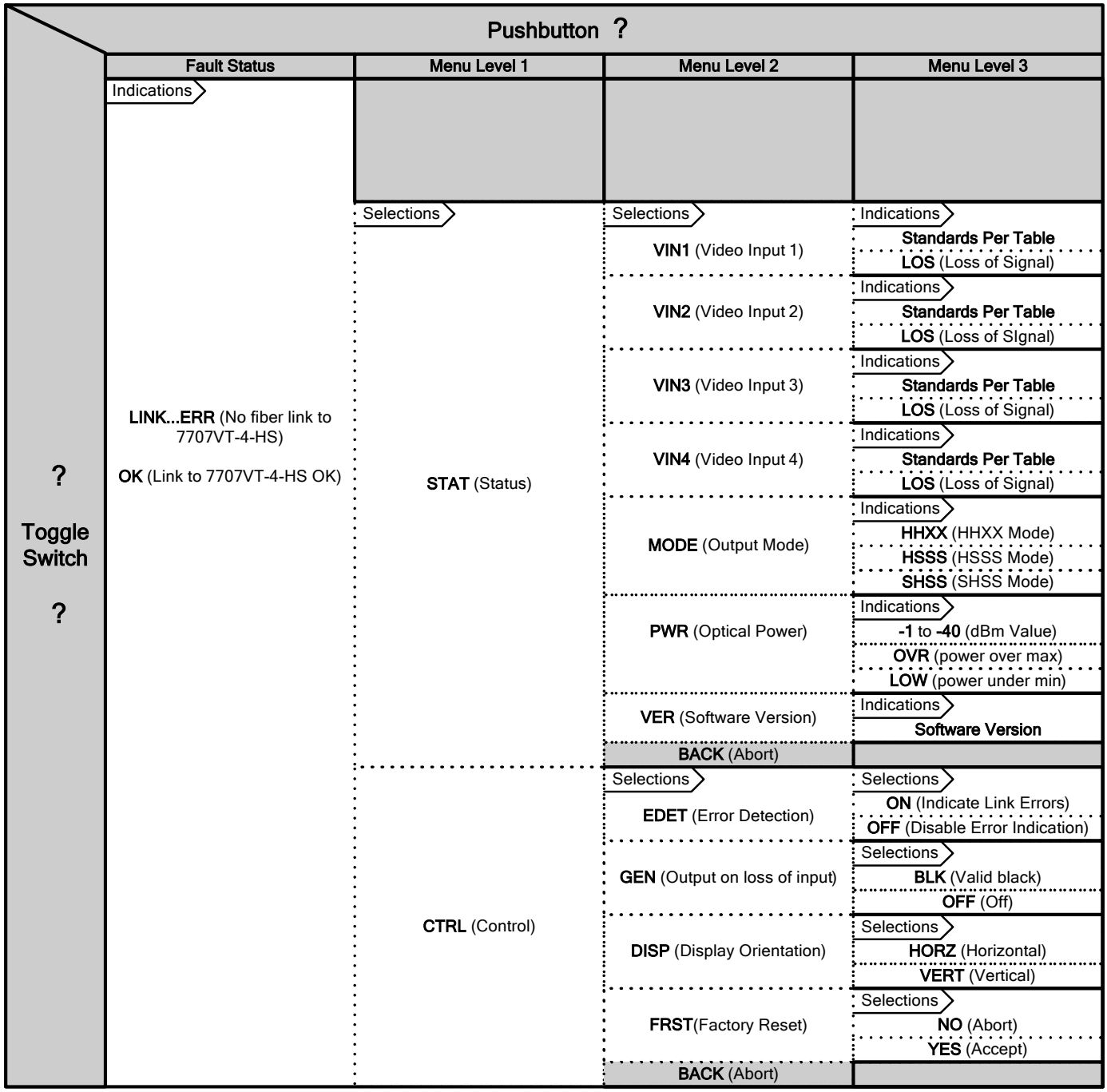

Figure 4-2: Card Edge Menu Structure

If a specific menu selection has a configuration value associated with it, then this may be changed using the toggle switch. 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 7707VR-4-HS top level, default display shows whether there is a valid optical connection with the companion 7707VT-4-HS. The display will indicate the following:

OK	A valid optical connection exists between the 7707VT-4-HS and 7707VR-4-HS
LINK…ERR	No valid optical link established between 7707VT-4-HS and 7707VR-4-HS. Flashing indication alternates between **LINK** and **ERR**.

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

4.2.2. Displaying the Video Standards

The 7707VR-4-HS detects the video standards of the signals present at its optical input. To display the video standards, select the **STAT** menu item in menu level 1, then use the toggle switch to display the desired video channel (from **VIN1** to **VIN4**) and press the pushbutton to select it. The video standard will be displayed from the list below:

1080i/60	**1080i/47.96**	**SDTI-P270**
1080i/59.94	**720p/60**	
1080i/50	**720p/59.94**	**LOS** (Loss of Signal)
1035i/60	**N270**	
1035i/59.94	**P270**	
1080i/48	**SDTI-N270**	

STAT
VIN1-VIN4
LOS

LOS Loss of Signal – A valid input is not detected.

4.2.3. Displaying the Video Output Mode

The output mode of the 7707VR-4-HS is determined automatically based on the composition of HD-SDI and SD-SDI video signals multiplexed and transmitted by the companion 7707VT-4-HS. To display the output mode, select the **STAT** menu item in menu level 1 then use the toggle switch to display the **MODE** option and press the pushbutton to select it. The possible modes and output signals are as follows:

Connector	HHXX	HSSS	SHSS
1	HD-SDI or SDI/SDTi	HD-SDI or SDI/SDTi	SDI/SDTi
2	HD-SDI or SDI/SDTi	SDI/SDTi	HD-SDI or SDI/SDTi
3	N/A	SDI/SDTi	SDI/SDTi
4	N/A	SDI/SDTi	SDI/SDTi

STAT *MODE* *HHXX* *HSSS* *SHSS*	**HHXX** HHXX Mode. **HSSS** HSSS Mode. **SHSS** SHSS Mode.

4.2.4. Displaying the Optical Power

The 7707VR-4-HS module can measure and display the input optical power over a range of -1dBm to –40dBm at increments of 1dBm for the standard version and -7dBm to –40dBm in 1dBm increments for the –H version. To display the input optical power, select the **STAT** menu item in menu level 1, and then use the toggle switch to display the **PWR** option and press the pushbutton to select it. The display will show one of the following:

STAT *PWR* *-1 to -40* *OVR* *LOW*	**-1 to –40** Optical input power within this range (Standard Version). **OVER** Indicates optical input power exceeding –1dBm for standard version and -7dBm for "–H" version. **LOW** Input optical power low (< -40 dBm). **(-7 to –40** Optical input power within this range (-H Version))

4.2.5. 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.

STAT *VER* *SOFTWARE VERSION*	For example: **VER 1.0 BLD 067**

4.2.6. Setting Input Error Detection

The 7707VR-4-HS can detect bit errors in the incoming optical signal. The **EDET** menu item turns this error detection on or off. When turned on, the Link Status Indicator will turn red and a trap value will be set (see section 6.4). To set the error detection mode, select the **CTRL** menu item in menu level 1, and then use the toggle switch to display the **EDET** option and press the pushbutton to select it. Use the toggle switch to select between **ON** and **OFF**.

CTRL *EDET* *ON* *OFF*	**ON** Link error detection is turned on. **OFF** Link error detection is turned off.

4.2.7. Setting Output Type on Loss of Input

The 7707VR-4-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-4-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, and then use the toggle switch to display the **GEN** option and press the pushbutton to select it. Use the toggle switch to select either **BLK** (valid black) or **OFF** (mute).

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

4.2.8. 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, and then use the toggle switch to display the **DISP** menu selection and use the pushbutton to select it. Use the toggle switch to change between **HOR** and **VERT**. Press the push button to make your selection.

CTRL *DISP* *HORZ* *VERT*	**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.

4.2.9. Resetting Factory Defaults

The **FRST** menu option will return the 7707VR-4-HS to factory defaults. To return all settings to factory defaults, select the **CTRL** menu item in menu level 1, and then 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.

CTRL *FRST* *NO* *YES*	**NO** Abort. **YES** Accept.

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-4-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-4-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 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 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. *VISTA*LINK® REMOTE MONITORING/CONTROL

6.1. WHAT IS *VISTA*LINK®?

*Vista*LINK® 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. *Vista*LINK® 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 *Vista*LINK® 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, *Vista*LINK® 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 7707VB-8-HS-OC192 and 7707VR-8-HS cards), each with a unique address (OID), communicate with the NMS through an SNMP Agent. Evertz *Vista*LINK® enabled 7700 series modules reside in the 3RU 7700FR-C MultiFrame and communicate with the manager via the 7700FC *Vista*LINK® 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 1, 2, 3, 4 Standard	A range of values describing the detected video standard (see section 4.2.2)
Video Output Mode	Indicates current video output mode (HHXX, HSSS or SHSS) (see section 4.2.3)
Optical Power	Indicates the optical power level, in dBm of the input signal (see section 4.2.4)

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
Input Error Detection	Enable or disable bit error detection on the input optical signal (see section 4.2.6).
Signal Output on Loss of Input	Allows the user to select valid black output, or muted output upon loss of input signal (see section 4.2.7).
Optical Power Alarm Threshold	Allows user to set the power threshold for the input optical power alarm trap.

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
Link Input Presence	Indicates the presence of a valid optical input signal from a companion 7707VT-4-HS (Reflects the state of the Link Status LED).
Video Input 1-4 Presence	Indicates the presence of valid input video signals within the multiplexed signal received from the companion 7707VT-4-HS (Reflects the state of the Video Status LEDs).
Link Input Bit Error Detection	Indicates the detection of bit errors in the incoming optical signal (when input error detection is enabled).
Optical Power Below Threshold	Indicates optical input signal below the low power level threshold setting.

Table 6–3: *Vista*LINK® Traps