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REVISION HISTORY

REVISION	DESCRIPTION	DATE
1.0	Preliminary Version	Jan 2005
1.1	Added 7707VAT-U-HD and updated laser warning	Aug 2005
1.2	Updated Menu and VistaLINK descriptions	Sept 2005
1.3	Added Video Lock Time Spec	Mar 2006
1.4	Added GEN and COAX menu descriptions	Nov 2008
1.5	Updated GEN and CLN menu items	Oct 2009
1.6	Updated block diagram	Nov 2009
1.7	Fixed typo in "Sample Rate Conversion" section	Jan 2010

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

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

1.   OVERVIEW

The 7707VAT-HD fiber transmitter extends one HD or SD digital video signal over a fiber optic link, accompanied by four AES audio signals. Audio signals are embedded into HD, SD, or SDTi video for optical transport. The 7707VAT-HD is designed to operate with a companion 7707VAR-HD receiver, to permit communication over distances up to 120Km, with minimum possible latency. The 7707VAT-U-HD has unbalanced audio connections and is identical to the 7707VAT-HD in all other respects.

Monitoring and control of card status and parameters is provided locally at the card-edge, or remotely via *Vista*LINK® capability.

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

7707VAT13-HD	1310 nm FP	-7dBm output, suitable for distances up to 50 Km
7707VAT15-HD	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.

7707VAT27-HD	1270 nm DFB
7707VAT29-HD	1290 nm DFB
7707VAT31-HD	1310 nm DFB
7707VAT33-HD	1330 nm DFB
7707VAT35-HD	1350 nm DFB
7707VAT37-HD	1370 nm DFB
7707VAT43-HD	1430 nm DFB
7707VAT45-HD	1450 nm DFB
7707VAT47-HD	1470 nm DFB
7707VAT49-HD	1490 nm DFB
7707VAT51-HD	1510 nm DFB
7707VAT53-HD	1530 nm DFB
7707VAT55-HD	1550 nm DFB
7707VAT57-HD	1570 nm DFB
7707VAT59-HD	1590 nm DFB
7707VAT61-HD	1610 nm DFB

There are several versions with built in isolators specifically suited to dense wave division multiplexing (DWDM) applications. The DWDM versions are suitable for distances >50 Km @ 1.5 Gb/s (for DWDM applications contact factory).

7707VATDyyy-HD   DWDM DFB laser output, yyy – ITU channel number

The 7707VAT-HD 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:
- HD/SD video and AES audio conveniently presented in a single product.
- Provides embedding of audio and control signals into HD-SDI (SMPTE 292M), SD-SDI (SMPTE 259M-C), SDTi (SMPTE 305.2M).
- Audio sample rate conversion permits asynchronous input of 32KHz, 44.1KHz, or 48KHz AES, with up to 24-bit resolution.
- Audio sample rate conversion may be disabled to permit Dolby-E support.
- With sample rate conversion enabled, transport of audio signals is independent of video interruptions other than format change.
- Audio inputs automatically accept balanced or unbalanced AES without configuration.
- 7707VAT-U-HD has unbalanced audio connections.
- Selectable embedded audio groups and selectable input video cleaning provide flexibility.
- Comprehensive signal and status monitoring via four-digit card-edge display, or *Vista*LINK®.
- Monitoring of input video format, audio group availability, EDH or CRC errors, and signal strength.
- Optical output wavelengths of 1310nm, 1550nm, and up to sixteen CWDM wavelengths (ITU-T G.694.2 compliant).
- DWDM wavelengths also available (ITU-T G.694.1 compliant).
- Compatible with multi-mode and single-mode fiber
- SC/PC, ST/PC, or FC/PC fiber connector options.
- Fully hot-swappable from front of frame.
- *Vista*LINK® enabled for remote monitoring and control when installed in 7700FR-C frame with 7700FC *Vista*LINK® Frame Controller.
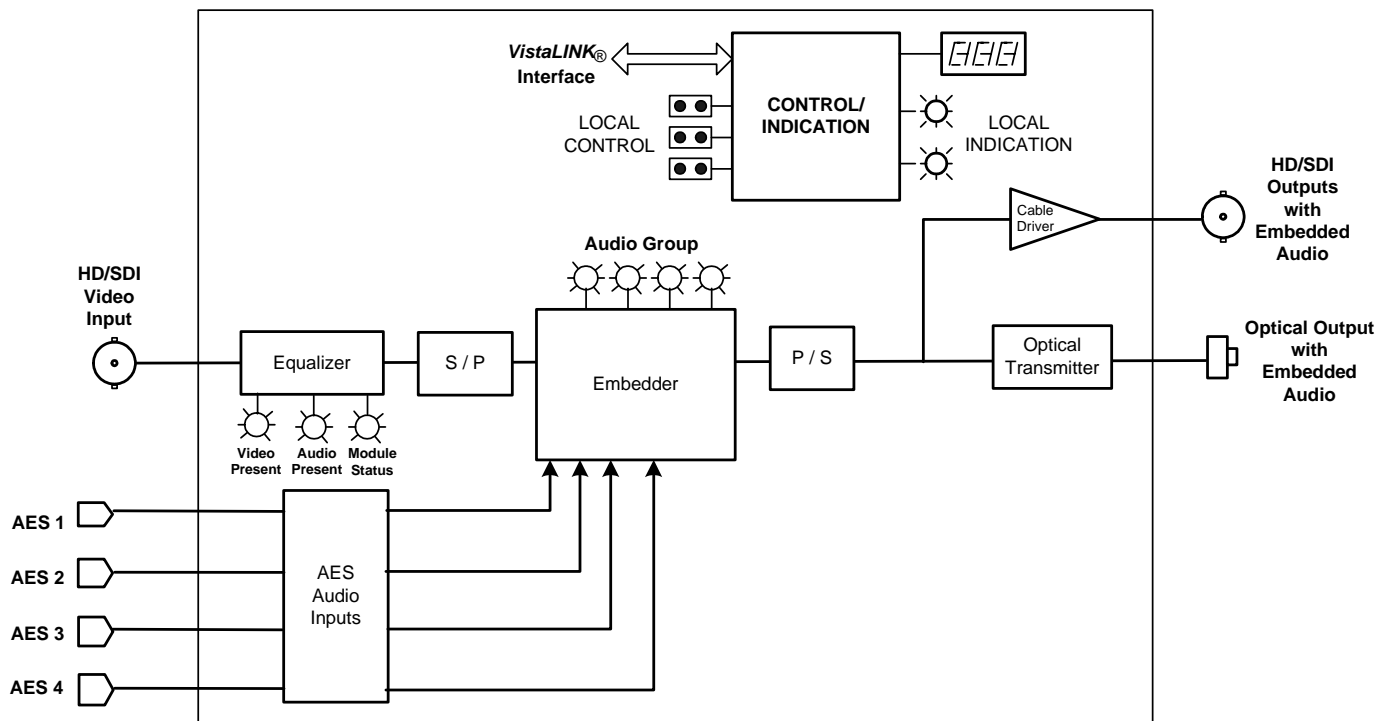
Figure 1-1: 7707VAT-HD Block Diagram

2.   INSTALLATION

Each 7707VAT-HD module comes with a companion rear plate that has two BNC connectors, multi-pin removable terminal block connections, and an SC/PC (shown), ST/PC or FC/PC optical connector. The 7707VAT-U-HD modules come with a companion rear plate that has six BNC connectors and one SC/PC, SC/PC with cover (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.
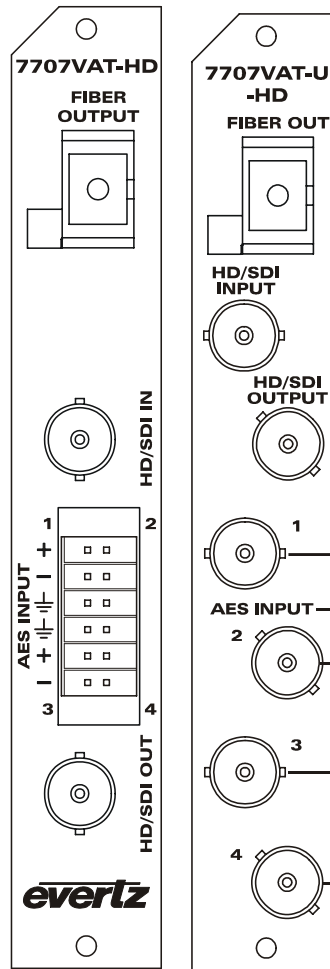
Figure 2-1: 7707VAT-HD Rear Panel

2.1.   VIDEO SIGNAL CONNECTIONS

HD INPUT: Input BNC connector for serial digital video signals compatible with HD-SDI (SMPTE 292M), SD-SDI (SMPTE 259M-C), or SDTi (SMPTE 305.2M) standards. This input provides adaptive equalization for up to 100m of industry standard Belden 1694A cable, at 1.485Gb/s. At 270Mb/s, this input provides adaptive equalization for up to 250m of Belden 1694A cable. See section 3.1 for video input specifications.

HD OUTPUT: Reclocked, level-restored, loop-back output BNC connector for serial digital video signals compatible with HD-SDI (SMPTE 292M), SD-SDI (SMPTE 259M-C), or SDTi (SMPTE 305.2M) standards. See section 3.2 for video output specifications.

2.2. AES AUDIO CONNECTIONS (MODEL 7707VAT-HD)

AES IN: AES audio input connections of the removable terminal block. The 7707VAT-HD accommodates four AES audio channels, designated as A1, A2, A3, and A4. Each of these four channels has a positive and negative terminal associated with it, and is able to accept balanced or unbalanced AES without card configuration. Balanced and unbalanced audio signals are connected as follows:

Balanced: Connect positive and negative audio signals to the corresponding positive and negative terminals of the 7707VAT-HD. This connection arrangement yields a nominal 110Ω input impedance for balanced audio signals.

Unbalanced: Connect unbalanced audio signals to the positive input terminal of the 7707VAT-HD. Leave the negative input terminal unconnected. This connection arrangement yields a nominal 75Ω input impedance for unbalanced audio signals.

See section 3.3 for AES audio input specifications.

2.3. AES AUDIO CONNECTIONS (MODEL 7707VAT-U-HD)

AES AUDIO IN: Unbalanced AES audio inputs for four AES audio pairs (2 groups) designated as A1, A2, A3, and A4 are available on four BNC connectors.

2.4. OPTICAL SIGNAL CONNECTIONS

FIBER OUTPUT: This is the optical output for the 7707VAT-HD. This output should be connected to the FIBER IN connector of a companion 7707VAR-HD module with a suitable fiber optic cable. The 7707VAR-HD maintains active output video while input video is not suitable for transmission (VID…LOS or STD…ERR condition. See section 4.2.1). In this case, active picture will be grey. The connector is a female SC/PC (shown), ST/PC, or FC/PC connection as specified at the time of purchase. This optical output is available in 1310nm, 1550nm, up to sixteen CWDM wavelengths (ITU-T G.694.2 compliant) and up to 40 DWDM wavelengths (ITU-T G.694.1 compliant). The output wavelength or DWDM channel number is marked on the rear panel of each module. When connected directly to a companion module, the output is compatible with multi-mode fiber optic cable. If not connected directly (i.e. connected through CWDM, DWDM, WDM, or splitter/combiner) the output is compatible only with single-mode fiber optic cable.

> **Do not hook up the 7707VAT-HD DWDM cards and 7707VAR-HD cards directly with a short fiber optic cable. The 7707VAT-HD DWDM card produces +7dBm of power which will damage the receiver if connected directly.**

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

2.5. CARE AND HANDLING OF OPTICAL FIBER

2.5.1. Safety


```
CLASS 1 LASER PRODUCT
```

Background colour: yellow
Triangular band: black
Symbol: black

2.5.2. Assembly

Assembly or repair of the laser sub-module is done only at Evertz facility and performed only by qualified Evertz technical personnel.

2.5.3. 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: 7707VAT13-HD, 7707VAT15-HD,
  7707VATxx-HD, (xx = 27, 29, 31, 33, 35, 37, 43, 45, 47, 49, 51, 53, 55, 57, 59, 61)
  7707VATDyyy-HD (Dyyy represents ITU Grid Channel: D200, D210, D220, D230, D240, D250, D260, D270, D280, D290, D300, D310, D320, D330, D340, D350, D360, D370, D380, D390, D400, D410, D420, D430, D440, D450, D460, D470, D480, D490, D500, D510, D520, D530, D540, D550, D570, D580, D590, D600)
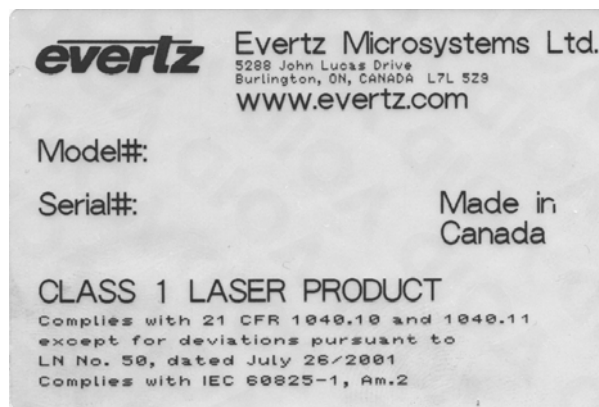
Figure 2-2: Reproduction of Laser Certification and Identification Label

2.5.4. 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 DIGITAL VIDEO INPUT

Number of Signals: 1 Input
Standards: SMPTE 292M (HD-SDI), SMPTE 259M-C (SD-SDI), SMPTE305.2M (SDTi)
Connector: BNC input per IEC 169-8
Equalization: Automatic to 100m (typ) @ 1.485Gb/s with Belden 1694A or equivalent cable
        Automatic to 250m (typ) @ 270 Mb/s with Belden 1694A or equivalent cable
Return Loss: > 15 dB up to 1.5GHz

3.2.   SERIAL DIGITAL VIDEO OUTPUT

Number of Signals: 1 Output
Standards: SMPTE 292M (HD-SDI), SMPTE 259M-C (SD-SDI), SMPTE305.2M (SDTi)
Connectors: BNC per IEC 169-8
Signal Level: 800mV nominal
DC Offset: 0V ±0.5V
Rise and Fall Time: 600ps nominal @270Mb/s
        150ps nominal @1.485Gb/s
Overshoot: <10% of amplitude
Return Loss: > 15 dB up to 1.5GHz
High Freq. Jitter: < 0.2 UI

3.3.   AES AUDIO INPUTS

Number of Signals: 4 Inputs
Standards: AES3-2003 (Balanced AES), SMPTE 276M (Unbalanced AES)
Connector:
  7707VAT-U: 4 BNC per IEC 61169-8 Annex A
  7707VAT: 12 pin removable terminal strip
Sampling Rate: 32KHz, 44.1KHz, 48kHz
Resolution: up to 24 bits
Minimum Input: < 200mVp-p
Maximum Input:
  Balanced: > 7Vp-p
  Unbalanced: > 1.2Vp-p
Equalization:
  Balanced: < 1500ft @ 48KHz, with Belden 1800B, and 2Vp-p source signal
  Unbalanced: < 1200m @ 48KHz, with Belden 8281, and 1Vp-p source signal
Impedance:
  Balanced: $\approx 110\Omega$
  Unbalanced: $\approx 75\Omega$
Return Loss: > 15dB, from 1MHz to 6MHz
Wideband Jitter: < 10nsp-p, with conditions of minimum to maximum cable length

3.4. OPTICAL OUTPUT

Number of Signals: 1 Output
Standards:
  HD-SDI Input: SMPTE 292M, with SMPTE 299M Embedded Audio
  SD-SDI Input: SMPTE 259M-C, with SMPTE 272M Embedded Audio
  SDTi Input: SMPTE 305.2M, with SMPTE 272M Embedded Audio
Signaling Rate: Rate of applied video
Connector: SC/PC, ST/PC, FC/PC female housing
Fiber Size: 9 μm core / 125 μm overall
Wavelengths:
  Standard: 1310nm, 1550nm (nominal)
  CWDM: 1270nm to 1610nm (ITU-T G.694.2 compliant)
  DWDM: ITU channel 20 to 60, 100GHz spacing, (ITU-T G.694.1 compliant)
Output Power:
  1310nm FP (Standard) -7dBm ± 1dBm
  1550nm & CWDM DFB 0dBm ± 1dBm
  DWDM DFB +7dBm ± 1dB
Return Loss: >14dB

3.5. VIDEO LOCK TIME

Synchronous switch: < 0.5 s
Asynchronous switch: < 0.8 s
Standards switch: <10 s

3.6. ELECTRICAL

Voltage: +12VDC
Power: 12 Watts

3.7. 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

3.8. PHYSICAL

7700 or 7701 Frame Mounting:
  Number of Slots: 1

4. STATUS INDICATORS AND DISPLAYS

The 7707VAT-HD has five LED status indicators and a 4-digit dot-matrix display on the front card-edge for monitoring and control of card status and parameters. The card-edge pushbutton and toggle switch are used to select various indications to the dot-matrix display. Figure 4-1 shows the locations of the indicators and pushbutton.
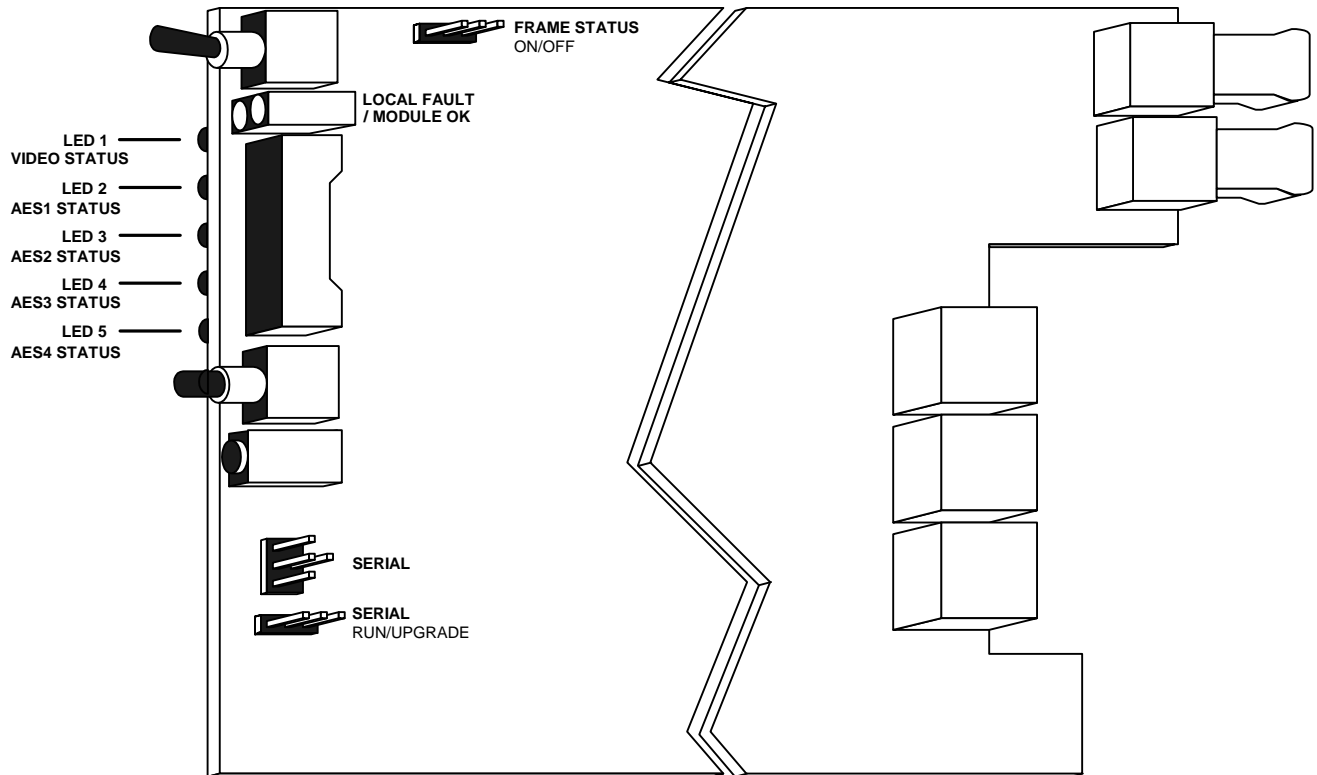
Figure 4-1: Location of Jumpers and Card Edge Controls

4.1. STATUS INDICATOR LEDS

Two large LEDs at the front card-edge indicate operational health of the module as follows:

MODULE OK: This green LED indicates good module health. It will be on while a valid signal is present at the video input, the output laser is operating properly, and the card power is good.

LOCAL FAULT: This red LED indicates poor module health. Three conditions could cause this fault indication to be active: (1) No valid signal is present at the video input, (2) operation of the output laser is erroneous, or (3) if a card power fault exists (i.e. a blown fuse). The LOCAL FAULT indication can also be reported to the frame by setting the FRAME STATUS jumper.

There are five small LEDs on the back of the card-edge that indicate signal presence. These LEDs are Bi-colour, and able to illuminate as red or green. The functions of these LEDs are as follows:

LED 1, VIDEO STATUS: This LED indicates the status of the video Input. When a valid input video signal is detected the LED will be green. The LED will be red while errors are detected within the input video. If no video is detected on the video input of the 7707VAT-HD the LED will remain off.

LED 2, AES 1 STATUS: This LED indicates the status of Audio Input 1. When a valid input audio signal is detected the LED will be green. When errors are detected within the input audio signal the LED will flash red. If no audio is detected on the first audio input of the 7707VAT-HD the LED will remain off.

LED 3, AES 2 STATUS: This LED indicates the status of Audio Input 1. When a valid input audio signal is detected the LED will be green. When errors are detected within the input audio signal the LED will flash red. If no audio is detected on the second audio input of the 7707VAT-HD the LED will remain off.

LED 4, AES 3 STATUS: This LED indicates the status of Audio Input 1. When a valid input audio signal is detected the LED will be green. When errors are detected within the input audio signal the LED will flash red. If no audio is detected on the third audio input of the 7707VAT-HD the LED will remain off.

LED 5, AES 4 STATUS: This LED indicates the status of Audio Input 1. When a valid input audio signal is detected the LED will be green. When errors are detected within the input audio signal the LED will flash red. If no audio is detected on the fourth audio input of the 7707VAT-HD the LED will remain off.

4.2. DOT-MATRIX DISPLAY AND CONTROLS

Additional monitoring and control functions are implemented via the 4-digit dot-matrix display and controls 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.

Pressing the pushbutton advances the display to the next menu level. The toggle-switch may then be used to move up or down through selections of that menu level. Select BACK to return to the previous menu level.

Pushbutton ?

Menu Level 1	Menu Level 2	Menu Level 3	Menu Level 4
Indications >			
LASR...ERR (Laser Error) Supersedes **VID...LOS** (Video Loss) Supersedes **STD...ERR** (Standard Error) Supersedes **OK** (A-Okay)			

Toggle Switch ? ?

Selections >	Selections >	Selections >	Indications >
STAT (Status)	**VIN** (Video Input)	**STD** (Video Standard)	Standards Per Table / **LOS** (Loss of VIdeo)
		EQ (Cable Length)	Indications > **0m** to **100m** / **>100** (more than 100m)
		GRP1 (Audio Group 1) **GRP2** (Audio Group 2) **GRP3** (Audio Group 3) **GRP4** (Audio Group 4)	Indications > **FREE** (Group Unused) **USED** (Group Used) **CLN** (Group Cleaned) **LOS** (Loss of Video)
	AIN1 (Audio Input 1) **AIN2** (Audio Input 2) **AIN3** (Audio Input 3) **AIN4** (Audio Input 4)	Indications > **32K** (32KHz) **44K** (44KHz) **48K** (48KHz) **LOS** (Loss of Signal)	
	VER (Software Version)	Indications > Software Version	
	BACK (Abort)		

Selections >	Selections >	Selections >
CTRL (Control)	**VOUT** (Video Output)	**STD** (Video Standard) — Standards Per Table / **AUTO** (Match Input)
		A1+2 (AES1 and AES2) / **A3+4** (AES3 and AES4) — Selections > **GRP1** (Audio Group 1) **GRP2** (Audio Group 2) **GRP3** (Audio Group 3) **GRP4** (Audio Group 4) **NONE** (Don't Embed) !? used groups are not provided as selections
		GEN — Selections > **OFF** **GREY** **BLACK** **BYP**
		COAX — Selections > **LOOP** **EMBD**
		LASR (Laser Enable Mode) — Selections > **CONT** (Continuous) **DISC** (Discontinuous)
	VIN (Video Input)	**CLN** (Clean Input Hanc) — Selections > **ON** (Clean Input Hanc) **OFF** (Pass Input Hanc) **AUTO**
		EDET (Error Detection) — Selections > **ON** (Indicate Errors to LED) **OFF** (Disable Error Indication)
	AIN1 (Audio Input 1) **AIN2** (Audio Input 2) **AIN3** (Audio Input 3) **AIN4** (Audio Input 4)	**SRC** (Sample Rate Convert) — Selections > **ON** (Enable Conversion) **OFF** (Disable Conversion)
		EDET (Error Detection) — Selections > **ON** (Indicate Errors to LED) **OFF** (Disable Error Indication)
	JACK (Monitor Jack)	**CHAN** (Audio Channel) — Selections > **AUD1** (Audio 1) **AUD2** (Audio 2) **AUD3** (Audio 3) **AUD4** (Audio 4)
		VOL (Volume) — Selections > **0** to **64** (Arbitrary Range)
	DISP (Display Orientation)	Selections > **HORZ** (Horizontal) **VERT** (Vertical)
	FRST (Factory Reset)	Selections > **NO** (Abort) **YES** (Accept)
	BACK (Abort)	

Figure 4-2: Card-edge Menu Quick Reference

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

Upon entering menu level 1 on power up, or following a configuration selection, the default display selection will indicate the warning status of the 7707VAT-HD. This warning status indication can also be entered while already in menu level 1, by using the toggle switch. During normal operation, while no warnings conditions are active, the `OK` indication will be displayed. Three warning indications can supersede this display state. The following list describes possible indications for this menu item, listed in order of display priority:

LASR….ERR	Laser Error Warning. Flashing indication alternates between **LASR** and **ERR**
VID….LOS	Video Loss of Signal. Flashing indication alternates between **VID** and **LOS**
STD….ERR	Video Standard Error. Input video standard does not match a manually selected output video standard. Flashing indication alternates between **STD** and **ERR**
OK	Okay. No warning conditions are active

4.2.2. Displaying the Input Video Standard

The card-edge display of the 7707VAT-HD can report the signal standard present at the active video input. To indicate the input video standard, select the `STAT` (Status) menu item in menu level 1 followed by `VIN` (Video Input) and `VSTD` (Video Standard) menu items. The following list describes possible indications for this menu selection:

```
STAT
  VIN
    VSTD
      1080i/60
      1080i/59.94
      1080i/50
      1035i/60
      1035i/59.94
      1080i/48
      1080i/47.96
      720p/60
      720p/59.94
      N270
      P270
      LOS
```

The *MUTE* controls (1 to 4) allow the user to mute each channel.
1080i/60 or 1080p/30sF standard is present:

1080i/60	1080i/60 or 1080p/30sF standard is present
1080i/59.94	1080i/59.94 or 1080p/29.97sF standard is present
1080i/50	1080i/50 or 1080p/25sF standard is present
1035i/60	1035i/59.94 standard is present
1035i/59.94	1035i/59.94 standard is present
1080i/48	1080i/48 or 1080p/24sF standard is present
1080i/47.96	1080i/47.96 or 1080p/23.98sF standard is present
720p/60	720p/60 standard is present
720p/59.94	720p/59.94 standard is present
N270	525i/59.94 standard is present
P270	624i/50 standard is present
LOS	Loss of signal. No valid video signal is detected at the selected input

4.2.3. Displaying the Input Equalization Strength

The 7707VAT-HD adaptively adjusts the amount of equalization applied to the digital video input and the applied equalization strength can be reported to the display. To indicate the input equalization strength, select the STAT (Status) menu item in menu level 1 followed by the VIN (Video Input) and VEQ (Video Equalization) menu items.

```
STAT
  VIN
    VEQ
      >100m
      0m to 100m
```

The following list describes possible indications for this menu selection:

0m to **100m**   Amount of equalization adaptively applied to the digital video input in meters.

>100m   Adaptive equalization greater than 100m.

4.2.4. Displaying the Status of Input Video Embedded Audio Groups

The 7707VAT-HD allows the user to monitor the status of input video embedded audio groups. This allows conflicts to be identified and resolved. To view the current status of input video embedded audio groups, select the STAT (Status) menu item in menu level 1, followed by the VIN (Video Input) and GRP1, GRP2, GRP3 or GRP4 (Audio Groups 1 through 4) menu items. For the sake of brevity, only the GRP1 menu item will be described below.

```
STAT
  VIN
    GRP1
      FREE
      USED
      CLN
      LOS
```

The following list describes possible indications for this menu item:

FREE   The monitored audio group is unused in applied input video.

USED   The monitored audio group is used in applied input video.

CLN   The monitored audio group is used in applied input video, but has been cleaned by the 7707VAT-HD. See section 0 for details.

LOS   No video input detected.

4.2.5. Displaying the AES Audio Sample Rate

The 7707VAT-HD can detect the sample rate of valid AES input audio on each channel and the detected sample rate can be reported to the display. To indicate the AES input sample rate, select the STAT (Status) menu item in menu level 1, followed by the AIN1, AIN2, AIN3, or AIN4 (Audio Input 1 through 4) menu item. For the sake of brevity, only the AIN1 menu item will be described below.

```
STAT
  AIN1
    48K
    44K
    32K
    LOS
```

The following list describes possible Audio Sample Rate indications:

48K   AES input sample rate is 48KHz
44K   AES input sample rate is 44.1KHz
32K   AES input sample rate is 32KHz
LOS   Loss of signal. No valid signal is detected

4.2.6. Displaying the Software Version

Software operating on the 7707VAT-HD has a version number associated with it. This version number can be indicated to the display. By this means, it can be verified that the module is operating with the most recent software. To reveal the software version,* select the STAT (Status) menu item in menu level 1, followed by the VER (Software Version) menu item.

STAT
VER
VER x.x BUILD xxx

The following describes the function of version menu item:

VER x.x BUILD xxx   Software version. Character string scrolls across four digit display

4.2.7. Selecting the Output Video Standard

User configuration selects the video standard for transmission over the optical interface. If the AUTO mode is selected, then the output video standard will match the input video standard. Otherwise, the output video standard will be as selected, regardless of the input standard. To configure the output video standard sent across the optical link by the 7707VAT-HD, select the CTRL (Control) menu item in menu level 1, followed by the VOUT (Video Output) and STD (Video Standard) menu items.

CTRL
VOUT
STD
AUTO
1080i/60
1080i/59.94
1080i/50
1035i/60
1035i/59.94
1080i/48
1080i/47.96
720p/60
720p/59.94
N270
P270

The following list describes possible user selections for this menu item:

Selection	Description
AUTO	Automatically transports the video standard detected at the input
1080i/60	1080i/60 or 1080p/30sF standard
1080i/59.94	1080i/59.94 or 1080p/29.97sF standard
1080i/50	1080i/50 or 1080p/25sF standard
1035i/60	1035i/59.94 standard
1035i/59.94	1035i/59.94 standard
1080i/48	1080i/48 or 1080p/24sF standard
1080i/47.96	1080i/47.96 or 1080p/23.98sF standard
720p/60	720p/60 standard
720p/59.94	720p/59.94 standard
N270	525i/59.94 standard
P270	625i/50 standard

The 7707VAT-HD maintains active output video while input video is not suitable for transmission (VID…LOS or STD…ERR condition. See section 4.2.1). In this case, active picture will be black.

4.2.8. Selecting Audio Embedding Group

This user menu item provides configuration of the embedded audio groups. To minimize conflicts, groups that are detected as USED in the applied input video (see section 4.2.4) are not provided as selections. To select the audio embedding groups select the CTRL (Control) menu item in menu level 1, followed by the VOUT (Video Output) and A1+2 (AES 1 and AES 2) or A3+4 (AES 1 and AES 2) menu items. For the sake of brevity, only the A1+2 menu item will be described below.

CTRL
VOUT
A1+2

GRP1
     GRP2
     GRP3
     GRP4
     NONE
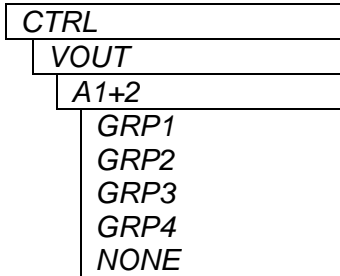
The following list describes possible user selections for this menu item:

GRP1   Embed the selected AES signals (A1+2 or A3+4) into group 1.

GRP2   Embed the selected AES signals (A1+2 or A3+4) into group 2.

GRP3   Embed the selected AES signals (A1+2 or A3+4) into group 3.

GRP4   Embed the selected AES signals (A1+2 or A3+4) into group 4.

NONE   Will not embed the selected AES signals (A1+2 or A3+4) into video.

Note that the same audio group cannot be selected twice; the selection for A1+2 cannot match the selection for A3+4. To minimize conflicts, the group configured for A3+4 will not be provided as a selection for group A1+2, and vise-versa.

4.2.9. Selecting the Output Video when the Signal is Lost

The GEN menu item enables the user to select the type of generated output that will be displayed on loss of video.

```
CTRL
  VOUT
    GEN
      OFF
      GREY
      BLACK
      BYP
```

The following list describes possible user selections for this menu item:

OFF   When set to OFF, the video output is muted upon loss or interruption of the input video.

GREY   When the signal is lost, grey video will be output. This enables a video "keep-alive" function for sustained transport of embedded audio upon input video loss, interruption or timing errors. A grey signal is generated until input video is re-qualified as valid (i.e., no loss, interruption or timing errors for some time).

BLACK   When the signal is lost, black video will be output. This enables a video "keep-alive" function for sustained transport of embedded audio upon input video loss, interruption or timing errors. A black signal is generated until input video is re-qualified as valid (i.e., no loss, interruption or timing errors for some time).

BYP   When set to BYP, the video "keep alive" function is bypassed for use in cases where input video has minor interruptions or timing errors that should not trigger the generated black or gray "keep-alive" output. This selection does not affect embedding or other functions of the product, except that input video must have sustained quality that is suitable for embedding.

4.2.10. Selecting the COAX Mode

The COAX menu item enables the user to either pass the original audio or embed the current audio into the selected group.

```
CTRL
  VOUT
    COAX
      LOOP
      EMBD
```

The following list describes possible user selections for this menu item:

LOOP   When set to *LOOP*, the module will pass the original audio from the input to the output.

EMBD   When set to *EMBD*, the audio will be embedded into the selected group and will be sent to video out.

4.2.11. Selecting the Output Laser Enable Mode

In some applications it is desirable to have the laser output disabled while no input video signal is present. Alternatively, it may be preferable to maintain an optical output signal, even with no input video. The 7707VAT-HD supports both modes of operation. To configure the output laser enable mode, select the CTRL (Control) menu item in menu level 1 followed by the VOUT (Video Output) and LASR (Laser) menu items.

```
CTRL
  VOUT
    LASR
      CONT
      DISC
```
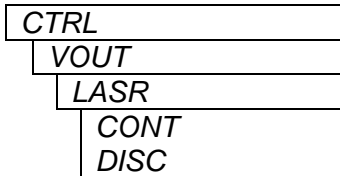
The following list describes possible user selections for this menu item:

CONT   Continuous operation. Laser is always enabled, even without valid video signal.

DISC   Discontinuous operation. Laser is disabled when no valid input video is detected.

4.2.12. Selecting Input Video Cleaning

Information might already be contained in the horizontal ancillary space of the applied input video. The user might wish to maintain this information in an unaltered state, or the user could favour cleaning this information. To enable or disable input video cleaning, select the CTRL (Control) menu item in menu level 1 followed by the VIN (Video Input) and CLN (Clean Input Hanc) menu items.

```
CTRL
  VIN
    CLN
      ON
      OFF
      AUTO
```
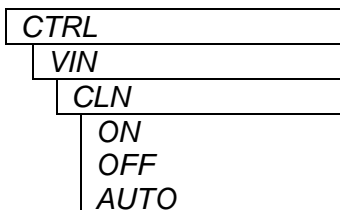
The following list describes possible user selections for this menu item:

ON   Enables cleaning of all embedded audio from input video HANC.

OFF   Disables cleaning of embedded audio from input video HANC. In the case where CTRL/VOUT/Ax+x menu selects a conflicting group for embedding, the priority is given to embedded audio in input video.

AUTO   Automates cleaning of embedded audio from input video HANC. In the case where CTRL/VOUT/Ax+x menu selects a conflicting group for embedding, the group is cleaned from input video and the priority is given to the 7707VAT-HD.

4.2.13. Selecting Video Error Detection

The 7707VAT-HD is capable of detecting incoming CRC or EDH errors on its video input. To turn error detection on or off select the CTRL (Control) menu item in menu level 1 followed by the VIN (Video Input) and EDET (Error Detection) menu items.

CTRL
VIN
EDET
ON
OFF
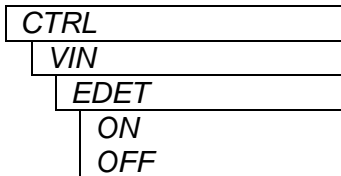
The following list describes possible user selections for this menu item:

ON   Enable video error detection. Errors will be reported to the card edge LED or VistaLINK®. The VIDEO STATUS LED will blink red on the occurrence of an error.

OFF   Disable video error detection.

4.2.14. Selecting AES Sample Rate Conversion

Audio must have a sample rate of 48KHz for embedding. To accommodate other input audio sample rates, the 7707VAT-HD provides sample rate conversion. Sample rate conversion should be turned on for normal operation; however, Dolby-E audio uses a proprietary encoding scheme that is not compatible with sample rate conversion. To enable or disable sample rate conversion, select the CTRL (Control) menu item in menu level 1, followed by the AIN1, AIN2, AIN3, or AIN4 (Audio Inputs 1 through 4) and SRC (Sample Rate Convert) menu items. For the sake of simplicity, only AIN1 menu item will be described in this manual.

CTRL
AIN1
SRC
ON
OFF

The following list describes possible user selections for this menu item:

ON   Turns sample rate conversion ON

OFF   Turns sample rate conversion OFF

4.2.15. Selecting Audio Error Detection

The 7707VAT-HD is capable of detecting incoming errors on its four audio inputs. To turn audio error detection on or off select the CTRL (Control) menu item in menu level 1, followed by the AIN1, AIN2, AIN3, or AIN4 (Audio Inputs 1 through 4) and EDET (Error Detection) menu items. For the sake of simplicity, only AIN1 will be described.

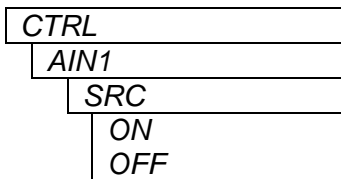| |
|---|
| *CTRL* |
| *AIN1* |
| *EDET* |
| *ON* |
| *OFF* |
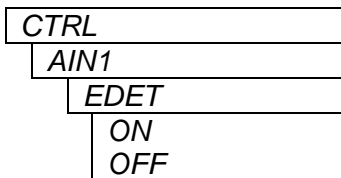
The following list describes possible user selections for this menu item:

ON   Enable audio error detection. Errors will be reported to the card edge LED or Vista*LINK*®. The corresponding AUDIO STATUS LED will blink red on the occurrence of an error.

OFF   Disable audio error detection.

4.2.16. Selecting the Headphone Monitoring Jack Channel

The 7707VAT-HD provides a convenient headphone monitoring jack at the card-edge. The monitored audio channel is configured by the user, via the card-edge interface. Audio volume of the headphone monitoring jack can also be adjusted using the card-edge volume control. To configure the headphone monitoring jack channel, select the CTRL (Control) menu item in menu level 1, followed by the JACK (Audio Jack) and CHAN (Audio Channel) menu items.

CTRL
JACK
CHAN
AUD1
AUD2
AUD3
AUD4

The following list describes possible user selections for this menu item:

AUD1   Channel 1 is selected to the headphone monitoring jack
AUD2   Channel 2 is selected to the headphone monitoring jack
AUD3   Channel 3 is selected to the headphone monitoring jack
AUD4   Channel 4 is selected to the headphone monitoring jack

To configure the headphone volume, select the CTRL (Control) menu item in menu level 1, followed by the JACK (Audio Jack) and VOL (Volume) menu items.

CTRL
JACK
VOL
0 to 64

The following list describes possible user selections for this menu item:

0 to 64   Sets the volume of the headphone jack.

4.2.17. Setting the Orientation of the Display

The 7707VAT-HD provides the ability to adjust the orientation of the display. When using a 3RU frame it is convenient to have the text read vertical whereas when using a 1RU frame a horizontal display is desirable. To change the orientation of the display select the CTRL (Control) menu item in menu level 1, followed by the DISP (Display) menu item.

CTRL
DISP
HORZ
VERT

The following list describes possible user selections for this menu item:

HORZ   Sets the orientation of the text to horizontal
VERT   Sets the orientation of the text to vertical

4.2.18. Selecting the Factory Reset Configuration

It is convenient to have a quick method of returning all configuration settings to a known value. The 7707VAT-HD provides a factory reset for this purpose. All values which are user configurable will be returned to a known state, as indicated below. To initialize a factory reset, select the CTRL (Control) menu item in menu level 1, followed by the FRST (Factory Reset) menu item.

CTRL
DISP
NO
YES

The following list describes possible user selections for this menu item:

NO   Return to previous menu item, without modification of configuration settings

YES   Initialize factory reset

5. JUMPER CONTROLS

5.1. SELECTING WHETHER LOCAL FAULTS WILL BE MONITORED BY THE GLOBAL FRAME STATUS

The FRAME STATUS jumper J4 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 J5 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 *UPGD* 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. 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® 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 VistaLINK® Pro 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 7707VAT-HD and 7707VAR-HD cards), each with a unique address (OID), communicate with the NMS through an SNMP Agent. Evertz VistaLINK® enabled 7700 series modules reside in the 3RU 7700FR-C MultiFrame and communicate with the manager via the 7700FC VistaLINK® frame controller module, which serves as the Agent.

3. A virtual database, known as the Management Information Base (MIB), lists all the variables being monitored, which both the Manager and Agent understand. Please contact Evertz for further information about obtaining a copy of the MIB for interfacing to a third party Manager/NMS.

For more information on connecting and configuring the VistaLINK® network, see the 7700FC Frame Controller chapter.

6.2. VISTALINK® MONITORED PARAMETERS

The following parameters can be remotely monitored via the VistaLINK® interface.

Parameter	Description
Video Input Standard	The detected video standard
Cable Length	Indicates input cable length in metres
Input Video Embedded Audio Group 1, 2, 3, 4	Status of Input video embedded audio groups
AES Input 1, 2, 3, 4	Displays AES Audio sample rate

Table 6-1: VistaLINK® Monitored Parameters

6.3. VISTALINK® CONTROLLED PARAMETERS

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

Parameter	Description
Video Output Standard	Sets output video standard
Laser	Sets output laser mode
Clean Input Video HANC	Enable/ Disable input video HANC cleaning
AES 1 / 2 Destination	Sets destination for AES 1 and 2
AES 3 / 4 Destination	Sets destination for AES 3 and 4
AES 1 to 4 Sample Rate Conversion	Enable/ Disable sample rate converters
Cable Length Alarm Threshold	Sets cable length alarm threshold

Table 6-2: VistaLINK® Controlled Parameters

6.4. VISTALINK® TRAPS

The following parameters can be remotely enabled and monitored through the VistaLINK® interface as traps in Alarm View.

Parameter	Description
Video Loss	Triggers on loss of input video signal
Video Error	Triggers on error in input video signal
Laser Fault	Triggers on optical output laser fault
Cable Length Fault	Triggers on cable length exceeds set threshold
AES Audio 1 to 4 Loss	Triggers on loss of AES audio signal
AES Audio 1 to 4 Error	Triggers on AES audio error

Table 6-3: VistaLINK® Traps