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REVISION HISTORY

REVISION	DESCRIPTION	DATE
0.1	Preliminary	Sept 09

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1. OVERVIEW

The 7847FSE Frame Synchronizer is designed to re-time a SMPTE 259M (625i/50, 525i/59.94) input to a local composite sync signal. When necessary, frames are repeated or dropped to maintain synchronization. The 7847FSE supports synchronization of both the video and any embedded audio present including the preservation of all vertical blanking data. When the input video is lost, this module will pass the input content, freeze the last good frame or generate black video. The frame synchronizers also have the ability to set the audio delay independently from the video delay and have the ability to adjust video parameters such as brightness, contrast, saturation and hue control. The 7847FSE enables the adjustment of audio parameters such as gain, mixing stereo pairs into monaural and the reassignment of audio channels if fully supported up to 16 channels of embedded audio. The 7847FSE is VistaLINK® capable, offering remote monitoring, control and configuration capabilities via Simple Network Management Protocol (SNMP) giving the flexibility to manage operations, including signal monitoring and module configuration from SNMP capable control systems (Manager or NMS).

Throughout this manual the term "784FSE series" is used to refer to all versions. When features apply only to specific versions the versions will be listed explicitly

	Synchronizes			AES Audio	
Model	**Video**	**Embedded Audio**	**AES Audio**	**Inputs**	**Outputs**
7847FSE-HD	HD/SD-SDI	Demux & mux 4 groups	No	--	--

Table 1-1: Products

Features:

- Synchronizes SD-SDI video signals with embedded audio
- Ultra low propagation delay mode
- Supports additional frames of video and audio delay
- Program Video output bypass relay protected on power loss
- Programmable output phase with respect to reference input
- Freeze on last good frame, or field, or go to black on loss of video or pass input
- Synchronizes 4 groups of embedded audio
- Adjustable brightness, contrast, saturation
- Active Format Descriptor insertion as per SMPTE 2016
- Dolby metadata insertion as per SMPTE 2020
- Full audio processor including channel shuffling, gain and loudness control
- Protection switching to backup input
- Card edge status LEDs
- VistaLINK®- capable offering remote control and configuration capabilities via SNMP

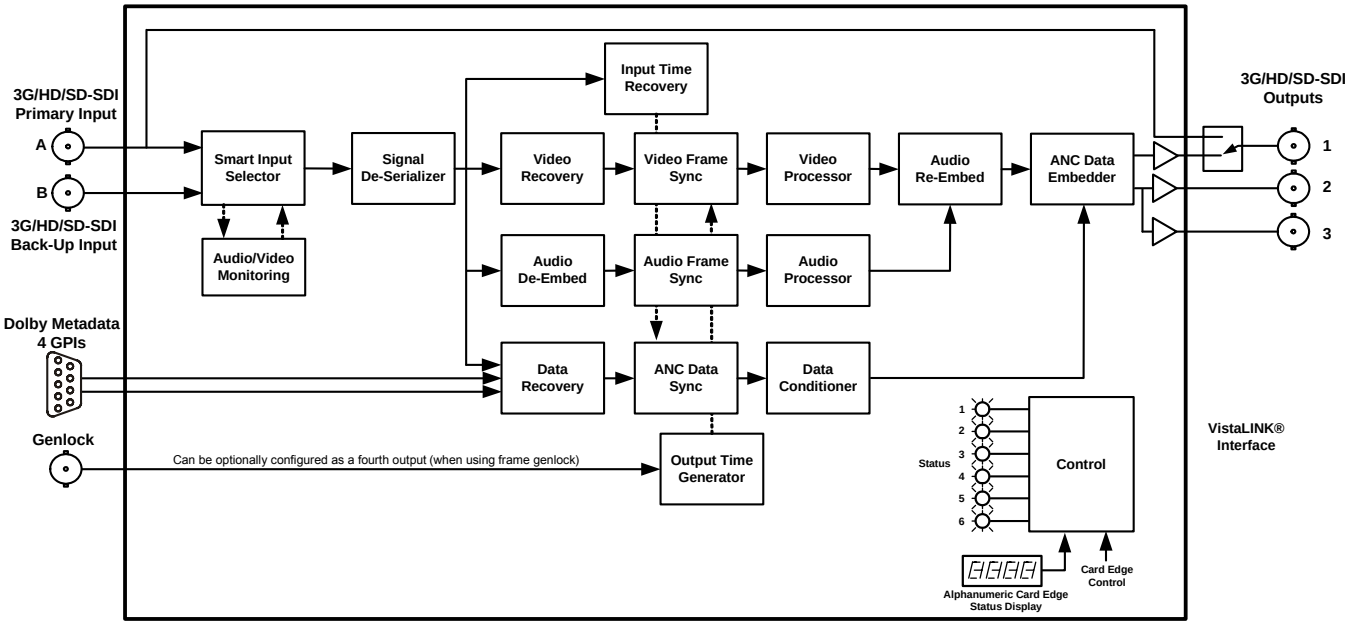

Figure 1-1: 7847FSE Frame Synchronizer Block Diagram

2. INSTALLATION

The 7847FSE version come with a companion rear plate occupies one slot in the 3RU 7700FR frame. For information on mounting the rear plate and inserting the module into the frame see section 3 of the 7700FR chapter.

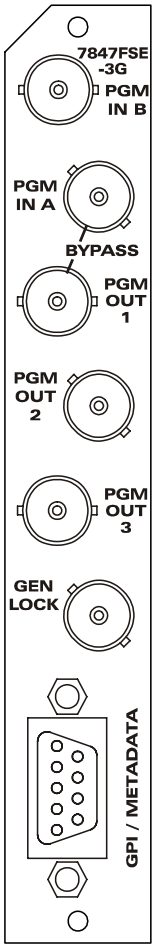

Figure 2-1: Module Rear Panels

2.1. HD AND SDI VIDEO INPUTS AND OUTPUTS

3G/HD/SDI INPUTS: Input BNC connector for 10-bit serial digital video signals compatible with the SMPTE 424M (3Gbps), SMPTE 292M (-HD versions) or SMPTE 259M-C standard. The video standard must be set to match the input video format. There is also a video backup BNC connector that can be used to switch to an emergency backup video feed in case the primary video feed fails.

3G/HD/SDI OUTPUTS: Three output BNC connectors with serial component video in the same format as the input video. These outputs contain the input video synchronized to the **GENLOCK** input video or to the free running internal oscillator if Genlock is not present. The top output is protected by a bypass relay, which will activate in the event of power loss to the module. There is a second and third identical output that is not bypass protected.

2.2. GENLOCK REFERENCE

For proper synchronization of the output video, the frame synchronizer must be locked to a genlock signal.

GENLOCK: There is an input BNC for connecting an analog Genlock reference. The genlock signal may be tri-level sync, NTSC or PAL, and is auto-detected by the module. This input can optionally be configured as a fourth output from the 7847FSE module. In this case the genlock signal will need to be obtained from the 7800FR internal genlock frame distribution.

3. TECHNICAL DESCRIPTION

3.1. SPECIFICATIONS

3.1.1. Serial Video Input Inputs A & B

Standard: SMPTE 424M (3Gb/s) 1080p
SMPTE 292M (1.5Gb/s), 1080i, 1035i, 720p
SMPTE 259M (270Mb/s) 525i, 625i
Connector: BNC per IEC 61169-8 Annex A

3.1.2. Input Equalization

SD: Automatic to 300m @ 270Mb/s with Belden 1694A or equivalent cable
HD: Automatic to 115m @ 1.5Gb/s with Belden 1694A or equivalent cable
3G: Automatic to 80m @ 3Gb/s with Belden 1694A or equivalent cable

3.1.3. Return Loss

SD: > 15dB up to 270MHz
HD: > 13dB up to 1.5GHz
3G: > 10dB up to 3.0GHz

3.1.4. Serial Video Outputs

Number of Outputs: 4 (1 output is bypass relay protected)
Connectors: BNC per IEC 61169-8 Annex A
Signal Level: 800mV nominal
DC Offset: 0V ±0.5V
Rise and Fall Time: 900ps nominal (SD)
200ps nominal (HD)
Overshoot: < 10% of amplitude
Wide Band Jitter: < 0.2 UI

3.1.5. Genlock Input

Type: NTSC or PAL Color Black 1V p-p, or Composite bi-level sync (525i/59.94 or 625i/50) 300mV
HD Tri-level Sync
Connector: BNC per IEC 61169-8 Annex A
Termination: 75Ω (dip-switch selectable)

3.1.6. Processing Functions Video

Black Level: ±7%
Luminance Gain: ±6dB
Chrominance Gain: ±6dB

3.1.7. Audio:

Gain: ±24dB
Remapping: Any input or mono mix of any L/R pair to any output

3.1.8. Input To Output Processing Delay

Minimum Delay Mode:3us to 1 frame plus 3us

3.1.9. Electrical:

Voltage: +12V DC
Power: 15W
EMI/RFI: Complies with FCC Part 15, Class A EU EMC Directive

3.1.10. Physical (Number of Slots):

350FR: 2
7700FR-C: 2
7800FR: 1

4. CONTROL

4.1.1. Adjusting the Output Video Phase

The frame synchronizers can be genlocked to either a composite or tri-level (on -HD versions) sync. The modules will auto-detect the presence and format of the genlock signal. Valid video standard and input sync combinations are listed in Table 4-1.

This adjustment can be controlled from the VistaLINK® network management interface

The V phase adjustment provides a coarse adjustment of timing and sets the number of lines that the out is delayed with respect to genlock input. The H phase adjustment provides fine adjustment of timing and sets the number of samples that the output is delayed with respect to the input genlock.

		Genlock Standard															
		PAL-B	NTSC-M	1080p/23.98	1080p/24	1080i/50	1080i/59.94	1080i/60	720p/59.94	720p60	1080p/23.98sF	1080p/24sF	1080p/25	1080p/29.97	1080p/30	1035i/59.94	1035i/60
Video Standard	625i/50	√				√							√				
	525i/59.94		√				√							√		√	
	1080i/50	√				√							√				
	1080i/59.94		√				√							√		√	
	1080i/60							√							√		√
	720p/59.94		√				√		√					√		√	
	720p/60							√		√					√		√
	1080p/23.98sF			√							√						
	1080p/24sF				√							√					

Table 4-1: Valid Standard and Genlock Combinations

Figure 4-1 and Figure 4-2 shows the relationship of the analog tri-level and bi-level inputs to the digital line structure when there is no horizontal phase delay between the genlock and the output video. This alignment is specified in SMPTE 274M and 296M.

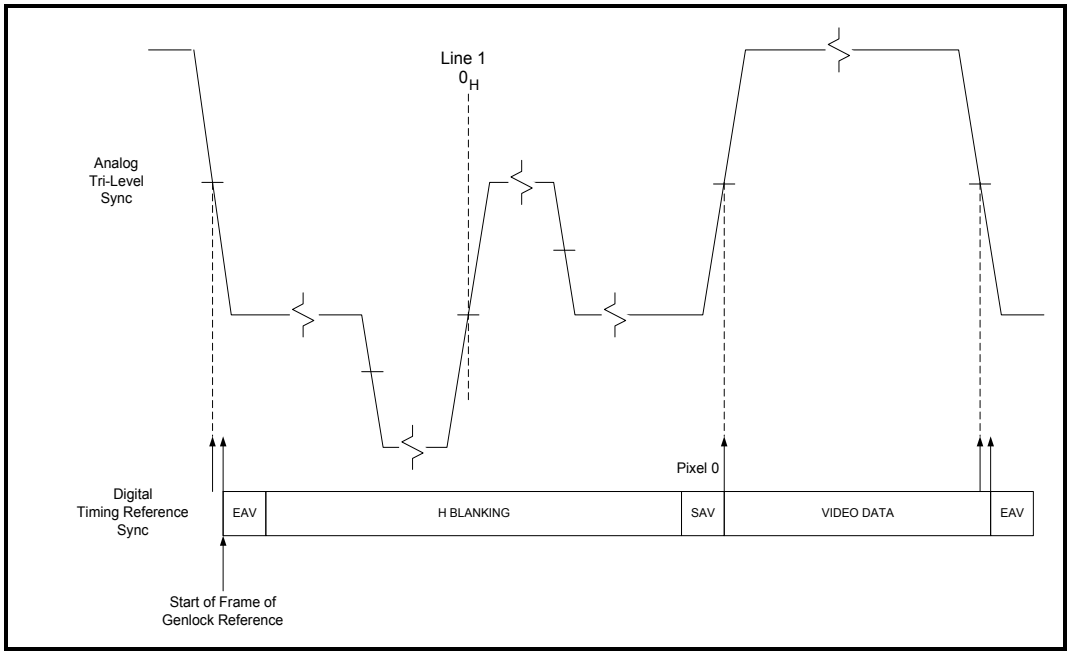

Figure 4-1: Tri-Level Reference Timing

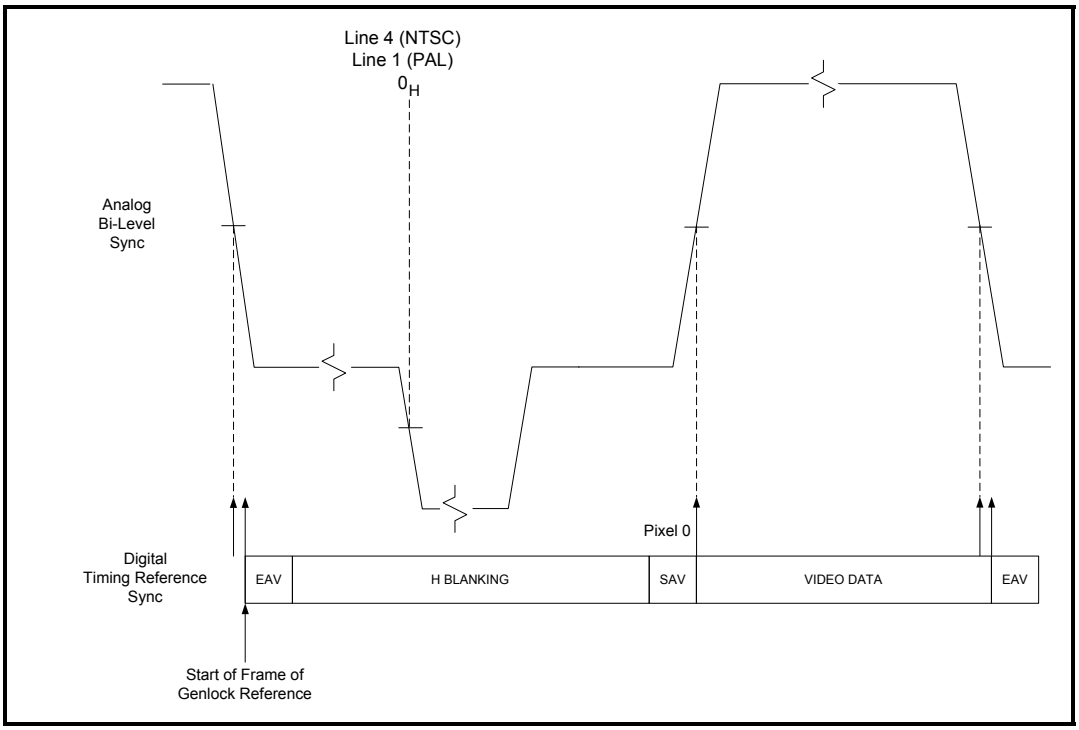

Figure 4-2: Bi-Level Reference Timing

5. JUMPERS

Figure 5-1 and Figure 5-2 provide the locations of the jumpers and LEDs on the boards.

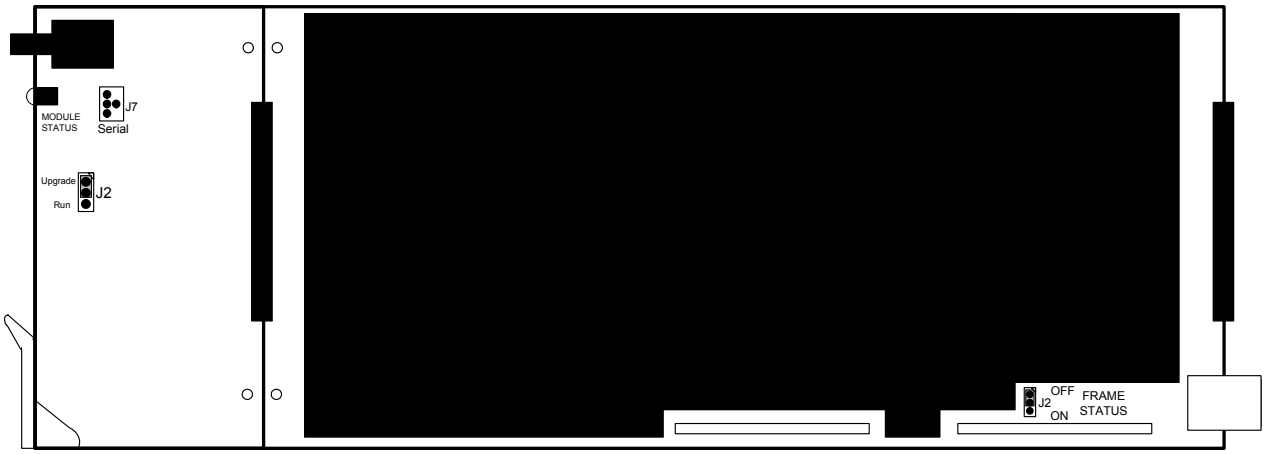

Figure 5-1: Location of Jumpers – Top View Main Module

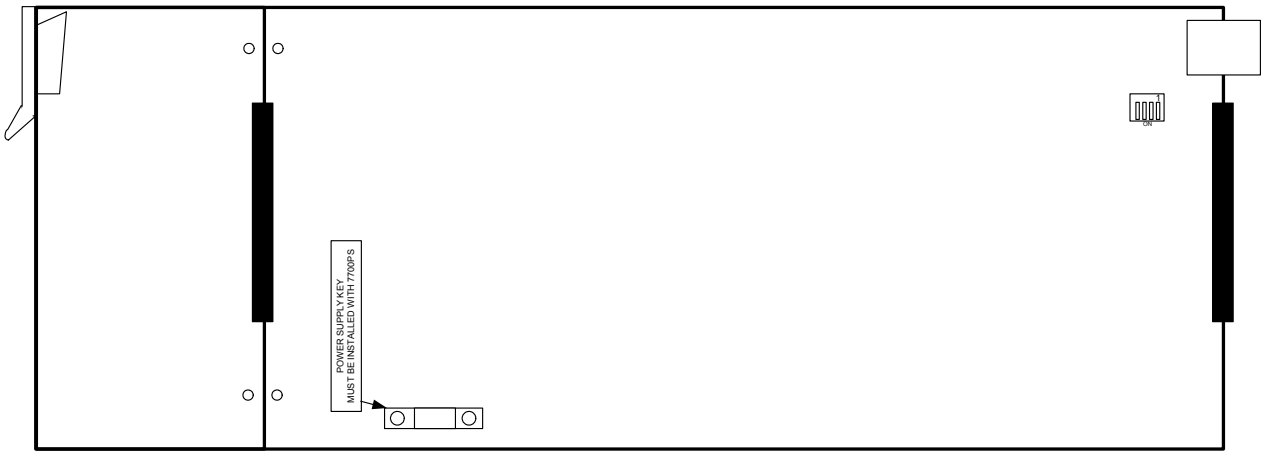

Figure 5-2: Location of Jumpers – Bottom View Main Module

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

FRAME STATUS: The FRAME STATUS jumper J2 is located near the rear of the board and close to the white metal connector. The FRAME STATUS jumper determines whether local faults (as shown by the Local Fault indicator) will be connected to the 7700FR-C or 7800FR frame's global status bus.

To monitor faults on this module with the frame status indicators (on the PS 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

Firmware updates can be performed using two methods. The first method is Ethernet based up-load of firmware using VistaLink PRO. The second method is using serial interface based up-load of firmware using the on-card upgrade serial port.

UPGRADE: The UPGRADE jumper (J2) is located on the top side of the main near the front of the card and is used when firmware upgrades are being done to the module. For normal operation it should be switched to the *RUN* position as shown in the diagrams above. See the *Upgrading Firmware* chapter in the front of the binder for more information.

To upgrade the firmware in the module unit pull it out of the frame. Move Jumper J2 into the *UPGRADE* position. Install the Upgrade cable provided (located in the vinyl pouch in the front of this manual) onto header J7 at the card edge. Re-install the module into the frame. Run the upgrade as described in *Upgrading Firmware* chapter. Once the upgrade is completed, remove the module from the frame, move J2 into the *RUN* position, remove the upgrade cable and re-install the module. The module is now ready for normal operation.

The Upgrade baud rate for the 7847 series modules is 115,200 baud. Additional serial connection settings are as follows:

Data Bits = 8
Parity = None
Stop Bits=1
Flow Control = None

5.3. SELECTING WHETHER THE GENLOCK REFERENCE INPUT IS TERMINATED

TERM: The micro DIP switch on the bottom of the board (near the connector) is used to terminate the genlock loop input. When DIP Switch 1 is set to “ON” there is in the 75 ohm terminating resistor placed between the genlock input and ground. When DIP Switch 1 is set in the “OFF” position the genlock input will be high impedance. Leave DIP SWITCH 2, 3 and 4 in the OFF position.

5.4. USING A SLOT BLOCKER

The 7847 series of modules can be installed in either the 7700FR-C or the 7800FR frames. These modules are designed to take two slots in the Evertz 7800FR frame and three slots in the 7700FR-C.

Modules can fit into two slots in a 7800FR frame because the 7800FR allows modules to consume more power on a per slot basis than the Evertz 7700FR-C. When a 7847 series module is installed in the 7700FR-C, the module must occupy 3 slots to ensure that the frame power is managed properly. This is accomplished by installing a “Slot Blocker” on the bottom side of the board. If the “Slot Blocker” is not installed on the card and the card is inserted into the 7700FR, the card will not power-up. When installing the card in a 7800FR, the “Slot Blocker” may be removed and it will power-up and operate normally. If the “Slot Blocker” remains installed and the card is inserted into the 7800FR, the card will also power-up and operate normally.

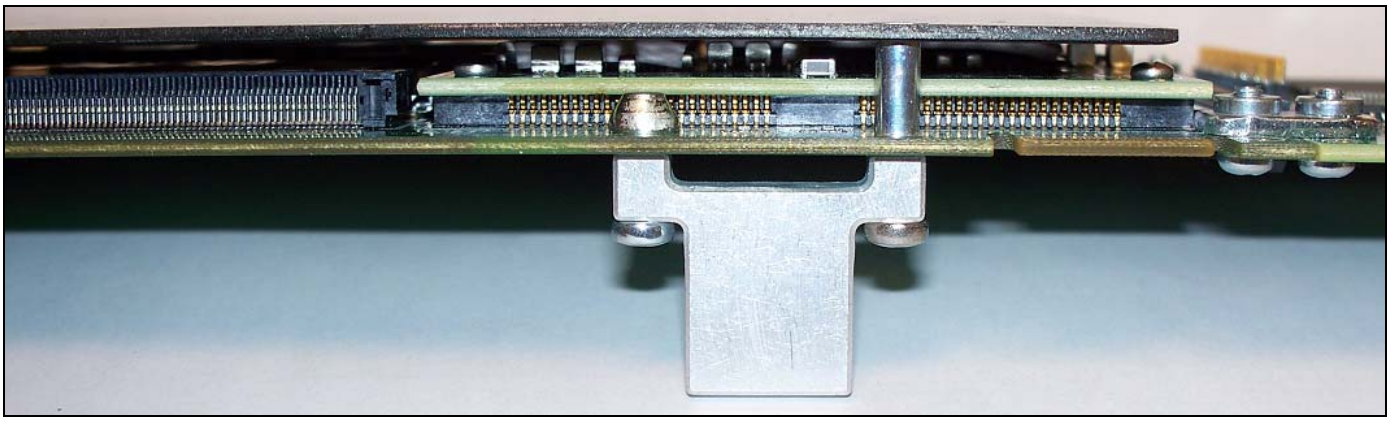

Figure 5-3: Slot Blocker

6. *VISTA*LINK® REMOTE MONITORING/CONTROL

6.1. WHAT IS *VISTA*LINK®?

*Vista*LINK® is Evertz' 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 7707EO and 7707OE 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
Detected Video Standard	Reports if a valid video signal is presented and what standard has been detected when it is present.
External Genlock Standard	Reports if a valid video reference has been supplied to the REF IN BNC and indicates the standard that is detected when a valid reference is applied.
Calculated Video Delay	Displays the calculated video processing delay through the module.
Calculated Audio Delay	Displays the calculated audio processing delay through the module.

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

6.3. *VISTA*LINK® *VISTA*LINK® CONTROLLED PARAMETERS

Parameter	Description
Video Standard	Selects the video input standard.
Video Input Source	Selects source of video input.
Reference Select	Set video or external genlock for card locking
V Phase Offset	Sets the vertical phase.
H Phase Offset	Sets the horizontal phase.
RGB Clip	Enables RGB clipper.
Y Gain	Varies the Source Y.
Y Offset (Black Level)	Varies the Source Y.
Cr Gain	Varies the Source Cr.
Cr Offset	Varies the Source Cr.
Cb Gain	Varies the Source Cb.
Cb Offset	Varies the Source Cb.
Hue	Adjusts the hue of the video signal. +/- 10 degrees in 0.1 degree increments.
R Gain	Varies the Gain in RGB Domain.
G Gain	Varies the Gain in RGB Domain.
B Gain	Varies the Gain in RGB Domain.
Saturation Gain	Sets the saturation gain level.
Video Gain	Sets the video gain level.
Gamma Adjust	Enables gamma adjust.
Gamma Level	Sets the gamma correction level.
Red Gamma Level	Adjusts the Red Gamma levels.
Green Gamma Level	Adjusts the Green Gamma levels.
Blue Gamma Level	Adjusts the Blue Gamma levels.
Audio Delay	Adjusts the audio delay from the card nominal.
SRC Mode	Sets mode of sample rate converter.
Embedder Group 1 Enable	Enables or disables the Embedder Group.
Embedder Group 2 Enable	Enables or disables the Embedder Group.
Embedder Group 3 Enable	Enables or disables the Embedder Group.
Embedder Group 4 Enable	Enables or disables the Embedder Group.
C-Bit	Enables the user to set the C-Bit Control.

SRC Status	Displays whether the sample rate converters are engaged or bypassed.
Source X	Routes one of the 16 input audio channels to the X input of the Channel 1 mixer.
Gain Adjust X	Sets the value of the gain from the selected source.
Invert Enable X	Inverts the phase or passes the selected audio channels.
Source Y	Routes one of the 16 input audio channels to the Y input of the Channel 1 mixer.
Gain Adjust Y	Sets the value of the gain from the selected source.
Invert Enable Y	Inverts the phase or passes the selected audio channels.
Recall Preset	Sets which preset will be recalled by the respective GPI input or manual control.
Store User Preset	Programs a user preset into the non-volatile flash memory
GPI	Configures the GPI's for preset loading.

Table 6-2: VistaLINK® Controlled Parameters