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REVISION HISTORY

REVISION	DESCRIPTION	DATE
1.0	First Release	Apr 04
1.1	Updated for firmware release 2v0 build 3	Aug 04
1.2	Updated to include new product versions: 7746FSE and 7746FSE-HD	Mar 05
1.3	Updated Figure 5 and 6 to show AES LEDs. Updated DIP instructions for piano key DIP switch, corrected menu text.	May 05
1.4	Added documentation for –GPI and SCTE104 Option	Feb 08
1.5	Added SCTE 104 VistaLINK® controlled parameters	Feb 08
1.6	Added documentation for AFD and line blanking. Updated rear plate drawings.	Apr 08
1.6.1	Added note about jumper location on the (c)7700-AES4-3 sub-module	Aug 08
1.6.2	Updated step 9 for the “Reset Procedure” (section 8.5). General cleanup.	Jan 09

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1. OVERVIEW

The 7746FS-HD and 7746FSE-HD series HDTV Frame Synchronizers are designed to retime HD or SD video conforming to SMPTE 259M (525i/59.94 or 625i/50) or SMPTE 292M (1080i/60, 1080i/59.94, 1080i/50, 1080p/24sF, 1080p/23.98sF, 720p/60, 720p/59.94 or 480p/59.94) to a local reference tri-level or composite sync signal. The 7746FSE standard definition Frame Synchronizer is designed to retime only SD video conforming to SMPTE 259M (525i/59.94 or 625i/50) to a local reference tri-level or composite sync signal. When necessary, frames are repeated or dropped to maintain synchronization. During the synchronizing process the video delay varies from 3 lines through to 1 frame plus 3 lines. Additional delay can be added to the synchronizing process in 1 frame increments.

The frame synchronizers are currently available in four versions to suit various application requirements.

Throughout this manual the term "7746FS-HD series" is used to refer to all versions. When features apply only to specific versions the versions will be listed explicitly (e.g. "7746FSE-HD version" or "7746FS-EAES4 version").

	Synchronizes			AES Audio	
Model	**Video**	**Embedded Audio**	**AES Audio**	**Inputs**	**Outputs**
7746FS-HD (Discontinued – replaced by 7746FSE-HD)	HD/SDI	Demux and mux 2 groups, (No sample rate conversion)	No	--	--
7746FSE-HD	HD/SDI	Demux and mux 2 groups	No	--	--
7746FSE-GPI-HD	HD/SDI	Demux and mux 2 groups	No	--	--
7746FS-EAES4-HD	HD/SDI	Demux and mux 2 groups	4	4	4
7746FSE	SDI	Demux and mux 2 groups	No	--	--
7746FSE-GPI	SDI	Demux and mux 2 groups	No	--	--
7746FSE-GPI-HD	HD/SDI	Demux and mux 2 groups	No	--	--

On all versions the video and any embedded audio present is synchronized. (There are no audio sample rate converters on the 7746FS-HD version). On the 7746FS-EAES4-HD version, the user can choose to have either 2 groups from the upstream embedded audio or audio from the 4 AES inputs embedded on the output video and output as AES. All four versions can also pass all VANC data after the switch lines. When the input video is lost, it will pass the input AES or mute if embedded audio is selected for synchronizing. The frame synchronizers also have the ability to set the audio delay independently from the video delay. The frame synchronizers have the ability to adjust video parameters (such as brightness, contrast and saturation) and audio parameters (such as gain, mixing stereo pairs into monaural and reassignment of audio channels within the groups). The card functions can be controlled from the card edge or through the VistaLINK® interface.

Features:

- Synchronizes 1080i/60, 1080i/59.94, 1080i/50, 1080p/24sF, 1080p/23.98sF, 720p/60, 720p/59.94, 480p/59.94, 525i/59.94 or 625i/50 (7746FSE synchronizes only 525i/59.94 or 625i/50)
- Minimum video input to output delay - 3 lines
- Maximum video input to output delay - 1 frame plus 3 lines
- 12 additional frames of delay can be added for interlaced video formats, 24 frames for progressive formats.
- Program Video output bypass relay protected on power loss
- Programmable output phase with respect to reference input
- Freeze on last good frame, or field, go to black on loss of video or pass input
- Synchronizes 2 groups of embedded audio and re-embeds 2 groups
- Front panel LEDs indicate: module fault, video and audio present
- Serial remote data logging
- Adjustable video black level (brightness), Y level (contrast) and chroma level (saturation)
- Hue control available for SD video formats
- Maximum audio input to output delay – equivalent to additional frames of video delay
- Synchronizes VANC data starting after switch line
- Synchronizes RP188 time codes
- Separate control of video and audio delay
- Audio Sample Rate Converters can be disabled (no sample rate converters on 7746FS-HD)
- Independently adjustable audio levels on all channels
- Ability to combine stereo pairs to monaural
- Reassignment of audio channels within the embedded groups
- VistaLINK® - enabled offering remote control and configuration capabilities via SNMP (using VistaLINK® PRO or 9000NCP Network Control Panel) is available when modules are used with the 3RU 7700FR-C frame and a 7700FC VistaLINK® Frame Controller module in slot 1 of the frame

Additional Features for EAES4 version:

- Synchronizes four external AES signals
- Synchronized audio is output as 4 AES signals
- AES outputs bypass relay protected on power loss

Additional Features for GPI version:

- GPI triggering of SCTE104 Packet Insertion (+SCTE104 Option)

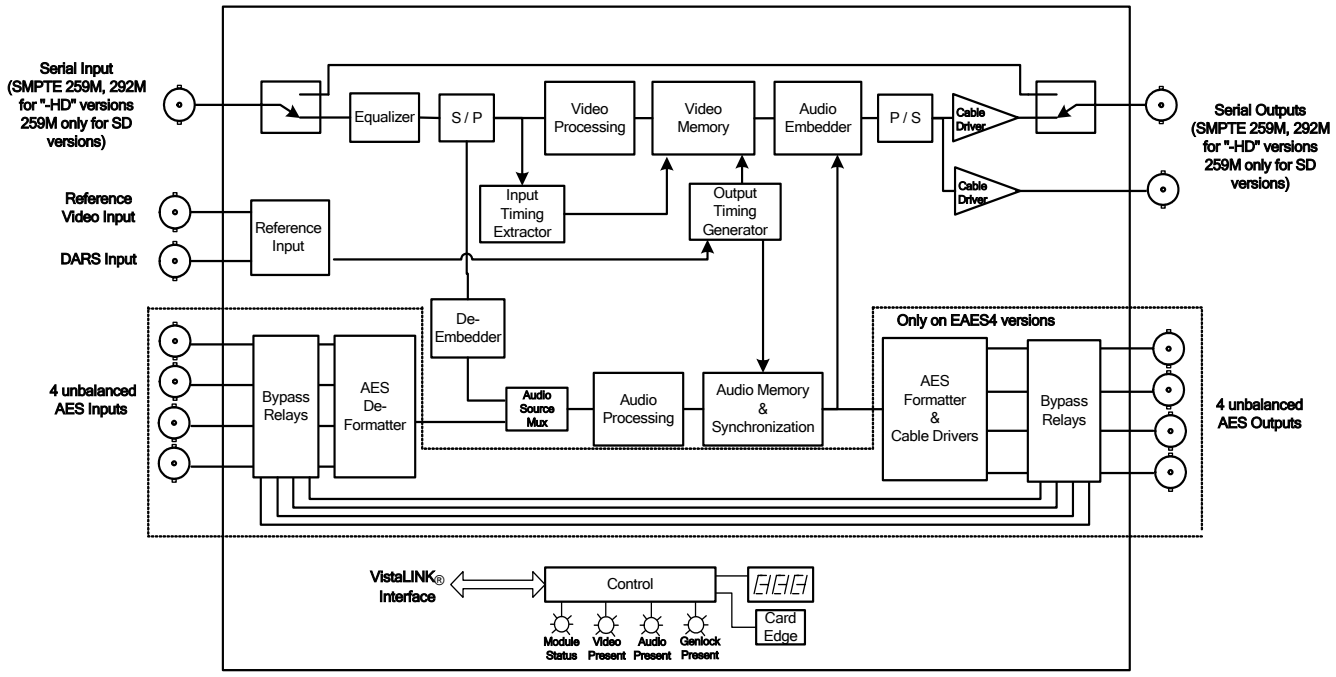


Figure 1-1: Frame Synchronizer Block Diagram

2. INSTALLATION

The 7746FS-HD, 7746FSE-HD and 7746FSE versions come with a companion rear plate that has 4 BNC connectors and occupies one slot in the 3RU 7700FR frame. The 7746FS-EAES4-HD version comes with a companion rear plate that has 13 BNC connectors and occupies two slots in the 3RU 7700FR frame. The –GPI versions come with a 2x3 terminal block for General Purpose Inputs and Outputs. For information on mounting the rear plate and inserting the module into the frame see section 3 of the 7700FR chapter.

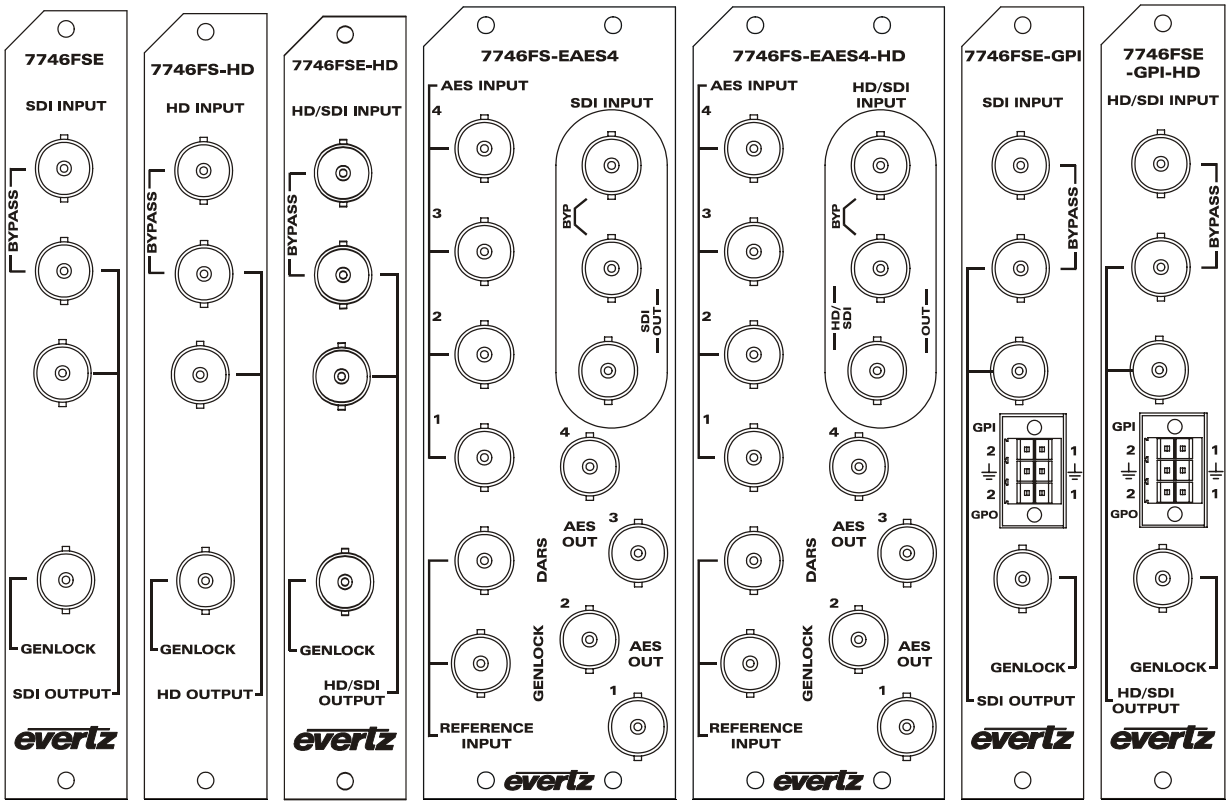


Figure 2-1: Module Rear Panels

2.1. HD AND SDI VIDEO INPUTS AND OUTPUTS

HD/SDI INPUT: Input BNC connector for 10-bit serial digital video signals compatible with the SMPTE 292M (-HD versions) or SMPTE 259M-C standard. The video standard must be set to match the input video format. See section 5.3.

HD/SDI OUTPUTS: Two 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 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 (on –HD versions), NTSC or PAL, and is auto-detected by the module. The 7746FS-HD version jumper J2 on the 7700REF sub-module selects whether the reference input is terminated to 75 ohms or high impedance. (See section 8.3) On the 7746FS-EAES4-HD, 7746FSE-HD and 7746FSE versions jumper J3 on the 7700-AES4 sub-module selects whether the reference input is terminated to 75 ohms or high impedance (default). (See section 8.3)

DARS: On the 7746FS-EAES4-HD version there is an input BNC for connecting a DARS reference. Jumper J5 on the 7700-AES4 sub-module selects whether the reference input is terminated to 75 ohms or high impedance (default). (See section 8.4) The DARS input is currently not supported.

2.3. AES AUDIO CONNECTIONS (7746FS-EAES4-HD VERSION ONLY)

On the 7746FS-EAES4-HD version, four unbalanced AES inputs and outputs are provided on BNC connectors. These inputs and outputs are for unbalanced AES signals conforming to SMPTE 276M. The user can select whether audio from the four channels of AES audio input, or from 2 groups of embedded audio is synchronized and the output is embedded on the output video. The synchronized audio is also output as four AES channels. The AES outputs are protected by bypass relays, which will activate in the event of power loss to the module. See Table 3-1 for information about possible minimum and maximum audio delays.

2.4. GENERAL PURPOSE INPUT (GPI) AND GENERAL PURPOSE OUTPUT (GPO) TERMINAL CONNECTIONS (7746FSE-GPI AND 7746FSE-GPI-HD VERSIONS ONLY)

Four pins on the (2x3) terminal block connector are used for two general purpose inputs (GPI) and two general purpose outputs (GPO).

Currently the GPIs are designed to work in conjunction with the SCTE104 option. An SCTE104 insertion module is an option available for the 7746FSE-GPI-HD and 7746FSE-GPI. At the present moment this feature allows for the triggering of a SCTE104 packet insertion on a specific line to be triggered by either a GPI1 or GPI2 closure. Control of the SCTE104 option is only available through VistaLINK®. Card edge control of this option is not available. See Table 10-2 for more information on configuring the SCTE104 functions.

The GPIs are active low with an active pull up to +5V. The user can activate GPIs simply by connecting the GPI input pins to ground. This can be done with a button, switch, relay or an open collector transistor.

Each GPO output can be used as normally open and normally closed relay contact pair. They can be used to pass simple contact closure information along with the video signal.

2.4.1. GPI and GPO Configuration

The GPI's are active low with internal pull up resistors (2k Ohms) to +5V. To make an input active, lower the signal to near ground potential (i.e. connect to shell or chassis ground). This can be done with a switch, relay, TTL drive, GPO output or other similar method. Figure 2-2 shows the input circuit for the general purpose inputs.

The GPO is active low with internal pull up (10k Ohm) resistors to +5V. When the output goes low it is able to sink up to 10mA. When high, the signal will go high (+5V). **Do not draw more than 100µA from the output.** Figure 2-3 shows the circuit for the general purpose output.

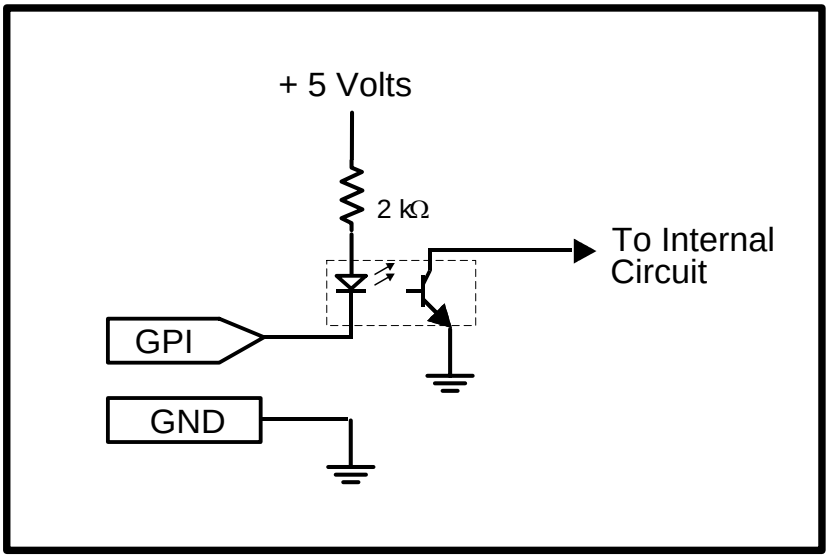


Figure 2-2: GPI Input Circuitry

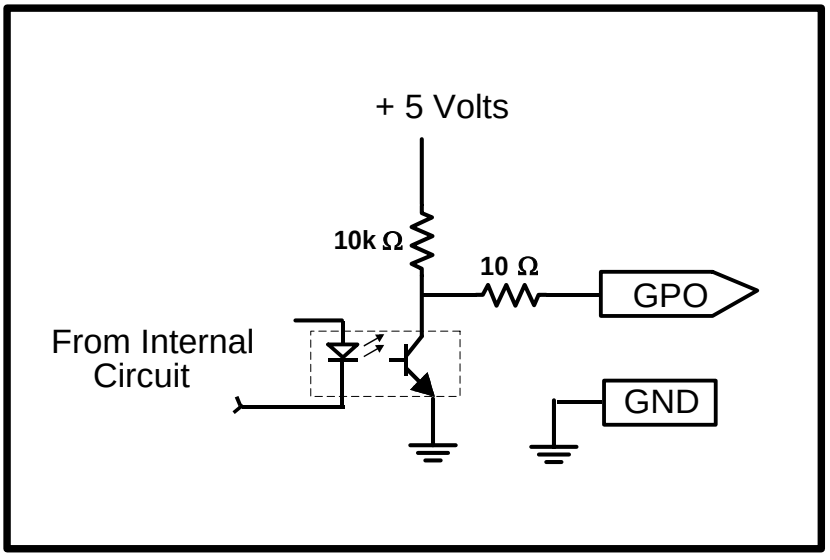


Figure 2-3: GPI Output Circuitry

2.4.2. GPI, GPO and Pin Assignment

PIN#	Assignment
1	GPI1
2	GND
3	GPO1
4	GPI2
5	GND
6	GPO2

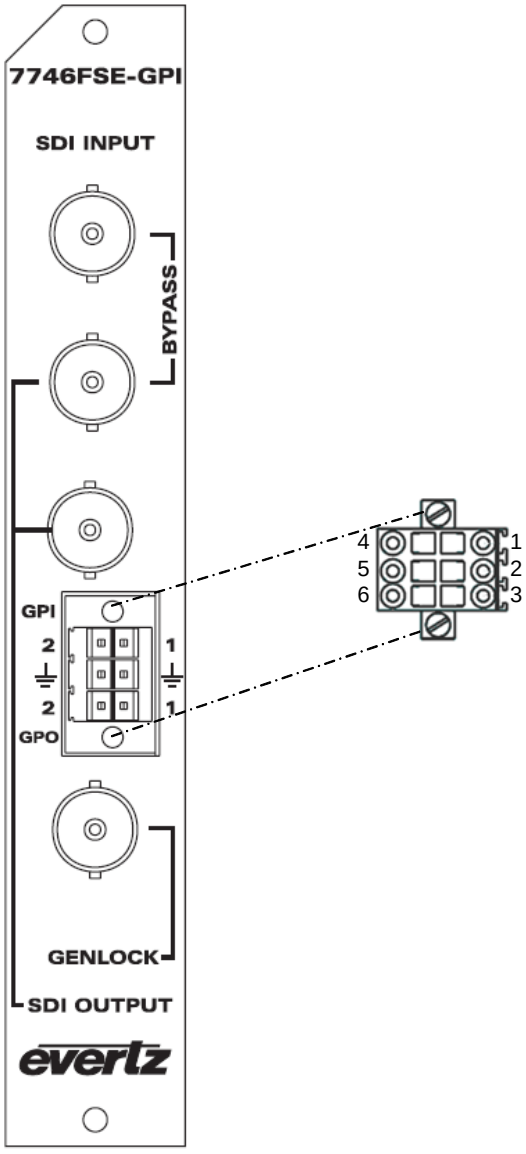


Figure 2-4: GPI and GPO Connections

NOTE: Identical pin assignments will apply to the 7746FSE-GPI-HD version.

3. SPECIFICATIONS

3.1. SERIAL VIDEO INPUT

Standard: DIP switch selectable
-HD versions: 1.485 Gb/sec SMPTE 292M -SMPTE 274M, SMPTE 296M, SMPTE 349M
All versions: 270 Mb/sec SMPTE 259M-C 525i/59.94 or 625i/50
(See Table 5-4 for supported video Standards)
Connector: BNC per IEC 61169-8 Annex A
Input Equalization:
SD: Automatic to 300m @ 270Mb/s with Belden 1694 or equivalent cable.
HD: Automatic to 115m @ 1.5Gb/s with Belden 1694 or equivalent cable.
Return Loss:
SD: >15 dB up to 270 MHz
HD: >13 dB up to 1.5 GHz

3.2. SERIAL VIDEO OUTPUT

Number of Outputs: 2 (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:
SD 900ps nominal
HD 200ps nominal
Overshoot: <10% of amplitude
Wide Band Jitter:
SD < 0.10 UI
HD < 0.16 UI

3.3. GENLOCK INPUT

Type: HD Tri-level Sync, (See Table 6-1)
NTSC or PAL Colour Black 1 V p-p, or
Composite bi-level sync (525i/59.94 or 625i/50) 300 mV
Connector: BNC per IEC 61169-8 Annex A
Termination: 75 ohm (jumper selectable)

3.4. DARS REFERENCE (-EAES4 VERSIONS ONLY – CURRENTLY NOT SUPPORTED)

Type: AES Digital Audio Signal with 48KHz sample rate
Standard: SMPTE 276M-1995 single ended AES
Connectors: BNC per IEC 61169-8 Annex A
Termination: 75 ohm (jumper selectable)

3.5. AES AUDIO INPUTS AND OUTPUTS (-EAES4 VERSIONS ONLY)

Number of Inputs: 4
Number of Outputs: 4
Standard: SMPTE 276M, single ended synchronous or asynchronous AES
Connectors: BNC per IEC 61169-8 Annex A
Resolution: 24 bits
Sampling Rate: 48 kHz
Impedance: 75 Ohms unbalanced
Signal Level: 1 V p-p nominal

3.6. GENERAL PURPOSE INTERFACE INPUTS/OUTPUTS

Number of Inputs: 2
Number of Outputs: 2
Type: Opto-isolated, active low, +5V supplied voltage
Connector: Weidmuller Terminal Block (2x3)
Signal Level: +5V

3.7. PROCESSING FUNCTIONS

Video:
- **Black Level:** +/- 7%
- **Luminance Gain:** +/- 6dB
- **Chrominance Gain:** +/- 6dB
- **Hue** +/- 20 degrees (SD)

Audio
- **Gain:** +/- 24dB
- **Re-mapping:** any input or mono mix of any L/R pair to any output

3.8. INPUT TO OUTPUT PROCESSING DELAY

3.8.1. Video Processing Delay

Minimum Delay Mode: 3 lines to 1 frame plus 3 lines
Additional Delay Mode: Up to 12 frames for interlaced formats (28 frames for progressive formats) of additional delay (1 frame increments)

3.8.2. Audio Processing Delay

Video Standard	Selected Video Delay	Min Audio Delay
1080i/60	< 69 lines	98 samples
1080i/59.94	< 69 lines	98 samples
1080i/50	< 57 lines	98 samples
1080p/24sF	< 55 lines	90 samples
1080p/23.98sF	< 55 lines	90 samples
720p/60	< 92 lines	98 samples
720p/59.94	< 92 lines	98 samples
480p/59.94	< 69 lines	98 samples
525i/59.94	< 69 lines	98 samples
625i/50	< 69 lines	98 samples

Video Standard	Selected Video Delay	Audio Delay
1080i/60	> 69 lines	Video (Audio*) Delay plus 98 samples
1080i/59.94	> 69 lines	Video (Audio*) Delay plus 98 samples
1080i/50	> 57 lines	Video (Audio*) Delay plus 98 samples
1080p/24sF	> 55 lines	Video (Audio*) Delay plus 98 samples
1080p/23.98sF	> 55 lines	Video (Audio*) Delay plus 98 samples
720p/60	> 92 lines	Video (Audio*) Delay plus 98 samples
720p/59.94	> 42 lines	Video (Audio*) Delay plus 98 samples
480p/59.94	> 69 lines	Video (Audio*) Delay plus 98 samples
525i/59.94	< 69 lines	Video (Audio*) Delay plus 98 samples
625i/50	< 69 lines	Video (Audio*) Delay plus 98 samples

Table 3-1: Audio Processing Delay

* The audio delay can be set to follow the video delay, which is set independently.

3.9. DATA LOGGING SERIAL PORT

Standard: RS 232
Connector: Software upgrade cable female DB-9
Baud Rate: 57600
Format: 8 bits, no parity, and 2 stop bits

3.10. ELECTRICAL

Voltage: + 12VDC
Power:
7746FSE: 12 Watts
7746FS-HD: 12 Watts
7746FS-EAES4-HD: 15.5 Watts
7746FSE-HD: 13.5 Watts
EMI/RFI: Complies with FCC regulations for class A devices
Complies with EU EMC directive

3.11. PHYSICAL

7700 frame mounting:

Number of slots: 1 for 7746FS-HD, 7746FSE-HD, and 7746FSE
2 for 7746FS-EAES4-HD

7701 frame mounting:

Number of slots: 1 for all versions

4. STATUS LEDS

4.1. MODULE STATUS LEDS

There are 5 LED status indicators at the front card edge as shown in Figure 8-1.

MODULE OK: This Green LED will be ON when the module is operating properly.

LOCAL FAULT: This Red LED makes it easy to identify one module in a frame that is missing an essential input or has another fault.

The LED will blink ON and OFF if the microprocessor is not running.

The LED will be on solid when input video or genlock input is missing or there is a fault in the module power supply.

VIDEO PRESENT: This Green LED will be ON when there is a valid video signal present at the module input.

AUDIO PRESENT: This green LED indicates the presence of audio.

On the 7746FS-HD, 7746FSE-HD and 7746FSE versions, the LED will be On when there is valid audio in one of the groups selected for de-embedding. This LED will be Off when there is no video input or the above conditions are not met.

On the 7746FS-EAES4-HD version, the LED will be On when there is a valid AES audio signal present at one of the AES inputs and the audio source is set to AES. The LED will also be On when there is valid audio in one of the groups selected for de-embedding and the audio source is set to the de-embedders. This LED will be Off when there is no video input or the above conditions are not met.

4.2. AUDIO CHANNEL LEDS

There are four small LEDs located on the lower half (opposite side of the dot matrix display). These LEDs indicate which audio channels are present. If the AES inputs are selected as the source, the LED is on when the corresponding AES pair is present (LED 1 will be ON when AES1 is present). If the Audio de-embedder is selected as a source, the LEDs will be ON when a selected group is present. If De-embedder 1's selected group is present, LED 1 & 2 will be ON. If De-embedder 2's selected group is present, LED 3 & 4 will be ON. See Figure 8-1 and Figure 8-2 for details.

4.3. AUDIO CHANNEL AND SUB-BOARD STATUS LEDS (7746FSE-GPI AND 7746FSE-GPI-HD VERSIONS ONLY)

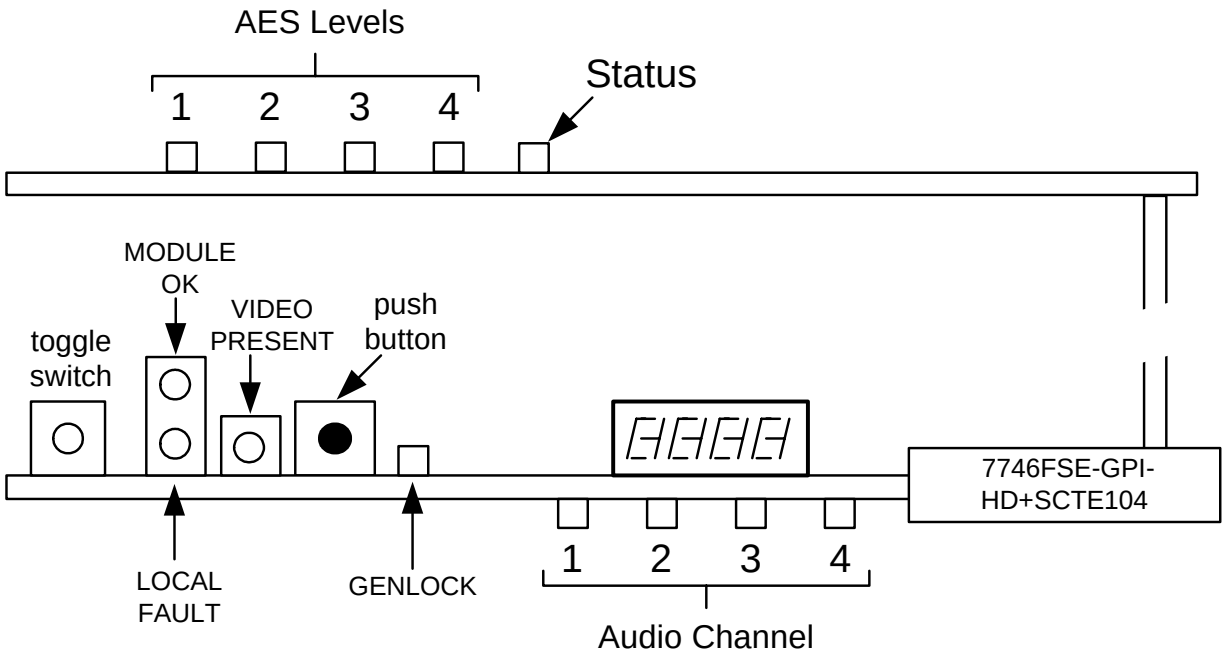


Figure 4-1: Audio Channel and Sub-Board Status LEDs

The four “left most” LEDs on the sub-board give a rough indication of the peak audio levels of the given channel pair. LED 1 shows the level for Channel 1 & 2, LED 2 shows the level for Channel 3 & 4, LED 3 shows the level for Channel 5 & 6, and LED 4 shows the level for Channel 7 & 8.

Table 4-1 indicates the measured level and the approximate colour.

Level	LED Colour
< -80 dBFS	off
> 80 dBFS	green
>20 dBFS	yellow
>6 dBFS	red
non-PCM*	blue*
SCTE 104 Insertion	Purple (+SCTE014) option only

Table 4-1: Measured Level and Approximate Colour

(*) non-PCM data including Dolby-E or Dolby AC-3 (detection currently not implemented)

4.4. SUB-BOARD STATUS LED

The following colours indicate the status of the audio sub-board:

Green = Correct Operation
Off = Not Configured
Red = Error

5. CARD EDGE CONTROLS

The frame synchronizers are equipped with an 8 position DIP switch, toggle switch, pushbutton and a 4 character dot matrix display to allow the user to select various functions. The DIP switch provides basic configuration functions that will normally be set only once, such as video standard selection, dot matrix display orientation, and VistaLINK® remote control selection. All other card functions are available through a menu system controlled by the toggle switch and pushbutton and displayed on the 4 character dot matrix display. (See section 6)

DIP switch 1 is located at the top of the DIP switch (farthest from to the card ejector). Table 5-1 gives an overview of the DIP switch functions. Sections 5.1 to 5.3 give a detailed description of each of the DIP switch functions.

There are two types of DIP switches possible on the frame synchronizers. For slide switches the On (closed) position is farthest from the front edge of the printed circuit board. For 'piano key' switches the On (closed) position is down or closest to the printed circuit board.

DIP Switch	Function
1	VistaLINK® or local control selection
2	Dot Matrix display orientation
3	Reserved – set to Off
4	
5	Video Standard Select
6	
7	
8	

Table 5-1: DIP Switch Functions

5.1. ENABLING VISTALINK® CONTROL OF THE FRAME SYNCHRONIZER

The frame synchronizer can be controlled using the card edge DIP switches and menu system or remotely via SNMP (using VistaLINK® PRO or the model 9000NCP Network Control Panel). When DIP switch 1 is set to the Off position the module will be controlled using the DIP switch and menu items described elsewhere in sections 5 and 6. When DIP switch 1 is set to the On position the module will be controlled remotely through SNMP. See section 10 for a full description of the parameters that can be monitored or controlled using VistaLINK®. VistaLINK® control is only available when the card is installed in the 3RU 7700FR-C frame and a 7700FC VistaLINK® Frame Controller card is installed in slot 1 of the frame.

DIP 1	FUNCTION	DESCRIPTION
Off	Local Control	Card is controlled through card edge controls
On	VistaLINK®	Card is controlled through VistaLINK®

Table 5-2: VistaLINK® Control Switch Settings

5.2. SELECTING THE DOT MATRIX DISPLAY ORIENTATION

DIP switch 2 selects between horizontal and vertical orientation of the dot matrix display.

DIP 2	FUNCTION	DESCRIPTION
Off	Horizontal	Characters on dot matrix display are horizontal
On	Vertical	Characters on dot matrix display are vertical

Table 5-3: Display Mode Switch Settings

5.3. SELECTING THE VIDEO FORMAT

DIP switches 5 to 8 are used to select the video format in use. The selections written in *italics* are not available for 7746FSE version.

DIP 5	DIP 6	DIP 7	DIP 8	DESCRIPTION
Off	*Off*	*Off*	*Off*	*1080p/23.98sF*
Off	*On*	*Off*	*Off*	*1080p/24sF*
Off	*Off*	*On*	*Off*	*Future Use*
Off	*On*	*On*	*Off*	*1080i/50*
Off	*Off*	*Off*	*On*	*1080i/59.94* *480p/59.94 (SMPTE 349M)*
Off	*On*	*Off*	*On*	*1080i/60*
Off	*Off*	*On*	*On*	*720p/59.94*
Off	*On*	*On*	*On*	*720p/60*
On	Off	Off	Off	525i/59.94
On	Off	Off	On	625i/50
On	On	On	On	Auto detect

Table 5-4: Video Standard Switch Settings

Other switch combinations are reserved for future use. When DIP switch 1 is ON, the video format is set using VistaLINK® control.

6. CARD EDGE MENU SYSTEM

The frame synchronizers are equipped with a toggle switch, pushbutton, and a 4 character dot matrix display to control various functions on the card. The toggle switch and pushbutton are used to navigate through a menu system to set various parameters for the module. When not in the menu system the toggle switch and pushbutton are used to display status messages on the serial port. (See section 6.3)

6.1. NAVIGATING THE MENU SYSTEM

You can use the toggle switch to move up and down the list of available parameters to adjust. (See section 6.2) To adjust any parameter, use the toggle switch to move up or down to the desired parameter and press the pushbutton. If the parameter is a numerical value, the number will increase if you lift the toggle switch and decrease if you push down on the toggle switch. If the parameter contains a list of options, 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 you to the parameter, select the menu item that 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.

Throughout the descriptions of the Menu items, default values are shown with shaded text.

6.2. TOP LEVEL MENU STRUCTURE

The following is a brief description of the top level of the menu tree that appears when you enter the ON screen menu. Selecting one of these items will take you down into the next menu level to set the value of that parameter. The details of each of the menu items are described in sections 6.4 to 6.9.

VDLY	Sets vertical phase offset from genlock reference
HDLY	Sets horizontal phase offset from genlock reference
FDLY	Sets additional video delay
LOVM	Selects action on loss of input video
BLVL	Sets black level
Y_GN	Sets Luminance gain
C_GN	Sets Chrominance gain
HUE	Sets the Hue (SD video signals only)
LOCK	Sets line locking mode (SD video signals only)
F0V0	Sets the V bit transition line in field 1 (525i/59.94 only)
F1V0	Sets the V bit transition line in field 2 (525i/59.94 only)
AFDM	AFD mode control
AFDL	AFD embed line
AFDC	AFD control code
AFDA	AFD aspect ratio
AFDB	AFD bar type
AFD1	AFD bar 1 size
AFD2	AFD bar 2 size
CBIT	AES C bit control
D1GP	De-embedder 1 group select
D2GP	De-embedder 2 group select
E1EN	Embedder 1 enable
E1GP	Embedder 1 group select
E2EN	Embedder 2 enable
E2GP	Embedder 2 group select
ADLY	Sets additional audio delay – in video frames
ASDL	Adjusts audio delay – in samples
SCH1 to SCH8	Audio channel 1 to channel 8 source select
GCH1 to GCH8	Audio channel 1 to channel 8 gain control
ASRC	Selects audio source to de-embedder or AES (EAES4 version only)
INV1 to INV8	Audio channel 1 to channel 8 inversion control
_SRC	Sets sample rate converter bypass mode (not available on 7746FS-HD version)
BRKA	Sets breakout audio mode (EAES4 version only)

6.3. DISPLAYING THE MODULE STATUS

When you are not in the menu system, the toggle switch is used to send a small help menu and module status report to the serial port accessible from the Card Edge Upgrade header J24 using the standard 7700 upgrade cable. You can use any standard terminal program such as HyperTerminal to monitor the output on the serial port. See the *Upgrading Firmware* chapter in the front of the manual binder for information on connecting your computer to the module using the upgrade cable. The required port settings are 115200 baud, No parity, 8 data bits, 2 stop bits, and no flow control.

To initiate the status display, press the pushbutton when you are not in the menu system. The card edge display will show HELP. Messages shown in *italics* are not available on the 7746FSE version. Messages highlighted in gray may be displayed only on 7746FS-EAES4-HD version. Pressing the toggle switch once displays DIP on the dot matrix display, and outputs the following DIP switch help message on the serial port:

The list of messages shown below is a sample only – messages displayed may differ.

```
========================================
DIP switch settings   UP=off=0   DOWN=on=1
----------------------------------------
1-2-3-4-5-6-7-8
1 . . . . . . . - VistaLINK Control
. 1 . . . . . . - Edge Display Orientation
. . . . 0 0 0 0 - 1080p/23.98sF
. . . . 0 0 0 1 - 1080i/59.94
. . . . 0 0 1 1 -  720p/59.94
. . . . 0 1 0 0 - 1080p/24sF
. . . . 0 1 0 1 - 1080i/60
. . . . 0 1 1 0 - 1080i/50
. . . . 0 1 1 1 -  720p/60
. . . . 1 0 0 0 –  525i/59.94
. . . . 1 0 0 1 -  625i/50
. . . . 1 1 1 1 – Auto detect
1-2-3-4-5-6-7-8
```

Pressing the toggle switch an additional time will display STAT on the dot matrix display, and the status message on the serial port:

```
Current Status:
H/W : build 1
    S/W : v1.2 build 3
    Video Delay (approximate) = 100 ms
    Configured Video standard : 1080i/59.94, spal:1920, sptl:2200, tlpf:1125
    Detected Video standard - : 1080i/59.94 (supported)
    Genlock present - - - - - : 1080i/59.94 tri-level sync detected.
    Audio Delay (approximate) = 100 ms
    Audio Demux status:
      DMX1 : group 1 not detected
      DMX2 : group 2 not detected
```

Pressing the toggle switch an additional time will display SET on the dot matrix display, and will display the following list of settings on the serial port:

```
Current Settings:
V phase (10 lines)
    H phase (0 samples)
    Additional Video Delay (7 frames)
    Freeze Mode (freeze to field 1)
    Black level = 0.00 %IRE
    Luma Gain   = 0.00 dB
    Chroma Gain = 0.00 dB
    Fast Lock disabled.
    Fast Lock Vbit transition line (for 525/59.94) set to 20 (283).
    SRC Bypass (SRCs are enabled)
    Breakout Audio Enable (normal audio mode)
    Demux 1 Group Select (group 1)
    Demux 2 Group Select (group 2)
    Embedder 1 Enable (enabled)
    Embedder 1 Group Select (group 1)
    Embedder 2 Enable (disabled)
    Embedder 2 Group Select (group 2)
    Audio Ch1 source = 1+2
    Audio Ch2 source = 2
    Audio Ch3 source = 3
    Audio Ch4 source = MUTE
    Audio Ch5 source = 5
    Audio Ch6 source = 6
    Audio Ch7 source = 7
    Audio Ch8 source = 8
```

Pressing the toggle switch an additional time will display EDGE on the dot matrix display, and will display the following Card Edge Control help message on the serial port:

```
-----------------------------------------------------
VDLY = vertical (line) delay
HDLY = horizontal (pixel) delay
FDLY = frame delay
LOVM = loss of video (freeze) mode
       _BLK = black
       _FRM = frame
       FLD1 = field 1
       FLD2 = field 2
BLVL = Black Level adjust
Y_GN = Luminance Gain adjust
C_GN = Chromanance Gain adjust
LOCK = Video Fast Lock mode adjust
F0V0 = 525/59.94 V-Bit transition line field 0
F1V0 = 525/59.94 V-Bit transition line field 1
D1GP = audio demux group selection
D2GP = audio demux group selection
E1EN = audio embedder enable
E1GP = audio embedder group selection
E2EN = audio embedder enable
E2GP = audio embedder group selection
ADLY = audio delay control
       FDLY = same as FDLY setting
          # = number of video frames
_SRC = sample rate converter bypass control
       __ON
       BYPS
BRKA = breakout audio mode
       NORM = normal audio routing
       _BRA = breakout audio direct from audio demux
ASRC = audio source selection
       _AES = AES inputs
       _DMX = audio demux as inputs
SCHx = channel x source selection
       1, 2, 3, 4, 5, 6, 7, 8, 1+2, 3+4, 5+6, 7+8, mute
GCHx = channel x gain selection

Use Push button & toggle switch to set behavior
```

6.4. CONFIGURING THE VIDEO PARAMETERS

6.4.1. 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 6-1.

When the *VDLY* or *HDLY* menu items are selected, the toggle switch is used to set the V phase (*VDLY*) or H phase (*HDLY*) of the output video relative to the Genlock reference. Pressing the toggle switch UP increments the value and pressing it DOWN will decrement the value. The V phase and H phase values are shown on the dot matrix display while they are being adjusted.

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 6-1: Valid Standard and Genlock Combinations

Figure 6-1 and Figure 6-2 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.

To aid in setting the Genlock phasing, the lines and samples of delay are logged to the serial port and are accessible from the Card Edge Upgrade header J24 using the standard 7700 upgrade cable. You can use any standard terminal program such as HyperTerminal to monitor the output on the serial port. The required port settings are 57600 baud, No parity, 8 data bits, 2 stop bits, and no flow control.

When DIP switch 1 is ON the V phase and H phase are set using VistaLINK® control.

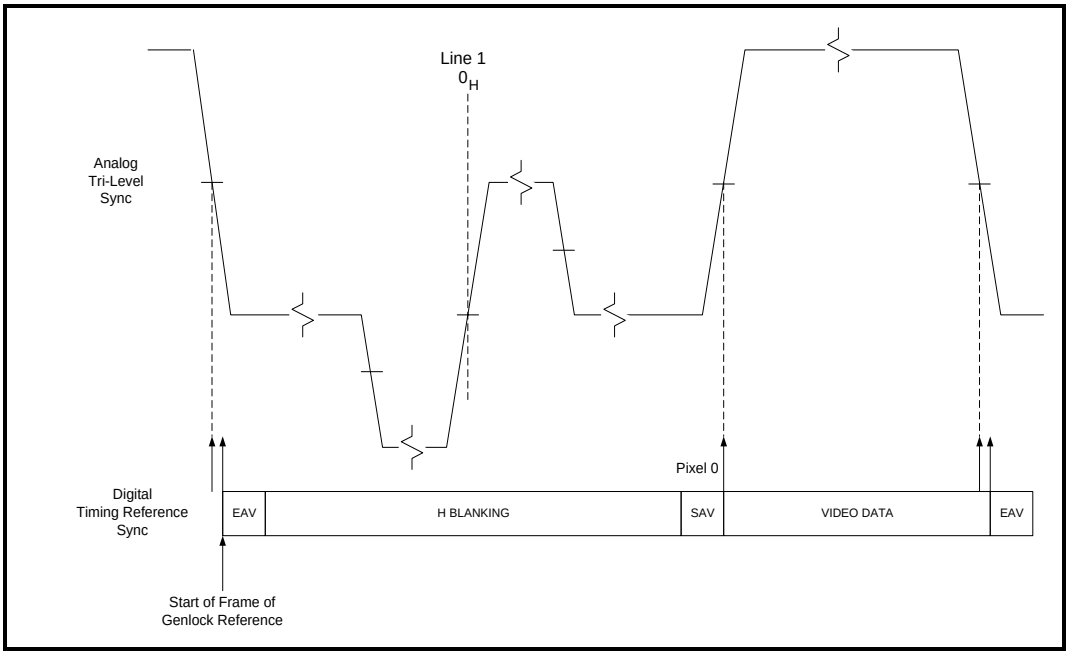


Figure 6-1: Tri-Level Reference Timing

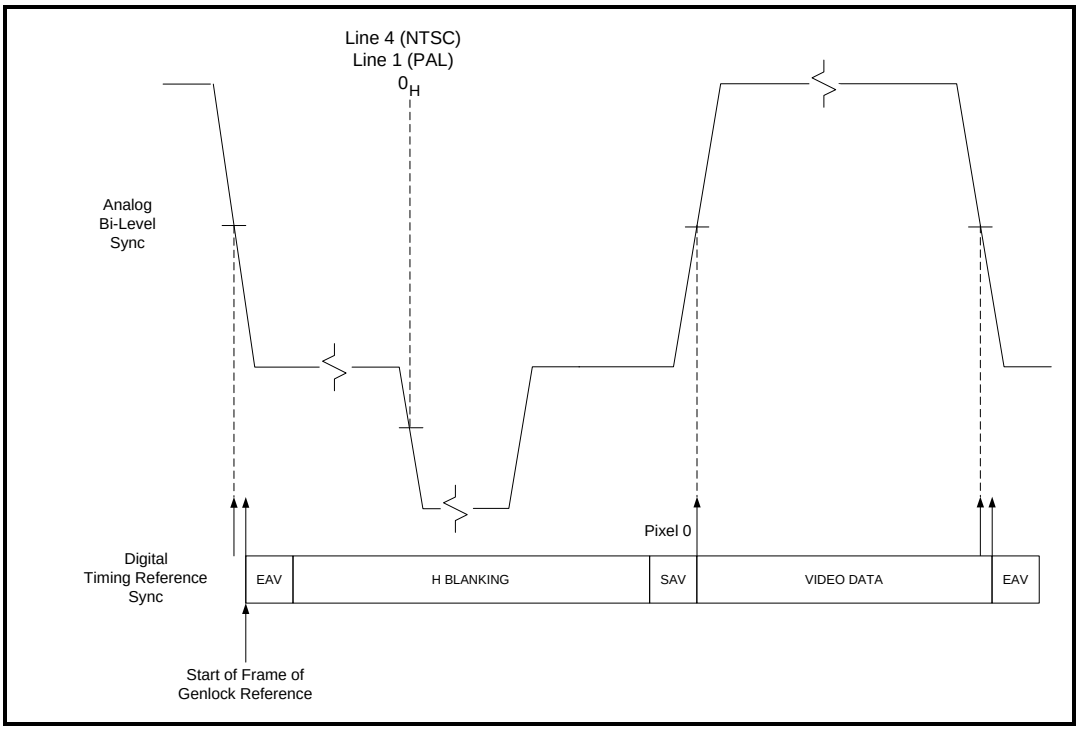


Figure 6-2: Bi-Level Reference Timing

Example:
To delay the output video 2 lines and 2 samples with respect to the input Genlock, first select the *VDLY* menu item. This will set the module into V phase adjust mode. Use the toggle switch to adjust the V phase until the dot matrix display shows `0002` and the logged message on the terminal reads:

```
V=0002 H=xxx
```

Every time the output phase delay is changed a new message will be logged to the screen.

Next select the *HDLY* menu item. This will set the module into H phase adjust mode. Use the toggle switch to adjust the H phase until the dot matrix display shows `0002` logged message on the terminal reads:

```
V=0002 H=0002
```

Press the pushbutton to return to the top level of the menu. This setting will be saved to non-volatile memory approximately 30 seconds after the last change has been made.

The factory default is to align the EAV of Line 1 of the output video with the beginning of the reference frame.

6.4.2. Setting Additional Frames of Synchronizer Delay for the Video

The frame synchronizers can add additional frames of video delay to the minimum delay required in order to synchronize the video. The delay added to the audio can be set to be equal to the video delay or can be independently set. (See section 6.8.5 for information on setting the audio delay.)

The *FDLY* menu item is used to select how much additional delay will be added to the video. Pressing the toggle up or down changes the delay value that will be indicated on the dot matrix display.

When DIP switch 1 is On, the amount of additional delay added to the video is set using VistaLINK® control.

6.4.3. Setting the Action on Loss of Video (Freeze Mode)

The *LOVM* menu item is used to select the action on loss of the input video. This menu item determines whether the synchronizer will display black or the last full frame, field 1 or field 2 of the video when there is no video input. Pressing the toggle up or down changes the freeze mode that will be indicated on the dot matrix display

DISPLAY	FREEZE MODE
BLK	Black
FRM	Last Frame
FLD1	Last Field 1
FLD2	Last Field 2
PASS	Pass Input Signal

Table 6-2: Freeze Mode Settings

When DIP switch 1 is ON the action on loss of input video is set using VistaLINK® control.

Black Freeze Mode:

When the video carrier is lost, video standard is mismatched, or incompatible video standard detected, the output will go to black.

Frame Freeze Mode:

When the video carrier is lost, video standard is mismatched, or incompatible video standard detected, the output will freeze to the last known good frame.

Field 1 Freeze Mode:

When the video carrier is lost, video standard is mismatched, or incompatible video standard detected, the output will freeze to field 1 of the last known good frame.

Field 2 Freeze Mode:

When the video carrier is lost, video standard is mismatched, or incompatible video standard detected, the output will freeze to field 2 of the last known good frame.

Pass Mode:

This mode is the most tolerant of video format errors. Please note that if the data is sufficiently corrupted or the video standard is mismatched, significant frame tearing or drops/repeats may occur with this mode.

When the video standard is set to automatic detection, the frame sync will output the incoming data as the last successfully detected video standard regardless of the condition or format of the incoming video data.

When the video standard is fixed, the output will be forced to the set video standard and will output the video data regardless of the condition or format of the incoming video data.

When the video carrier is lost, the output will freeze to the last known frame. Due to the nature of this mode, the frame may not be completely free of visual errors.

6.5. CONFIGURING THE VIDEO PROCESSING FUNCTIONS

The *Video Processing* controls are used to configure parameters associated with the component video processing.

6.5.1. Setting the Video Black Level (Brightness)

The *BLVL* menu item is used to set the black level (DC offset of the Y channel). For no offset of the black level, set this control to 0. The adjustment range is +/- 7 IRE with ½ IRE resolution.

It is better to set/calibrate this black level control before the video level control is adjusted. If the video level is adjusted first, and you need to adjust this black level control, you will have to go back and correct the video level slightly.

6.5.2. Setting the Video Luminance Level (Contrast)

The *Y_GN* menu item is used to set the gain of the luminance channel of the video (contrast). For unity gain, set this value to 0. The adjustment range is +/- 6dB.

It is better to calibrate the black level control before setting this control.

6.5.3. Setting the Video Chroma Level (Saturation)

The *C_GN* menu item is used to set the gain on the Cb and Cr channels of the video (saturation). For unity gain, set this value to 0. The adjustment range is +/- 6dB.

6.5.4. Setting the Video Hue (SD Video Only)

The *HUE* menu item is used to set the hue of the output signal. For unity gain, set this value to 0. You have greater than +/- 20 deg. range with this control.

6.6. CONFIGURING THE FRAME LOCK PARAMETERS (SD VIDEO ONLY)

The *Frame Lock* controls are used to configure the input phase locking algorithm of the frame synchronizer for standard definition video. There are three menu items used to configure the frame locking parameters. These menu items are not used for high definition video signals.

6.6.1. Setting the Frame Lock Mode

Due to the nature of the standard definition timing reference signals (TRS), there are only a few positions where you can determine the exact picture position in the raster. These are the F-bit and V-bit transitions in the video data. Two of the most useful are the transitions that occur a few lines before and a few lines after the video switch line.

The *LOCK* menu item is used to set the frame locking mode (*Normal* or *Fast*).

In *Normal* locking, the F-bit transition at the beginning of the frame is used to align the video frame. This is suitable for most situations. Unfortunately, if the frame synchronizer is in zero delay mode (additional video frame of delay is set to zero) a picture shift may occur if the sources of video being switched are out of phase.

In this situation the *Fast* lock algorithm can be used. In this locking mode, the V-bit transitions are also used for additional information about the picture position. Even after a switch at the switch line, the picture position is maintained even if the sources of video are out of phase by several lines.

6.6.2. Setting the V Bit Transition Line

The 1 to 0 transition of the V-bit must be in the same line position between the sources of video. This is always true for 625i/50 video, but with some legacy 525i/59.94 equipment this may not be true. According to the SMPTE 125M standard, the V bit 1 to 0 transition (signaling the end of the vertical blanking interval) occurs at line 20 for field 1 and line 283 for field 2. The standard also allows for the V bit transition to occur anywhere between lines 10 and 20. For the frame synchronizer to perform a *Fast* lock, the location of the V bit transition must be known. The *F0V0 and F1V0* menu items are used to set the V bit transition line for field 1 (F bit = 0) and field 2 (F bit = 1) respectively. These two menu items are not used for 625i/50 or high definition video signals.

6.7. CONFIGURING THE ACTIVE FORMAT DESCRIPTION (AFD) PARAMETERS

Active Format Description (AFD) is a method for telling downstream equipment the optimal way to display the associated video content. It is implemented as an embedded packet within the video stream. This packet contains information such as the aspect ratio formatting of the original material, how the material is currently formatted and the primary and secondary ways that the video is best displayed. This information determines whether the video should be letterboxed, pillarboxed, 4:3 or 16:9.

6.7.1. Setting the Active Format Description Mode

The *AFDM* menu item is used to select whether the active format description is enabled or not. Pressing the toggle up or down enables, deletes all or disables the active format description packets as indicated on the dot matrix display.

DISPLAY	ACTIVE FORMAT DESCRIPTION MODE
OFF	No Active Format Description packets are embedded.
DEL	No Active Format Description packets are embedded, and any existing packets in the stream are deleted.
ENBL	Active Format Packets are embedded.

Table 6-3: AFD Mode Selection

6.7.2. Setting the Active Format Embed Line

The *AFDL* menu item is used to select which line the AFD information will be embedded on. Pressing the toggle up or down selects the line number as indicated on the dot matrix display. This value can be set between line 10 and line 20, with the default value being line 12.

DISPLAY	AFD EMBED LINE
10	Line 10
11	Line 11
12	Line 12
…	
20	Line 20

Table 6-4: AFD Embed Line

6.7.3. Setting the Active Format Control Code

Active Format Description works by using a control code, which is encoded to describe what the original source format is, and the primary and secondary ways in which it is best displayed. The *AFDC* menu item is used to set the AFD encoding. Available options as well as descriptions are shown in Figure 6-3. Pressing the toggle up or down selects between the different control codes as indicated on the dot matrix display.

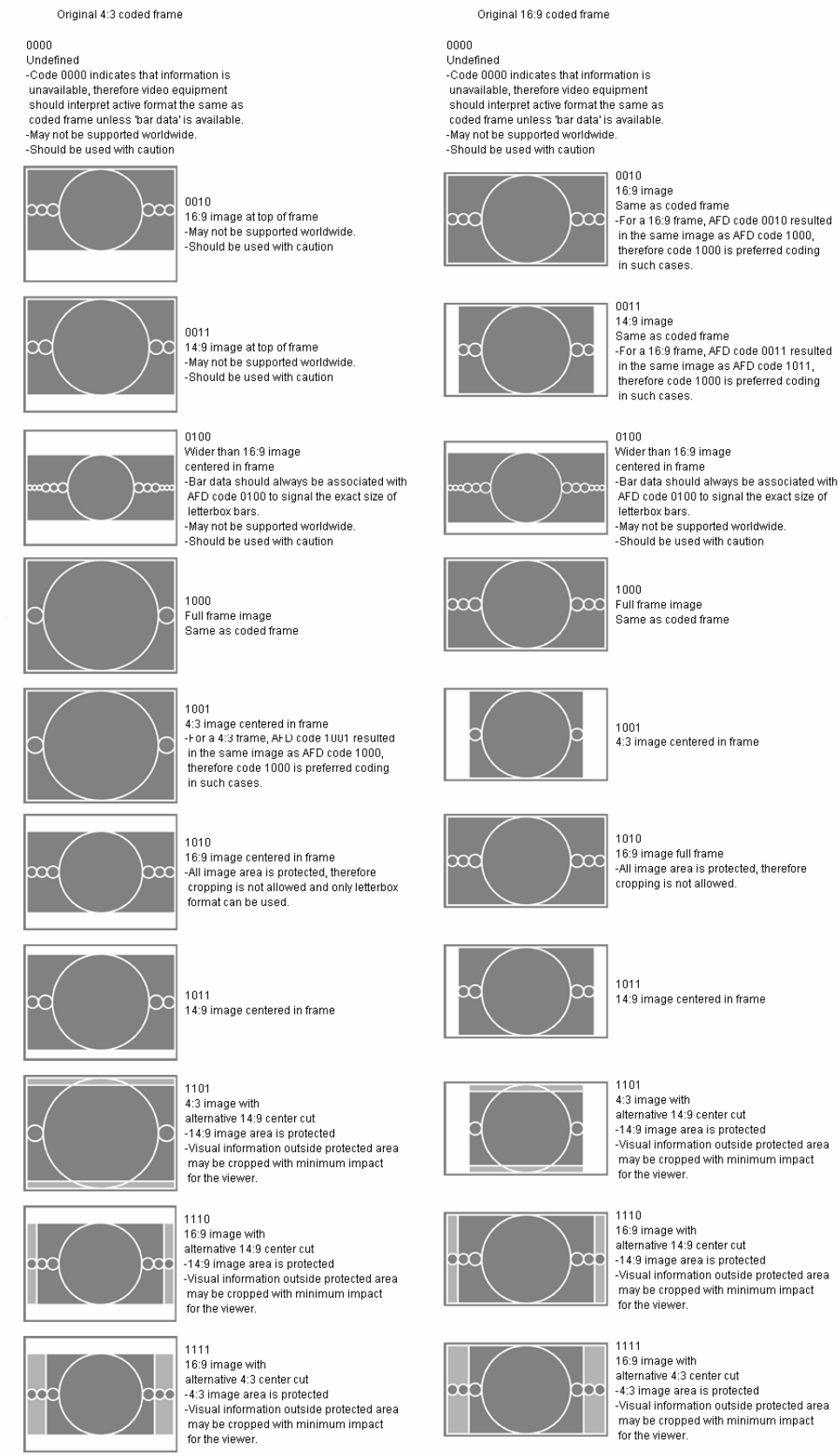


Figure 6-3: AFD Control Codes

6.7.4. Setting the Active Format Description Aspect Ratio

The *AFDA* menu item is used to select the aspect ratio of the source video. This selection affects which encoded scenario is done in conjunction with the AFD control code. Pressing the toggle up or down selects between 16:9 and 4:3 as indicated on the dot matrix display.

DISPLAY	AFD ASPECT RATIO
16.9	Original frame is 16:9 encoded
_4.3	Original frame is 4:3 encoded

Table 6-5: AFD Aspect Ratio

6.7.5. Setting the Active Format Description Bar Type

The *AFDB* menu item selects which type of bars will be created when in manual bar mode (control code 0000). Pressing the toggle up or down selects between letterbox (bars on top and bottom) and pillarbox (bars on left and right) as indicated on the dot matrix display. The size of the bars is set by the line 1 and line 2 bar size controls.

DISPLAY	AFD BAR TYPE
LETR	Custom bars will be letterboxed
PILL	Custom bars will be pillarboxed

Table 6-6: AFD Bar Type

6.7.6. Setting the Active Format Description Bar Size

The *AFD1* and *AFD2* menu items select the line size of bar 1 and bar 2 respectively. The values available for this menu item is dependent on the current operating video standard and the bar type selection value. Pressing the toggle up or down selects the line size as indicated on the dot matrix display.

6.8. CONFIGURING THE AUDIO PARAMETERS

6.8.1. Setting the Audio Sample Rate Converter Mode (not available on 7746FS-HD version)

The *_SRC* menu item is used to select whether sample rate conversion is enabled or not. Pressing the toggle up or down enables or disables the sample rate converters as indicated on the dot matrix display.

DISPLAY	SAMPLE RATE CONVERTER MODE
ON	Audio is sample rate converted at 48 kHz that is synchronous to the input video. Audio can be either synchronous or asynchronous to the video source.
BYPS	The content of the audio is preserved without any loss, and directly embedded into the input video. Audio must be synchronous to the video source. This setting is required for Dolby E.

Table 6-7: Sample Rate Converter Settings

When DIP switch 1 is On the audio sample rate converter mode is set using VistaLINK® control.

6.8.2. Setting the Audio Breakout Mode (7746FS-EAES4-HD version only)

The *BRKA* menu item is used to select the audio breakout mode. Pressing the toggle up or down enables or disables audio breakout mode as indicated on the dot matrix display.

When "Audio Breakout" mode is enabled, the audio de-embedder's outputs are routed directly to the AES outputs, bypassing any rate conversion or synchronization. When audio breakout mode is disabled, the synchronized audio input is presented to the AES outputs. Regardless of whether the *Audio breakout mode* is enabled or not, the audio input for synchronization is always selected by the *ASRC* menu item, and the audio embedder always receives the synchronized audio input. (See section 6.8.6 for information on selecting the audio source).

DISPLAY	AUDIO BREAKOUT MODE
NORM	Audio breakout mode disabled.
BRA	Audio breakout mode enabled.

Table 6-8: Audio Breakout Mode Settings

When DIP switch 1 is ON, the audio breakout mode is set using VistaLINK® control.

6.8.3. Selecting the Audio Groups That Will Be De-embedded

The SMPTE 299M and SMPTE 272M standards permit up to 4 groups of 4 audio channels to be embedded into the video bitstream. The frame synchronizer de-embeds two groups of audio that can be selected as the source for synchronization and embedding on the output video. (See section 6.8.6 for information on selecting the audio source). The *D1GP* and *D2GP* menu items are used to set the group for de-embedder 1 (*D1GP*) or de-embedder 2 (*D2GP*). Pressing the toggle up or down changes the group as indicated on the dot matrix display.

DISPLAY	DE-EMBEDDER AUDIO GROUP
1	1 (Default for de-embedder 1)
2	2 (Default for de-embedder 2)
3	3
4	4

Table 6-9: Audio De-Embedder Group Settings

When DIP switch 1 is ON, the audio de-embedder groups are set using VistaLINK® control.

6.8.4. Selecting The Audio Groups That Will Be Embedded

The SMPTE 299M and SMPTE 272M standards permit up to 4 groups of 4 audio channels to be embedded into the video bitstream. The frame synchronizer has two embedders that each embed one group of audio from the source selected for synchronization. (See section 6.8.6 for information on selecting the audio source).

The *E1EN* and *E2EN* menu items are used to enable or disable embedder 1 (*E1EN*) or embedder 2 (*E2EN*). Pressing the toggle up or down enables or disables respective audio embedder as indicated on the dot matrix display.

DISPLAY	EMBEDDER MODE
OFF	Embedder Disabled
ON	Embedder Enabled.

Table 6-10: Audio De-Embedder Group Settings

The *E1GP* and *E2GP* menu items are used to set the group where audio will be placed for embedder 1 (*E1GP*) or embedder 2 (*E2GP*). Pressing the toggle up or down changes the group as indicated on the dot matrix display.

DISPLAY	EMBEDDER AUDIO GROUP
1	1 (Default for embedder 1)
2	2 (Default for embedder 2)
3	3
4	4

Table 6-11: Audio Embedder Group Settings

When DIP switch 1 is On the audio embedder groups are set using VistaLINK® control. The audio embedders are also enabled or disabled using VistaLINK® control.

6.8.5. Setting Additional Frames of Synchronizer Delay for the Audio

The frame synchronizer can add up to 12 additional frames of delay to the audio for interlaced video formats and up to 28 frames for progressive video formats. The audio delay can be set to follow the video delay setting or it can be independently set. The *ADLY* menu item is used to select how much additional audio delay will be added. Pressing the toggle up or down changes the delay value that will be indicated on the dot matrix display.

DISPLAY	ADDITIONAL DELAY
0	0 frames
1	1 frames
2	2 frames
…	
VDLY	Same as Video Delay setting

Table 6-12: Audio Delay Settings

When DIP switch 1 is ON, the additional audio delay is set using VistaLINK® control.

6.8.6. Adjusting Synchronizer Delay for the Audio

The *ASDL* menu item allows the audio to be advanced or delayed from audio frame delay (set by the *ADLY* menu item) over a range of -999 to 999 audio samples (approximately -20.8ms to 20.8 ms). If the audio frame delay of the card (set by the *ADLY* menu item) is set to 0 frames of delay, the lower limit of the delay range is adjusted to 0 samples, instead of -999.

An example for the use of this control would be to advance Dolby-E if it has undergone an accumulated delay pushing it out of frame alignment.

DISPLAY	DELAY ADJUSTMENT FROM NOMINAL (*ADLY)* DELAY
-999	999 samples less delay
-2	2 samples less delay
-1	1 sample less delay
0	0 samples
1	1 sample additional delay
2	2 sample additional delay
…	
999	999 samples additional delay

Table 6-13: Audio Delay Settings

When DIP switch 1 is ON, the additional audio delay is set using VistaLINK® control.

6.8.7. Selecting the Audio Source (7746FS-EAES4-HD version only)

The *ASRC* menu item is used to select whether the audio for synchronization will be taken from the AES inputs or the de-embedders. When the de-embedders are selected as the source, the audio group must be selected using the *D1GP* and *D2GP* menu items. (See section 6.8.3 for information on selecting the de-embedder groups.) The embedders can be individually enabled or disabled and the user can select the embedding group for each of the embedders. (See section 6.8.4 for information on controlling the embedders.) Normally the audio selected as the source is synchronized along with the video, re-embedded on the outputs and output as AES. When *Audio Breakout mode* is enabled, audio from the de-embedders bypasses the synchronization and is output without delay on the AES outputs. (See section 6.8.2 for information about audio breakout mode.)

DISPLAY	SOURCE FOR	
	Embedder 1 & AES 1 and AES 2 Outputs	**Embedder 2 & AES 3 and AES 4 Outputs**
AES	AES 1, AES 2 Inputs	AES 3, AES 4 Inputs
DMX	De-embedder 1 group	De-embedder 2 group

Table 6-14: Audio Source Settings

When DIP switch 1 is ON, the audio embedder sources are set using VistaLINK® control.

6.9. CONFIGURING THE AUDIO PROCESSING FUNCTIONS

The Audio Processing controls are used to configure parameters associated with the manipulation of the audio content. There are similar control items to adjust the routing and processing of each of the 8 audio channels. For simplicity only the control items for channel 1 will be shown in the manual.

6.9.1. Re-mapping the Audio Channels

The Channel mapping controls (*SCH1* to *SCH8*) permit basic audio channel routing and manipulation. Pressing the toggle up or down changes the source for the respective output audio channel as indicated on the dot matrix display.

Any single input channel can be routed to any output channel. The default is to route the input channel corresponding to the output (e.g. input channel 1 to output channel 1). A mono mix of any L/R input pair can also be output on any channel (e.g. a mono mix of input channels 1 and 2 to output channel 1). Output channels can also be muted.

DISPLAY	CHANNEL SOURCE
1	Select channel 1 (Default for Channel 1)
2	Select channel 2 (Default for Channel 2)
3	Select channel 3 (Default for Channel 3)
4	Select channel 4 (Default for Channel 4)
5	Select channel 5 (Default for Channel 5)
6	Select channel 6 (Default for Channel 6)
7	Select channel 7 (Default for Channel 7)
8	Select channel 8 (Default for Channel 8)
1+2	Mono mix of channel 1 & 2
3+4	Mono mix of channel 3 & 4
5+6	Mono mix of channel 5 & 6
7+8	Mono mix of channel 7 & 8
MUTE	Mute output channel

Table 6-15: Output Audio Channel Source Selection

6.9.2. Setting the Audio Levels

The audio gain controls (G*CH1* to G*CH8*) are used to adjust the level of the respective output audio channel. The gain controls have a range of +/-24 dB with 1/10 dB resolution. The displayed value is the amount of gain (+ve), or attenuation (-ve), in decibels, where 0dB corresponds to unity gain.

Whenever +ve gain is configured, there is the possibility of distortion due to clipping. If the input audio level is increased to greater than 0dB FS, by adding gain, then the output audio will be limited at 0dB FS.

6.10. CONFIGURING THE VIDEO THUMBNAIL FUNCTIONS

When DIP switch 1 is On, the *Video Thumbnail* controls used to configure parameters associated with capturing and sending thumbnail video images over Ethernet can be controlled and monitored using VistaLINK®. These controls allow the user to enable thumbnails, set their size and the IP address where they will be sent.

6.11. CONFIGURING THE LINE BLANKING CONTROLS

When DIP switch 1 is On, the *Line Blank* controls are used to selectively blank lines 6-29 in both field 1 and field 2, and they are controlled and monitored using VistaLINK®. These controls allow the user to enable or disable each line in both fields individually.

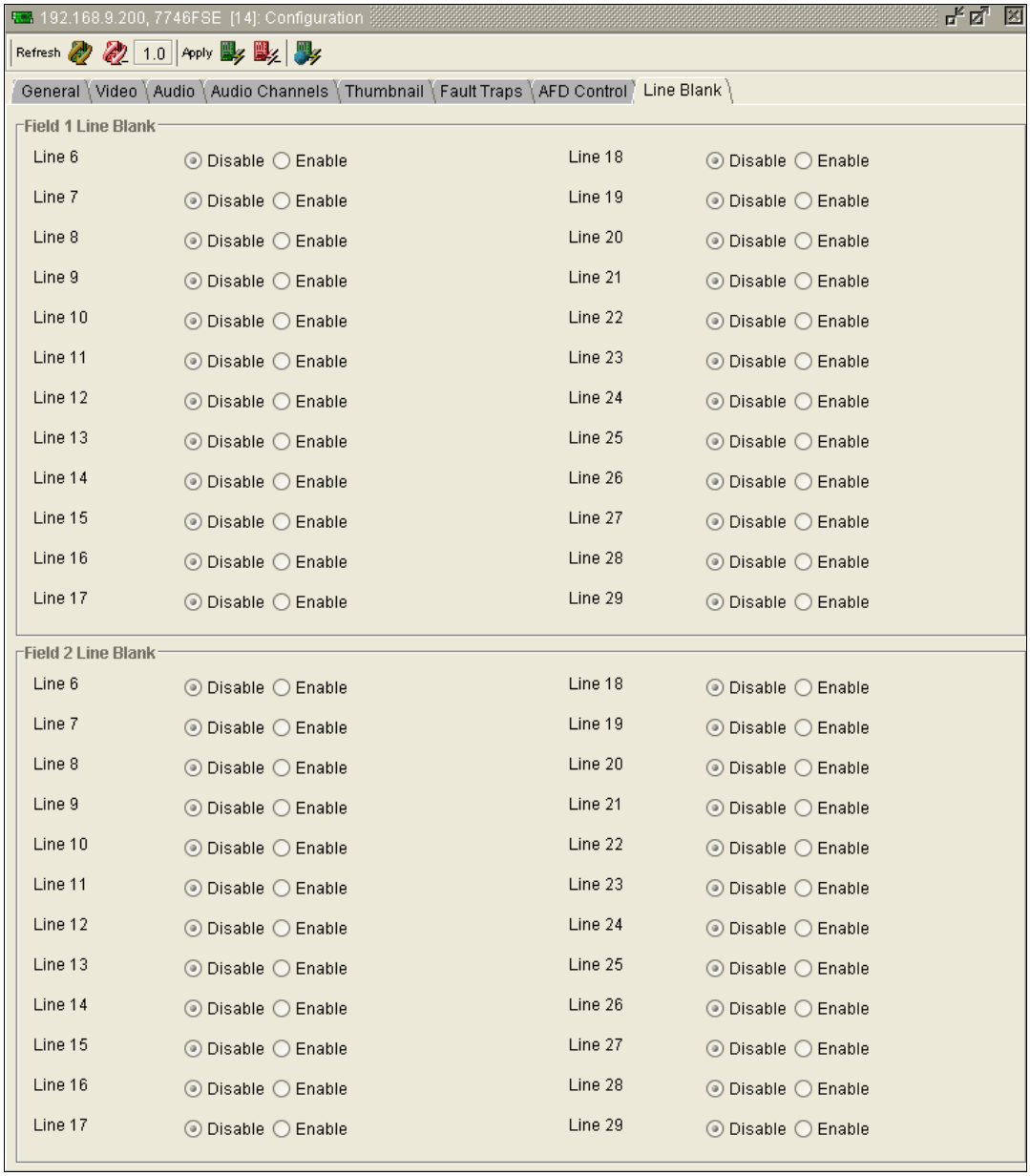


Figure 6-4: VistaLINK® PRO - Line Blank Controls

7. EVENT LOGGING

To assist in system verification, events are logged by the frame synchronizer to the serial port accessible from the Card Edge Upgrade header J24 using the standard 7700 upgrade cable. You can use any standard terminal program such as HyperTerminal to monitor the output on the serial port. See the *Upgrading Firmware* chapter in the front of the manual binder for information on connecting your computer to the module using the upgrade cable. The required port settings are No parity, 8 data bits, 2 stop bits, and no flow control. The baud rate is 57600 baud for the 7746FS-HD and 7746FS-EAES4-HD models and 115200 Baud for the 7746FSE and 7746FSE-HD models.

Table 7-1 and Table 7-2 list the messages that are logged by the frame synchronizer under normal operation. Some messages are not supported in all versions of the synchronizer. Messages generated by control parameter changes are not shown.

Logged Message	Event Description
Genlock present: (detected type)	Output video is genlocked, detected type is reported
Genlock Free running: (status)	Output video is free running – reason given
Genlock invalid: (reason)	Genlock signal is present but incompatible with video standard
Input Switch	Change in input video phase detected
Video Present	Input video is present
Loss of Video	Input video is lost
Repeat	Video frame was repeated
Drop	Video frame was dropped
Video standard Autodetect: (type)	Valid input video standard auto-detected – standard reported
Video standard Set: (type)	Video standard that the module is set to
Audio Jam synced	Audio delay has been adjusted (not available on 7746-FS-HD version - occurs in SRC bypass mode only)

Table 7-1: Common Logged Event Messages

Logged Message	Event Description
AES1 unlocked	AES1 input not present or invalid
AES1 locked	AES1 input present
AES2 unlocked	AES2 input not present or invalid
AES2 locked	AES2 input present
AES3 unlocked	AES 3 input not present or invalid
AES3 present	AES 3 input present
AES4 unlocked	AES 4 input not present or invalid
AES4 present	AES 4 input present

Table 7-2: Logged Event Messages only on EAES4 version

8. JUMPERS

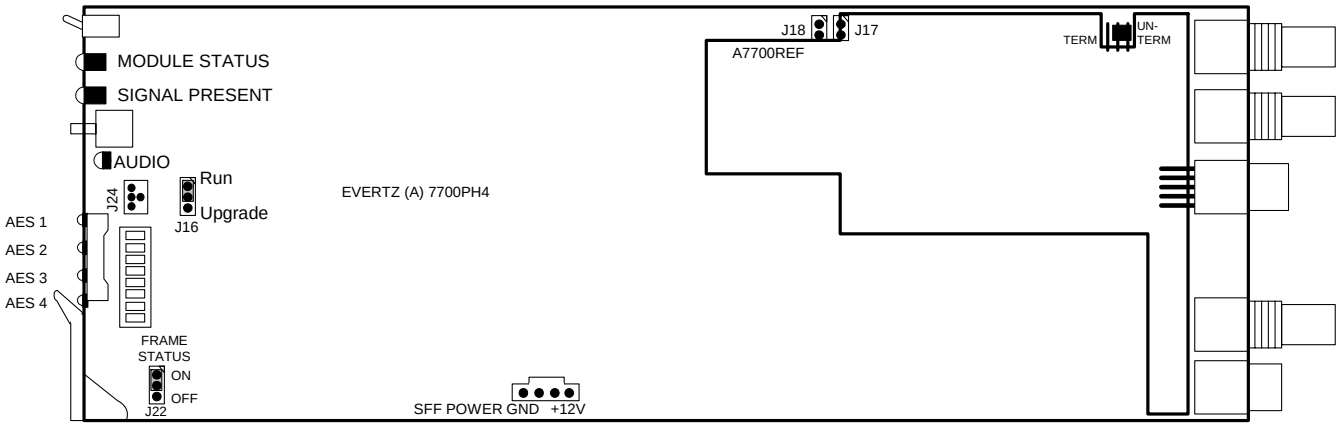


Figure 8-1: Location of Jumpers on 7746FS-HD

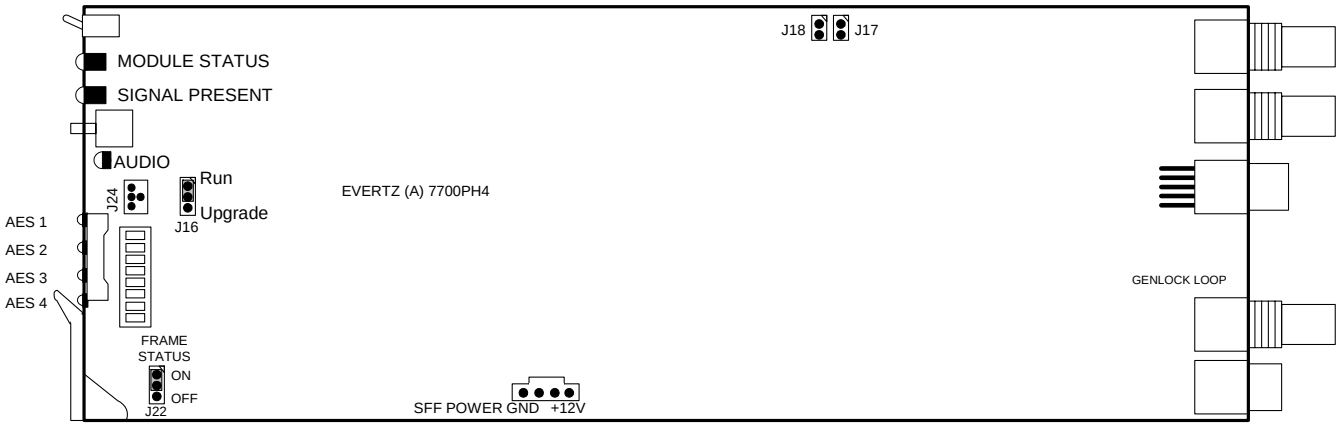


Figure 8-2: Location of Jumpers on 7746FSE, 7746FSE-HD and 7746FS-EAES4-HD

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

FRAME STATUS: The FRAME STATUS jumper located at the front of the module determines whether local faults (as shown by the Local Fault indicator) will be connected to the 7700FR 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.

8.2. CONFIGURING THE MODULE FOR FIRMWARE UPGRADES

UPGRADE: The UPGRADE jumper J16 located at the front of the module 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 Jumper J16 into the *UPGRADE* position. Install the Upgrade cable provided (located in the vinyl pouch in the front of this manual) onto header J24 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 J16 into the *RUN* position, remove the upgrade cable and re-install the module. The module is now ready for normal operation.

8.3. SELECTING WHETHER THE GENLOCK REFERENCE INPUT IS TERMINATED

TERM/UNTERM: The GENLOCK TERM/UNTERM jumper is used to terminate the genlock input. When it is in the TERM position a 75 ohm terminating resistor will connect the input to ground. When it is in the UNTERM position the genlock input will be high impedance. The jumper is located in different places depending on the version of the frame synchronizer.

On the 7746FS-HD version, jumper J2 located on the A7700REF genlock sub-module is used to terminate the genlock input.

On the 7746FSE, 7746FSE-HS and 7746FS-EAES4-HD versions, jumper J3 located on the A7700-AES4-2 sub-module is used to terminate the genlock input.

Please note that on the newer version of the board, (c)7700-AES4-3 sub-module, Jumper J4 is used to terminate the genlock input.

8.4. SELECTING WHETHER THE DARS REFERENCE INPUT IS TERMINATED (7746FS-EAES4-HD ONLY)

DARS: The DARS jumper J5 located on the A7700-AES4-2 sub-module is used to terminate the DARS input. When it is in the TERM position a 75 ohm terminating resistor will connect the DARS input to ground. When it is in the UNTERM position the DARS input will be high impedance. The DARS input is currently not supported.

8.5. RESETTING THE MODULE TO ITS FACTORY DEFAULT CONDITION

This operation will completely reset the module and all user settings will be erased. Make sure you want to reset the module before you proceed.

Occasionally users want to reset the module to its factory default condition. The following procedure allows you to erase all user settings and restore the factory settings.

You will need the following equipment in order to reset the card to its factory defaults:

- PC with available communications port.
- Terminal program that is capable of Xmodem file transfer protocol (such as HyperTerminal).
- Special Serial Upgrade cable supplied with the 7700FR-C frame. This cable is normally in the vinyl pouch at the front of this manual. (Evertz part #WA-76). A "Straight-thru" serial extension cable (DB9 female to DB9 male) may be required if you need to extend the length of the WA-S76 serial upgrade cable.

Reset Procedure:

1. Remove the module from the frame.

2. Move the UPGRADE jumper into the *UPGRADE* position.

3. Connect the 7700PB Serial Upgrade cable to the 2 row x 3 pin header labelled J24. Install the cable with the ribbon cable towards the front of the board.

4. Connect the 9 pin connector on the end of the Serial Update cable to the PCs' RS-232 communications port.

5. Start the terminal program.

6. Configure the port settings of the terminal program as follows:

Model	**7746FS-HD 7746FS-EAES4-HD**	**7746FSE 7746FSE-HD**
Baud	57600	115200
Parity	no	no
Data bits	8	8
Stop bits	2	2
Flow Control	None	None

7. Install the module into the frame. After the module powers up, a banner with the boot code version information should appear in the terminal window.

For example:

```
EVERTZ MFC5407 MONITOR 2.1.3
COPYRIGHT 1997, 1998, 1999, 2000, 2001, 2002 EVERTZ MICROSYSTEMS LTD.
UPGRADE JUMPER INSTALLED

UPLOAD FILE NOW, CONTROL-X TO CANCEL
```

8. The following is a list of possible reasons for failed communications:

   - Defective Evertz Serial Upgrade cable.
   - Wrong communications port selected in the terminal program.
   - Improper port settings in the terminal program. (Refer to step 6 for settings).

9. Press the <CTRL> and <X> keys 5 times quickly to break out of the load prompt, then press the <CTRL> and <X> keys one more time. This will bring you to the boot prompt.

10. Type the word “reset”, without quotes, and hit the <ENTER> key once. The boot code will ask `Are you sure?` Type "y", without quotes.

11. Wait one minute, power down the module. Remove the module from the frame and disconnect the Serial Upgrade cable from the module. Restore the UPGRADE jumper to the *RUN* position. Reinsert the module into the frame.

12. You can now close the terminal program and disconnect the RS-232 serial cable from the PC.

The module is now set to factory defaults**.**

9. TYPICAL CONFIGURATIONS

9.1. SYNCHRONIZE VIDEO WITH EMBEDDED AUDIO (UNCOMPRESSED)

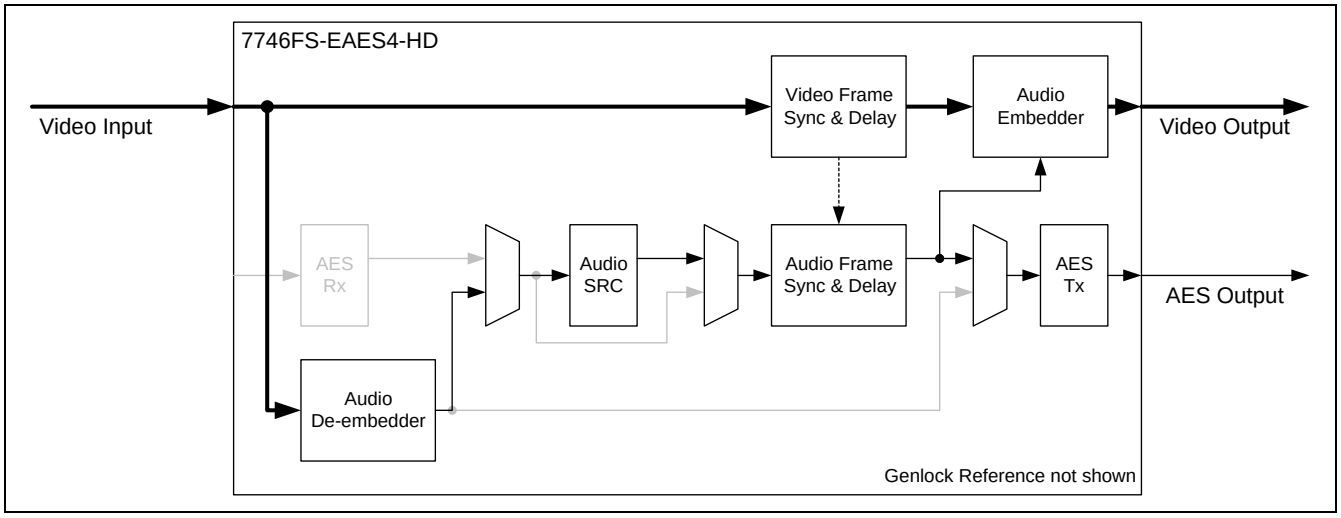


Figure 9-1: Synchronize Video with Embedded Audio (Uncompressed)

Video Input: Video with embedded audio (uncompressed PCM) in Group 1 & 2.

Video Output: Synchronized video with synchronized audio re-embedded into Group 1 & 2.

AES Output: Synchronized audio from embedded group 1 & 2.

Control Settings:

ASRC: Audio Source = DMX

_SRC: SRC Mode = ON

BRKA: Breakout Audio = NORM

D1GP: De-embedder 1 Group = 1

D2GP: De-embedder 2 Group = 2

E1EN: Embedder1 enable = ON

E1GP: Embedder1 Group = 1

E2EN: Embedder2 enable = ON

E2GP: Embedder2 Group = 2

9.2. SYNCHRONIZE VIDEO WITH SEPARATE AES AUDIO

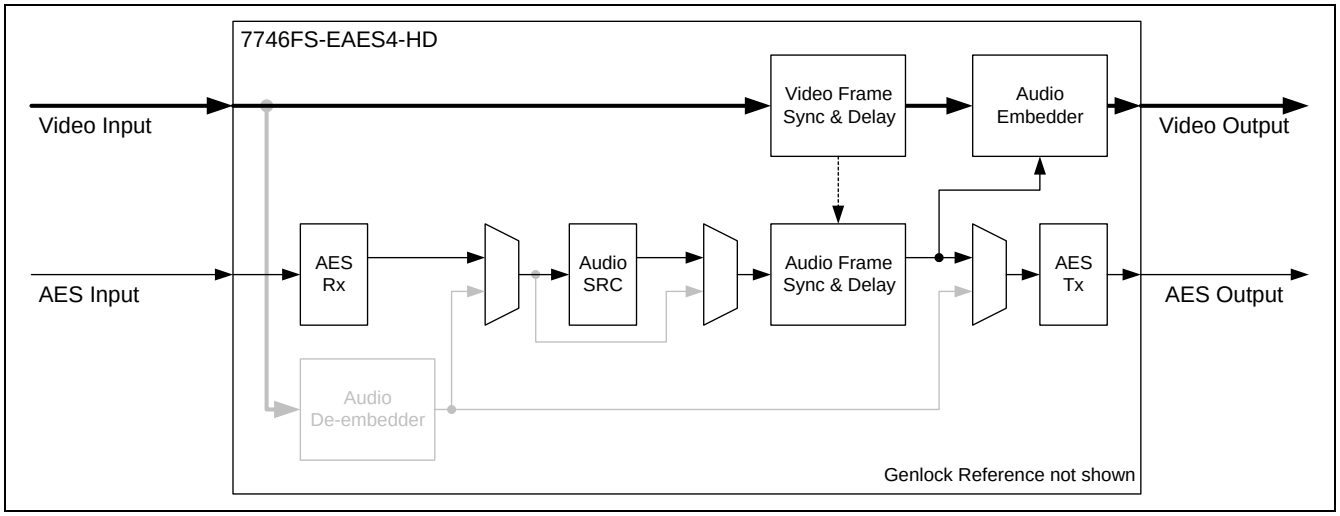


Figure 9-2: Synchronize Video with Separate AES Audio

Video Input: Video with embedded audio (uncompressed PCM) in Group 1 & 2.

Audio Input: 4 AES.

Video Output: Synchronized video with synchronized audio from AES inputs into Group 1 & 2.

AES Output: Synchronized audio from AES inputs. Embedded audio from Video input is discarded.

Control Settings:

ASRC: Audio Source = AES

_SRC: SRC Mode = ON

BRKA: Breakout Audio = NORM

E1EN: Embedder1 enable = ON

E1GP: Embedder1 Group = 1

E2EN: Embedder2 enable = ON

E2GP: Embedder2 Group = 2

9.3. DELAY VIDEO AND EMBED COMPRESSED AUDIO FROM AES

Video Input: Video that is synchronous to genlock reference.

Audio Input: Synchronous AES input with compressed audio.

Video Output: Delayed video with audio embedded into Group 1 & 2.

AES Output: Delayed audio output.

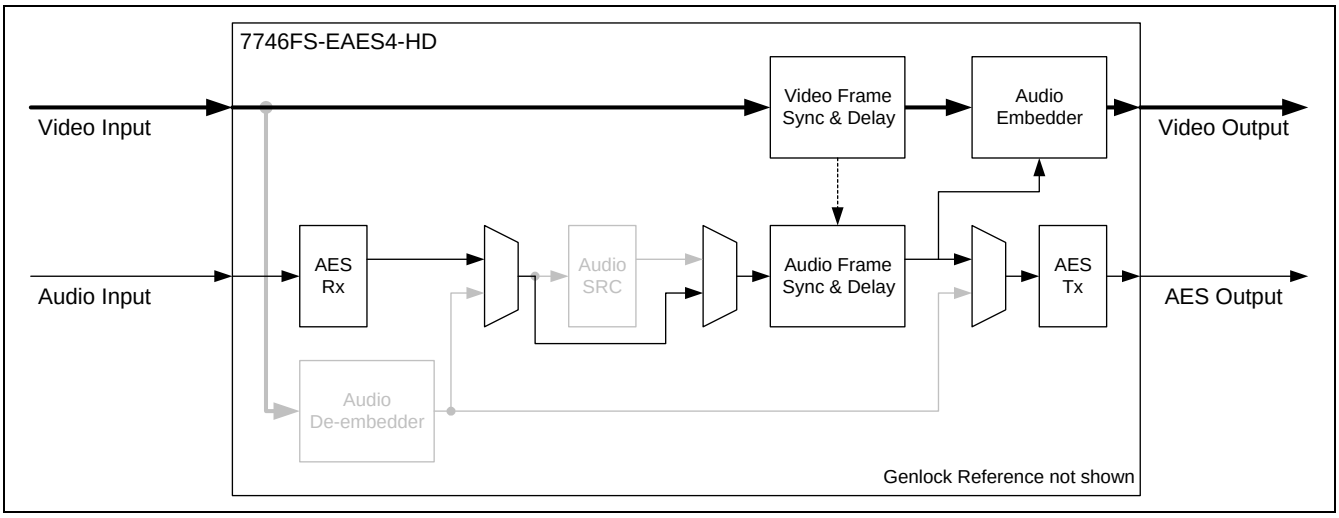


Figure 9-3: Delay Video and Embed Compressed Audio from AES

Control Settings:

ASRC: Audio Source = AES

_SRC: SRC Mode = BYPS

BRKA: Breakout Audio = NORM

E1EN: Embedder1 enable = ON

E1GP: Embedder1 Group = 1

E2EN: Embedder2 enable = ON

E2GP: Embedder2 Group = 2

9.4. SYNCHRONIZE VIDEO WITH EMBEDDED COMPRESSED AUDIO, OUTPUT THE AUDIO TO EXTERNAL DECOMPRESSOR AND THEN SYNCHRONIZE AND EMBED THE UNCOMPRESSED AUDIO

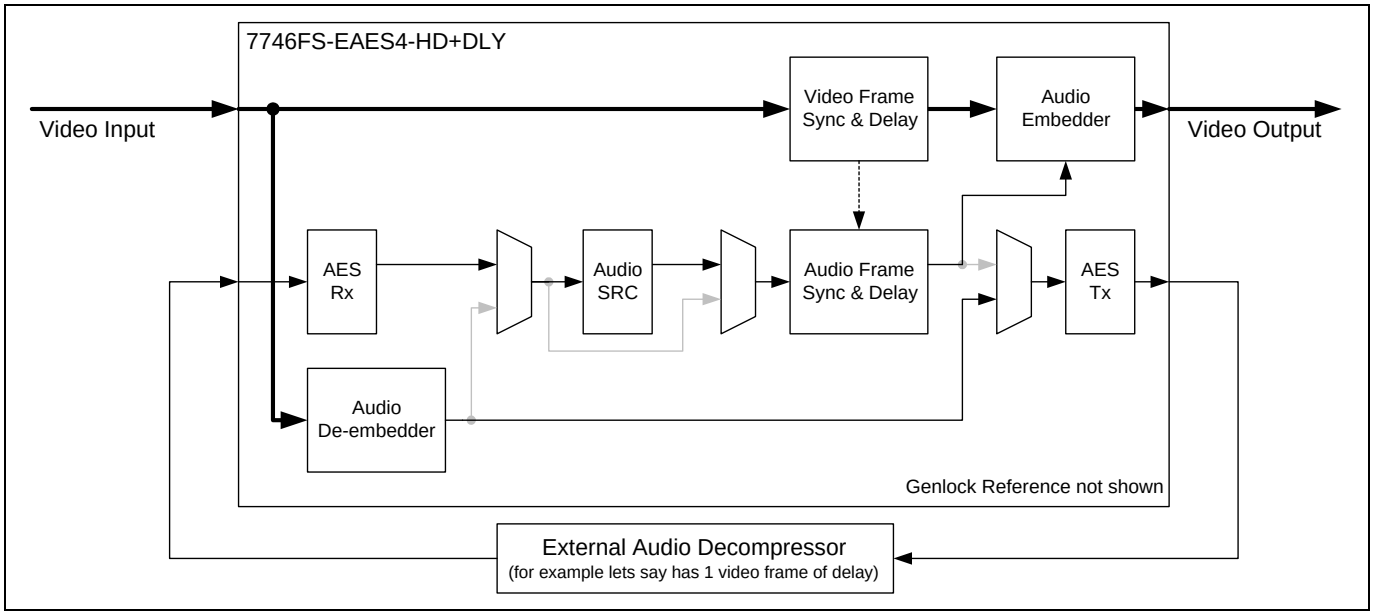


Figure 9-4: Synchronize Video with Embedded Compressed Audio, Output the Audio to External Decompressor and then Synchronize and Embed the Uncompressed Audio

Video Input: Video with compressed embedded audio.

Audio Input: From an external audio decompressor.

Video Output: Synchronized video with embedded and synchronized uncompressed audio.

AES Output: Compressed audio.

Control Settings:

ASRC: Audio Source = AES

FDLY: Extra video delay = +1 frames

_SRC: SRC Mode = ON

BRKA: Breakout Audio = BRA

D1GP: De-embedder 1 Group = 1

D2GP: De-embedder 2 Group = 2

E1EN: Embedder1 enable = ON

E1GP: Embedder1 Group = 1

E2EN: Embedder2 enable = ON

E2GP: Embedder2 Group = 2

ADLY: Extra audio delay = 0 frames

9.5. DELAY VIDEO WITH EMBEDDED UNCOMPRESSED AUDIO, OUTPUT THE AUDIO TO EXTERNAL COMPRESSOR AND THEN EMBED THE COMPRESSED AUDIO

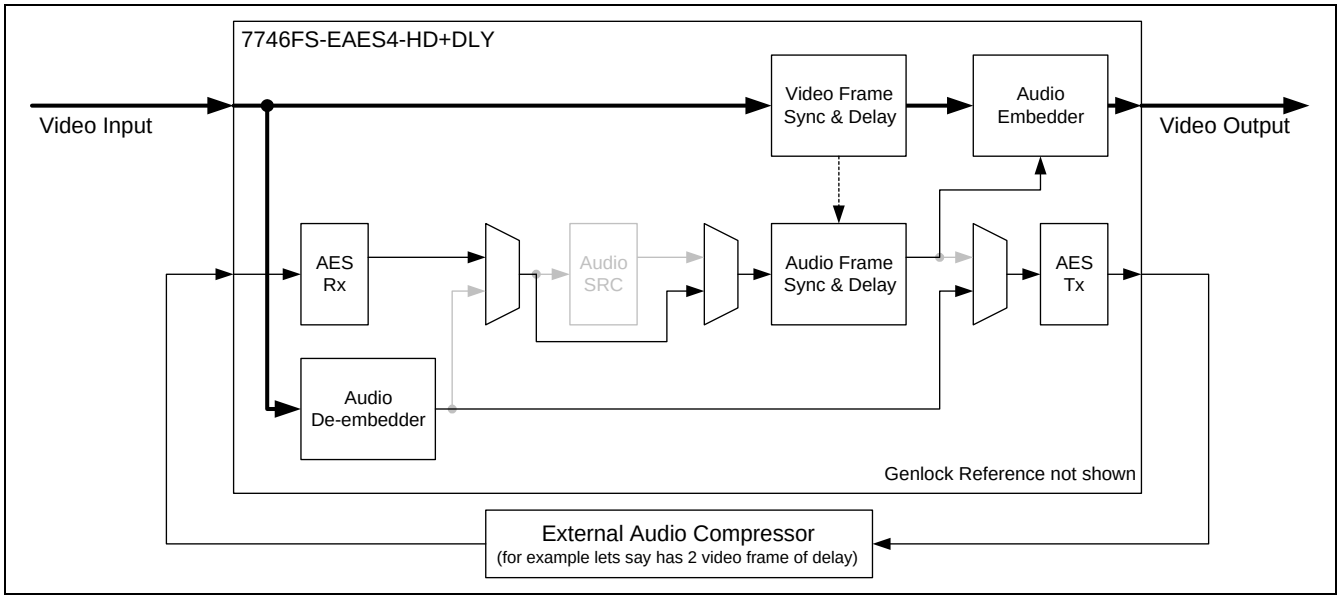


Figure 9-5: Delay Video with Embedded Uncompressed Audio, Output the Audio to External Compressor and then Embed the Compressed Audio

Video Input: Video with uncompressed embedded audio.

Audio Input: From an external audio compressor.

Video Output: Synchronized video with embedded and synchronized compressed audio.

AES Output: Uncompressed audio.

Control Settings:

ASRC: Audio Source = AES

FDLY: Extra video delay = +2 frames

_SRC: SRC Mode = ON

BRKA: Breakout Audio = BRA

D1GP: De-embedder 1 Group = 1

D2GP: De-embedder 2 Group = 2

E1EN: Embedder1 enable = ON

E1GP: Embedder1 Group = 1

E2EN: Embedder2 enable = ON

E2GP: Embedder2 Group = 2

ADLY: Extra audio delay = 0 frames

9.6. SYNCHRONIZE VIDEO AND DEMUX AUDIO TO AES OUTPUTS, AND EMBED NEW AUDIO FROM AES INPUTS

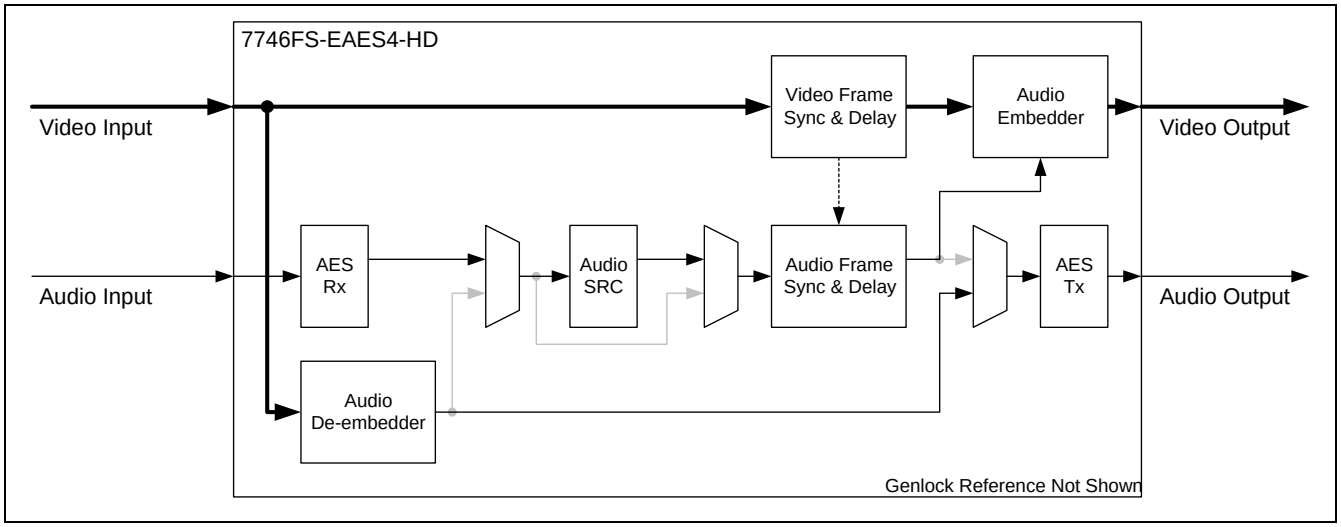


Figure 9-6: Synchronize Video and De-embed Audio to AES Outputs, and Embed New Audio from AES Inputs

Video Input: Video with embedded audio.

Audio Input: From an external audio source.

Video Output: Synchronized video with embedded and synchronized external AES.

AES Output: De-embedded audio from input video.

Control Settings:

ASRC: Audio Source = AES

_SRC: SRC Mode = ON

BRKA: Breakout Audio = BRA

D1GP: De-embedder 1 Group = 1

D2GP: De-embedder 2 Group = 2

E1EN: Embedder1 enable = ON

E1GP: Embedder1 Group = 1

E2EN: Embedder2 enable = ON

E2GP: Embedder2 Group = 2

10. VISTALINK® REMOTE MONITORING/CONTROL

10.1. 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 products.

2. Managed devices (such as the frame synchronizers), 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.

10.2. VISTALINK® MONITORED PARAMETERS

The following parameters can be remotely monitored through the VistaLINK® interface:

Parameter	Description
Card Type	Indicates version of the Frame Synchronizer
Master Jumper	Indicates whether the card is in Remote or Local Mode
Input Video Not Present	Indicates the presence of a valid video input signal (the state of the VIDEO PRESENT LED)
Video Input Fail	Indicates interrupting of the input video
Input Video Standard	Indicates video format of input signal
Genlock Not Present	Indicates the presence of a valid video genlock reference signal
AES 1 Not Present	Indicates that AES 1 audio is not present (EAES4 version only)
AES 2 Not Present	Indicates that AES 2 audio is not present (EAES4 version only)
AES 3 Not Present	Indicates that AES 3 audio is not present (EAES4 version only)
AES 4 Not Present	Indicates that AES 4 audio is not present (EAES4 version only)
Demux 1 Group Not Present	Indicates that Demux 1 group audio is not present
Demux 2 Group Not Present	Indicates that Demux 2 group audio is not present

Table 10-1: VistaLINK® Monitored Parameters

10.3. VISTALINK® CONTROLLED PARAMETERS

Parameter	Description
Video Standard	Sets the video standard
V Phase	Sets the vertical phase with respect to the genlock reference
H Phase	Sets the horizontal phase with respect to the genlock reference
Additional Video Delay	Sets additional Video Delay
Video Freeze Mode	Sets action on loss of input video
Lock Type	Sets the line locking mode (SD Video Only)
V Bit Transition Line – Field 1	Sets the V Bit Transition line in field 1 (525/59.94 signals only)
V Bit Transition Line – Field 2	Sets the V Bit Transition line in field 2 (525/59.94 signals only)
Sample Rate Converter Enable	Enables and disables the sample rate converters (not available on 7746FS-HD version)
Audio Source	Selects audio source to de-embedded or AES (EAES4 version only)
Audio Breakout Mode	Enables and disables audio breakout mode (EAES4 version only)
Audio De-embedder 1 Source	Sets source group for de-embedder 1
Audio De-embedder 2 Source	Sets source group for de-embedder 2
Audio Embedder 1 Group	Sets destination group for embedder 1 or disable embedder 1
Audio Embedder 2 Group	Sets destination group for embedder 2 or disable embedder 2
Additional Audio Delay	Sets additional audio delay
Video Black Level	Sets the black level (DC Offset) of the video
Video Luminance Gain	Sets the luminance gain of the video
Video Chroma Gain	Sets the chroma gain of the video
Video Hue	Sets the hue of the video (SD video only)
Audio Ch1 Processing	Sets what audio will be output on channel 1
Audio Ch2 Processing	Sets what audio will be output on channel 2
Audio Ch3 Processing	Sets what audio will be output on channel 3
Audio Ch4 Processing	Sets what audio will be output on channel 4
Audio Ch5 Processing	Sets what audio will be output on channel 5
Audio Ch6 Processing	Sets what audio will be output on channel 6
Audio Ch7 Processing	Sets what audio will be output on channel 7
Audio Ch8 Processing	Sets what audio will be output on channel 8
Audio Ch1 Gain	Sets the gain of Audio channel 1
Audio Ch2 Gain	Sets the gain of Audio channel 2
Audio Ch3 Gain	Sets the gain of Audio channel 3
Audio Ch4 Gain	Sets the gain of Audio channel 4
Audio Ch5 Gain	Sets the gain of Audio channel 5
Audio Ch6 Gain	Sets the gain of Audio channel 6
Audio Ch7 Gain	Sets the gain of Audio channel 7
Audio Ch8 Gain	Sets the gain of Audio channel 8
Thumbnail Enable	Enable thumbnail images to be sent via Ethernet
Thumbnail Size	Sets the size of the thumbnail image
Thumbnail Destination	Sets the IP address location that the thumbnail is sent to
AFD Embed Mode	Turns AFD packets on or off

AFD Embed Line	Sets the line that the AFD packets are embedded on
AFD Bar Type	Sets the AFD bar type for manual bars
AFD Bar Size 1	Sets the line size of AFD bar 1
AFD Bar Size 2	Sets the line size of AFD bar 2
AFD Code Selection	Sets AFD encoding for either 4:3 or 16:9 source video
GPI Triggering	Sets which GPI will trigger the SCTE104 module Disable = Disables GPI triggering of the SCTE104 module GPI1 = Sets triggering of the SCTE104 module with GPI1 GPI2 = Sets triggering of the SCTE104 module with GPI2
DPI Filtering	Enable = Enables SCTE104 packet embedding at the moment Disable = Disables SCTE104 packet embedding at the moment
Line Select	Selects the VANC line to embed SCTE104 packet
Line Blanking	Enables or disables line blanking for lines 6-29 in both field 1 and field 2 of the video.
SCTE 104 Settings	
Reserved	This parameter is a fixed value and cannot be modified. The reserved parameter is two-byte field and is fixed to a value of 0xFFFF. It will be inserted as the first word in the SCTE 104 packet.
messsageSize	The *messageSize* parameter defines the size of the entire *single_operation_message()* structure in bytes. This parameter is a read-only parameter and the 7746FSE-GPI-HD+SCTE104 generates its value internally and dynamically.
protocol_version	The *protocol_version* is an 8-bit unsigned integer field whose function is to allow, in the future, this message type to carry parameters that may be structured differently than those defined in the current SCTE 104 protocol. It shall be zero (0x00). Non-zero values of *protocol_version* may be used by future versions of the SCTE 104 standard to indicate structurally different messages. This parameter is a fixed value and cannot be modified.
AS_Index	The *AS_index* uniquely identifies the source of the message (since it is possible to have several automation systems active at once). The number ranges from 0 to 255 and shall be zero if this index is not required. If non-zero, AS_index shall be unique within a single digital compression system.
message_number	The *message_number* can be any number in the range 0 to 255 and must be unique for the life of a message. The *message_number* is used to identify an individual request. This parameter is a read-only parameter and the 7746FSE-GPI-HD+SCTE104 generates its value internally and dynamically. Each time a new message is injected, the message number will increment.
DPI_PID_index	The DPI_PID_index specifies the index to the DPI PID, which will carry the splice_info_sections. The number ranges from 0 to 65535. DPI_PID_index shall be zero if not required by the system architecture. This two-byte control is defined as a text entry box with a maximum possible value of 65535.

SCTE35_protocol_version	An 8-bit unsigned integer field whose function is to allow, in the future, this message type to carry parameters that may be structured differently than those defined in the current protocol. It shall be zero (0x00). Non-zero values of *protocol_version* may be used by a future version of the SCTE 104 standard to indicate structurally different messages. This parameter is a fixed value and cannot be modified.
Timestamp	This field delivers the exact time to process all of the requests in the injected message. The *time_type* field may be zero, indicating the messages are processed immediately. The 7746FSE-GPI-HD+SCTE104 injects a fixed value of 0x00, thereby instructing immediate processing.
num_ops	This field defines an integer value that indicates the number of requests contained within the data packet. This parameter has a fixed value of 0x01, indicating a single data table embedded in the packet. This data table is the Splice Request Data table.
opID	The opID is an integer value that indicates what request is being sent. This parameter is fixed to a value of 0x0101, indicating that the *splice_request_data()* table is transmitted. This value is fixed and cannot be modified.
Data_length	The *data_length* is the size of the data() field being sent in bytes. This parameter is a read-only parameter and the 7746FSE-GPI-HD+SCTE104 generates its value internally and dynamically.
GPI Mode	The GPI mode defines what state the GPI will be considered active when triggered. This parameter has two states: Active Low and Active High. When set to Active Low, the 7746FSE-GPI-HD+SCTE104 will consider a GPI triggered when the voltage level drops from the internal +5V to ground. When set to Active High, the 7746FSE-GPI-HD+SCTE104 will consider a GPI triggered when the voltage level transitions from ground to +5V.
Upstream Pass Mode	This parameter defines the behaviour of the 7746FSE-GPI-HD+SCTE104 if SCTE 104 packets detected on the input. This parameter has two states: Pass Through and Pass Remap. If the value is set to Pass Through and a SCTE 104 packet is detected on the input, they are directly passed to the output on the same detected line. If the value is set to Pass Remap, then the original detected packets are marked for deletion as per SMPTE 291M and re-inserted onto a new line defined by the Upstream Line Remap Control.
Upstream Line Remap	This parameter defines which line to re-insert detected SCTE 104 packets. This parameter is only used when the Upstream Pass Mode parameter is set to a value of Pass Remap and has a valid range from lines 6 to 29 for both SD-SDI and HD-SDI type signals.

GPI Triggering	This parameter enables and disables the GPI processor. There are 3 possible values; disable, GPI 1, and GPI 2. To completely disengage the GPI processor set the value of this parameter to disable. When set to disable, any GPI triggering activity will be ignored. To use GPI 1 as the SCTE 104 insertion trigger, set this parameter to a value of GPI 1, and to use GPI 2 as the SCTE 104 insertion trigger, set this parameter to a value of GPI 2. Upon each successful SCTE 104 insertion the 7746FSE-GPI-HD+SCTE104 will send an SNMP trap alarm and also illuminate the card edge LED's for a period of approximately 5 seconds.
DPI Filter	This parameter is used to disable or enable upstream DPI filtering. To filter out any detected upstream SCTE 104 messages set this value to enable. To allow upstream SCTE 104 message to pass through the 7746FSE-GPI-HD+SCTE104 module, then set this value to disable. When set to disable the Upstream Pass Mode will be used to define the pass through behaviour.
Line Select	When inserting SCTE 104 messages, this parameter is used to define the insertion line and has a valid range from lines 6 to 29 for both SD-SDI and HD-SDI type signals.
Manual DPI Insert	This parameter is used primarily as a test and debug control. When set to a value of *enable*, the 7746FSE-GPI-HD+SCTE104 will insert a SCTE 104 message once every 10 seconds. Upon each successful insertion the 7746FSE-GPI-HD+SCTE104 will send an SNMP trap alarm and also illuminate the card edge LED's for a period of approximately 5 seconds.

splice_insert_type	The *splice_insert_type* parameter is an 8-bit unsigned integer defining the type of insertion operation desired. This parameter has 5 possible states: *spliceStart_normal*, *spliceStart_immediate*, *spliceEnd_normal*, *sliceEnd_immediate*, and *splice_cancel*. Please refer to SCTE 104 for clarification of the inferred values. *spliceStart_normal* section(s) occur at least once before a splice point. This interval should match the requirements of SCTE 35 and serve to set up the actual insertion. It is recommended that if sufficient pre-roll time is given by the AS, the Injector sends several succeeding SCTE 35 *splice_info_section*() sections (per SCTE 35 and SCTE 67) in response to a single *splice_request* message with a *spliceStart_normal* *splice_insert_type* value. *spliceStart_immediate* sections may come once at the splice point's exact location. The Injector shall set the *splice_immediate_flag* to 1 and the *out_of_network_indicator* to 1 in the resulting SCTE 35 *splice_info_section*() section. Usage of "immediate mode" signaling is not recommended by SCTE 35 and may result in inaccurate splices. *spliceEnd_normal* sections come to terminate a splice done without a duration specified. They may also be sent to ensure a splice has terminated on schedule. The Injector sets the *out_of_network_indicator* to 0. If they are to terminate a *spliceStart_normal* with no duration specified, they should be sent prior to the minimum interval before the return point and carry a value for *pre_roll_time*, especially if terminating a long form insertion. *spliceEnd_immediate* sections come to terminate a current splice before the splice point, or a splice in process earlier than expected. The Injector sets the *out_of_network_indicator* to 0 and the *splice_immediate_flag* to 1. The value of *pre_roll_time* is ignored. *splice_cancel* sections come to cancel a recently sent *spliceStart_normal* section. The AS must supply the correct value of *splice_event_id* for the section to be cancelled. The Injector shall set the splice_event_cancel_indicator to 1.
splice_event_source	The *splice_event_source* is a user assigned number for the source of a cue message. There are four possible values: 0, 4, 8 and 12. A value of 0 indicates that the source of the cue message is a cue embedded in the original source material. A value of 4 indicates a cue created by automation system switching. A value of 8 defines a cue created by a live event trigger system, and a value of 12 indicates a cue created by a local content replacement system. The *splice_event_source* and the *splice_event_number* together define the *splice_event_id* parameter that is inserted into the SCTE 104 message.

splice_event_number	The *splice_event_number* is the number chosen by the event source to identify an instance of the cue message. Its value is automatically calculated by the 7746FSE-GPI-HD+SCTE104 and makes up the lower 28 bits of the *splice_event_id*.
unique_program_id	This parameter is defined as a two-byte parameter and has a possible range of 0 to 65535. According to SCTE 104, the use of this field by servers and splicers is unknown at this time.
pre_roll_time (ms)	The *pre_roll_time* parameter is a 16-bit field giving the time to the insertion point in milliseconds. This parameter has a possible range of 0 to 65535. This field is ignored for *splice_insert_type* values other than *spliceStart_normal* and *spliceEnd_normal*.
break_duration (tenths)	The *break_duration* parameter is a 16-bit field giving the duration of the insertion in tenths of seconds. This parameter has a possible range of 0 to 65535. This field is ignored for *splice_insert_type* values other than *spliceStart_normal* and *spliceStart_immediate*.
avail_num	This parameter is an 8-bit field giving identification for a specific avail within the current *unique_program_id*. The value follows the semantics specified in SCTE 35 for this field. It may be zero to indicate its non-usage. This parameter has a possible range of 0 to 255.
avails_expected	This parameter is an 8-bit field giving a count of the expected number of individual avails within the current viewing event. If zero, it indicates that *avail_num* has no meaning. This parameter has a possible range of 0 to 255.
auto_return_flag	If this field is non-zero and a non-zero value of *break_duration* is present, then the *auto_return* field in the resulting SCTE 35 section will be set to one. This field is ignored for *splice_insert_type* values other than *spliceStart_normal* and *spliceStart_immediate*. Within this implementation this field is fixed to 0x00 and cannot be modified.

Table 10-2: VistaLINK® Controlled Parameters

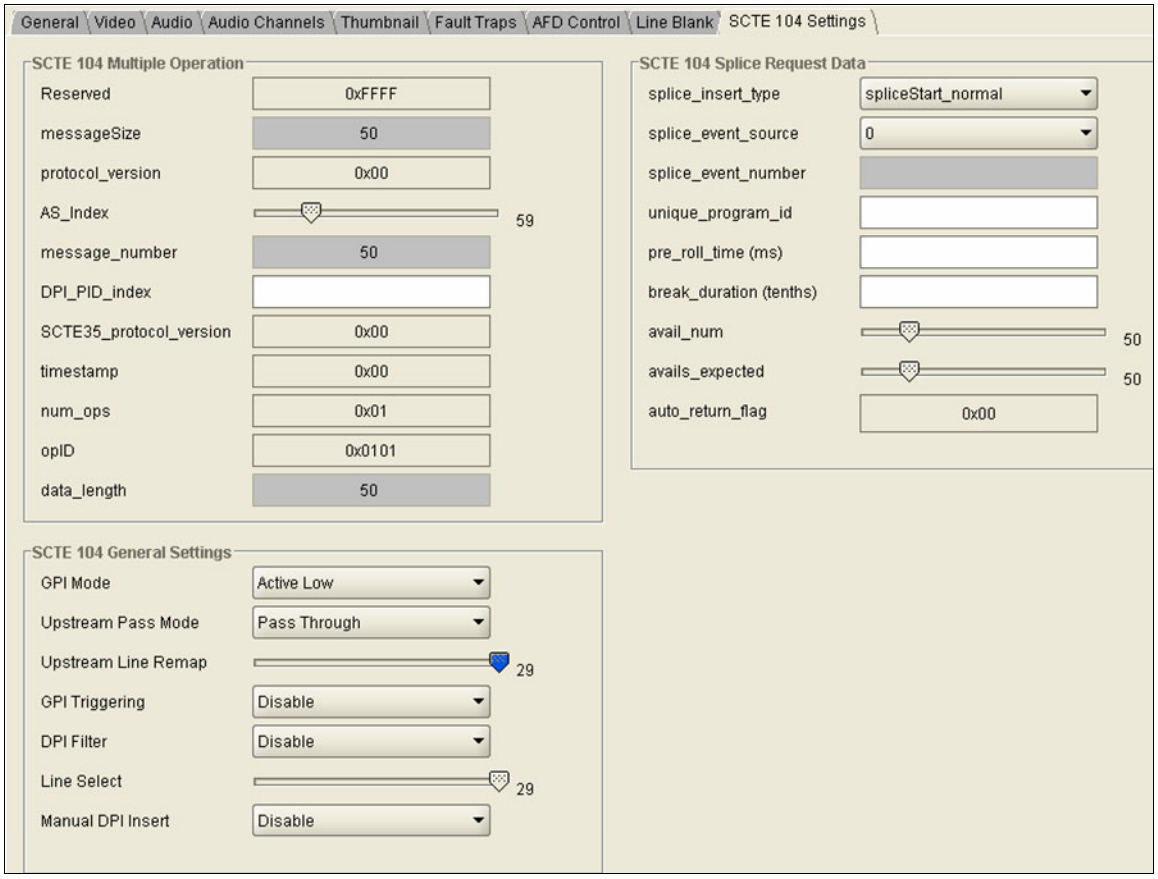


Figure 10-1: VistaLINK® 7746FSE-GPI-HD+SCTE104 Configuration View

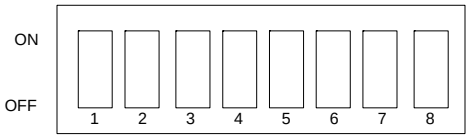
10.4. VISTALINK® TRAPS

Trap	Description
Video Not Present	Triggers when video is present/missing
Video Input Fail	Triggers when video is interrupted
Genlock Not Present	Triggers when genlock is present/missing
AES 1 Not Present	Triggers when AES 1 audio is missing (EAES4 version only)
AES 2 Not Present	Triggers when AES 2 audio is missing (EAES4 version only)
AES 3 Not Present	Triggers when AES 3 audio is missing (EAES4 version only)
AES 4 Not Present	Triggers when AES 4 audio is missing (EAES4 version only)
Demux 1 Group Not Present	Triggers when the Demux 1 group audio is present/missing
Demux 2 Group Not Present	Triggers when the Demux 2 group audio is present/missing
SCTE104 Trap	Triggers when a SCTE 104 DPI message is inserted

Table 10-3: VistaLINK® Traps

11. DIP SWITCH QUICK REFERENCE

Selections written in *italics* are not available on 7746FSE version.



DIP 5	DIP 6	DIP 7	DIP 8	Video Format
Off	*Off*	*Off*	*Off*	*1080p/23.98sF*
Off	*On*	*Off*	*Off*	*1080p/24sF*
Off	*Off*	*On*	*Off*	*Future Use*
Off	*On*	*On*	*Off*	*1080i/50*
Off	*Off*	*Off*	*On*	*1080i/59.94 or 480p/59.94*
Off	*On*	*Off*	*On*	*1080i/60*
Off	*Off*	*On*	*On*	*720p/59.94*
Off	*On*	*On*	*On*	*720p/60*
On	Off	Off	Off	525i/59.94
On	Off	Off	On	625i/50
On	On	On	On	Auto detect

DIP 3	DIP 4	
Off	Off	Reserved (set to Off)

DIP 2	Card Edge Display Mode
Off	Horizontal
On	Vertical

DIP 1	Control Mode
Off	Local control
On	VistaLINK® control enabled

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