TABLE OF CONTENTS

Figures

Tables

REVISION HISTORY

REVISION	DESCRIPTION	DATE
0.1	Preliminary version	Dec 05
0.2	General format cleanup	May 09
0.3	Added metadata monitor/proc and breakout audio mode configuration features	Sept 09

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1. OVERVIEW

The 7746FS-EAES8-HD series HD Frame Synchronizers are designed to re-time a SMPTE 292M (1080i/60, 1080i/59.94, 1080i/50, 1080p/24sF, 1080p/23.98sF, 720p/60, 720p/59.95, 720p/50, 1035i/59.94, 1035i/60, or 480p/59.94) or SMPTE 259M (625i/50, 525i/59.94) input 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.

Throughout this manual, references to the 7746FS-EAES8-HD series indicate that the sections apply to both versions of the frame synchronizer. Where the section only applies to one or the other version the specific model number followed by the word version will be used.

On the 7746FS-EAES8-HD series, the user can choose to have 8 stereo pairs from 4 groups in the upstream embedded audio and, from the 8 AES inputs embedded on the output video and outputs as AES.

On the 7746FS-EAES8-DD-HD version, one selected channel is processed by the on-card Dolby Decoder. If the channel contains Dolby E or Dolby Digital (AC3), it will yield up to 8 additional discrete audio channels, 2 channels of stereo down mix and the associated Dolby E Metadata. Up to 16 selected channels may be optionally delayed up to 1.2 seconds and re-embedded into the output video and/or directed to AES outputs. Video output may be optionally delayed to help with lip sync. If PCM audio is embedded, the device acts as a simple 4 group audio de-embedder.

The 7746FS-EAES8-DD-HD version also handles Dolby E Metadata. Metadata is optionally embedded in the Vertical Ancillary data (VANC) and can be provided as an output for downstream devices (i.e. Dolby Encoders, Multichannel Audio Tool, etc.). For lip sync cohesion and ease of editing, Dolby E data is organized in blocks with lengths matching the associated video frame. The decoder will match the beginning of each output block with the start of video, as provided with the genlock input. Users can also dial up an additional delay, up to 1.2 seconds. The 8 AES inputs can be configured as a backup, in the event the primary is lost, or as a voice-over source.

Both versions can also pass all VANC data after switching 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 have the ability to set the audio delay independently from the video delay.

The 7746FS-EAES8-HD series modules also have the ability to adjust video parameters such as brightness, contrast, and saturation. The hue control is available for both SD and HD standards. They can also adjust audio parameters such as gain, invert, two-channel mixing, and reassignment of audio channels. The embedder and AES outputs can individually choose between two independent audio mixers.

The 7746FS-EAES8-HD series modules occupy two card slots in the 3RU frame (7700FR-C), which will hold up to 15 1-slot modules or one slot in the 1RU frame (7701FR), which will hold up to three modules. The 7746FS-EAES8-HD can also fit in a standalone unit (S7701FR).

VistaLINK® enables control and configuration capabilities via Simple Network Management Protocol (SNMP). This offers the flexibility to manage the module status monitoring and configuration from SNMP enabled control systems such as Evertz VistaLINK®.

Features:

- Synchronizes 1080i/60, 1080i/59.94, 1080i/50, 1080p/24sF, 1080p/23.98sF, 720p/60, 720p/59.94, 720p/50, 1035i/59.94, 1035i/60, 480p/59.94, 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, 28 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 4 groups of embedded audio and re-embeds 4 groups
- Front panel LEDs indicate: module fault, video and embedded group presence, and AES input presence
- Serial remote data logging
- Adjustable video black level (brightness), Y level (contrast) and chroma level (saturation)
- Adjustable hue control for SD and HD standards
- Maximum audio input to output delay - equivalent to additional frames of video delay
- Synchronizes VANC data starting after switch line
- Synchronizes SMPTE 12M-2 time codes
- Separate control of video and audio delay
- Audio Sample Rate Converters can be disabled, or set to automatically detect non-PCM data (i.e. Dolby- E™) and disable on a per-input basis
- Independently adjustable audio levels and inversion on all channels
- Ability to combine any two inputs to any output (including mono-aural downmixes of all input stereo pairs)
- Provides 2:1 audio mixing capability, ideal for “ducking” audio or voiceovers
- Can be used at the inputs of an audio console to expand inputs and add mixing capacity
- Performs voice overs, mix downs and on-air breakaways
- Reassignment of audio channels
- Synchronizes eight external AES signals
- Synchronized audio is output as 8 AES signals
- AES and embedded outputs can choose from two independent mixers
- AES outputs bypass relay protected on power loss
- De-embeds and embeds Dolby-E™ metadata to and from video VANC space
- Metadata monitoring thru VistaLINK® and modification of dial norm “parameter”
- VistaLINK® - capable offering remote control and configuration capabilities via SNMP (using VistaLINK® PRO, 9000NCP or 9000NCP2 Network Control Panel) is available when modules are used with the 3RU 7800FR frame and a 7700FC VistaLINK® Frame Controller module in slot 1 of the frame

Additional features on the –DD version:

- Automatic switchover to backup audio source on loss of selected Dolby stream
- Adjustable video delay to match Dolby decoder audio delay

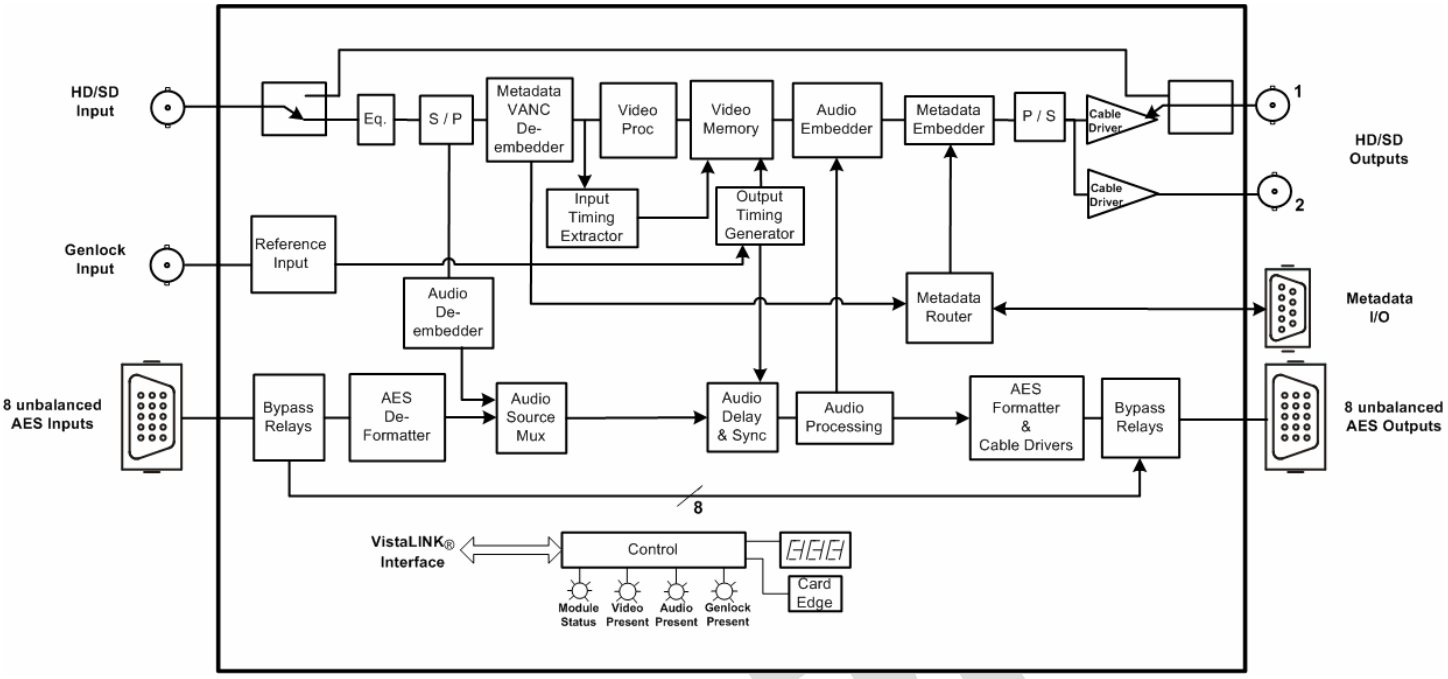


Figure 1-1: 7746FS-EAES8-HD Block Diagram

2. INSTALLATION

The 7746FS-EAES8-HD series modules come with a companion rear plate that occupies two slots in the frame. For information on mounting the rear plate and inserting the module into the frame see section 3 of the 7700FR chapter.

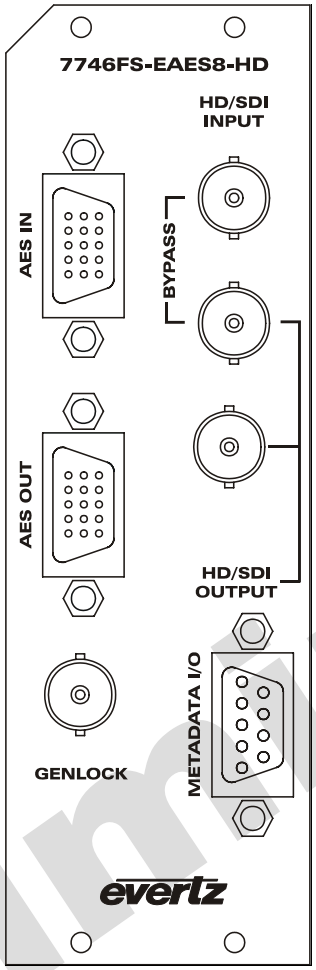


Figure 2-1: Rear Panel

2.1. VIDEO CONNECTIONS

HD/SDI IN: The input BNC connector for 10-bit serial digital video signals compatible with the SMPTE 292M or SMPTE 259M standard. The module can automatically detect the video standard or can be manually set for a specific video standard.

HD/SDI OUT: There are two BNC connectors with reclocked serial component video outputs, in the same video standard as the input. These outputs contain the input video synchronized to the GENLOCK signal or to the free running oscillator if GENLOCK is not present. The audio present at AES inputs 1 to 8 is embedded in accordance with the SMPTE 272M or SMPTE 299M standard. The top HD/SDI output is protected by a bypass relay, which will activate in the event of power loss to the module. The remaining output is not bypass protected.

2.2. GENLOCK REFERENCE

For proper synchronization of the output video (and the Dolby Decoder on the –DD version), the module must be locked to a genlock signal of the output video format.

GENLOCK: This BNC is for connecting a video or tri-level sync reference and is auto-detected by the module. Jumper J5 selects whether the reference input is terminated to 75 ohms or high impedance (default). (See section 7.3).

2.3. AES INPUT AND OUTPUT AUDIO CONNECTIONS

Eight unbalanced AES inputs and eight unbalanced AES outputs conforming to SMPTE 276M are provided on the two high density DB-15 connectors labeled **AES IN** and **AES OUT**. The breakout cables provided will bring these signals conveniently to BNC connectors. The eight AES input channels can be used as a backup or voice-over source. The de-embedded and processed audio can be output as eight AES channels. Table 2-1 and Table 2-2 show the respective DB-15 connector pin outs.

Name	Description	DB-15 Pin
GPI2	Reserved for Future Use	1
	Reserved for Future Use	2
	Reserved for Future Use	3
	Reserved for Future Use	4
	Reserved for Future Use	5
	Reserved for Future Use	6
AES In 2	AES Input 2 - Unbalanced	7
GPI1	Reserved for Future Use	8
AES In 6	AES Input 6 – Unbalanced	9
AES In 5	AES Input 5 – Unbalanced	10
AES In 1	AES Input 1 - Unbalanced	11
AES In 8	AES Input 8 – Unbalanced	12
AES In 7	AES Input 7 – Unbalanced	13
AES In 4	AES Input 4- Unbalanced	14
AES In 3	AES Input 3- Unbalanced	15
GND	Ground	Shell

Table 2-1: AES INPUT Audio Connector Pin Out

Name	Description	DB-15 Pin
	Reserved for Future Use	1
	Reserved for Future Use	2
	Reserved for Future Use	3
	Reserved for Future Use	4
	Reserved for Future Use	5
	Reserved for Future Use	6
AES Out 2	AES Output 2 - Unbalanced	7
	Reserved for Future Use	8
AES Out 6	AES Output 6 – Unbalanced	9
AES Out 5	AES Output 5 – Unbalanced	10
AES Out 1	AES Output 1 - Unbalanced	11
AES Out 8	AES Output 8 – Unbalanced	12
AES Out 7	AES Output 7 – Unbalanced	13
AES Out 4	AES Output 4- Unbalanced	14
AES Out 3	AES Output 3- Unbalanced	15
GND	Ground	Shell

Table 2-2: AES OUTPUT Audio Connector Pin Out

The 7746FS-EAES8-HD series modules are shipped with two breakout cables for the DB-15 connector (Evertz Part # WPAES8-BNCM-6F), which can be used to facilitate wiring the AES audio and GPI connections. The pin out of the cables is shown in Table 2-3.

DB-15 PIN	Wire	Ground/Shield Connection	Label Name	Connector Type	AES IN FUNCTION	AES OUT FUNCTION
1	Red		W1 RED	WIRE	GPI2	X
2	Green		W2 GREEN	WIRE	X	X
3	Blue		W3 BLUE	WIRE	X	X
4	(not used)		(not used)		X	X
5	(not used)		(not used)		X	X
6	White		W4 WHITE	WIRE	X	X
7	Coax	DB15 Shell	AES A2	BNC MALE	AES In 2	AES Out 2
8	Yellow		W5 YELLOW	WIRE	GPI1	X
9	Coax	DB15 Shell	AES B2	BNC MALE	AES In 6	AES Out 6
10	Coax	DB15 Shell	AES B1	BNC MALE	AES In 5	AES Out 5
11	Coax	DB15 Shell	AES A1	BNC MALE	AES In 1	AES Out 1
12	Coax	DB15 Shell	AES B4	BNC MALE	AES In 8	AES Out 8
13	Coax	DB15 Shell	AES B3	BNC MALE	AES In 7	AES Out 7
14	Coax	DB15 Shell	AES A4	BNC MALE	AES In 4	AES Out 4
15	Coax	DB15 Shell	AES A3	BNC MALE	AES In 3	AES Out 3
Shell	Black		GND	WIRE	GND	GND

Table 2-3: AES Audio Breakout Cable (Evertz Part # WPAES8-BNCM-6F)

2.4. METADATA I/O

The 7746FS0EAES8-HD series modules provide a DB-9 connector for the handling of Metadata. The 7746FS0EAES8-HD series modules can transmit Metadata; receive Metadata or both, depending on the application.

For the cases where the module is either transmitting or receiving Metadata, a typical 9-pin serial cable (not provided) can be used to connect the modules to a Dolby device like the DP570. The pin out of the connector is shown in Table 2-4.

PIN Number on Connector	Module Operation (See section 6.11.2 for settings) 7746FS-EAES8-HD to DP570	Module Operation (See section 6.11.2 for settings) DP570 to7746FS-EAES8-HD
1	Shield	Shield
2	TX A asynchronous out -	RX A asynchronous out -
3	RX B asynchronous out +	TX B asynchronous out +
4	Ground	Ground
5	NC	NC
6	Ground	Ground
7	TX B asynchronous out +	RX B asynchronous out +
8	RX A asynchronous out -	TX A asynchronous out -
9	Shield	Shield

Table 2-4: Metadata Transmit or Receive Connections

In applications where the Metadata I/O will both transmit AND receive, the module, and the transmitting and receiving DP570 will need to be wired as shown in Figure 2-2. The module will also have to be configured to operate in RXTX mode (see section 6.11.2).

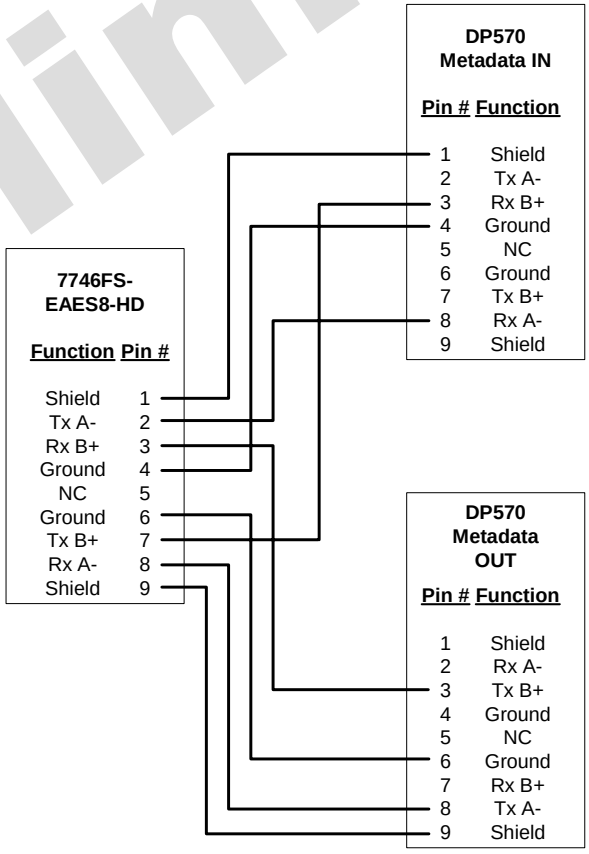


Figure 2-2: Metadata Transmit and Receive

2.5. GENERAL PURPOSE INPUTS

The 7746FS0EAES8-HD series modules have 2 General purpose inputs (GPI) available on the **AES IN** port. Currently, the GPIs are not used and are reserved for future use.

3. SPECIFICATIONS

3.1. SERIAL DIGITAL VIDEO INPUTS

Standards: Auto detectable and user settable.
SMPTE 292M (1.5Gb/s), 1080i/60, 1080i/59.94, 1080i/50, 1080p/24sF, 1080p/23.98sF, 720p/60, 720p/59.95, 720p/50, 1035i/59.94, 1035i/60, or 480p/59.94
SMPTE 259M-C (270 Mb/s) 525 or 625 line component
Number of Inputs: 1
Connector: BNC per IEC 61169-8 Annex A
Input Equalization:
SD Standards: Automatic to 300m @ 270Mb/s with Belden 1694 or equivalent cable
HD Standards: Automatic to 125m @ 1.5Gb/s with Belden 1694 or equivalent cable
Return Loss:
SD Standards: <-15 dB up to 270Mb/s
HD Standards: <-15 dB up to 1. 5Gb/s

3.1. SERIAL DIGITAL VIDEO OUTPUTS

Standard: Same as input
Number of Outputs: 2 (1 output bypass relay protected)
Connector: BNC per IEC 61169-8 Annex A
Signal Level: 800mV nominal
DC Offset: 0V ±0.5V
Rise and Fall Time:
SD Standards: 740ps nominal
HD Standards: 200ps nominal
Overshoot: <10% of amplitude
Wide Band Jitter:
SD Standards: < 0.10UI
HD Standards: < 0.22UI

3.2. GENLOCK INPUT

Type: HD Tri-Level sync, NTSC or PAL Colour Black 1 V p-p (auto detect)
Connector: BNC per IEC 61169-8 Annex A
Termination: Hi-Z or 75 ohm (jumper selectable)
Return Loss: >40dB to 10 MHz

3.3. AES AUDIO INPUTS

Standard: SMPTE 276M, single ended synchronous or asynchronous AES
Number of Inputs: 8 unbalanced
Connectors: Female High Density DB-15, breakout cable to BNC connectors supplied
Input Level: 0.1 to 2.5 Vp-p (5Vp-p tolerant)
Input Impedance: 75 Ω
Return Loss: >25 dB 100 kHz to 6 MHz
Equalization: Automatic to 1000m with Belden 1694 or equivalent cable @ 48 kHz AES signal
Sampling Rate: 48 kHz ± 100 ppm
Impedance: 75 Ω
Resolution: Up to 24-bit

3.4. AES AUDIO OUTPUTS

Standard: SMPTE 276M, single ended synchronous AES
Number of Outputs: 8 unbalanced
Connectors: Female High Density DB-15, breakout cable to BNC connectors supplied
Sampling Rate: 48 kHz
Impedance: 75 Ω
Resolution: Up to 24-bit

3.5. METADATA INPUT/OUTPUT

Type: SMPTE RDD6 Dolby E Metadata
Connectors: Female DB-9
Baud Rate: 115200 baud

3.6. HEADPHONE AUDIO OUTPUTS

Number of Outputs: 1
Type: Stereo 3.5mm jack
Output Load: 32 Ω +
Signal Level: 100 mW max, soft adjustable over 40 dB range
THD+N: 1 %
SNR: 90 dB RMS, “A” weighted

3.7. DELAY

AC3 Decode Delay: 32 ms nominal
Dolby E Decode Delay: 1 frame nominal
De-embedding Latency: 600 µs nominal
Additional Audio Delay: 0 to 1.2 secs (user programmable)
Additional Video Delay: 0 to 7 frames (user programmable)

3.8. ELECTRICAL

Voltage:	+12VDC
Power:	19 Watts
EMI/RFI:	Complies with FCC regulations for class A devices Complies with EU EMC directive

3.9. PHYSICAL

350FR:	2
7700FR-C:	2
7800FR:	2
7701FR:	2

4. STATUS INDICATORS

The 7746FS0EAES8-HD series modules have 17 LED Status indicators on the front card edge to show operational status of the card at a glance. Figure 4-1 shows the location of the LEDs and card edge controls.

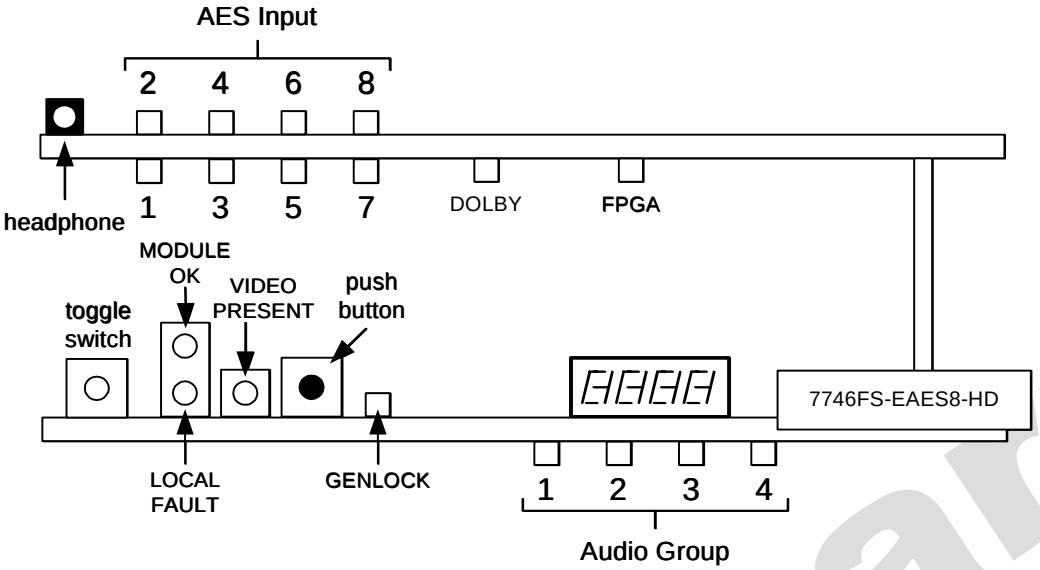


Figure 4-1: Status LED Locations

Three large LEDS on the front of the main board indicate the general health of the module.

LOCAL FAULT: This Red LED indicates poor module health and will be ON during the absence of a valid input signal, an invalid genlock, or if a local input power fault exists (i.e.: a blown fuse). The LOCAL FAULT indication can also be reported to the frame through the FRAME STATUS jumper.

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

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

The other LEDs are:

GENLOCK: This Green LED will be ON when there is a signal present at the module genlock input.

DOLBY STATUS: This LED will be GREEN and ON when the Dolby Decoder is processing or active. The LED will be RED and ON if there is an error with the Dolby Decoder. The LED is off when the Dolby Decoder is not active. (Only on 7746FS-EAES8-DD-HD).

On the 7746FS-EAES8-HD, this LED is always GREEN and ON.

FGPA CONFIG: This LED will be RED and ON when the FPGA is loading on power up. The LED is OFF during normal module operation.

4.1. EMBEDDED AUDIO STATUS LEDS

Four LEDs located on the lower end of the main board of the module (near the card extractor) indicate which embedded audio groups are present in the input video. Audio Group LED 1 is located closest to the center of the module.

Audio Group LED	Colour	Audio Group Status
1	Off	No group 1 present on input video.
	Green	Group 1 present on input video.
2	Off	No group 2 present on input video.
	Green	Group 2 present on input video.
3	Off	No group 3 present on input video.
	Green	Group 3 present on input video.
4	Off	No group 4 present on input video.
	Green	Group 4 present on input video.

Table 4-1: Audio Group Status LEDs

Eight LEDs located on the sub card of the module indicate which AES input channels are present. AES input channel 1 is located top leftmost LED, and AES input channel 2 to the right.

AES Input Channel LED	Colour	AES Input Channel Status
1	Off	AES input channel 1 is not present
	Green	AES input channel 1 is present
	Yellow	AES input channel 1 is present with encoded Dolby
2	Off	AES input channel 2 is not present
	Green	AES input channel 2 is present
	Yellow	AES input channel 2 is present with encoded Dolby
3	Off	AES input channel 3 is not present
	Green	AES input channel 3 is present
	Yellow	AES input channel 3 is present with encoded Dolby
4	Off	AES input channel 4 is not present
	Green	AES input channel 4 is present
	Yellow	AES input channel 4 is present with encoded Dolby
5	Off	AES input channel 5 is not present
	Green	AES input channel 5 is present
	Yellow	AES input channel 5 is present with encoded Dolby
6	Off	AES input channel 6 is not present
	Green	AES input channel 6 is present
	Yellow	AES input channel 6 is present with encoded Dolby
7	Off	AES input channel 7 is not present
	Green	AES input channel 7 is present
	Yellow	AES input channel 7 is present with encoded Dolby
8	Off	AES input channel 8 is not present
	Green	AES input channel 8 is present
	Yellow	AES input channel 8 is present with encoded Dolby

Table 4-2: AES Input Channel Presence LEDs

5. CARD EDGE CONTROLS

The 7746FS-EAES8-HD series modules can be configured by the card edge controls. There are some key control components that can be found at the card edge:

1. Toggle Switch
2. 4 Character Dot Matrix Display
3. Push Button
4. 4 Audio LEDs

Toggle Switch: This component will become active once the card has completed booting. Its primary function is to navigate through the menu system.

4 Character Dot Matrix Display: This component will become active once power is applied to the card. This component is used to relay text-based information to the user. It will be used to scroll build and card information, or display the menu options to the user.

Push Button: This component will become active once the card has completed booting. It is primarily used for navigating through the menu system.

4 Audio Group LEDs: These LEDs are primarily used to indicate what groups are embedded in the input video signal during normal operation. However, when navigating the card edge menu, these LEDs are used to indicate menu depth status. For example, when at the top-level menu, all the LEDs are OFF. When the user navigates into another menu (e.g. Video Control), Audio group 1 LED turns ON. Audio group LED 1 is located closest to the centre of the module. If the user enters a sub-menu (e.g. Video Control -> Video Standard Select), then both Audio Group LEDs 1 and 2 turn ON, indicating another depth within the menu system.

When navigating the card edge menu system, when all the Audio LEDs are OFF the user is at the Top Level menu.

The 7746FS-EAES8-HD series modules are also equipped with an 8-position DIP switch. Currently, the DIP switch has no functionality and is reserved for future use.

6. CARD EDGE MENU SYSTEM

6.1. NAVIGATING THE MENU SYSTEM

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

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

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

6.2. TOP LEVEL MENU STRUCTURE

Table 6-1 provides a brief description of the top level of the menu tree that appears when you enter the card edge menu system. Selecting one of these items will take you down into the next menu level to set the value of that parameter. The details of the each of the menu items are described in sections 6.3 to 6.13.

VCTR	Video Control	Sets the video standard that the module will operate in, timing offset of the video output, and loss of video mode.
ACTR	Audio Control	Sets audio controls for the module such as: Coarse and fine audio delays; Sample Rate Converter mode; C-bit control; Embedder Group enable; and Demux loss of video mode.
VP	Video Proc Control	Sets the black, luma, and chroma levels.
AP	Audio Proc Control	Sets the audio processor and router controls.
HEAD	Headphone Monitor	Sets the headphone volume level and selects the source for headphone monitoring.
DLBY	Dolby Decoder Control	Sets the controls for the Dolby Decoder A and B, and loss of signal mode. (7746FS-EAES8-DD-HD only)
META	Metadata	Sets the Metadata Mux and demux settings and configures the DB-9 Metadata I/O.
STAT	Status	Reports the status of the firmware, FPGA revisions, input video standard, operating standard, audio group detection, AES Input presence, and Dolby Status.
MISC	Miscellaneous	The miscellaneous menu enables VistaLINK®, sets display orientation, and performs factory reset.

Table 6-1: Top Level Menu Structure

The parameter adjustments are REAL TIME ADJUSTMENTS and will affect the output video/audio immediately. These settings should not be adjusted when the output video/audio is in the broadcast chain.

6.3. CONFIGURING THE VIDEO CONTROLS

The *Video Control* menus are used to configure parameters associated with the module's operating standards, output video timing and loss of video mode. The chart below shows the items available in the *Video Control* menus. Sections 6.3.1 to 6.3.5 give detailed information about each of the menu items.

VSTD	Video Standard Select	Sets the video standard that the module will operate in.
VDLY	Vertical Phase	Sets the vertical delay of the output video.
HDLY	Horizontal Phase	Sets horizontal delay of the output video.
FDLY	Frame Phase	Sets frame delay of the output video.
LOVM	Freeze Mode	Sets module action when input video is lost.

Table 6-2: Video Controls Menu

6.3.1. Setting the Video Standard

Video Control	
VSTD	
Auto detect	AUTO
625i/50	PALB
525i/59.94	NTSC
1080i/50	1I50
1080i/59.94	1I59
1080i/60	1I60
720p/59.94	7P59
720p/60	7P60
1080p/23.98sF	1S23
1080p/24sF	1S24
1035i/59.94	3I59
1035i/60	3I60
720p/50	7P50

This control selects the operating standard that the module will operate in. The internal timing of the module will be based on this standard. If the operating standard is set to *Auto detect*, then the module will operate based on the input video standard.

If the operating standard is set to a specific value (e.g. 525i/59.94), then regardless of the input video standard, the module will operate in 525i/59.94.

The output video standard will always be the same as the operating standard. However, NO format or standard conversion will occur.

This control is NOT a LIVE control. The parameter will change once the pushbutton is pressed.

6.3.2. Setting the Vertical Phase

Video Control
VDLY
0 to Max
0

This control selects the vertical delay of the output video signal in respect to the input video. The range of values is based on the operating standard of the module.

6.3.3. Setting the Horizontal Phase

Video Control
HDLY
0 to Max
0

This control selects the horizontal delay of the output video signal in respect to the input video. The range of values is based on the operating standard of the module.

6.3.4. Setting the Frame Phase

Video Control
FDLY
0 to Max
1

This control selects the frame delay of the output video signal in respect to the input video. The range of values is based on the operating standard of the module. *Max* will be 12 for interlaced standards and 28 for progressive standards.

6.3.5. Setting the Action to Take when Input Video Is Missing

Video Control	
LOVM	
Black	*BLK*
Frame	*FRM*
Field 1	*FLD1*
Field 2	*FLD2*
Pass	*PASS*

This control allows the user to set the action to take when the input video is missing: the output to go to black, freeze on the good frame only, freeze on field 1 of last good frame, freeze on field 2 of last good frame or pass the input with this control.

When set to *Black*, the output video will be black.

When set to *Frame*, the output video will show the last good frame.

When set to *Field 1*, the output video will show the first field of the last good frame.

When set to *Field 2*, the output video will show the second field of the last good frame.

When set to *Pass* the output video may be incoherent when the video input standard mismatches the video output standard. If input video is completely unlocked, video output is frozen.

6.4. CONFIGURING THE AUDIO CONTROLS

The *Audio Control* menus are used to configure the sample rate converters; the mode of the sample rate converter, C-bit control, which embedded group to enable, and the demux behaviour with a loss of video. The chart below shows the items available in the *Audio Control* menus. Sections 6.4.1 to 6.4.6 give detailed information about each of the menu items.

ADLY	Coarse Audio Delay	Sets audio delay in frames of video increments (coarse).
ASDLY	Fine Audio Delay	Sets audio delay in milliseconds (in 2048 µs increments)
SRC	SRC Mode	Sets the audio sample rate converter bypass mode.
CBIT	C-Bit Control	Sets the AES channel status bit handling.
EMB1	Embedder Group 1 Enable	Enables audio embedder for group 1.
EMB2	Embedder Group 2 Enable	Enables audio embedder for group 2.
EMB3	Embedder Group 3 Enable	Enables audio embedder for group 3.
EMB4	Embedder Group 4 Enable	Enables audio embedder for group 4.
DLVM	Demux Loss of Video Mode	Sets the action of the audio demux in case of input video loss.
BRKA	Audio Breakout Mode	Sets the audio breakout mode.

Table 6-3: Audio Controls Menu

6.4.1. Setting the Coarse Audio Delay

Audio Control
ADLY
FDLY
0 to Max

This control adjusts the audio delay in terms of video frames (coarsely). The delay is respective of the input video. The range of the parameter is based on the operating standard of the module, since this parameter follows the video frame phase.

When *FDLY* is selected then the audio delay is the same as the frame delay (see section 6.3.4).

Otherwise, the user can insert a delay of *0 to max* video frames.

6.4.2. Setting the Fine Audio Delay

Audio Control
ASDLY
-33ms to +33ms
0

This control adjusts the audio delay (finely). This parameter is displayed in milliseconds and adjusted in approximately sample increments (approximately 20.83µs).

If *ADLY* (see section 6.4.1) is set to 0, then the parameter range is 0 to 33ms.

Otherwise, fine audio delay ranges from –33ms to +33ms.

6.4.3. Setting the SRC Mode

Audio Control
SRC
Enable
Bypass
Automatic

This sets the bypass mode of the audio sample rate converter.

When *Enabled*, 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.

When in *Bypass* mode, the content of the audio is preserved without any loss, and directly embedded into the input video. Audio must synchronous to the video source. If not, there may be samples that are dropped or repeated.

When set to *Automatic*, the sample rate converter will be automatically enabled when the module detects a PCM signal. It will also bypass the SRC, if Dolby E is detected.

6.4.4. Setting the C-bit Control

Audio Control
CBIT
Preserve
Replace

This control determines how the AES channel status bits are handled when being routed from input to output. When set to *preserve*, the module will preserve as many bits as possible, but always change to professional 48 kHz. When set to *replace*, all the C-bit will be replaced with static channel status message that reads professional 48 kHz.

6.4.5. Enabling the Audio Embedders

There are four menu items used to enable embedder groups. The menu item for each embedder group component works in the same way so for simplicity only the menu item for *Embedder Group* 1 will be shown in the manual.

Audio Control	
EMB1	
Enable	*ON*
Disable	*OFF*

This control enables or disables audio embedder for group 1.

When *Enable* is selected, Group 1 will be embedded into the output video signal.

When *Disable* is selected, Group 1 will not be embedded into the output video signal.

The default setting for EMB2, EMB3, and EMB4 is Disable. Some legacy SD equipment does not function correctly with more than 1 embedded audio group. Therefore, by default ONLY EMB1 is enabled.

6.4.6. Setting the Demux Loss of Video Mode

Audio Control	
DLVM	
Mute	*MUTE*
Pass AES	*AES*

This sets the demux action in the event of input video loss.

When *Mute* is selected, the module will *mute* the outputs.

When *Pass AES* is selected, the module routes AES inputs as a backup.

6.4.7. Setting the Breakout Audio Mode

Audio Control
BRKA
Normal
Breakout DMX

The *BRKA* menu item is used to select the audio breakout mode.

Normal (NRML) disables breakout mode and processed audio is routed to the AES outputs.

When Demux (DMX) is selected. The output of the de-embedder is routed directly to the AES outputs prior to any audio synchronization, delay, processing or Dolby decoding/encoding.

6.5. CONFIGURING THE AUDIO DELAY

The *Audio Delay* menu is used to configure the bulk coarse and fine audio delay and Channel Pair Delays.

Audio Delay Control Mode	Sets the mode of the audio delay control.
Bulk	Adjusts the coarse and fine audio delay of the Bulk controls.
Channel Pair Delay	Sets the value of the channel pair delay in milliseconds.

6.5.1. Setting the Audio Delay Control Mode

Audio Delay
- *Audio Delay Control Mode*
  - *Bulk*
  - *Channel Pair*

With this control, the user can select the audio delay mode.

Select *Bulk* to assign bulk as the audio delay mode.

Select *Channel Pair* to assign the channel pair as the audio delay mode.

6.5.2. Setting the Bulk Controls

The *Coarse and Fine Audio Delay* mode can be adjusted using the appropriate sliders.

6.5.2.1. Setting the Coarse Audio Delay Mode

Audio Delay
- *Bulk*
  - *Coarse Audio Delay*
    - *0 to 28 frames*

With this control, the user can set the number of coarse audio delay frames.

Move the slider to the left or right to increase or decrease the number of frames. The value ranges from 0 to 28 frames.

6.5.2.2. Setting the Fine Audio Delay Mode

Audio Delay
- *Bulk*
  - *Fine Audio Delay*
    - *0 to 28 frames*

With this control, the user can set the number of fine audio delay frames.

Move the slider to the left or right to increase or decrease the number of frames. The value ranges from 0 to 28 frames.

6.5.3. Setting the Channel Pair Delay

The channel pair delay is broken into pairs ranging from Channel Pair 1 & 2 to Channel Pair 15 & 16.

Audio Delay
- *Channel Pair Delay*
  - *Channel 1 & 2*
    - *0 to 100 ms*

With this control, the user can adjust the number of milliseconds that the selected channel pair will be delayed.

The value ranges from 0 to 100 ms.

6.6. CONFIGURING THE VIDEO PROCESSING FUNCTIONS

The *Video Processor* menus are used to configure parameters associated with the video processing functions. The chart below shows the items available in the *Video Processor* menu. Sections 6.6.1 to 6.6.4 give detailed information about each of the menu items.

BLVL	Black Level Adjust	Sets the black level of the output video (brightness)
Y_GN	Luma Gain Adjust	Sets the luma gain of the output video (contrast)
C_GN	Chroma Gain Adjust	Sets the chroma gain of the output video (saturation)
HUE	Hue Control	Adjusts the hue of the output video

6.6.1. Setting the Black Level

Video Processor
BLVL
-7.0 to 7.0 IRE
0

With this control, the user can adjust the black level of the output video. For no offset of the black level, set the control to 0. The adjustment range is +/- 7 IRE with ½ IRE resolution.

6.6.2. Setting the Luma Gain

Video Processor
Y_GN
-6 to 6 dB
0

With this control, the user can adjust the gain of the luminance channel of the output video (contrast). For unity gain, set this value to 0. The adjustment range is +/- 6 dB.

6.6.3. Setting the Chroma Gain

Video Processor
C_GN
-6 to 6 dB
0

With this control, the user can adjust the gain on the Cb and Cr channels of the output video (saturation). For unity gain, set this value to 0. The adjustment range is +/- 6 dB.

6.6.4. Setting the Hue

Video Processor
HUE
-20 to +20 deg.
0

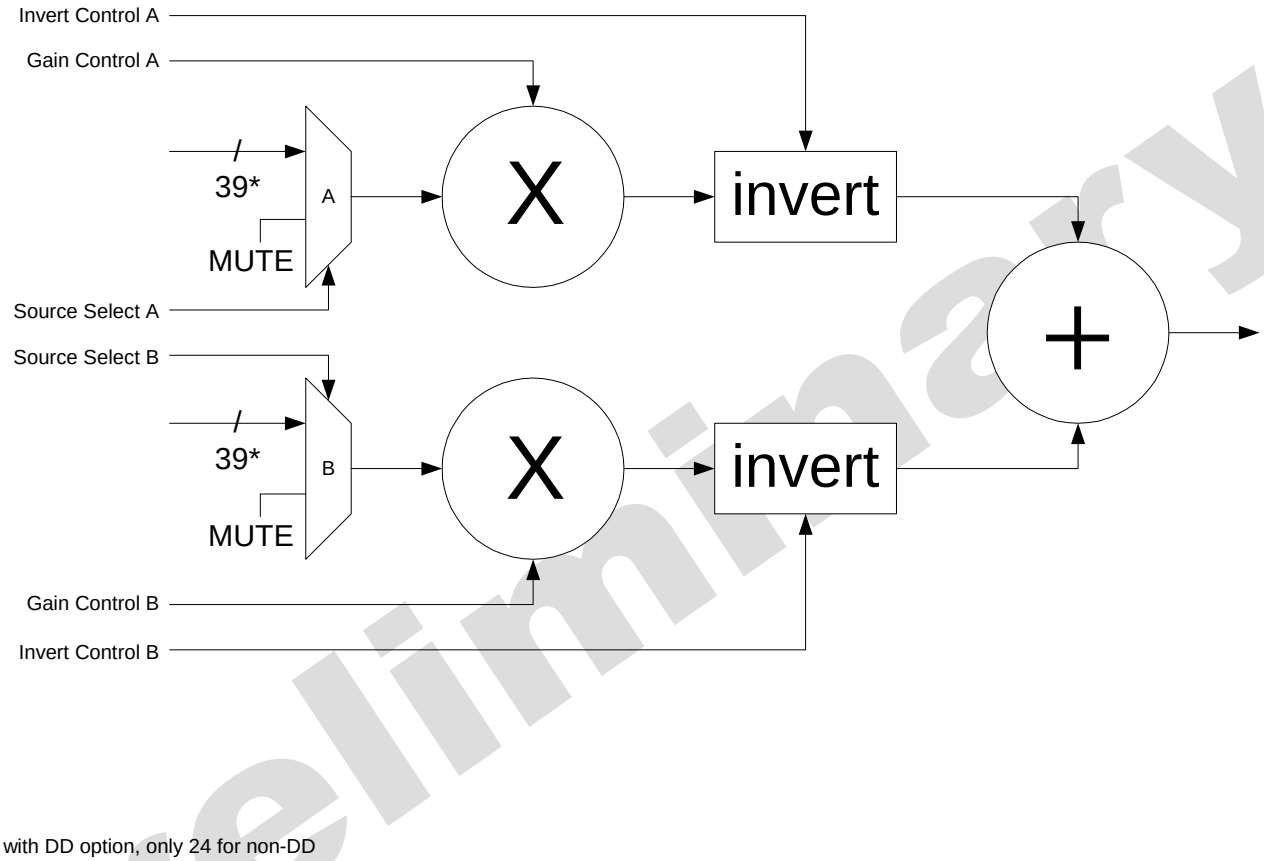
With this control the user can adjust the Hue or color of components. For unity gain, set this value to 0. The adjustment range is +/- 20 degrees, in 0.1 degree increments.

6.7. UNDERSTANDING THE AUDIO PROCESSOR

In order to understand the parameters of the Audio Processor on the 7746FS-EAES8-HD, this section gives a brief description of each of the major components that comprise the Audio Processor. This section is meant to aid the user when configuring the Audio Processor (sections 6.8 to 6.10).

6.7.1. Single Mixer

This is the basic building block of the Audio Processor. There are two mixers on the 7746FS-EAES8-HD series module. Each mixer has 16 output channels. Figure 6-1 describes one stage for a mixer output channel. The user can mix two sources, adjust the gain and inversion of each source, and output them.



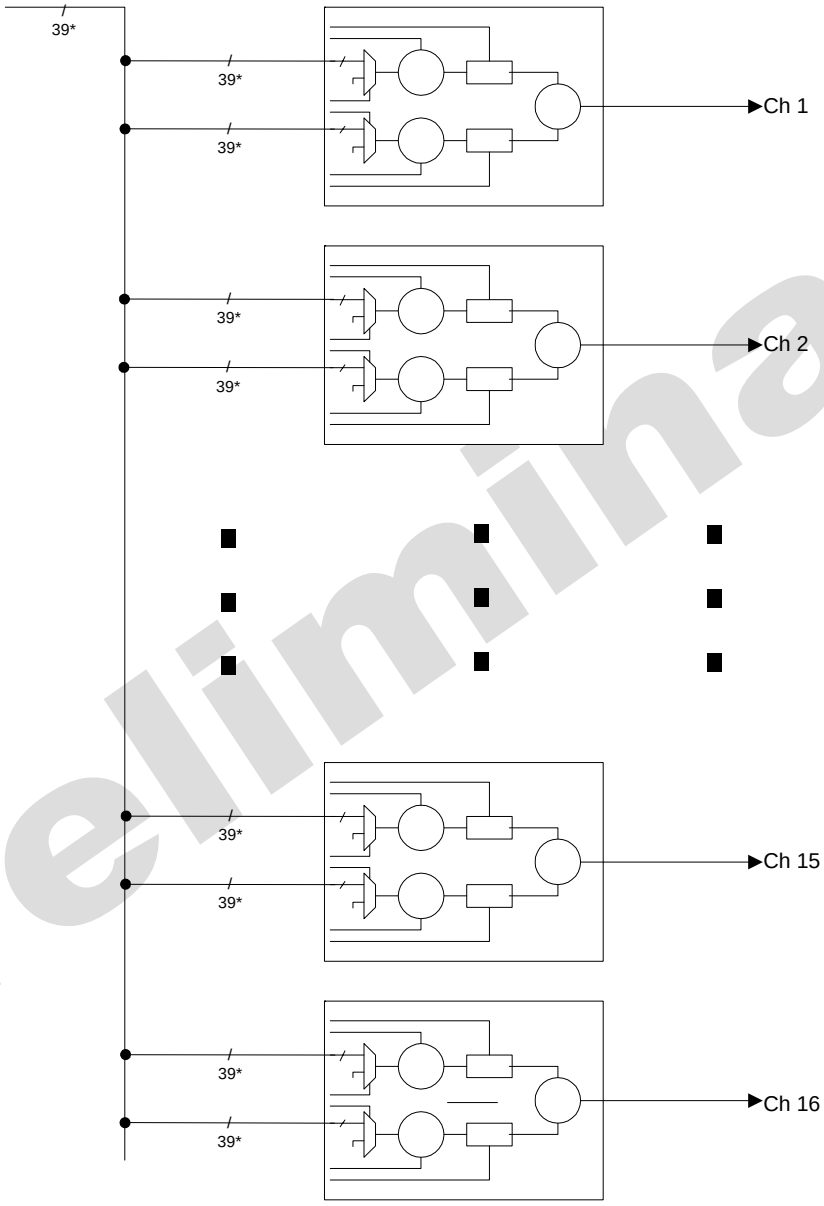
*39 with DD option, only 24 for non-DD

Figure 6-1: Single Mixer Stage

Typically, only Input A is used, and Input B is defaulted to MUTE. Input B would be used when mixing in voice-overs.

6.7.2. Full Mixer

Figure 6-2 shows all the mixer stages for one of the two mixers on the 7746FS-EAES8-HD series module. This illustration shows how the user can map mix any input sources to the 16 output channels of the mixer.

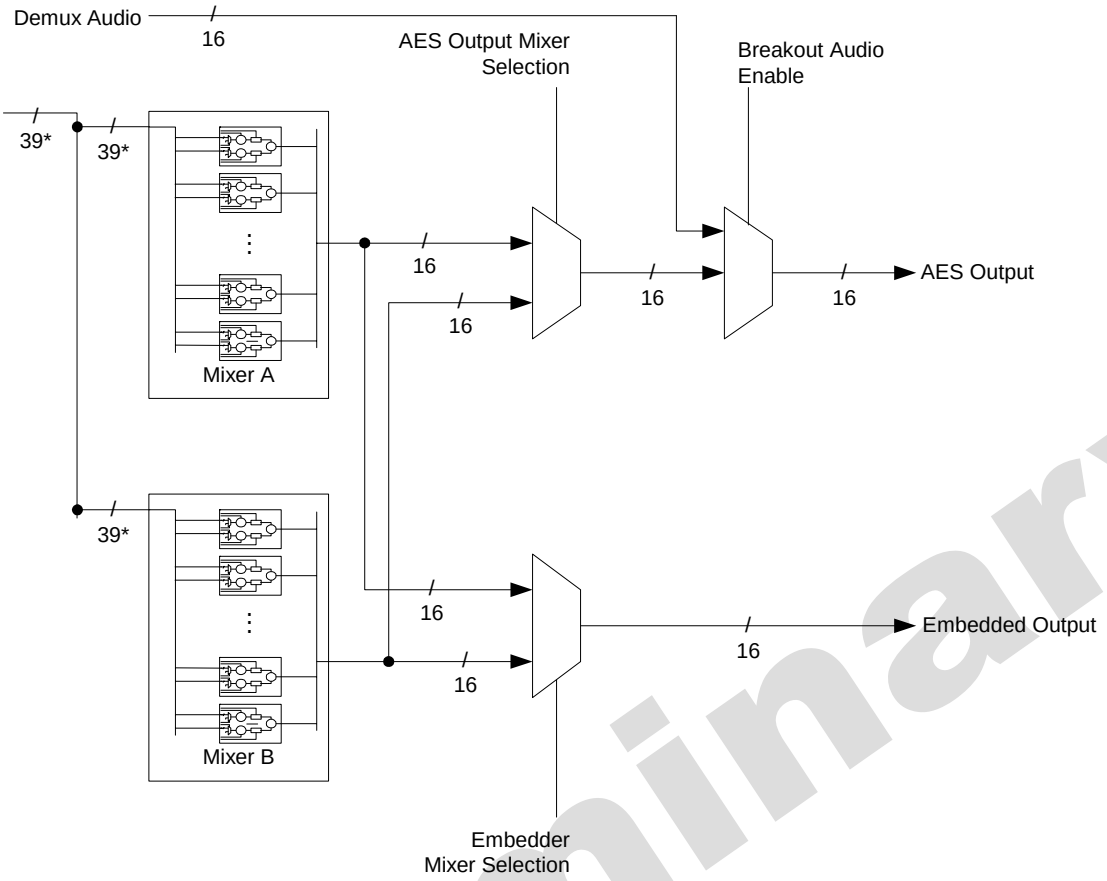


*39 with DD option, only 24 for non-DD

Figure 6-2: Full Mixer

6.7.3. Mixer A and B

Figure 6-3 shows how the two mixers are used to embed the output video and the external AES outputs.

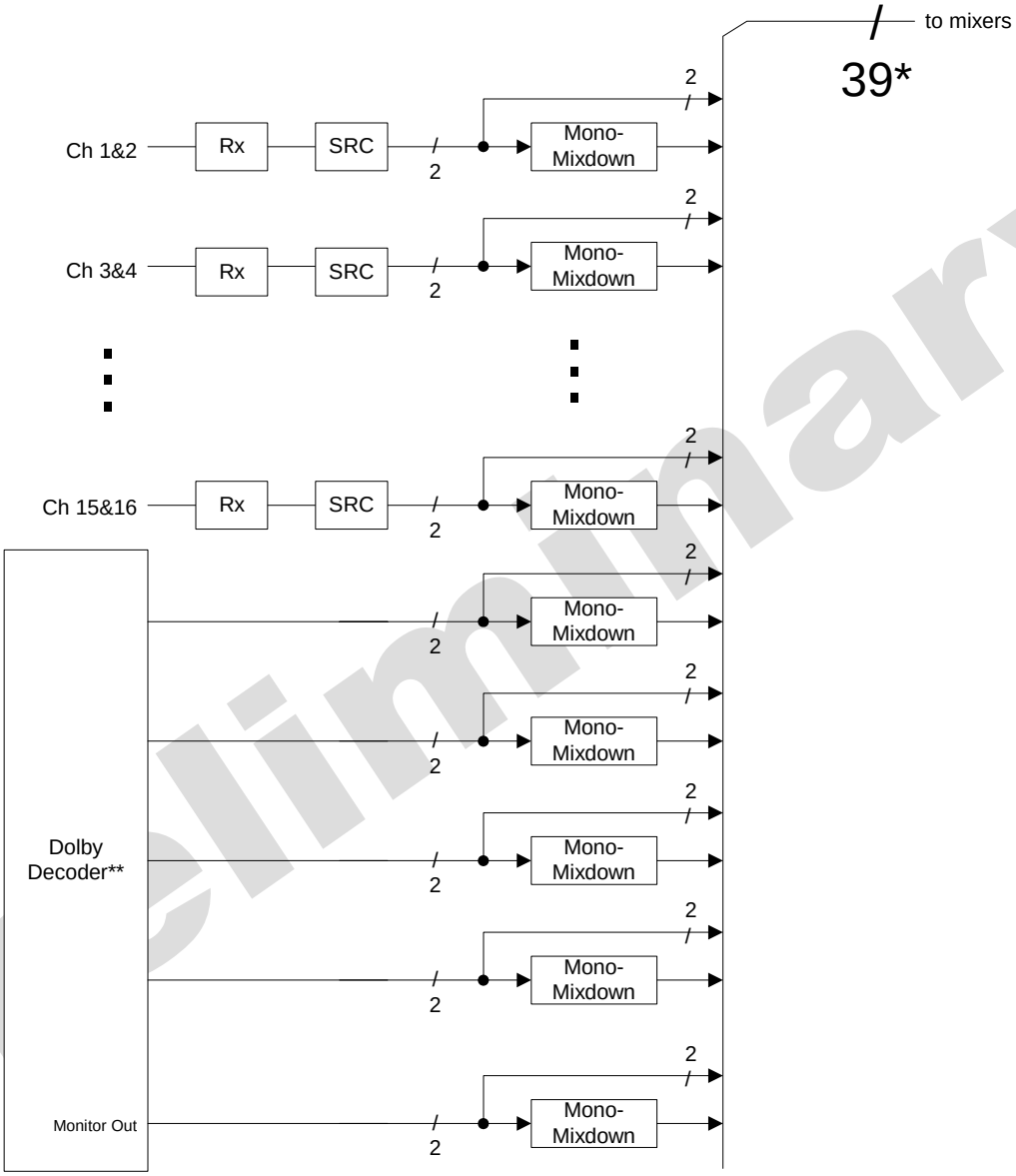


*39 with DD option, only 24 for non-DD

Figure 6-3: Mixer A and B

6.7.4. Mono Mixer

Figure 6-4 describes how the mono-mixers are used to provide mono down mixes as input sources for the two mixers.



**only avaliable with DD option

*39 with DD option, only 24 for non-DD

Figure 6-4: Mono-Mixers

6.7.5. Dolby Decoder

On the 7746FS-EAES8-DD-HD version, there is a Dolby Decoder available. Figure 6-5 describes how the Dolby Decoder can be used to provide decoded Dolby E as input sources for the two mixers.

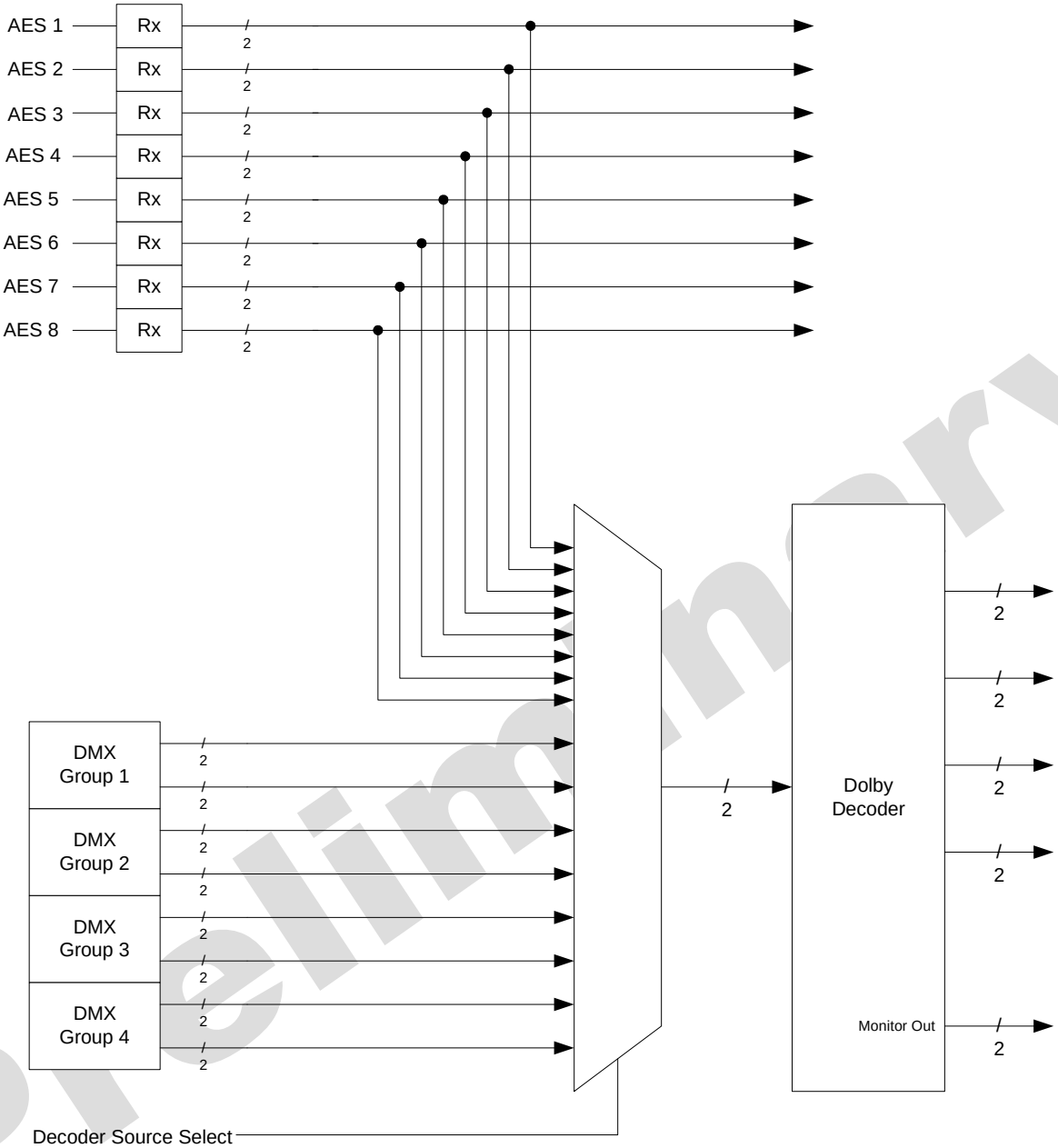


Figure 6-5: Dolby Decoder (only on 7746FS-EAES8-DD-HD)

6.7.6. Headphone Monitoring

Figure 6-6 describes which sources are available to the user to monitor through the card edge headphone jack.

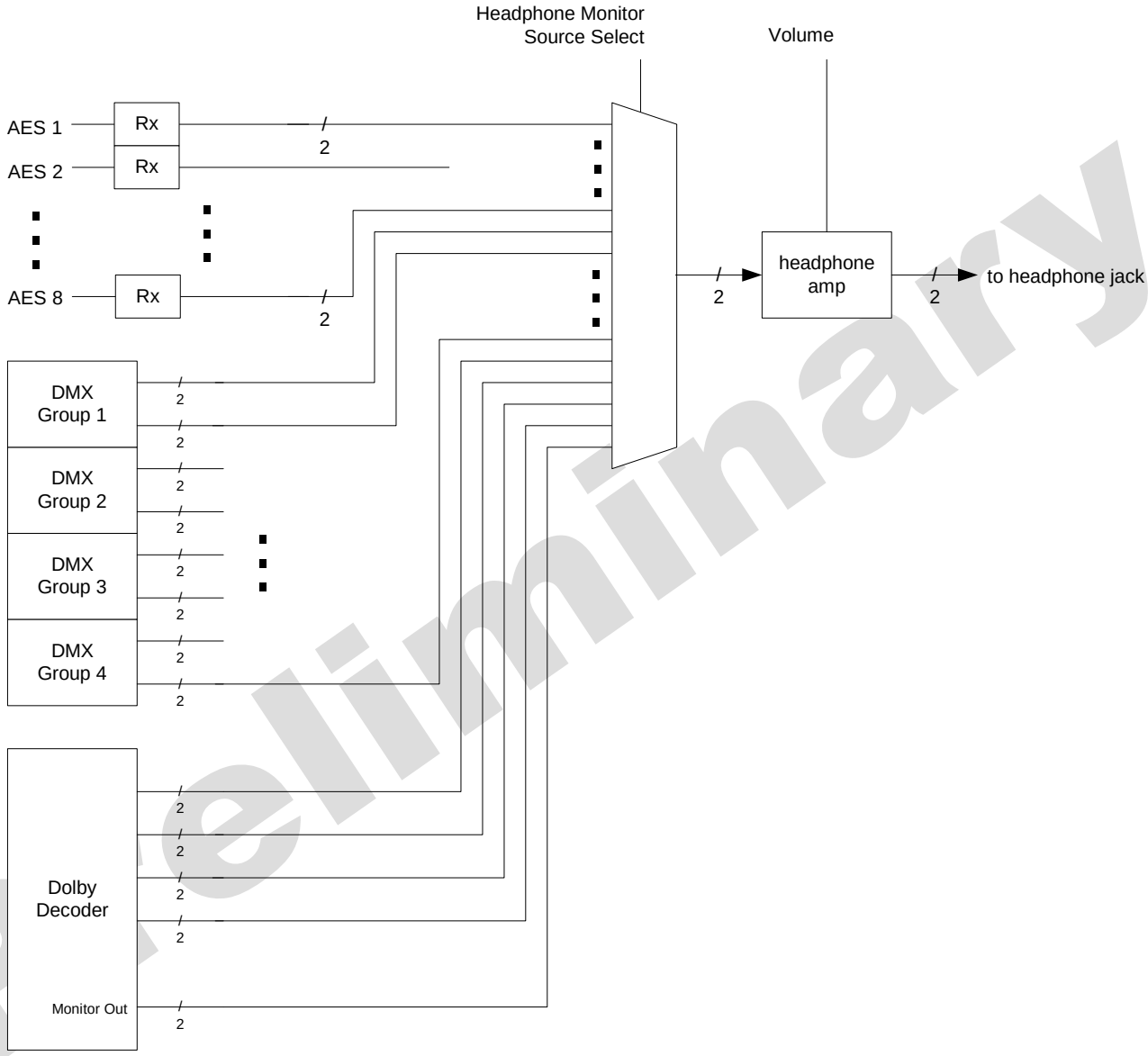


Figure 6-6: Headphone Monitoring

Due to hardware resource limitations, occasional drop/repeat of samples MAY occur when using the headphones to monitor AES outputs.

6.8. CONFIGURING THE AUDIO PROCESSING FUNCTIONS

The *Audio Processor* menus are used to configure parameters associated with the audio processing and routing functions of the 7746FS-EAES8-HD. The chart below shows the items available in the *Audio Processor* menu. Sections 6.8.1 to 6.8.5 give detailed information about each of the menu items.

MASS	Mixer A Source Select	Selects the input source for Mixer A.
MAGC	Mixer A Gain Control	Sets the gain of the inputs for Mixer A.
MAIV	Mixer A Inversion Control	Sets the inversion control for the inputs for Mixer A.
MBSS	Mixer B Source Select	Selects the input source for Mixer B.
MAGC	Mixer B Gain Control	Sets the gain of the inputs for Mixer B.
MAIV	Mixer B Inversion Control	Sets the inversion control for the inputs for Mixer B.
EMBM	Embedder Mixer Selection	Selects which mixer to output to the embedder.
AESO	AES Output Selection	Selects which mixer to output to AES.
SRCS	Sample Rate Converter Source	Selects the source for Sample Rate Converters.

6.8.1. Selecting Input Source for Mixer A

The parameters for both Mixer A and B are the same. For the sake of simplicity in the manual only the menus for Mixer A will be described.

Audio Processor	
MASS	
Ch1 A Source Select	*1AS*
Ch1 B Source Select	*1BS*
Ch2 A Source Select	*2AS*
Ch2 B Source Select	*2BS*
Ch3 A Source Select	*3AS*
Ch3 B Source Select	*3BS*
Ch4 A Source Select	*4AS*
Ch4 B Source Select	*4BS*
Ch5 A Source Select	*5AS*
Ch5 B Source Select	*5BS*
Ch6 A Source Select	*6AS*
Ch6 B Source Select	*6BS*
Ch7 A Source Select	*7AS*
Ch7 B Source Select	*7BS*
Ch8 A Source Select	*8AS*
Ch8 B Source Select	*8BS*
Ch9 A Source Select	*9AS*
Ch9 B Source Select	*9BS*
Ch10 A Source Select	*AAS*
Ch10 B Source Select	*ABS*
Ch11 A Source Select	*BAS*
Ch11 B Source Select	*BBS*
Ch12 A Source Select	*CAS*
Ch12 B Source Select	*CBS*
Ch13 A Source Select	*DAS*
Ch13 B Source Select	*DBS*
Ch14 A Source Select	*EAS*
Ch14 B Source Select	*EBS*
Ch15 A Source Select	*FAS*
Ch15 B Source Select	*FBS*
Ch16 A Source Select	*GAS*
Ch16 B Source Select	*GBS*

This control allows the user to specify what is the input source for each pair (A and B) of the 16 channels of Mixer A.

The following are the default values for each of the input sources (same for MBSS):

1AS = CH1
1BS = MUTE
2AS = CH2
2BS = MUTE
3AS = CH3
3BS = MUTE
4AS = CH4
4BS = MUTE
5AS = CH5
5BS = MUTE
6AS = CH6
6BS = MUTE
7AS = CH7
7BS = MUTE
8AS = CH8
8BS = MUTE
9AS = CH9
9BS = MUTE
AAS = CHA
ABS = MUTE
BAS = CHB
BBS = MUTE
CAS = CHC
CBS = MUTE
DAS = CHD
DBS = MUTE
EAS = CHE
EBS = MUTE
FAS = CHF
FBS = MUTE
GAS = CHG
GBS = MUTE

6.8.1.1. Selecting the Source for Channel 1 A of Mixer A

The parameters for each pair (A and B) for all 16 channels are the same. For the sake of simplicity in the manual only the menus for Channel 1 A for Mixer A will be described.

Audio Processor	
MASS	
1AS	
Ch. 1	*CH1*
Ch. 2	*CH2*
Ch. 3	*CH3*
Ch. 4	*CH4*
Ch. 5	*CH5*
Ch. 6	*CH6*
Ch. 7	*CH7*
Ch. 8	*CH8*
Ch. 9	*CH9*
Ch. 10	*CHA*
Ch. 11	*CHB*
Ch. 12	*CHC*
Ch. 13	*CHD*
Ch. 14	*CHE*
Ch. 15	*CHF*
Ch. 16	*CHG*
*Dolby Decoder A Ch. 1**	*DDA1*
*Dolby Decoder A Ch. 2**	*DDA2*
*Dolby Decoder A Ch. 3**	*DDA3*
*Dolby Decoder A Ch. 4**	*DDA4*
*Dolby Decoder A Ch. 5**	*DDA5*
*Dolby Decoder A Ch. 6**	*DDA6*
*Dolby Decoder A Ch. 7**	*DDA7*
*Dolby Decoder A Ch. 8**	*DDA8*
*Dolby Decoder A Mon. 1**	*DDAA*
*Dolby Decoder A Mon. 2**	*DDAB*
Mono Mix Ch. 1 & 2	*MM12*
Mono Mix Ch. 3 & 4	*MM34*
Mono Mix Ch. 5 & 6	*MM56*
Mono Mix Ch. 7 & 8	*MM78*
Mono Mix Ch. 9 & 10	*MM9A*
Mono Mix Ch. 11 &12	*MMBC*
Mono Mix Ch. 13 & 14	*MMDE*
Mono Mix Ch. 15 & 16	*MMFG*
*Mono Mix DD A Ch. 1 & 2**	*MA12*
*Mono Mix DD A Ch. 3 & 4**	*MA34*
*Mono Mix DD A Ch. 5 & 6**	*MA56*
*Mono Mix DD A Ch. 7 & 8**	*MA78*
*Mono Mix DD A M1 & M2**	*MAMM*
MUTE	*MUTE*

This parameter selects the source for Channel 1 A of Mixer A.

The Dolby Decoder values are only available on the 7746FS-EAES8-DD-HD module. These parameters are marked by the *.

6.8.2. Setting the Gain of the Input Sources for Mixer A

Audio Processor	
MAGC	
Ch1 A Gain Control	1AGC
Ch1 B Gain Control	1BGC
Ch2 A Gain Control	2AGC
Ch2 B Gain Control	2BGC
Ch3 A Gain Control	3AGC
Ch3 B Gain Control	3BGC
Ch4 A Gain Control	4AGC
Ch4 B Gain Control	4BGC
Ch5 A Gain Control	5AGC
Ch5 B Gain Control	5BGC
Ch6 A Gain Control	6AGC
Ch6 B Gain Control	6BGC
Ch7 A Gain Control	7AGC
Ch7 B Gain Control	7BGC
Ch8 A Gain Control	8AGC
Ch8 B Gain Control	8BGC
Ch9 A Gain Control	9AGC
Ch9 B Gain Control	9BGC
Ch10 A Gain Control	AAGC
Ch10 B Gain Control	ABGC
Ch11 A Gain Control	BAGC
Ch11 B Gain Control	BBGC
Ch12 A Gain Control	CAGC
Ch12 B Gain Control	CBGC
Ch13 A Gain Control	DAGC
Ch13 B Gain Control	DBGC
Ch14 A Gain Control	EAGC
Ch14 B Gain Control	EBGC
Ch15 A Gain Control	FAGC
Ch15 B Gain Control	FBGC
Ch16 A Gain Control	GAGC
Ch16 B Gain Control	GBGC

This control allows the user to adjust the gain of the input sources for each pair (A and B) of the 16 channels of Mixer A.

6.8.2.1. Setting the Gain for Channel 1 A of Mixer A

The parameters for each pair (A and B) for all 16 channels are the same. For the sake of simplicity in the manual only the menus for Channel 1 Input A for Mixer A will be described.

Audio Processor
MAGC
1AGC
-24 to +24 dB
0

This parameter sets the gain for Channel 1 A of Mixer A. For unity gain, set the parameter to 0. The adjustment range is +/- 24 dB, in increments of 0.1 dB.

6.8.3. Setting the Inversion Control of the Input Sources for Mixer A

Audio Processor	
MAIV	
Ch1 A Invert	*1AIV*
Ch1 B Invert	*1BIV*
Ch2 A Invert	*2AIV*
Ch2 B Invert	*2BIV*
Ch3 A Invert	*3AIV*
Ch3 B Invert	*3BIV*
Ch4 A Invert	*4AIV*
Ch4 B Invert	*4BIV*
Ch5 A Invert	*5AIV*
Ch5 B Invert	*5BIV*
Ch6 A Invert	*6AIV*
Ch6 B Invert	*6BIV*
Ch7 A Invert	*7AIV*
Ch7 B Invert	*7BIV*
Ch8 A Invert	*8AIV*
Ch8 B Invert	*8BIV*
Ch9 A Invert	*9AIV*
Ch9 B Invert	*9BIV*
Ch10 A Invert	*AAIV*
Ch10 B Invert	*ABIV*
Ch11 A Invert	*BAIV*
Ch11 B Invert	*BBIV*
Ch12 A Invert	*CAIV*
Ch12 B Invert	*CBIV*
Ch13 A Invert	*DAIV*
Ch13 B Invert	*DBIV*
Ch14 A Invert	*EAIV*
Ch14 B Invert	*EBIV*
Ch15 A Invert	*FAIV*
Ch15 B Invert	*FBIV*
Ch16 A Invert	*GAIV*
Ch16 B Invert	*GBIV*

This control allows the user to set the inversion control of the input sources for each pair (A and B) of the 16 channels of Mixer A.

This allows the user to invert audio pairs if desired. This control is useful in cases of wiring errors, etc.

6.8.3.1. Setting the Inversion Control for Channel 1 A of Mixer A

The parameters for each pair (A and B) for all 16 channels are the same. For the sake of simplicity in the manual only the menus for Channel 1 Input A for Mixer A will be described.

Audio Processor	
MAIV	
1AIV	
Normal	*NRML*
Invert	*INVT*

This parameter sets the inversion control for Channel 1 Input A of Mixer A. When set to *Normal*, the pairs will remain as is. When set to *Invert*, the pairs will be inverted.

6.8.4. Setting which Mixer will Output to Embedders A and B

Audio Processor
EMBM
Mixer A
Mixer B

This parameter selects which mixer (A or B) will output as embedded audio in output video.

6.8.5. Setting which Mixer will Output to AES

Audio Processor
AESO
Mixer A
Mixer B

This parameter selects which mixer (A or B) will output to external AES.

6.8.6. Setting Input Sources for Sample Rate Converters

Audio Processor
SRCS
SRC12
SRC34
SRC56
SRC78
SRC9A
SRCBC
SRCDE
SRCFG

The parameter selects which Sample Rate Converter to configure the input source for.

6.8.6.1. Setting the Input Sources for Each SRC

Audio Processor	
SRCS	
SRC12	
Normal	*DMX1*
AES Input 1	*AES1*

This parameter will select the source for the Sample Rate Converter for channels 1 and 2.

The source can be the demuxed audio from the input signal or the external AES 1 Input.

Audio Processor	
SRCS	
SRC34	
Normal	*DMX2*
AES Input 2	*AES2*

This parameter will select the source for Sample Rate Converter for channels 3 and 4.

The source can be the demuxed audio from the input signal or the external AES 2 Input.

Audio Processor	
SRCS	
SRC56	
Normal	*DMX3*
AES Input 3	*AES3*

This parameter will select the source for the Sample Rate Converter for channels 5 and 6.

The source can be the demuxed audio from the input signal or the external AES 3 Input.

Audio Processor	
SRCS	
SRC78	
Normal	*DMX4*
AES Input 4	*AES4*

This parameter will select the source for the Sample Rate Converter for channels 7 and 8.

The source can be the demuxed audio from the input signal or the external AES 4 Input.

Audio Processor	
SRCS	
SRC9A	
Normal	*DMX5*
AES Input 5	*AES5*

This parameter will select the source for the Sample Rate Converter for channels 9 and 10.

The source can be the demuxed audio from the input signal or the external AES 5 Input.

Audio Processor	
SRCS	
SRCBC	
Normal	*DMX6*
AES Input 6	*AES6*

This parameter will select the source for the Sample Rate Converter for channels 11 and 12.

The source can be the demuxed audio from the input signal or the external AES 6 Input.

Audio Processor	
SRCS	
SRCDE	
Normal	*DMX7*
AES Input 7	*AES7*

This parameter will select the source for the Sample Rate Converter for channels 13 and 14.

The source can be the demuxed audio from the input signal or the external AES 7 Input.

Audio Processor	
SRCS	
SRCFG	
Normal	*DMX8*
AES Output 8	*AES8*

This parameter will select the source for the Sample Rate Converter for channels 15 and 16.

The source can be the demuxed audio from the input signal or the external AES 8 Input.

6.9. CONFIGURING THE HEADPHONE MONITOR

The *Headphone Monitor* menus are used to configure parameters associated with the headphone jack on the module. The chart below shows the items available in the *Headphone Monitor* menu. Sections 6.9.1 to 6.9.2 give detailed information about each of the menu items.

HVOL	Headphone volume	Sets the volume for the headphone.
HSRC	Headphone source	Selects the source for the headphone monitoring

6.9.1. Setting the Headphone Volume

Headphone Monitor
- *HVOL*
  - *HV00 to HV15*
  - *HV07*

With this control you can set the headphone volume to one of 16 levels.

Total adjustment range is over 50 dB. Level 00 is the lowest volume and is effectively mute.

Please be aware that if the headphone source is compressed Dolby E/AC3, the output will be full-scale noise.

6.9.2. Selecting the Source for the Headphone Monitoring

Headphone Monitor
- *HSRC*

AES1	*AES1*
AES2	*AES2*
AES3	*AES3*
AES4	*AES4*
AES5	*AES5*
AES6	*AES6*
AES7	*AES7*
AES8	*AES8*
DMX Ch. 1 & 2	*DMX1*
DMX Ch. 3 & 4	*DMX2*
DMX Ch. 5 & 6	*DMX3*
DMX Ch. 7 & 8	*DMX4*
DMX Ch. 9 & 10	*DMX5*
DMX Ch. 11 & 12	*DMX6*
DMX Ch. 13 & 14	*DMX7*
DMX Ch. 15 & 16	*DMX8*
Dolby Decoder A Ch. 1 & 2	*DA12*
Dolby Decoder A Ch. 3 & 2	*DA34*
Dolby Decoder A Ch. 5 & 2	*DA56*
Dolby Decoder A Ch. 7 & 2	*DA78*
Dolby Decoder A M1 & M2	*DAAB*

This selects the audio source for the headphone monitoring.

If the parameter is set to *AES1* to *AES8*, then the headphone will be monitoring the external discrete AES inputs.

If the parameter is set to *DMX1* to *DMX8*, then the headphone will be monitoring the incoming embedded audio.

If the parameter is set to *DA12* to *DAAB*, then the headphone will be monitoring the Dolby Decoded channels (only on 7746FS-EAES8-DD-HD).

Note: Due to hardware resource limitations, occasional drop/repeat of samples MAY occur when using the headphones to monitor AES outputs.

6.10. CONFIGURING THE DOLBY DECODER (774FS-EAES8-DD-HD only)

The *Dolby Decoder* menus are used to configure parameters associated with the Dolby Decoders on the module and its behaviour with a loss of signal. The chart below shows the items available in the *Dolby Decoder* menu. Sections 6.10.1 to 6.10.2 give detailed information about each of the menu items.

DD_A	Dolby Decoder A	Sets the controls for Dolby Decoder A.
DDLS	Dolby Decoder Loss of Signal	Sets the response of the Dolby Decoder to a loss of signal

6.10.1. Setting the Controls for Dolby Decoder A

Dolby Decoder	
DD_A	
Decoder Source Select	*DDSS*
Video Sync Source Select	*DDVS*
Decoder Mode	*DDMO*
Output Latency	*DDOL*
Program Play Feature	*DDPP*
Dynamic Range Processing	*DDDR*
Monitor Channel Map	*DDMM*

This sets the controls for the Dolby Decoder A. These controls will determine what the decoder's inputs are, its sync source, its mode, and its output latency.

This will also control the program play feature, dynamic range processing, and the monitor channel map.

6.10.1.1. Selecting the Source for Dolby Decoder A

Dolby Decoder	
DD_A	
DDSS	
AES 1	*AES1*
AES 2	*AES2*
AES 3	*AES3*
AES 4	*AES4*
AES 5	*AES5*
AES 6	*AES6*
AES 7	*AES7*
AES 8	*AES8*
DMX Ch. 1 & 2	*DMX1*
DMX Ch. 3 & 4	*DMX2*
DMX Ch. 5 & 6	*DMX3*
DMX Ch. 7 & 8	*DMX4*
DMX Ch. 9 & 10	*DMX5*
DMX Ch. 11 & 12	*DMX6*
DMX Ch. 13 & 14	*DMX7*
DMX Ch. 15 & 16	*DMX8*

This selects the input source for Dolby Decoder A. The sources can be any one of the external discrete AES channels or one of the 8 pairs of de-embedded audio.

6.10.1.2. Selecting the Sync Source for Dolby Decoder A

Dolby Decoder	
DD_A	
DDVS	
Output Video	VOUT
Input Video	VIN
Genlock	GL

With this control you can select the source of sync for the Dolby Decoder.

Select *VOUT* to use the video output as the source of sync.

Select *VIN* to use the video input as the source of sync.

Select *GL* to use the genlock input as the source of sync.

6.10.1.3. Selecting the Mode for Dolby Decoder A

Dolby Decoder	
DD_A	
DDMO	
Mute	MUTE
Only Dolby Digital	D-D
Only Dolby E	D-E
Decode All	ALL

With this control you can select the Dolby Decoder mode.

When the control is set to *Mute*, then the Dolby Decoder outputs Mute, regardless of the input contents.

When the control is set to *Only Dolby Digital*, then only Dolby Digital is decoded.

When the control is set to *Only Dolby E*, then only Dolby E is decoded.

When the control is set to *Decode All*, the Dolby Decoder will decode all Dolby formats and pass PCM inputs through.

6.10.1.4. Selecting the Output Latency for Dolby Decoder A

Dolby Decoder	
DD_A	
DDOL	
Minimum	MIN
1 Video Frame	1FRM

With this control you can setup the Dolby Decoder decoded outputs latency.

Select *MIN* to configure the Dolby Decoder for the minimum possible decoding delay.

Select *1FRM* to configure the Dolby Decoder for a decoding delay equivalent to 1 frame of video.

6.10.1.5. Setting the Program Play Feature for Dolby Decoder A

Dolby Decoder	
DD_A	
DDPP	
No	NO
Yes	YES

With this control you can setup the Dolby Decoder “Program Play” feature for Dolby E.

Select *No* to configure the Dolby Decoder Program Play for normal (synchronous) operation.

Select *Yes* to configure the Dolby Decoder Program Play to enable proper decoding of Dolby-E stream coming off of a VTR that has been sped up by up to 15%. Additional pitch-shift processing is applied and output latency is forced to min. **NOTE:** The Dolby-E stream has to be input via the external ("backup") AES input.

6.10.1.6. Setting the Dynamic Range Processing of Dolby Decoder A

Dolby Decoder	
DD_A	
DDDR	
Bypass	BYPS
RF	RF
LINE	LINE

With this control you can setup the Dolby Decoder dynamic range compression for AC3 (Dolby Digital only).

Select *BYPS* to configure the Dolby Decoder to bypass dynamic range processing. Program levels are unaltered.

Select *RF* to configure the Dolby Decoder to adjust the dynamic range using a RF (or 'strong") dynamic range compression profile.

Select *LINE* to configure the Dolby Decoder to adjust the dynamic range using a LINE (or 'light") dynamic range compression profile.

6.10.1.7. Selecting the Monitor Channel Map of Dolby Decoder A

Dolby Decoder	
DD_A	
DDMM	
Mono	MONO
Stereo	STRO
Pro-Logic	PROL

This controls the format of the monitored down-mix output of the Dolby Decoder.

When the control is set to *Mono*, then the format of the down-mixed output will be mono.

When the control is set to *Stereo*, then the format of the down-mixed output will be a stereo pair.

When the control is set to *Pro-Logic*, then the format of the down-mixed output will be Pro-Logic.

6.10.2. Setting the Action on Loss of Signal from the Dolby Decoder A

Dolby Decoder	
DDLS	
Demux	DMX
Dolby Decoder	DLBY
AES	AES

With this control you can select the audio source to use when the input for the Dolby Decoder is not a Dolby encoded stream. This control affects all the sources that are set to take their inputs from the Dolby Decoder.

Select *DMUX* to automatically switch the input sources to the de-embedder outputs

Select *DOLB* to always keep the input sources as the Dolby Decoder. When the Dolby Decoder is given a PCM stream, its output will be the PCM audio on pair 1 and silence on the remaining pairs.

Select *AES* to automatically switch the input sources to the AES inputs.

6.11. CONFIGURING THE METADATA

The *Metadata* menu is used to configure the parameters related to the Dolby Metadata. The chart below shows the items available in the *Metadata* menu. Sections **Error! Reference source not found.** to 6.11.2 give detailed information about each of the menu items.

MD_A	Decoder A	Sets the controls for Metadata Decoder A.
DB9C	DB-9 Configuration	Sets the behaviour of the DB-9 Metadata I/O.
MMON	Metadata Monitor/Processor	Sets the controls for the metadata monitor and dialnorm processor.

The MD_A Decoder A options are as follows:

METO	Output Source Select	METO specifies the output of the Metadata.
METV	Embed Source Select	METV specifies the type of Metadata that is inserted in VANC.
VADL	De-embed Line	VADL selects the input VANC line for de-embedding.
VADI	De-embed DID	VADI selects the VANC Data ID.
VADS	De-embed SID	VADS selects the VANC Secondary Data ID.
VALK	Pass Existing Metadata	*VAKL* selects whether to delete specified VANC packets.
VAEL	*Embed Line*	*VAEL* selects the output VANC for embedding.
VAEI	*Embed DID*	*VAEI* selects the output VANC Data ID.
VAES	*Embed SID*	*VAES* selects the output VANC Secondary Data ID.
VAEN	*Embed Enable*	*VAEN* selects whether VANC will be embedding on the output video.

6.11.1.1. Selecting the Type of Metadata that is Output from Metadata Decoder A

Metadata
- *MD_A*
  - *Output Source Select - METO*
    - *Dolby Decoder A*
    - *VANC A*
    - *External A*
    - *Proc A*
    - *Author*

With this control you can set the type of Metadata output.

Select *Dolby Decoder A* to output Metadata from the Dolby Decoder A.

Select *VANC A* to output Metadata from the input VANC packets.

Select *External A* to output Metadata from the external META input.

Select *Proc A* to output Metadata from the Proc A.

Select *Author* to output Metadata from the author.

6.11.1.2. Selecting the Type of Metadata that is Inserted into VANC

Metadata
MD_A
Embed Source Select - METV
Dolby Decoder A - DLBA
VANC A - VNCA
External A - EXTA
Proc A
Author

With this control you can set the type of Metadata that is inserted into VANC data by the embedder when *VAEN* menu item is set to *ON.*

Select *DLBA* to insert Metadata from the Dolby Decoder A.

Select *VNCA* to insert Metadata from the input VANC packets.

Select *EXTA* to insert Metadata from the external META input.

Select *Proc A* to output Metadata from the Proc A.

Select *Author* to output Metadata from the author.

6.11.1.3. Configuring the VANC Metadata De-Embedder

There are four menu items used to configure the input VANC de-embedder.

Metadata
MD_A
De-embed Line - VADL
0 to 31

With this control you can set the line for de-embedding VANC Metadata packets from the input video.

Metadata
MD_A
De-embed DID - VADI
0 to FF (hex)

With this control you can set the Data ID for de-embedding VANC Metadata packets. Normally you should not have to change this from the default value. The values shown are expressed as hexadecimal numbers.

The default value of data ID 45 corresponds to the latest proposals of SMPTE RP291

Metadata
MD_A
De-embed SDID - VADS
1
1 to FF (hex)

With this control you can set the Secondary Data ID for de-embedding VANC Metadata packets. Normally you should not have to change this from the default value. The values shown are expressed as hexadecimal numbers. When the *VADI* menu item is set to values in the range of *C0 to CF*, type 1 Metadata packets will be de-embedded and the *VADS* menu item is not relevant as dictated by SMPTE 291M.

Metadata	
MD_A	
Pass Existing Metadata - VALK	
Clean	KILL
Pass	PASS

With this control you can set whether the VANC packets matching the *VADI* and *VADS* menu item values will be removed from the video or passed through to the output.

Select *KILL* to remove the VANC packets.

Select *PASS* to pass the packets through to the output video.

6.11.1.4. Configuring the VANC Metadata Embedder

There are four menu items used to configure the input VANC de-embedder.

Metadata
MD_A
Embed Line - VAEL
0 to 31

With this control you can set the line for embedding VANC Metadata packets onto the output video.

Metadata
MD_A
Embed DID - VAEI
0 to FF (hex)

With this control you can set the Data ID for embedding VANC Metadata packets. Normally you should not have to change this from the default value. The values shown are expressed as hexadecimal numbers.

Metadata
MD_A
Embed SDID - VAES
1
1 to FF (hex)

With this control you can set the Secondary Data ID for embedding VANC Metadata packets. Normally you should not have to change this from the default value. The values shown are expressed as hexadecimal numbers. When the *VAEI* menu item is set to values in the range of *C0 to CF*, type 1 metadata packets will be generated and the *VADS* menu item is not relevant as dictated by SMPTE 291M.

Metadata
MD_A
Embed Enable - VAEN
On
Off

With this control you can select whether the VANC packets will be embedded onto the output video or not.

Select *ON* to insert VANC Metadata packets on the output video. The input source of Metadata for the VANC packets is set by the *METV* menu item. See section 6.11.1.2.

Select *OFF* to disable VANC insertion.

6.11.2. Configuring the External Metadata I/O

Metadata	
DB9C	
Tx Primary/ Rx Secondary	*TXRX*
Rx Primary/Tx Secondary	*RXTX*

This configures the external Metadata I/O DB-9 connection.

TXRX configures the Metadata I/O to receive from a Dolby DP570 unit with the following pin out:

Pin	Function
2	Rx A-
3	Tx B+
7	Rx B+
8	Tx A-

RXTX configures the Metadata I/O to transmit to a Dolby DP570 unit with the following pin out:

Pin	Function
2	Tx A-
3	Rx B+
7	Tx B+
8	Rx A-

6.11.3. Configuring the Monitor/Proc Source Select

Metadata	
MMON	
Monitor/Proc Source Select - MSRC	
VANC A	
External A	

With this control you can set the source of metadata to monitor and process.

Select *VNCA* to output Metadata from the input VANC packets.

Select *EXTA* to output Metadata from the external META input.

6.11.4. Setting the Metadata Monitor/Processor Controls

Metadata	
MMON	
Dialnorm Adjust Pgm 1	*DP1A*
Dialnorm Adjust Pgm 2	*DP2A*
Dialnorm Adjust Pgm 3	*DP3A*
Dialnorm Adjust Pgm 4	*DP4A*
Dialnorm Adjust Pgm 5	*DP5A*
Dialnorm Adjust Pgm 6	*DP6A*
Dialnorm Adjust Pgm 7	*DP7A*
Dialnorm Adjust Pgm 8	*DP8A*

This sets the controls for the Metadata Monitor and Processor (allows the adjustment of the dialnorm setting).

Dialnorm Adjust Pgm 1-8 (DP1A to DP8A) allows the modification of the dialnorm field in the metadata message.

6.12. DISPLAYING THE MODULE STATUS

The *Status* menus are used to show the status of various parameters of the 7746FS-EAES8-HD. The chart below shows the items available in the *Status* menu. Sections 6.12.1 to 6.12.5 give detailed information about each of the menu items.

UPRV	Module Firmware	Displays the firmware revision of the module.
F1RV	FPGA1 Revision	Displays the FPGA revision of the module's main board.
F2RV	FPGA2 Revision	Displays the FPGA revision of the module's sub board.
IVSD	Input Video Standard	Displays the detected input video standard.
OVSD	Operating Standard	Displays the operating standard of the module.

6.12.1. Checking the Module Firmware

Status
UPRV
Eg. "V1.0 BUILD 100"

The status parameter will report the firmware version that is operating on the module.

6.12.2. Checking FPGA 1 Revision

Status
F1RV
Eg. "7"

The status parameter will report the revision of FPGA 1 on the module.

6.12.3. Checking FPGA 2 Revision

Status
F2RV
Eg. "8"

The status parameter will report the revision of FPGA 2 on the module.

6.12.4. Checking the Input Video Standard

Status
IVSD
Eg. "1I59"

The status parameter will report the input video standard. See section 6.3.1 for supported standards.

6.12.5. Checking the Output Video Standard

Status
OVSD
Eg. "1I59"

The status parameter will report the output video standard. See section 6.3.1 for supported standards.

6.13. CONFIGURING MISCELLANEOUS PARAMETERS

The *Miscellaneous* menu is used to configure miscellaneous parameters to enable VistaLINK® control, display orientation, and to perform a factory reset. The chart below shows the items available in the *Closed Captioning* menu. Sections 6.13.1 to 6.13.3 give detailed information about each of the parameters.

VLNK	VistaLINK® control enable	Enables the ability to control the module through VistaLINK®.
DISO	Display Orientation	Sets the orientation of the card edge dot matrix display.
FRST	Factory Resets	Resets various components of the module to their factory settings.

6.13.1. Enabling VistaLINK® Control of the Module

Miscellaneous	
VLNK	
Enable	*RMTE*
Disable	*LCAL*

This configures the VistaLINK® control of the module.

RMTE enables VistaLINK® control of the module. The user is able to use VistaLINK® to monitor and configure the module in addition to the card edge controls.

LCAL disables VistaLINK® control of the module. The user is only able to monitor and configure the module from the card edge controls.

6.13.2. Setting Card Edge Display Orientation

Miscellaneous	
DISO	
Horizontal	*HORZ*
Vertical	*VERT*

With this control you can select a horizontal or vertical orientation for the displays to accommodate mounting the module in the 3RU or 1RU frames.

6.13.3. Resetting the Module to its Factory Defaults

Miscellaneous	
FRST	
Reset All	*ALL*
Video Control Reset	*VCR*
Audio Control Reset	*ACR*
Video Proc Reset	*VPR*
Audio Proc Reset	*APR*
Mixer A Reset	*MAR*
Mixer B Reset	*MBR*
Dolby Decoder & Met A Reset	*DAR*

With this control you can reset the entire module or certain functional blocks to its factory default condition.

ALL will reset the entire module to the factory settings.

VCR will reset the Video Control only to factory settings. All the other module settings will remain the same.

ACR will reset the Audio Control only to factory settings. All the other module settings will remain the same.

VPR will reset the Video Proc only to factory settings. All the other module settings will remain the same.

APR will reset the Audio Proc only to factory settings. All the other module settings will remain the same.

MAR will reset the Mixer A only to factory settings. All the other module settings will remain the same.

MBR will reset the Mixer B only to factory settings. All the other module settings will remain the same.

DAR will reset the Dolby Decoder A and Metadata A only to factory settings. All the other module settings will remain the same.

6.13.3.1. Resetting the Module to Factory Settings

The resetting of the module and its components to factory settings behave the same way. For the sake of simplicity in the manual only the reset menu for the *Reset All* will be described.

Miscellaneous	
FRST	
ALL	
Yes	*YES*
No	*NO*

With this control you can reset the entire module to the factory settings.

YES will reset the module to the factory settings.

NO will not reset the module to factory settings.

7. JUMPERS

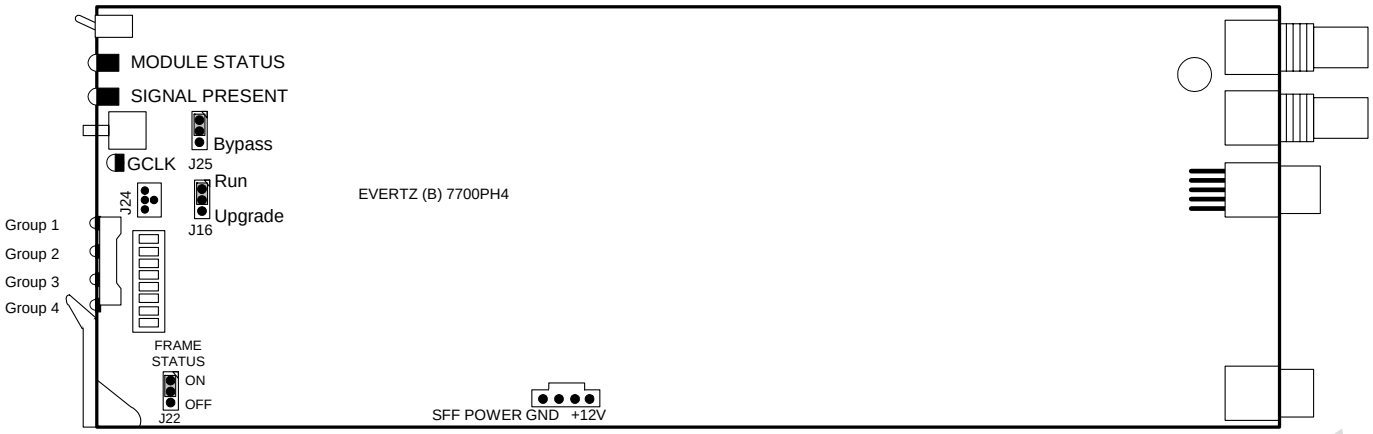


Figure 7-1: Location of Jumpers – Rev B Main Board

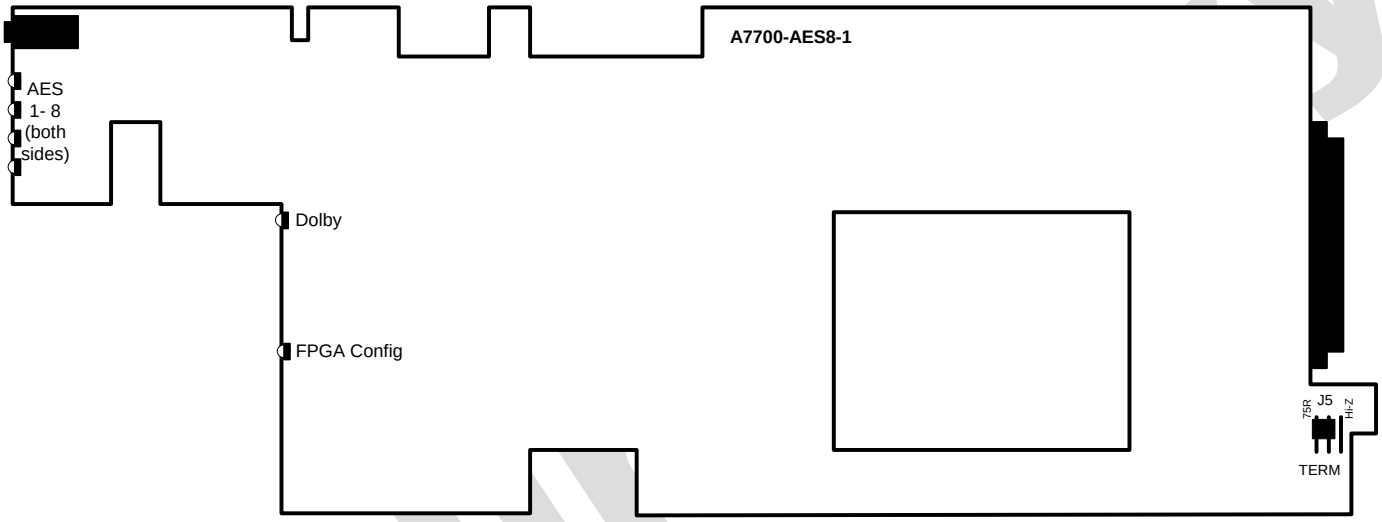


Figure 7-2: Location of Jumpers/LEDs – Rev. 1 Sub Board

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

FRAME STATUS: The FRAME STATUS jumper J22 located at the front of the main 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.

7.2. CONFIGURING THE MODULE FOR FIRMWARE UPGRADES

UPGRADE: The UPGRADE switch is located at J16 jumper location on the front side of the main module 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 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* chapter. Once the upgrade has completed, 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.

The Upgrade baud rate for the 7746FS-EAES8-HD module is 115,200 baud.

7.3. SELECTING WHETHER THE GENLOCK REFERENCE INPUT IS TERMINATED

TERM: The TERM jumper J5 located at the rear of the sub board is used to terminate the genlock loop input. When it is in the 75R position a 75 ohm terminating resistor will connect the input to ground. When it is in the HI-Z position the genlock input will be high impedance.

7.4. SELECTING WHETHER THE INPUT VIDEO IS BYPASS

BYPASS: The BYPASS jumper J25 located at the front of the module is used to terminate the genlock loop input.

8. *VISTA*LINK® REMOTE MONITORING/CONTROL

8.1. WHAT IS *VISTA*LINK®?

*Vista*LINK® is Evertz's remote monitoring and configuration platform which operates over an Ethernet network using Simple Network Management Protocol (SNMP). SNMP is a standard computer network protocol that enables different devices sharing the same network to communicate with each other. *Vista*LINK® provides centralized alarm management, which monitors, reports, and logs all incoming alarm events and dispatches alerts to all the VLPro Clients connected to the server. Card configuration through *Vista*LINK® PRO can be performed on an individual or multi-card basis using simple copy and paste routines, which reduces the time to configure each module separately. Finally, *Vista*LINK® enables the user to configure devices in the network from a central station and receive feedback that the configuration has been carried out.

There are 3 components of SNMP:

1. An SNMP manager, also known as a Network Management System (NMS), is a computer running special software that communicates with the devices in the network. Evertz *Vista*LINK® Pro 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 7746FS-EAES8-HD), 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.

9. MENU QUICK REFERENCE

Video Control (VCTR)
- Video Standard Select
- Vertical Phase
- Horizontal Phase
- Frame Phase
- Freeze Mode

Video Proc Control (VP)
- Black Level Adjust
- Luma Gain Adjust
- Chroma Gain Adjust
- Hue Control

Headphone Monitor (HEAD)
- Headphone Volume
- Headphone Source

Status (STAT)
- Module Firmware
- FPGA1 Version
- FPGA2 Version
- Input Video Standard
- Operating Standard

Audio Control (ACTR)
- Coarse Audio Delay
- Fine Audio Delay
- SRC Mode
- C-Bit Control
- Embedded Group 1 Enable
- Embedded Group 2 Enable
- Embedded Group 3 Enable
- Embedded Group 4 Enable
- Demux Loss of Video Mode
- Audio Breakout Mode

Audio Proc Control (AP)
- Mixer A Source Select
- Mixer A Gain Control
- Mixer A Inversion Control
- Mixer B Source Select
- Mixer B Gain Control
- Mixer B Inversion Control
- Embedder Mixer Selection
- AES Output Selection
- Sample Rate Converter Source

Dolby Decoder Control (DLBY) (–DD version only)
- Dolby Decoder A Control
- Dolby Decoder Loss of Signal

Metadata (META)
- Metadata Decoder A
- DB-9 Configuration
- Metadata Monitor/Processor

Miscellaneous (MISC)
- VistaLINK® Control Enable
- Display Orientation
- Factory Resets

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