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REVISION HISTORY

REVISION	DESCRIPTION	DATE
0.1	Preliminary version	Dec 05
0.2	Added 7721AD8-B-HD rear plate drawing and information	Jan 09

1. OVERVIEW

The 7721AD8-HD Audio De-embedder extracts embedded audio from 4 specified groups as defined by SMPTE 299M from a 1.5 Gb/s serial HD input video signal or as defined by SMPTE 272M from a 270 Mb/s serial SD input video signal. Up to 16 selected channels may be de-embedded and directed to 8 AES outputs.

This module also de-embeds Dolby E™ Metadata from Vertical Ancillary data (VANC) and can be provided as an output for downstream devices (i.e. Dolby Encoders, Multichannel Audio Tool, etc.).

The 7721AD8-HD occupies one card slot 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 7721AD8-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:

- Automatic detection of video standard
- Flexible de-embedded audio router (16x16)
- 24-bit AES (from HD) and 20-bit AES (from SD)
- VANC decode and output of Dolby metadata
- Card edge display for status and miniature bar graphs for audio peak levels
- Card edge LED's for module status, video and audio signal presence, and module fault

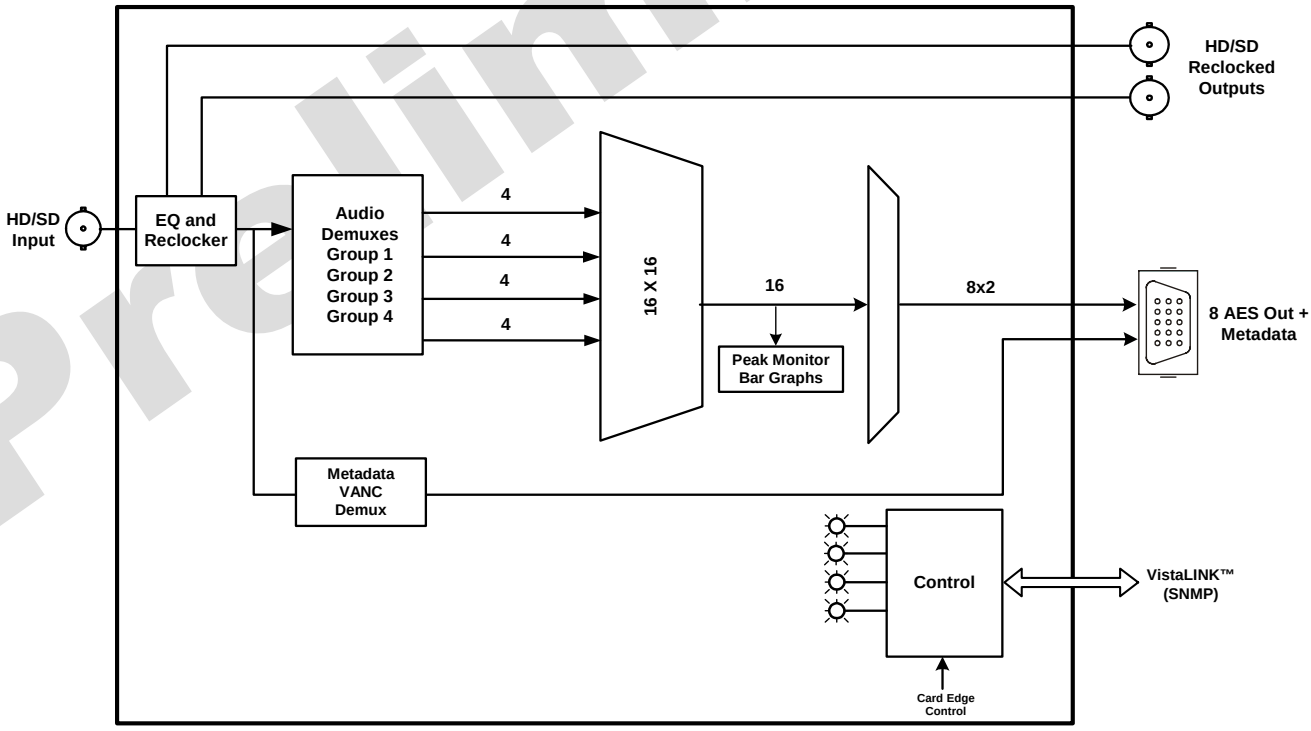

Figure 1-1: 7721AD8-HD Block Diagram

2. INSTALLATION

The 7721AD8-HD comes with a companion rear plate that occupies one slot in the frame. For information on mounting the rear plate and inserting the module into the frame see section 3 of the 7700FR chapter.

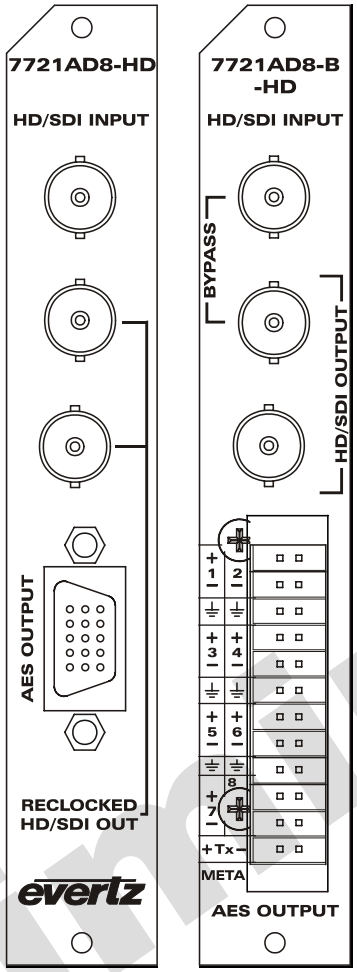

Figure 2-1: Rear Panels

2.1. VIDEO CONNECTIONS

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

RECLOCKED HD/SDI OUT: These BNC connectors are used to output a reclocked copy of the input video.

2.2. AES OUTPUT AUDIO CONNECTIONS

AES OUTPUT: On the 7721AD8-HD, there are eight unbalanced AES outputs conforming to SMPTE 276M which are provided on this DB-15 connector. Any of the eight AES input channels can be used as a backup or voice-over source. Table 2-1 shows the DB-15 connector pin out. On the 7721AD8-B-HD, there is a 2 x 12 pin terminal strip containing the balanced AES output de-embedded from the video. The pin-out of the 2 x 12 removable terminal strip is as shown in Figure 2-1.

Name	Description	DB-15 Pin
	Reserved for Future Use	1
META +	Metadata + output	2
	Reserved for Future Use	3
	Reserved for Future Use	4
	Reserved for Future Use	5
META -	Metadata - output	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 2-1: AES OUTPUT Audio Connector Pin Out

The 7721AD8-HD is shipped with a breakout cable for the DB-15 connector (Evertz Part # WPAES8-BNCM-6F), which can be used to facilitate wiring the AES audio and Metadata connections. The pin out of the cable is shown in Table 2-2.

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

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

2.3. METADATA CONNECTIONS

The 7721AD8-HD provides the ability to handle Metadata. The 7721AD8-HD can transmit Metadata to a Dolby device (such as the DP570). There are two wires (META+ and META-) available on the WPAES8-BNCM-6F which can be used to connect to the Dolby device.

Figure 2-2 shows how to wire the META+ and META- wires to a DP570.

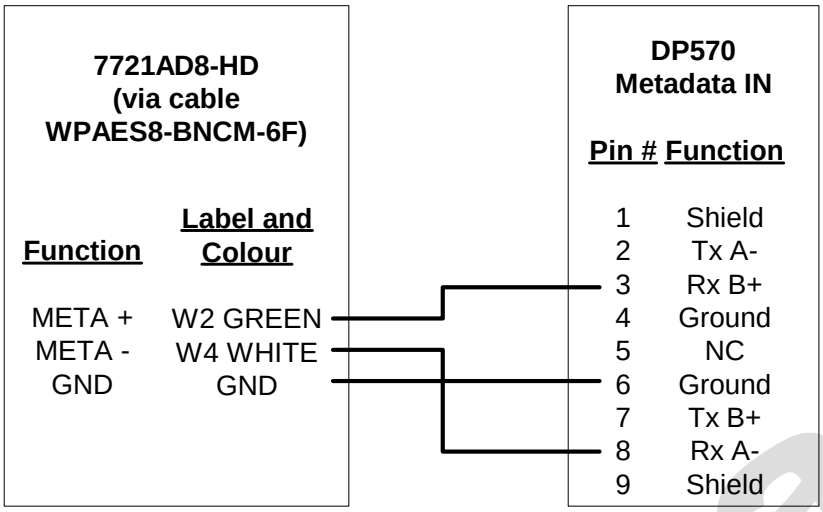

Figure 2-2: Connecting to a Dolby DP570

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/30, 1080p/30(sF), 1080p/29.97, 1080p/29.97(sF), 1080p/25, 1080p/25(sF), 1080p/24, 1080p/24(sF), 1080p/23.98, 1080p/23.98(sF), 720p/60, 720p/59.94, 720p/50, 1035i/60, 1035i/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

3.2. SERIAL DIGITAL VIDEO OUTPUTS

Standard:	Same as input
Number of Outputs:	2 Reclocked
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:	< 0.1UI
HD Standards:	< 0.2UI

3.3. EMBEDDED AUDIO INPUT

Standard:	SMPTE 299M – 24-bit 48 kHz synchronous SMPTE 272M – 20-bit 48 kHz synchronous

3.4. AES AUDIO OUTPUTS

Standard: SMPTE 276M, single ended synchronous AES
Number of Outputs:
Unbalanced AES: 8
Balanced AES: 8
Connectors:
Unbalanced AES: Female High Density DB-15, breakout cable to BNC connectors
Balanced AES: 2 x 12 removable terminal block
Sampling Rate: 48 kHz
Impedance:
Unbalanced AES: 75 Ω
Balanced AES: 110 Ω
Resolution: Up to 24-bit

3.5. METADATA OUTPUT

Type: SMPTE RDD6 DOLBY E Metadata
Connector: Female High Density DB-15
Baud Rate: 115,200 baud
Signal Level: Same as RS-422

3.6. DELAY

De-embedding Latency:
SD Standards: 140 µs nominal
HD Standards: 600 µs nominal

3.7. ELECTRICAL

Voltage: +12VDC
Power: 7 Watts.
EMI/RFI: Complies with FCC regulations for class A devices.
Complies with EU EMC directive.

3.8. PHYSICAL

Number of slots:
7700 frame mounting: 1
7701 frame mounting: 1

4. STATUS INDICATORS

The 7721AD8-HD has 13 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.

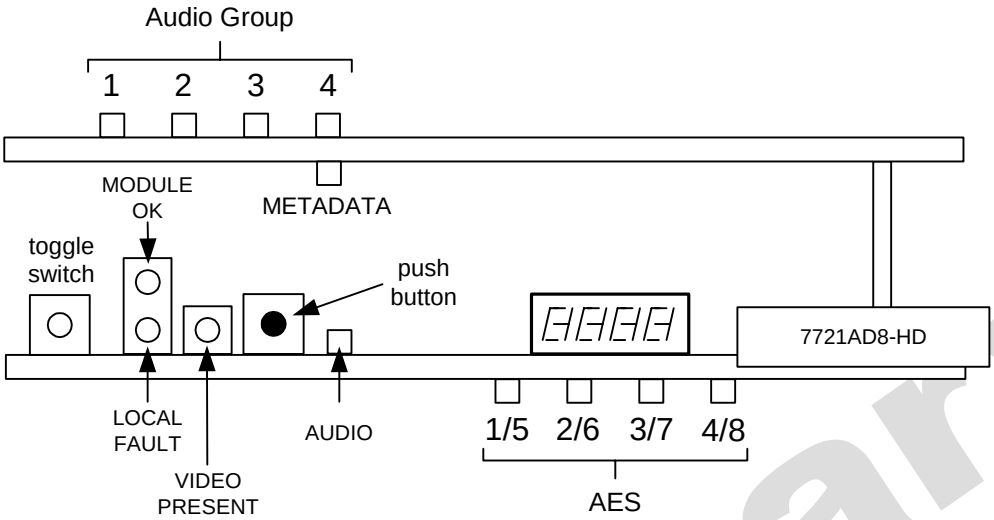

Figure 4-1: Status LED Locations

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 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 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:

AUDIO PRESENT This Green LED will be ON when there are any embedded audio groups present at the module input.

METADATA This LED will be GREEN and ON to indicate that the Metadata is passing through error-free. The LED will be flashing RED and ON if there is an error with Metadata. The module will verify checksum and perform sanity checks on the syntax of the Metadata. Any errors will cause the LED to flash RED.

4.1. AUDIO STATUS LEDS

The four Green LEDs located on the lower end of the main board of the module (near the card extractor) indicate the status of the 8 AES channels. Depending on the setting of the LED parameter (see 6.7.1) in the Utilities menu, the LEDs will represent either AES 1 to 4 or AES 5 to 8.

AES LED	LED Behaviour	AES Channel Status
1 or 5	OFF	AES 1 (or 5) is not present. Either the corresponding embedded group is not present or in HD, the group is present but the channel is marked invalid.
	ON (solid)	AES 1 (or 5) is present and PCM audio is detected
	ON (blinking)	AES 1 (or 5) is present and Dolby audio is detected
2 or 6	OFF	AES 2 (or 6) is not present. Either the corresponding embedded group is not present or in HD, the group is present but the channel is marked invalid.
	ON (solid)	AES 2 (or 6) is present and PCM audio is detected
	ON (blinking)	AES 2 (or 6) is present and Dolby audio is detected
3 or 7	OFF	AES 3 (or 7) is not present. Either the corresponding embedded group is not present or in HD, the group is present but the channel is marked invalid.
	ON (solid)	AES 3 (or 7) is present and PCM audio is detected
	ON (blinking)	AES 3 (or 7) is present and Dolby audio is detected
4 or 8	OFF	AES 4 (or 8) is not present. Either the corresponding embedded group is not present or in HD, the group is present but the channel is marked invalid.
	ON (solid)	AES 4 (or 8) is present and PCM audio is detected
	ON (blinking)	AES 4 (or 8) is present and Dolby audio is detected

Table 4-1: AES Channel Status LEDs

The 4 LEDs located on the sub card of the module indicate which embedded audio groups are present. Embedded audio group 1 is located top leftmost LED.

Audio Group LED	Colour	Embedded Audio Group Status
1	Off	Embedded audio group 1 is not present
	Green	Embedded audio group 1 is present.
	Red	Embedded audio group 1 is present but has errors.
2	Off	Embedded audio group 2 is not present
	Green	Embedded audio group 2 is present.
	Red	Embedded audio group 2 is present but has errors.
3	Off	Embedded audio group 3 is not present
	Green	Embedded audio group 3 is present.
	Red	Embedded audio group 3 is present but has errors.
4	Off	Embedded audio group 4 is not present
	Green	Embedded audio group 4 is present.
	Red	Embedded audio group 4 is present but has errors.

Table 4-2: Embedded Audio Group Presence LEDs

5. CARD EDGE CONTROLS

The 7721AD8-HD 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.

When navigating the card edge menu system and it is indicated that all the Audio LEDs are OFF the user is at the Top Level menu.

The 7721AD8-HD module is 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 push up on the toggle switch and decrease if you push down on the toggle switch. If the parameter contains a list of choices, you can cycle through the list by pressing the toggle switch in either direction. The parameter values are changed as you cycle through the list.

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

On all menus, there is an extra selectable item: *BACK*. Selecting *BACK* will take you to the previous menu (the one that was used to get into the current menu). On the main menu, *BACK* will 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 6.7.

MONI	Monitor Controls	Status displays showing audio signal peak levels
STAT	Status	Status displays showing signal input status items
AMUX	Audio Channel Routing	Control menu to set parameters relating to the audio channel routing
META	Metadata	Control menu to set parameters relating to the Metadata
UTIL	Miscellaneous	Control menu to set miscellaneous parameters

Table 6-1: Top Level Menu Structure

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

6.3. MONITORING THE PEAK AUDIO LEVELS

The *MONI* menu is used to show the peak values for each of the audio channels. When the *MONI* menu is entered the active display name will be shown for about 1 second, and then the value will be shown. To display the display name again press the pushbutton. The chart below shows the items available in the *MONI* menu. Sections 6.3.1 to 6.3.2 give detailed information about each of the menu items.

1234	Displays the bar graphs for peak values of discrete output channels 1, 2, 3, & 4. (i.e. OP1A, OP1B, OP2A, and OP2B)
5678	Displays the bar graphs for peak values of discrete output channels 5, 6, 7, & 8. (i.e. OP3A, OP3B, OP4A, and OP4B)
9ABC	Displays the bar graphs for peak values of discrete output channels 9, 10, 11, & 12. (i.e. OP5A, OP5B, OP6A, and OP6B)
DEFG	Displays the bar graphs for peak values of discrete output channels 13, 14, 15, & 16. (i.e. OP7A, OP7B, OP8A, and OP8B)
1to8	Displays the bar graphs for peak values of output pairs: 1+2, 3+4, 5+6, and 7+8. (i.e. AES1, AES2, AES3, and AES4)
9toG	Displays the bar graphs for peak values of output pairs: 9+10, 11+12, 13+14, & 15+16. (i.e. AES5, AES6, AES7, and AES8)
1toG	Displays the bar graphs for peak values of output groups: 1+2+3+4, 5+6+7+8, 9+10+11+12, and 13+14+15+16.
dB 1	Displays the peak value for output channel 1 (AES1 left sub-frame) in dBFS.
dB 2	Displays the peak value for output channel 2 (AES1 right sub-frame) in dBFS.
dB 3	Displays the peak value for output channel 3 (AES2 left sub-frame) in dBFS.
…	…
dB G	Displays the peak value for output channel 16 (AES8 right sub-frame) in dBFS.

Table 6-2: Monitor Menu

6.3.1. Displaying the Peak Output Audio Values as Bar Graphs

Each of the 4 sections of the dot-matrix display can show a bar graph representation of the peak level for the selected channel or the average of peaks of multiple channels. Each section of the display is comprised of a 5 x 5 array of dots. Diagonal rows of dots represent one of 9 different signal peak levels as shown in Figure 6-1 and Table 6-3.

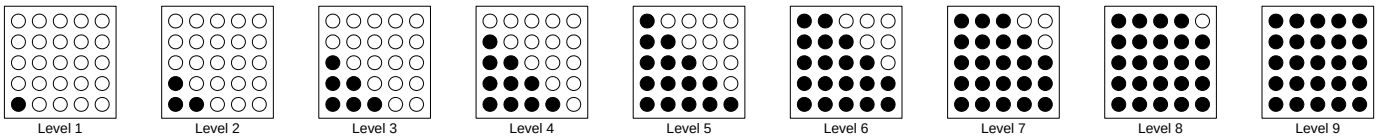

Figure 6-1: Peak Level Bar Graph Displays

Bar Graph Level	dBFS
Level 1	-60
Level 2	-36
Level 3	-30
Level 4	-24
Level 5	-21
Level 6	-18
Level 7	-15
Level 8	-12
Level 9	-6

Table 6-3: Bar Graph Peak Levels

Table 6-3 allows you to correlate the dot-matrix display levels to the peak levels in dBFS units. The ballistics of all bar graphs follow the AES/EBU guidelines and have the attack time constant set to 0 seconds, and the decay time constant set to 1.5 seconds / 20 dB.

Since this module deals with up to 16 different audio channels and the display is limited to showing only 4 miniature bar graphs at a time, 7 different channel groupings are available to select which channels activity is presented: “1234”, “5678”, “9ABC”, “DEFG”, “1to8”, “9toG”, “1toG”.

MONI
1234
See Figure 6-1 *&* Table 6-3

With this display you can simultaneously and graphically show the peak values for discrete channels 1 to 4 (OP1A through OP2B). Channel 1 (OP1A) is shown on the left (top) section and channel 4 (OP2B) is shown on the right (bottom) section.

MONI
5678
See Figure 6-1 *&* Table 6-3

With this display you can simultaneously and graphically show the peak values for discrete channels 5 to 8 (OP3A through OP4B). Channel 5 is shown on the left (top) section and channel 8 is shown on the right (bottom) section.

MONI
9ABC
See Figure 6-1 *&* Table 6-3

With this display you can simultaneously and graphically show the peak values for discrete channels 9 to 12 (OP5A through OP6B). Channel 9 is shown on the left (top) section and channel 12 is shown on the right (bottom) section.

MONI
DEFG
See Figure 6-1 *&* Table 6-3

With this display you can simultaneously and graphically show the peak values for discrete channels 13 to 16 (OP7A through OP8B). Channel 13 is shown on the left (top) section and channel 16 is shown on the right (bottom) section.

MONI
1to8
See Figure 6-1 *&* Table 6-3

With this display you can simultaneously and graphically show the peak values for pairs of channels 1 to 8 (OP1A through OP4B). Channel (1+2) is shown on the left (top) section and channel (7+8) is shown on the right (bottom) section.

The peak values are an average of the pair.

MONI *9toG* *See* Figure 6-1 *&* Table 6-3	With this display you can simultaneously and graphically show the peak values for discrete channels 9 to 16 (OP5A through OP8B). Channel (9+10) is shown on the left (top) section and channel (15+16) is shown on the right (bottom) section. The peak values are an average of the pair.
MONI *1toG* *See* Figure 6-1 *&* Table 6-3	With this display you can simultaneously and graphically show the peak values for discrete channels 1 to 16 (OP1A through OP8B). Channel (1+2+3+4) is shown on the left (top) section and channel (13+14+15+16) is shown on the right (bottom) section. The peak values are an average of the group.

6.3.2. Displaying the Peak Audio Values as Numerical Values

There are 16 display items to show the peak values for each of the 16 audio output channels. For the sake of simplicity in the manual only the display for channel 1 will be shown below.

MONI *dB 1* *e.g.: "1-23"*	With this display you show the peak values for channel 1 in dBFS. In the example on the left "1-23", the leading "1" stands for channel 1, and the "-23" stands for peak value detected of -23 dBFS. The numerical peak values decay around 20 dB per 1.5 second.

6.4. DISPLAYING THE SIGNAL INPUT STATUS

The *STAT* menu is used to show the status of various input signals. When the *STAT* menu is entered the active status display name will be shown for about 1 second, and then the value will be shown. To display the status display name again press the pushbutton. To select other status items, use the toggle switch. The chart below shows the items available in the *STAT* menu. Sections 6.4.1 to 6.4.6 below give detailed information about each menu item.

AES1	Displays the AES 1 (1st pair of audio group 1) Input status
AES2	Displays the AES 2 (2nd pair of audio group 1) Input status
AES3	Displays the AES 3 (1st pair of audio group 2) Input status
AES4	Displays the AES 4 (2nd pair of audio group 2) Input status
AES5	Displays the AES 5 (1st pair of audio group 3) Input status
AES6	Displays the AES 6 (2nd pair of audio group 3) Input status
AES7	Displays the AES 7 (1st pair of audio group 4) Input status
AES8	Displays the AES 8 (2nd pair of audio group 4) Input status
VIFM	Displays the video input format
IGRP	Displays input embedded audio groups status
DX1S	Displays audio group 1 de-embedder status
DX1R	Displays audio group 1 de-embedder sample rate
DX1C	Displays audio group 1 de-embedder valid channels
DX2S	Displays audio group 2 de-embedder status
DX2R	Displays audio group 2 de-embedder sample rate
DX2C	Displays audio group 2 de-embedder valid channels
DX3S	Displays audio group 3 de-embedder status
DX3R	Displays audio group 3 de-embedder sample rate
DX3C	Displays audio group 3 de-embedder valid channels
DX4S	Displays audio group 4 de-embedder status
DX4R	Displays audio group 4 de-embedder sample rate
DX4C	Displays audio group 4 de-embedder valid channels
VAPK	Displays status of Dolby Metadata packets in VANC
VAMT	Displays status of de-embedded Metadata stream

6.4.1. Displaying the Status of the AES Inputs

There are 8 menu items to cover 8 AES channel pairs embedded in video. AES1 in this context refers to the first channel pair in audio group 1. Consequently, AES8 refers to the second channel pair in audio group 4. For the sake of simplicity only the menu item for AES input 1 will be shown.

STAT *AES1* *PCM* *DLBE* *DLBD* *n/a*	With this display you can show the status of the AES1 (1st pair of audio group 1) input. *PCM* is displayed when linear ("normal") audio has been detected *DLBE* is displayed when Dolby E has been detected, *DLBD* is displayed when Dolby Digital (AC3) has been detected, *"n/a"* is displayed when the relevant (here group 1) packets don't exist or the channel pair is marked as invalid in HD audio packets.

6.4.2. Displaying the Video Input Format

STAT *VIFM* *None* *PALB* *NTSC* *3i59* *3i60* *1s23* *1s24* *1i50* *1i59* *1i60* *7p59* *7p60* *7p50* *1p23* *1p24* *1p25* *1p29* *1p30*	With this display you can show the type of the video input. No video present PAL-B NTSC-M 1035i/59.94 1035i/60 1080p/23.98sF 1080p/24sF 1080i/50 1080i/59.94 1080i/60 720p/59.94 720p/60 720p/50 1080p/23.98 1080p/24 1080p/25 1080p/29.97 1080p/30

6.4.3. Displaying Available Embedded Audio Groups in Input Video

STAT *IGRP* *1234*	With this display you can show which embedded audio groups are present on the input video. The corresponding digit is shown for each audio group present. Blinking digit indicates errors in the corresponding audio group packets. A missing group is indicated by a dash ("-") in the corresponding position.

6.4.4. Displaying the Status of the Audio De-embedders

There are identical status displays for the de-embedders for each of the 4 audio groups. For the sake of simplicity only the status displays for the group 1 de-embedder are shown.

6.4.4.1. Displaying General Status of Audio Group 1 De-embedder

STAT	
DX1S	
	PRES
	PKER
	FFLO
	5FER
	DBER
	FFHI

With this display you can show status of audio group 1 de-embedder.

PRES represents audio presence with no errors
PKER represents a packet error (checksum or parity)
FFLO represents the FIFO is empty error
5FER represents a 5 frame fault
DBER represents a DBN discontinuity error
FFHI represents a FIFO full error
---- represents No group 1 packets

6.4.4.2. Displaying the Sample Rate for Audio Group 1

STAT	
DX1R	
	ASYN
	UNKN
	32K
	44K1
	48K

With this display you can show the sample rate of audio group 1.

ASYN represents an asynchronous rate.
UNKN represents an unknown rate.
32K represents a 32 kHz sample rate
44K1 represents a 44.1 kHz sample rate
48K represents a 48 kHz sample rate.
---- represents No group 1 packets.

Sample rates are indicated in HD audio packets. When using a SD input, the sample rate of 48 kHz is assumed, however, the display will show "*UNKN*" since it is not specifically indicated in the audio packets.

6.4.4.3. Displaying the Valid Audio Channels for Audio Group 1

STAT	
DX1C	
	1234

With this display you can show the valid audio channels in audio group 1.

1 corresponds to AES pair 1 channel A is valid PCM
2 corresponds to AES pair 1 channel B is valid PCM
3 corresponds to AES pair 2 channel A is valid PCM
4 corresponds to AES pair 2 channel B is valid PCM
---- represents No group 1 packets.

When a channel pair contains Dolby-E or Dolby Digital, it will display DE or DD respectively.

An absent or invalid channel is marked with a dash ("-"). A channel can be invalid if it is so marked by an upstream HD embedder, or if it's audio group is altogether missing.

6.4.5. Displaying the VANC Metadata Packet Status

STAT
VAPK
PRES
n/a

With this display you can show the status of the VANC Metadata packets.

PRES represents the fact that Metadata packets are present with the selected DID and SDID. (This status item will show the presence of packets anywhere in the VANC data space, not just the selected line.)

"*n/a*" represents no Metadata packets present.

6.4.6. Displaying the Input VANC Metadata Status

STAT
VAMT
OK
n/a

With this display you can show the status of the de-embedded Metadata data.

OK represents that Metadata appears with correct structure and checksums.

The *OK* will blink if errors are found in the Metadata.

"*n/a*" represents no Metadata is present.

6.5. CONFIGURING THE AUDIO CHANNEL ROUTING

The *AMUX* menu is used to control the internal routing of the audio channels shown in Figure 1-1. When the *AMUX* menu is entered the active menu item name will be shown.

The module has four de-embedders (1, 2, 3, and 4) each dedicated to de-embed the respective audio group. Table 6-4 shows the names of de-embedded channels for each de-embedder. These channel names are used throughout the *AMUX* menu items. Sections 6.5.1 to 6.5.2 below give detailed information about each menu item.

Input Channels		De-embedded *input* channel names when UTIL/2CHA control mode is...		Default *destination* channel names when UTIL/2CHA control mode is...	
		...CHAN	...PAIR	...CHAN	...PAIR
De-embedder 1 channels	1A	IP1A	IP1	OP1A	OP1
	1B	IP1B		OP1B	
	2A	IP2A	IP2	OP2A	OP2
	2B	IP2B		OP2B	
De-embedder 2 channels	1A	IP3A	IP3	OP3A	OP3
	1B	IP3B		OP3B	
	2A	IP4A	IP4	OP4A	OP4
	2B	IP4B		OP4B	
De-embedder 3 channels	1A	IP5A	IP5	OP5A	OP5
	1B	IP5B		OP5B	
	2A	IP6A	IP6	OP6A	OP6
	2B	IP6B		OP6B	
De-embedder 4 channels	1A	IP7A	IP7	OP7A	OP7
	1B	IP7B		OP7B	
	2A	IP8A	IP8	OP8A	OP8
	2B	IP8B		OP8B	

Table 6-4: Audio Routing Matrix Input and Output Channel Names

There are identical menu items that control the routing for each discrete (mono) channel (when the *UTIL / 2CHA* menu item is set to *CHAN*) or for each stereo pair (when the *UTIL / 2CHA* menu item is set to *PAIR*). See the block diagram in Figure 1-1 to identify where the signals are being used.

6.5.1. Configuring the Audio Routing – Discrete Channel Control Mode

For the sake of simplicity only the menu item for audio output channel 1A (left sub frame of AES1 OUT) will be shown.

AMUX
OP1A
IP1A
IP1B
IP2A
IP2B
IP3A
IP3B
IP4A
IP4B
IP5A
IP5B
IP6A
IP6B
IP7A
IP7B
IP8A
IP8B

When the *UTIL / 2CHA* menu item is set to *CHAN,* this menu item is used to set the input source for the discrete output channel 1A (left sub frame of AES1 OUT).

Refer to Table 6-4 to clarify the provenance of the listed input choices.

6.5.2. Configuring the Audio Routing – Stereo Pair Control Mode

For the sake of simplicity only the menu item for audio output stereo pair 1 (AES1 OUT) will be shown.

AMUX
OP1
IP1
IP2
IP3
IP4
IP5
IP6
IP7
IP8

When the *UTIL / 2CHA* menu item is set to *PAIR,* this menu item is used to set the input source for the stereo output pair 1 (AES1 output).

Refer to Table 6-4 to clarify the provenance of the listed input choices.

6.6. CONFIGURING THE DOLBY METADATA DE-EMBEDDER

The *META* menu is used to configure parameters related to the Dolby Metadata. When the *META* menu is entered the active menu item name will be shown. To select other menu items, use the toggle switch. The chart below shows the items available in the *META* menu. Sections 6.6.1 to 6.6.3 below give detailed information about each menu item.

VADL	Selects the input VANC line for de-embedding
VADI	Selects the input VANC Data ID (DID)
VADS	Selects the input VANC Secondary Data ID (SDID)

6.6.1. Selecting VANC Line for De-embedding

META
VADL
DL10
DL1 to DL31

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

6.6.2. Selecting the Input VANC Data ID (DID)

META
VADI
DI45
DI50 to DI5F
DIC0 to DICF

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.

6.6.3. Selecting the Input VANC Secondary Data ID (SID)

META
VADS
DS01
DS01 to DSFF

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 2 digit 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.

6.7. CONFIGURING MISCELLANEOUS PARAMETERS

The *UTIL* menu is used to configure miscellaneous parameters and to view and upgrade the card firmware. When the *UTIL* menu is entered the active menu item name will be shown. To select other menu items, use the toggle switch. The chart below shows the items available in the *UTIL* menu. Sections 6.7.1 to 6.7.5 below give detailed information about the menu items.

2CHA	Selects whether audio routing, delay and voice over controls apply to individual channels or stereo pairs.
DISP	Selects the orientation of the dot-matrix display
FRST	Resets the card to its factory default condition.
VERS	Displays the firmware version of the card
UPGR	Initiates firmware upgrade for the card

6.7.1. Configuring the Audio Channel Control Mode

- *UTIL*
  - *2CHAN*
    - *CHAN*
    - *PAIR*

With this control you can control whether the audio mux, delay and voice over controls operate on individual channels or on stereo pairs.

Select *CHAN* to process the audio as individual channels. (e.g.: OP1A, OP1B, IP5A, etc.).

Select *PAIR* to control the audio processing (like routing) as stereo pairs. (Pair OP1 consisting of channels OP1A and OP1B.)

6.7.2. Configuring the Dot-Matrix Display Orientation

- *UTIL*
  - *DISP*
    - *VERT*
    - *HOR*

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.

6.7.3. Displaying the Firmware Version

- *UTIL*
  - *VERS*
    - *v1.0*
    - *b21*
    - *f037*
    - *hw 1*

With this control you can display the firmware version and build number of the module.

The first set of characters (prefixed with 'v') represents the firmware version number.

The second set of characters (prefixed with 'b') represents the firmware build number.

The third set of characters (prefixed with 'f') represents the FPGA revision.

The last set of characters (prefixed with 'hw') represents the hardware build identification number.

6.7.4. Resetting the Module to its Factory Defaults

- *UTIL*
  - *FRST*
    - *NO*
    - *YES*

With this control you can reset the module to its factory default condition.

Select *NO* to return back to the upper menu item without affecting the presets.

Select *YES* to return the module to its factory default condition. Factory defaults are shown underlined in the menu descriptions in section 6.

6.7.5. Upgrading the Module Firmware

UTIL
UPGR
NO
YES

With this control you can initiate and upgrade of the module firmware.

Select *NO* to return back to the upper menu item without upgrading.

To upgrade the firmware, install the Upgrade cable provided (located in the vinyl pouch in the front of this manual) onto the COM header J16 at the front edge of the card. Select *YES* to initiate the firmware upgrade. The module application will terminate and the boot monitor will start.

Run the upgrade as described in part 2 and part 3 of the *Upgrading Firmware* chapter in the front of the binder. Once the upgrade is completed, the card will reboot. Remove the upgrade cable. The module is now ready for normal operation.

See section 7.2 for information on upgrading the firmware when the application firmware is not running.

The Upgrade baud rate for the 7721AD8-HD series modules is 115,200 baud.

7. JUMPERS

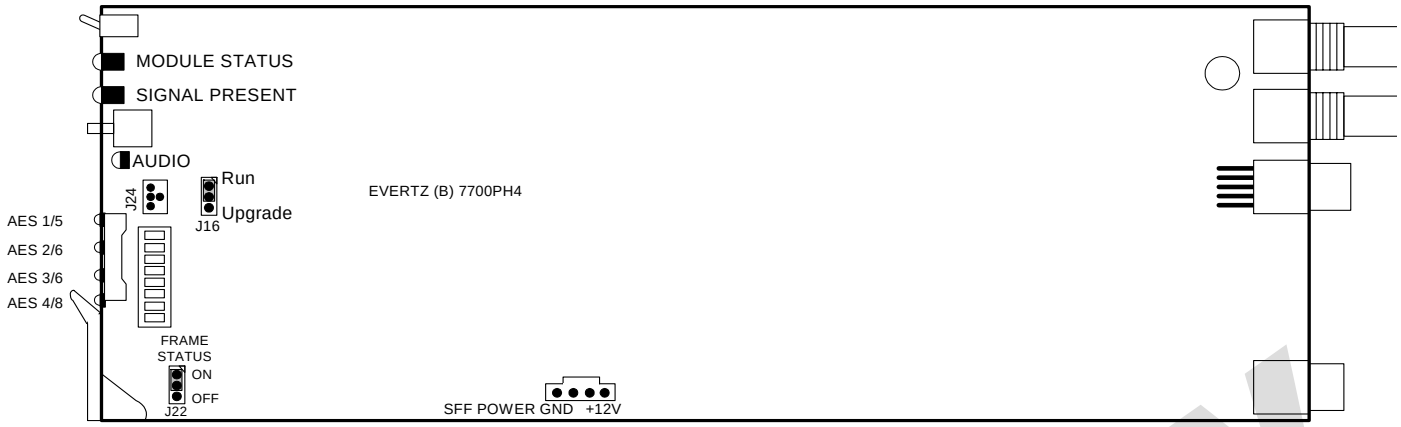

Figure 7-1: Location of Jumpers – Rev B Main Board

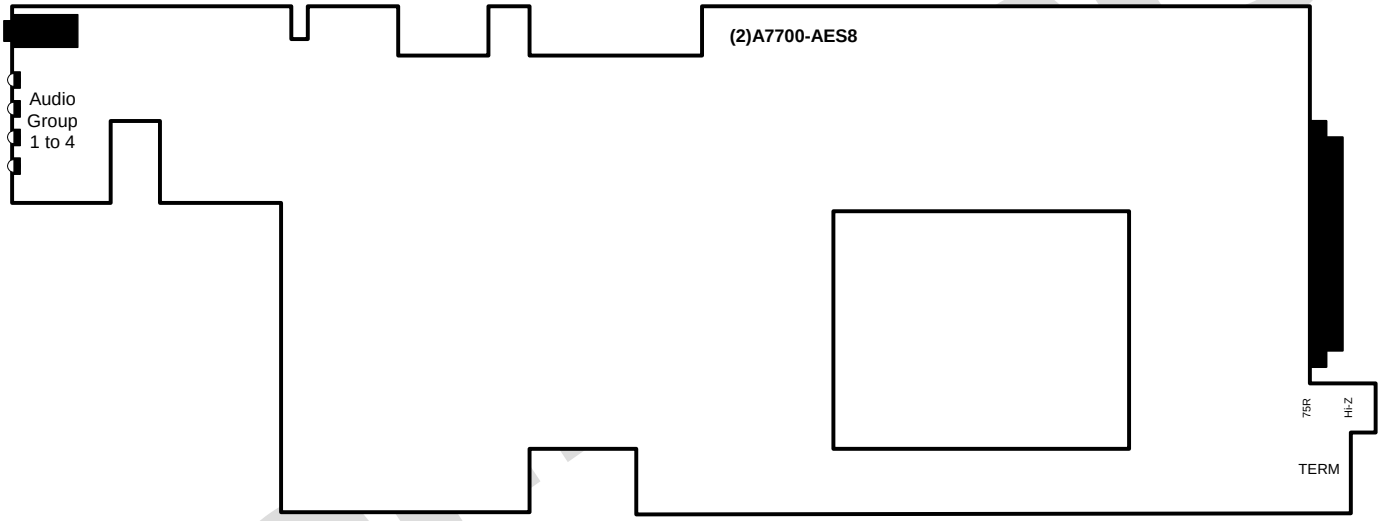

Figure 7-2: Location of LEDs – Rev. 2 Sub Board

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 is 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 7721AD8-HD module is 115,200 baud.

8. VISTALINK® REMOTE MONITORING/CONTROL

8.1. WHAT IS VISTALINK®?

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

There are 3 components of SNMP:

1. An SNMP manager also known as a Network Management System (NMS) is a computer running special software that communicates with the devices in the network. Evertz VistaLINK® Pro Manager graphical user interface (GUI), third party or custom manager software may be used to monitor and control Evertz VistaLINK® enabled fiber optic products.

2. Managed devices (such as 7721AD8-HD), 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.

9. MENU QUICK REFERENCE

Monitor (MONI)

- Discrete Output Channels 1, 2, 3, and 4
- Discrete Output Channels 5, 6, 7 and 8
- Discrete Output Channels 9, 10, 11 and 12
- Discrete Output Channels 13, 14, 15 and 16
- Output Pairs AES1, AES2, AES3 and AES4
- Output Pairs AES5, AES6, AES7 and AES8
- Output Groups AES1+2, AES3+4, AES5+6 and AES7+8
- Peak Value for Output Channel 1
- Peak Value for Output Channel 2
- Peak Value for Output Channel 3
- Peak Value for Output Channel 4
- Peak Value for Output Channel 5
- Peak Value for Output Channel 6
- Peak Value for Output Channel 7
- Peak Value for Output Channel 8
- Peak Value for Output Channel 9
- Peak Value for Output Channel 10
- Peak Value for Output Channel 11
- Peak Value for Output Channel 12
- Peak Value for Output Channel 13
- Peak Value for Output Channel 14
- Peak Value for Output Channel 15
- Peak Value for Output Channel 16

Status (STAT)

- AES1 Input Status
- AES2 Input Status
- AES3 Input Status
- AES4 Input Status
- AES5 Input Status
- AES6 Input Status
- AES7 Input Status
- AES8 Input Status
- Video Input Format
- Input Embedded Audio Group Status
- Audio Group 1 De-embedder Status
- Audio Group 1 De-embedder Sample Rate
- Audio Group 1 De-embedder Valid Channels
- Audio Group 2 De-embedder Status
- Audio Group 2 De-embedder Sample Rate
- Audio Group 2 De-embedder Valid Channels
  Audio Group 3 De-embedder Status
- Audio Group 3 De-embedder Sample Rate
- Audio Group 3 De-embedder Valid Channels
- Audio Group 4 De-embedder Status
- Audio Group 4 De-embedder Sample Rate
- Audio Group 4 De-embedder Valid Channels
  Dolby Metadata Packet Status
- De-embedded Metadata Stream Status

Audio Channel Routing (AMUX)

- Output Channel 1 A
- Output Channel 1 B
- Output Channel 2 A
- Output Channel 2 B
- Output Channel 3 A
- Output Channel 3 B
- Output Channel 4 A
- Output Channel 4 B
- Output Channel 5 A
- Output Channel 5 B
- Output Channel 6 A
- Output Channel 6 B
- Output Channel 7 A
- Output Channel 7 B
- Output Channel 8 A
- Output Channel 8 B

Metadata (META)

- Input VANC Line
- Input VANC DID
- Input VANC Secondary Data ID

Utilities (UTIL)

- Individual Channels or Pairs
- Display Orientation
- Firmware Version
- Factory Reset
- Upgrade